GW - 107

GENERAL CORRESPONDENCE

YEAR(S):

1994 - 1989

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

August 26, 1994

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-111-334-168

Mr. Thomas D. Hutchins
Environmental Compliance Engineering
El Paso Natural Gas Company
P.O. Box 1492
El Paso, TX 79978

RE: PHASE IV GROUND WATER CONTAMINATION STUDY
EPNG JAL NO. 4 GAS PLANT
LEA COUNTY, NEW MEXICO

Dear Mr. Hutchins:

The New Mexico Oil Conservation Division (OCD) is in the process of reviewing El Paso Natural Gas Company's (EPNG) June 20, 1994 "JAL NO. 4 PLANT, PHASE IV GROUNDWATER STUDY, EL PASO NATURAL GAS COMPANY". This document contains the results of EPNG's recent offsite investigations of the extent of ground water contamination related to the operation of the Jal No. 4 Gas Plant.

The OCD has the following comments, questions and requests regarding the above referenced document:

1. EPNG's initial March 30, 1993 investigation work plan set the depth interval for completion of monitor wells ACW-8, ACW-9, ACW-10 and ACW-11 at 150-170 feet (ie. at the contact of the top of the red bed). However, according to the well logs and monitor well completion diagrams, these wells were completed at 140-160 feet. This is approximately 10 feet above the top of the red bed contact. Please provide the reasoning for the change in the depth of the monitor well completion interval.

2. The document recommends initiating recovery of contaminated ground water from the vicinity of ACW-4 as soon as possible. Please provide the OCD with a work plan for implementing this recommendation.

3. The document recommends installation of additional monitor wells to define the downgradient extent of the plume. Please provide the OCD with a work plan for determining the full extent of contamination related to EPNG's activities.

4. Please provide the OCD with a plan for regularly monitoring ground water quality and potential contaminant migration both onsite and downgradient of the facility.

5. Please submit all original documents to the OCD Santa Fe Office with copies provided to the OCD Hobbs Office.

Submission of the above items will allow the OCD to complete a review of EPNG's Phase IV Report.

If you have any questions, please call me at (505) 827-5885.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Jerry Sexton, OCD Hobbs District Supervisor
Wayne Price, OCD Hobbs Office - Files

P 111 334 168

Receipt for Certified Mail
No Insurance Coverage Provided
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TOTAL Postage & Fees	$
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PS Form 3800, June 1991

Fold at line over top of envelope to the right of the return address

El Paso
Natural Gas Company

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-541-2600

Thomas D. Hutchins

June 20, 1994

Mr. Roger C. Anderson
New Mexico Oil Conservation Division
P.O. Box 2088
Land Office Building
Santa Fe, New Mexico 87504-2088

Re: Jal No. 4 Plant, Phase IV Groundwater Study, El Paso Natural Gas Company

It is my pleasure to provide two (2) copies of the referenced report for your review and comment. The report was requested by NMOCD and is provided to advise you of the status of the Jal No. 4 Groundwater Study.

El Paso Natural Gas Company (EPNG) would like to meet with you and your staff to discuss the report recommendations in early July. I will contact you to set up the meeting.

EPNG appreciates your patience and we look forward to working with you to a successful completion of this project. If you have questions or need additional documentation please call me at 915/541-3242.

Sincerely,

Thomas D. Hutchins

Thomas D. Hutchins, Manager
Environmental Compliance Engineering

Attachments: As Stated

EPNG/OCD Jal #4 Meeting · 3/30/93 10:30 am

participants

Bill Olson	OCD
Phil Baca	EPNG
Lori Taylor	"
G. Garibay	"

see handout agenda

map shows new mws locations
sample for BTEX, cations-anions

check on Christie injection well for remediation

EPNG will submit full report on all Invest. work after installation & sampling of new mw's. ~~Report will include remediation proposal~~

3/30/93

OCD MEETING

JAL #4

NAME	COMPANY	PHONE
G. GARIBAY	EPNG	915/541-5764
Lori A. Saylor	EPNG	915/686-3226
PHILIP BACA	EPNG	915/541-2323
Bill Olson	OCD	(505) 827-5885
Roger Anderson	"	(505) 827-5812

3/30/93
EPNG/OCD meeting

AGENDA

JAL NO. 4

EL PASO NATURAL GAS COMPANY
and
NEW MEXICO OIL CONSERVATION DIVISION

March 30, 1993

I. PHASE III ACTIVITIES

- A. Installation of monitoring wells in Phase III
- B. Presence of a vertical gradient

II. PHASE IV INSTALLATION OF ADDITIONAL WELLS

- A. Surface locations
- B. Screened interval
- C. Sampling Protocol

III. STATUS REPORT

IV. OTHER BUSINESS

Table 3

SUMMARY OF INORGANIC ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES COLLECTED JULY 1992

PHASE III GROUNDWATER STUDY
JAL NO. 4 PLANT

Parameter	Sample Description (Name and Depth of Screened Interval)							
	Upgradient	On-Site Downgradient			Off-Site Downgradient			
	EPNG-1* (120'-160')	ACW-2A (98'-118')	ENSR-2 (121'-146')	ACW-4 (154'-169')	ACW-6 (110'-120')	ACW-7 (105'-115')	ACW-5 (105'-115')	WQCC Standard
Conductance (µmhos/cm)	986.0	43,500	106,500	80,762	871.5	7,069.40	1,304.50	No Standard
Chloride (mg/L)	72.0	15,275	30,676	38,350	172	2,232	418	250
pH	7.7	8.07	8.53	7.07	8.67	7.12	7.08	Between 6 and 9
Potassium (mg/L)	5.5	35.9	159	165	3.59	6.12	10.3	No Standard
Sodium (mg/L)	85.7	5,080	12,400	26,700	173	1,200	324	No Standard
Sulfate (mg/L)	90.0	16.4	1,502	1,963	144	<2.0	457	600
Total Dissolved Solids (TDS) (mg/L)	NA	24,900	62,300	69,100	600	4,840	1,880	1,000

Note: Results from Sample EPNG-1 were obtained from K.W. Brown & Associates' report titled "Expanded Hydrogeology Study for the El Paso Natural Gas Company Jal #4 Facility" dated August 1990.

mg/L Milligrams per liter.

NA Not available.

µmhos/cm Micromhos per centimeter.

WQCC Water Quality Control Commission.

' Feet.

DRAWN BY		
CHECKED BY		
DOCUMENT MANAGER		
PROJECT MANAGER		
DEM	11/17/92	

A REV. DATE 11/13/92

EPNG JAL NO. 4 PLANT

EPNG–1 (120'–160')

* 986

ENSR–2 (121'–146')

ACW–2A (98'–118')

ACW–4 (154'–169')

ACW–3

ACW–6 (110'–120')

ACW–7 (105'–115')

ACW–5 (105'–115')

ACW–8 (150'–170')

ACW–9 (150'–170')

ACW–10 (150'–170')

ACW–11 (150'–170')

HWY 18

HWY 18

10,000 20,000 30,000 40,000 50,000 60,000 5,000

43,500 106,500 872 80,762 7,069 1,304

0 300 600

SCALE IN FEET

N

EXPLANATION

——— – – ———	JAL NO. 4 PLANT SITE BOUNDARY
ACW–2A	APPROXIMATE EXISTING MONITORING WELL LOCATION AND NUMBER (INSTALLED PRIOR TO JULY 1992)
ACW–3	APPROXIMATE NEW MONITORING WELL LOCATION AND NUMBER (INSTALLED JULY 1992)
(100'–120')	SCREENED INTERVAL DEPTH IN FEET BELOW LAND SURFACE
80,761	MEASURED CONDUCTANCE IN GROUNDWATER – UMHOS/CM (SAMPLES COLLECTED JULY 1992)
10,000	MODEL–PREDICTED CONDUCTANCE – UMHOS/CM (K.W. BROWN 1990)
	INTERPRETED PLUME OUTLINE FROM ELECTROMAGNETIC SURVEY (BURLINGTON 1992)

* Note: Background measurement obtained from sample collected by K.W. Brown, June 1990.

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

June 29, 1993

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO.P-111-334-220

Mr. Michael J. McConnell
Sid Richardson Gasoline, Ltd.
First City Bank Tower
201 Main St., Suite 3000
Ft. Worth, Texas 76102

RE: Discharge Plan GW-10 Jal #3 Plant
Discharge Plan GW-107 Jal #4 Compressor Station
Lea County, New Mexico

Dear Mr. McConnell:

Pursuant your letter dated June 10, 1993, this letter aknowledges and approves your request to change the operator name for both the discharge plans associated with the above mentioned facilities. A copy of this letter and your request will be placed in our discharge plan files. The operator name will now be "Sid Richardson Gasoline, Ltd." per your request.

The Oil Conservation Division will continue to address all correspondence to you on all environmental matters until you tell us otherwise.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

RCA.cee
xc: OCD Hobbs Office

SID RICHARDSON CARBON & GASOLINE CO.
FIRST CITY BANK TOWER
201 MAIN STREET
FORT WORTH, TEXAS 76102

MICHAEL J. McCONNELL
COMPLIANCE COORDINATOR
ENVIRONMENTAL HEALTH & SAFETY

817/390-8600

June 10, 1993
MJM-73-93

File: NM-6

CERTIFIED MAIL - RETURN RECEIPT
P 078 226 219

Mr. Roger Anderson
New Mexico Energy, Minerals &
Natural Resources Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Subject: Jal No. 3 and Jal No. 4 Water Discharge Plans
Injection Well Permit - Administrative Order SWD-231

Dear Mr. Anderson:

Sid Richardson Gasoline, Ltd. is requesting an administrative modification to the subject water discharge plans which are in effect at our Jal No. 3 and Jal No. 4 gas processing plants. This modification will change the company name from that which is currently on file.

A recent organizational restructuring of the Company segregated our carbon black operations from our natural gas processing operations. In order to accurately reflect this change, we are updating all legal documents which include operating permits and related regulatory documents. No other changes to plant operations, facilities or processes are involved. Ownership is not changing. Only the company name is being revised. The Sid Richardson Jal No. 3 and Jal No. 4 gas plants will continue to adhere to all subject discharge plan requirements as they currently exist.

Please revise the company name on each discharge plan as follows:

Sid Richardson Gasoline, Ltd.
d/b/a Sid Richardson Gasoline Co.

It would be greatly appreciated if you could send an acknowledgment and an approval letter to this request at your earliest convenience. Also, are we correct in our assessment that the subject Administrative Order, by virtue of its inclusion in the Jal No. 3 Discharge Plan as Appendix F, does not require a separate request for a company name revision? Please advise. If you require any additional information or have any questions, please do not hesitate to call.

Sincerely,

Michael J. McConnell
Compliance Coordinator
Environmental Health & Safety
(817) 338-8386

MJM:gad

cc: C. P. O'Farrell/E. F. Gunn
W. J. Farley
K. C. Clark/R. L. Gawlik
G. W. Washburn

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following discharge plan renewal applications have been submitted to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, New Mexico 87504-2088, Telephone (505) 827-5800:

(GW-108) - Williams Field Services, Robert Peacock, Project Manager, P.O. Box 58900, M.S. 10368, Salt Lake City, Utah, 84158-0900, has submitted a discharge plan application for their San Juan 30-5 No. 1 C.D.P., located in the NW/4 SW/4 and NE/4 SW/4, Section 18, Township 30 North, Range 5 West, NMPM, Rio Arriba County, New Mexico. Approximately 5 gallons per day of wastewater will be contained in above ground tanks prior to disposal in an OCD approved disposal facility. Groundwater most likely to be affected by an accidental discharge is at a depth of approximately 160 feet with a total dissolved solids concentration of approximately 2000 mg/l. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

(GW-103) - Yates Petroleum Corporation, Chuck Morgan, 105 South Fourth Street, Artesia, New Mexico, 88210, has submitted a discharge plan application for their Livingston Ridge Compressor Station located in the SW/4 SW/4, Section 7, Township 22 South, Range 32 East, NMPM, Lea County, New Mexico. Approximately 100 gallons per day of waste water is contained in above ground tanks prior to disposal in an OCD approved Class II disposal well. There is no known protectable groundwater below the site. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

(GW-107) - Sid Richardson Carbon & Gasoline Company, Wayne J. Farley, Manager, Gas Operations, 201 Main Street, Fort Worth, Texas 76102, has submitted a discharge plan renewal application for their Jal #4 Compressor Facility located in the SE/4, Section 31, Township 23 South, Range 37 East, NMPM, Lea County, New Mexico. This facility is the compressor portion of the former El Paso Natural Gas Company Jal #4 Gas Processing Plant (GW-7). Approximately 3500 gallons per day of wastewater is collected in above ground tanks prior to disposal in an OCD approved Class II disposal well. Groundwater most likely to be affected by an accidental discharge is at a depth of approximately 105 feet with a total dissolved solids concentration of approximately

7500 mg/l. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 aa.m. and 5:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 9th day of March, 1992.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

S E A L

WILLIAM J. LEMAY, Director

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Suite D, 3530 Pan American Highway, NE
Albuquerque, New Mexico 87107

March 19, 1992

Mr. Roger Anderson
Acting Bureau Chief
Environmental Bureau
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Dear Mr. Anderson:

This responds to the Notice of Publication dated March 12, 1992, regarding the Oil Conservation Division discharge permit applications GW-108, GW-103, and GW-107 on fish, shellfish, and wildlife resources in New Mexico.

The U.S. Fish and Wildlife Service (Service) has determined there are no wetlands or other environmentally sensitive habitats, plants, or animals that will be adversely affected by the following discharges.

GW-108 - Williams Field Services San Juan 30-5 No. 1 C.D.P., NW 1/4, SW 1/4, and NE 1/4, SW 1/4 of Section 18, T30N, R5W, Rio Arriba County, New Mexico.

GW-103 - Yates Petroleum Corporation Livingston Ridge Compressor Station, SW 1/4, SW 1/4 of Section 7, T22S, R32E, Lea County, New Mexico.

GW-107 - Sid Richardson Carbon and Gasoline Company Jal #4 Compressor Facility, SE 1/4 of Section 31, T23S, R37E, Lea County, New Mexico.

If you have any questions concerning our comments, please contact Laurie S. Shomo at (505) 883-7877.

Sincerely,

for Jennifer Fowler-Propst
Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife Enhancement, Albuquerque, New Mexico.

3/18/92 Christie Gas Jct #4

Arrived at 1500 with RCA
CE - Hobbs

Met with Joe Shepard
for O.P. inspection

Inspection Items

1.) Drum storage on pad, curb
2.) Sump leak detection or
enclosure integrity
3.) Underground line inspection >

3/18/92 @ Sid Richardson Jct #4

Arrived at 1600 with RCA
CE - Hobbs

Met with Curtis Clark
for O.P. Inspection

Inspection Items

1.) Drum storage
2.) Berming at tanks
3.) Sump leak detection
Sump on north end of
Compressor bldg has oil/produced
needs to be remediated
4.) Sump NE of boiler plant
on fence north Christie
has oil stained, needs remediation
5.) Oil leaks around engine on oil tanks
on west plant tanks does
needs remediation

Affidavit of Publication

STATE OF NEW MEXICO)

) ss.

COUNTY OF LEA)

Joyce Clemens being first duly sworn on oath deposes and says that he is Adv. Director of THE LOVINGTON DAILY LEADER, a daily newspaper of general paid circulation published in the English language at Lovington, Lea County, New Mexico; that said newspaper has been so published in such county continuously and uninterruptedly for a period in excess of Twenty-six (26) consecutive weeks next prior to the first publication of the notice hereto attached as hereinafter shown; and that said newspaper is in all things duly qualified to publish legal notices within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico.

That the notice which is hereto attached, entitled

Notice Of Publication

and numbered ..... in the

..... Court of Lea County, New Mexico, was published in a regular and entire issue of THE LOVINGTON DAILY LEADER and not in any supplement thereof, ~~once each week on the same day of the week~~, for one (1) day ~~consecutive weeks~~, beginning with the issue of

March 18, 19 92

and ending with the issue of

March 18, 19 92

And that the cost of publishing said notice is the sum of $ 39.42

which sum has been (Paid) (~~Assessed~~) as Court Costs

Joyce Clemens

Subscribed and sworn to before me this 18th day of March, 19 92

Mrs. Jean Hennen

Notary Public, Lea County, New Mexico

My Commission Expires Sept. 28, 19 94

LEGAL NOTICE
NOTICE OF PUBLICATION
STATE OF NEW MEXICO
ENERGY, MINERALS AND
NATURAL RESOURCES
DEPARTMENT
OIL CONSERVATION
DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following discharge plan renewal applications have been submitted to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, New Mexico 87504-2088, Telephone (505) 827-5800:

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(GW-103) - Yates Petroleum Corporation, Chuck Morgan, 105 South Fourth Street, Artesia, New Mexico, 88210, has submitted a discharge plan application for their Livingston Ridge Compressor Station located in the SW/4 SW/4, Section 7, Township 22 South, Range 32 East, NMPM, Lea County, New Mexico. Approximately 100 gallons per day of waste water is contained in above ground tanks prior to disposal in an OCD approved Class II disposal well. There is no known protectable groundwater below the site. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

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Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 a.m. and 5:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 9th day of March, 1992.

STATE OF NEW MEXICO
OIL CONSERVATION
DIVISION
WILLIAM J. LEMAY,
DIRECTOR

SEAL

Published in the Lovington Daily Leader March 18, 1992.

NOTICE OF PUBLICATION
STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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GIVEN under the seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 9th day of March, 1992.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION
WILLIAM J. LEMAY,
Director

(SEAL)
(Published March 19, 1992)

Affidavit of Publication

NEW MEXICO
Rio Arriba } ss.

rt Trapp, being first duly sworn, declare and say that I am the Publ- Rio Grande Sun, a weekly newspaper, published in the English lan- having a general circulation in the City of Espanola and County of State of New Mexico, and being a newspaper duly qualified to pub- tices and advertisements under the provisions of Chapter 167 of the s of 1937; that the publication, a copy of which is hereto attached,

ed in said paper once each week for 1 consecutive weeks, and day of each week in the regular issue of the paper during the time n, and that the notice was published in the newspaper proper, and

pplement, the first publication being on the 19th day of March 19 92 and the last publication on the 19th day March 19 92; that payment for said advertisement has ade), or (assessed as court costs); that the undersigned has person- of the matters and things set forth in this affidavit.

Robert Trapp
Publisher

Subscribed and sworn to before me this 19th day of March, A.D., 1992

Ruth Lopez
Notary Public

My Commission expires
5-17-93

Display Advertising — SS - Stand Spies

Supplies

balance after 30 days

t per mont

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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(GW-108) - Williams Field Services, Robert Peacock, Project Manager, P.O. Box 58900, M.S. 10368, Salt Lake City, Utah, 84158-0900, has submitted a discharge plan application for their San Juan 30-5 No. 1 C.D.P., located in the NW/4 SW/4 and NE/4 SW/4, Section 18, Township 30 North, Range 5 West, NMPM, Rio Arriba County, New Mexico. Approximately 5 gallons per day of wastewater will be contained in above ground tanks prior to disposal in an OCD approved disposal facility. Groundwater most likely to be affected by an accidental discharge is at a depth of approximately 160 feet with a total dissolved solids concentration of approximately 2000 mg/l. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

(GW-103) - Yates Petroleum Corporation, Chuck Morgan, 105 South Fourth Street, Artesia, New Mexico, 88210, has submitted a discharge plan application for their Livingston Ridge Compressor Station located in the SW/4 SW/4, Section 7, Township 22 South, Range 32 East, NMPM, Lea County, New Mexico. Approximately 100 gallons per day of waste water is contained in above ground tanks prior to disposal in an OCD approved Class II disposal well. There is no known protectable groundwater below the site. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

(GW-107) - Sid Richardson Carbon & Gasoline Company, Wayne J. Farley, Manager, Gas Operations, 201 Main Street, Fort Worth, Texas 76102, has submitted a discharge plan renewal application for their Jal #4 Compressor Facility located in the SE/4, Section 31, Township 23 South, Range 37 East, NMPM, Lea County, New Mexico. This facility is the compressor portion of the former El Paso Natural Gas Company Jal #4 Gas Processing Plant (GW-7). Approximately 3500 gallons per day of wastewater is collected in above ground tanks prior to disposal in an OCD approved Class II disposal well. Groundwater most likely to be affected by an accidental discharge is at a depth of approximately 105 feet with a total dissolved solids concentration of approximately

7500 mg/l. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 aa.m. and 5:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 9th day of March, 1992.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

S E A L

WILLIAM J. LEMAY, Director

SID RICHARDSON CARBON & GASOLINE CO.
FIRST CITY BANK TOWER
201 MAIN STREET
FORT WORTH, TEXAS 76102
817/390-8600

February 18, 1992

File: Co-05-92

NMED-Water Quality Management
P. O. Box 2088
Santa Fe, NM 87504-2088

Attn: Roger Anderson

Re: Jal No. 4 Discharge Plan

Dear Mr. Anderson:

In accordance with our telephone conversation on February 14, 1992, I am forwarding for your review and approval three copies of the Discharge Plan for our Jal No. 4 compressor facility located near Jal, New Mexico. Also enclosed is a check for the amount of $50.00 for the filing fee.

If you have any questions, please do not hesitate to call me at (817) 390-8684. Thank you for your help.

Very truly yours,

Larry B. Copeland
Project Engineer

LBC:cg

Enclosures

CC: WJF (w/o att.)
EFG (w/o att.)
KRC/CEA/LBC/File (w/o att)

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

August 5, 1991

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-756-666-890

Mr. William C. Jones, Project Engineer
Sid Richardson Carbon & Gasoline Company
201 Main Street, Suite 3000
Fort Worth, Texas 76102

RE: Hydrostatic Test Water Discharge
Jal 3 Gas Plant
Lea County, New Mexico

Dear Mr. Jones:

The Oil Conservation Division (OCD) has received your request, dated July 31, 1991, to discharge approximately 315,000 gallons of hydrostatic test waters to the Class II disposal located at the Jal #3 Gas Processing Plant. The wastewater will be generated from the testing of a gathering line between the Jal #4 and Jal #3 Gas Processing Plants. The wastewater will be stored in frac tanks prior to disposal.

Based on the information provided your request, disposal of the hydrostatic test waters in the Jal #3 Class II disposal well is hereby approved.

Please be aware that this approval does not relieve you of liability should your operation result in actual pollution of surface or ground waters or the environment actionable under other laws and/or regulations.

If you have any questions, please contact Roger Anderson at (505) 827-5884.

Sincerely,

William J. LeMay
Director

WJL/sl

cc: OCD Hobbs Office

SID RICHARDSON CARBON & GASOLINE CO.
FIRST CITY BANK TOWER
201 MAIN STREET
FORT WORTH, TEXAS 76102
817/390-8600

OIL CONSERVATION DIVISION
'91 AUG 10 AM 10 19

July 31, 1991

File: 1-Jo-19-91

New Mexico Energy, Minerals, and
Natural Resources Department
OIL CONSERVATION DIVISION
P. O. Box 2088
Santa Fe, NM 87504-2088

Attn: Roger Anderson

Re: Hydrostatic Test of a Gathering Pipeline

Dear Mr. Anderson:

Sid Richardson Carbon & Gasoline Co., located at 201 Main Street, Suite 3000 Ft. Worth, Texas, hereinafter called Sid Richardson, plans to conduct a hydrostatic test of a 16 inch gathering pipeline between the Jal #4 and Jal #3 gas plants near Jal, New Mexico. With the Oil Conservation Division's approval, Sid Richardson plans to begin testing various segments of the pipeline on August 7, 1991 and complete testing by August 28, 1991.

The pipeline begins at the Sid Richardson Jal #4 gas plant,

LEGAL DESCRIPTION:

SE/4 SE/4, Section 31, S/2 SW/4, West T & N, R.R.R.O.W., Section 32, T-23-S, R-37-E, Lea County, New Mexico. Also portions of Lots 3 & 4, SW/4 NW/4 and W/2 SW/4 of Section 5, T-24-S, R-37-E, N.M.P.M., lying West of Texas-New Mexico R.O.W.,

Location: Approx. 11 miles North of Jal, N.M., on State Highway No. 18,

and terminates at the Sid Richardson Jal #3 gas plant,

LEGAL DESCRIPTION:

NW/4 SW/4, Section 33, T-24-S, R-37-E, Lea County, New Mexico,

Location: Approx. 5 miles North of Jal, N.M., and 2 miles East of State Highway No. 18.

The estimated volume of water required to conduct the hydrostatic test is 315,000 gallons of fresh water. After said testing is completed, we plan to discharge the test water into frac tanks and transport the water to a Class 2 disposal well operated by XL Transportation Company of Jal, New Mexico.

Please send our discharge permit to:

SID RICHARDSON CARBON & GASOLINE CO.
201 Main Street, Suite 3000
Fort Worth, TX 76102

Attn: William C. Jones
Project Engineer

If you have any additional questions, please contact me at (817) 390-8760.

Sincerely,

William C. Jones

William C. Jones
Project Engineer

WCJ:cg

CC: WJF
NWM
HEH
KCC
KRC/CEA/WCJ/File

8/1/91

class 2 only per Dave Dunn

Verbal approval 8/1/91 RJT

8-1 12:30

Roger

Dick

Dawn

Sid Richardson

Carlton Gondeiro

817-

390-8640

El Paso
Natural Gas Company

OIL CONSERV JN DIVISION
REC VED
'91 JUL 8 AM 9 39

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-541-2600

July 3, 1991

Mr. Bill Olson, Hydrogeologist
Environmental Bureau
New Mexico Oil Conservation Division
P.O. Box 2088
State Land Office Bldg.
Santa Fe, NM 87504

Subject: ENSR Groundwater Assessment Report at EPNG's Jal No. 4 Plant.

Dear Mr. Olson:

Please find enclosed a copy of the subject report. Please feel free to contact me at 915/541-2323 if you have any questions concerning the content of this report.

Sincerely,

Philip L. Baca, P.E.
Sr. Compliance Engineer

PLB:vo

bc: D.R. Payne
H. Van
File: 5004 (w/w)

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

June 24, 1991

CERTIFED MAIL
RETURN RECIEPT NO. P-106-675-361

Mr. Philip L. Baca
Compliance Engineering
El Paso Natural Gas Company
P.O. Box 1492
El Paso, TX 79978

RE: EPNG JAL NO. 4 GAS PLANT
GROUND WATER CONTAMINATION STUDY
EDDY COUNTY, NEW MEXICO

Dear Mr. Baca:

On June 20, 1991, the New Mexico Oil Conservation Division (OCD) met with you to discuss the January 1991 "EXPANDED HYDROGEOLOGY STUDY FOR THE EL PASO NATURAL GAS COMPANY JAL-4 FACILITY, PHASE 2 REPORT". The discussion focused on the following conclusions contained within the Phase 2 report for which there was general agreement between OCD and EPNG:

1. Ground water under and downgradient of the facility is contaminated with dissolved phase volatile organics and total dissolved solids (TDS).

2. The contaminated ground water is a result of the use of the former unlined disposal ponds.

3. A plume of ground water contaminated with TDS and benzene in excess of New Mexico Water Quality Control Commission ground water standards is migrating downgradient and offsite of the facility..

4. There is no imminent danger of contamination of water supply or private water wells.

OCD stated during the September 24, 1990 meeting between OCD and EPNG that the results of the Phase 2 investigation would determine the necessity of performing additional investigations and/or remedial actions. The Phase 2 report has documented the occurrence of both heavily contaminated ground water and the offsite migration of these contaminants.

Therefore, OCD requests that EPNG submit a proposal to determine the full extent of ground water contamination related to the Jal-4 facility. The proposal should address:

1. The horizontal extent of the plume.

2. Installation of vertically nested monitor wells to determine if there are any density effects due to the high TDS nature of the plume. At a minimum, monitor wells should be installed at the base, the middle and top of the aquifer in areas of high concentrations of TDS.

3. Water quality testing of ground water for:

   a. Aromatic and halogenated volatile organics.

   b. Major cations and anions.

   c. Nitrogen (nitrate, nitrite and total nitrogen)

Due to the lack of an imminent threat to water supply or private water wells and a lack of knowledge of the extent of contamination, the OCD defers comment on the Phase 2 proposed remedies for contaminated ground waters.

In addition, OCD requests that EPNG provide OCD with a copy of the first hydrogeological report on Jal-4 prepared by ENSR Consulting and Engineering.

If you have any questions, please call me at (505) 827-5885.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: OCD Hobbs Office

El Paso
Natural Gas Company

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-541-2600

April 26, 1991

RECEIVED

APR 2 9 1991

OIL CONSERVATION DIV.
SANTA FE

New Mexico Oil Conservation Division
P.O. Box 2088
State Land Office Bldg.
Santa Fe, NM 87504

Subject: Report for Groundwater Study at EPNG's Jal No. 4 Plant

Dear Mr. Boyer:

Please find enclosed a copy of the subject report. EPNG would appreciate meeting with you in the near future to discuss the report's recommendations. Please phone me at 915/541-2323 at your earliest convenience so that we may arrange for a meeting.

Sincerely,

Philip L. Baca, P.E.
Sr. Compliance Engineer

PLB/vo
Enclosure

EPNG Phase II Jal #4 G.W. Investigation Review

I. Comments / Questions

✓ 1) No Phase I report in OCD files

✓ 2.) Well locations not as proposed ? (ACW-2)
(agreed to at previous meeting)

✓ 3.) Wells screened below W.T. ? (≈ 4-10')

✓ 4.) Analytical Parameters - No results of 1.) Cations/Anions
2.) PAH's
3.) NO_3^-

5.) G.W. Modeling (extent of plume)

✓ a.) Assumptions of uniform fluid density, no vertical concentration gradients may not be valid

✓ b.) Input parameters -
- model assumes no storage in aquifer ?
- source of data for ?
  a.) pond leakage rate & quality - (cooling tower ≈ 10 times concentration)
  b.) aquifer thickness - previous info Hydro report

6.) Pump + Treat Modeling

✓ a.) model used ? (USGS MOC)
b.) results of options 2, 3, 4, 6, 7 ?

II Additional Work Needed

✓ 1.) Water quality samples for

a.) Cations / Anions
b.) PAH's
c.) $NO_3^=$

/ 2.) Complete definition of plume boundaries

a.) horizontally
b.) vertically

/ 3.) Sample ? (or is information available)

a.) upgradiant windmill (not sampled) } in either phase I-II
b.) EPNG -5 } in phase I report
c.) EPNG - 6 }

OCD/EPNG Meeting 6/20/91 1000 hrs

participants -

OCD:
- Dave Boyer
- Bill Olson
- Roger Anderson
- Kathy Brown

EPNG:
- Lori Saylor
- Phil Baca
- Anon
- Don

A.) Hydrotest. (re. 6/13/91 EPNG. correspondence)

discuss results 6/13/91

O like to discharge to unlined pits for waters under WQCC stds.

RCA samples show after filter meaning?

P.B. hay bales inside pipe used as filter

OGB More concerned with organics in early end of N.M. lines cause oils more likely to drop out in beginning of pipelines

O + P.B Most pigging done early in lines
Lines from Farmington pigged
Not much problem after Guadalupe station and line

across SE Caprock area which transmit Texas gas

RCA Want to discharge test water not wash waters ?

DGB. How will operation work

P. 1st pig, then rinse water, 2nd pig to push thru

Wash, capture thru test. Will haul off wash water
Want to discharge test water

P.B. In Texas have to build pre pit to filter off oil/grease
Texas requires tests at beginning/middle/end test water

RCA We will require same if goes to unlined pit

P.B. We want to do that to protect against future claims

RCA, DGB Need a separate rinse ie 1000 gal & front bank of pigs for final rinse before test and also run thru hay bails in case of oil/grease

Discharge approval conditioned upon depth to G.W possibly other conditions

P.B. Ask for list of analyses required in what PAH's

W.O. Need at least WQCC PAH's

RCA Have you ever analyzed piggin, sludges

A.C. Have, at San Juan Station for heavy metals, PAH's

RCA Reason for asking If you know what normally in wastes then know what to test for

RCA Are most discharges expected to be over 100,000 gals

P.B. Yes, because are reconditioning all pipelines

DGB. Would like general criteria of at least 50 feet above G.W.

D + P.B Don't have problem with that

RCA Is there periodic testing of pipelines

P.B. Only tested prior to operation as per DOT for mainline transmission, does not include gathering lines. Trunk gathering lines are under DOT

OGD Summary

1.) Wash water followed by wash collected for disposal

2.) Discharge test water at greater than 50' DTW

3.) Sample beginning / middle / end test waters

4.) Get constituent list for sampling

5.) Filter for potential oil/grease

6.) No sheen or oil on pond if so clean up

P.D. David Hall has hydrotest going up in July near Laguna at 2000' main line

OGB. We can approve for above conditions

RCA Anything over 100,000 gals will need P.P. for new pipe and all old pipe

OGB Samples will be provided when available (condition 7)

D. We will notify District Office 24 hrs in advance

A C. What type of soap is used

D. Biodegradable, non-hazardous

DGB Need application at Laguna soon in order to get timely approval

B. Washington Ranch

P.B. Discuss handout.

Ran caliper log on well 9 ~~8~~ 2

Not sure why problem with tubing

Production casing in good shape

Review well location on ariel photo

~~Other factors~~

Get back to OCD with basic info (next week will call to tell when can set) and proposal for well #9

Want us to keep press. on prod. + surface casing down

DGB Yes, but also need to know what's causing problem before determining solution

DGB Comple at other wells also show low H_2S

Resample production on #9

PB Will do

C) Jal #4 Phase II Contamination Study

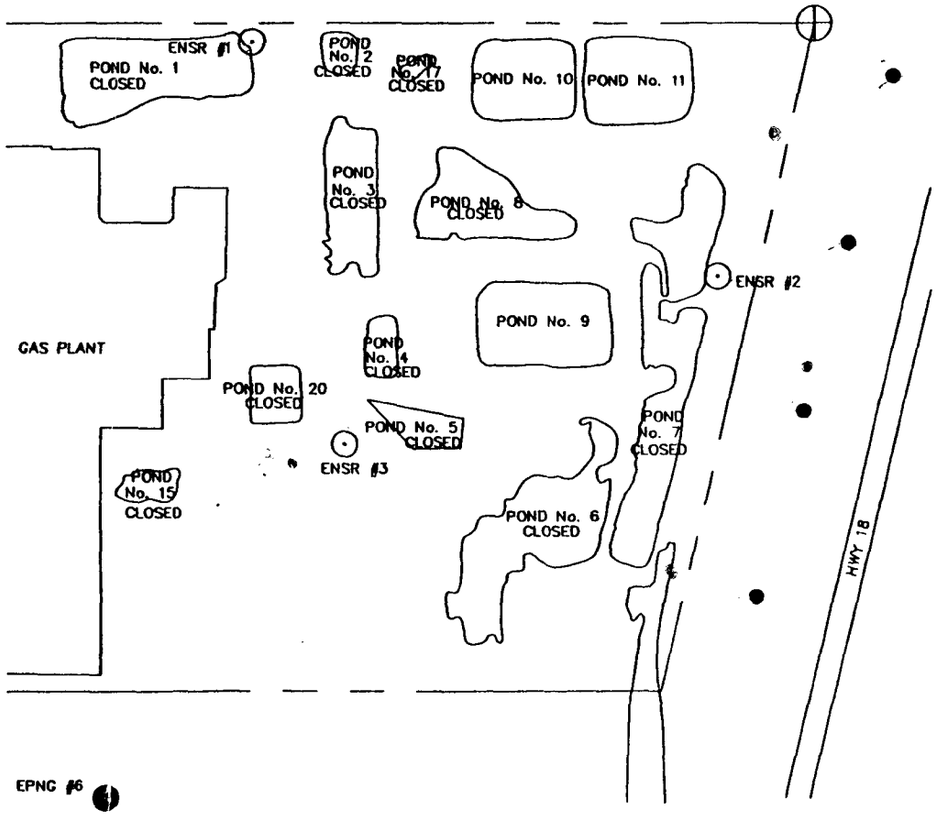
DGB When are top of red bed

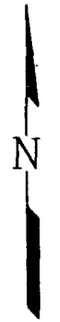
PB ≈ 200 feet?

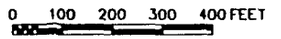
Ideal

proposal to investigate
example at type of vertical ~~&~~ invest.
and ~~&~~ shows address remediation

10' screen base & middle



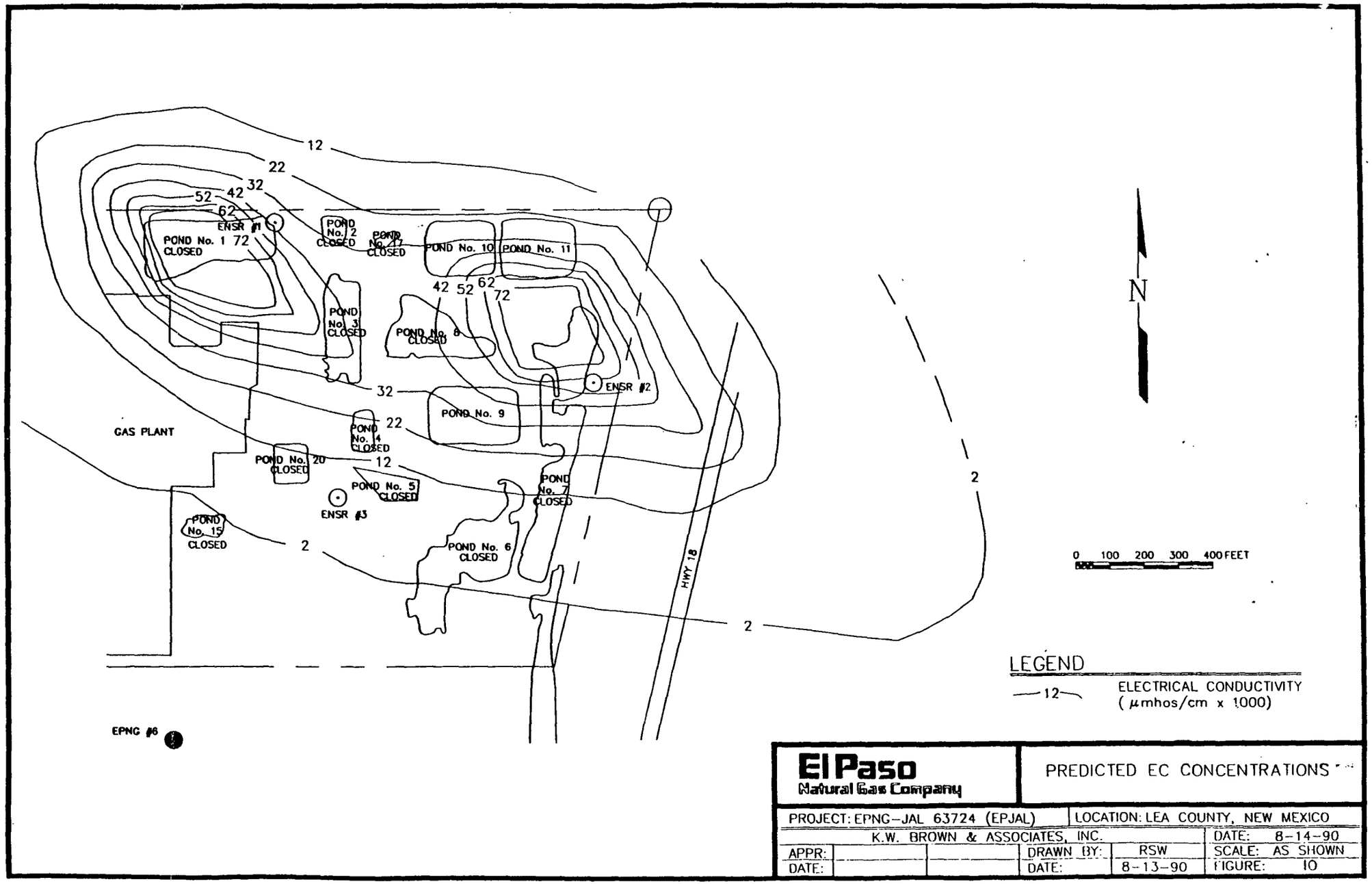




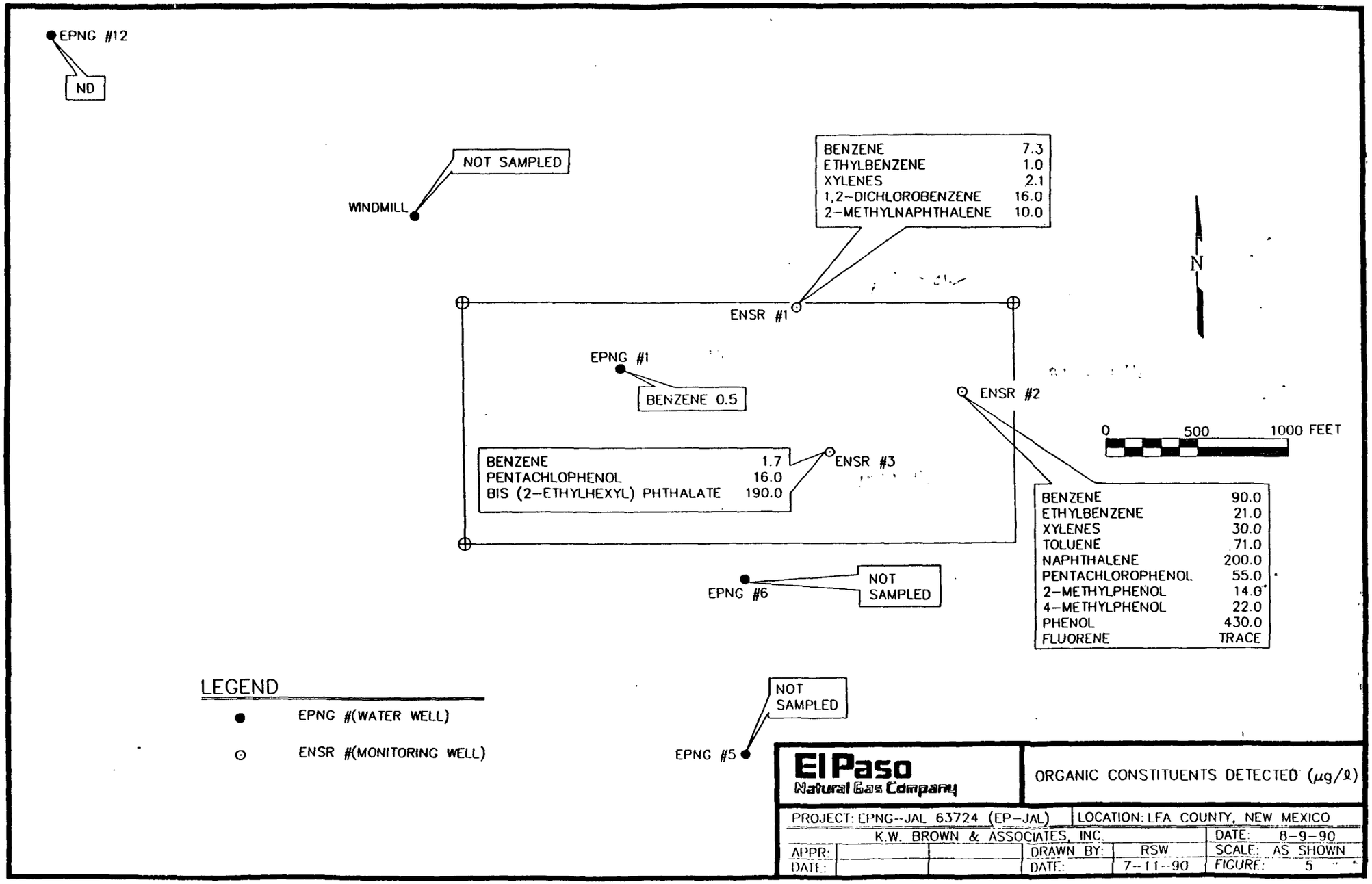
LEGEND

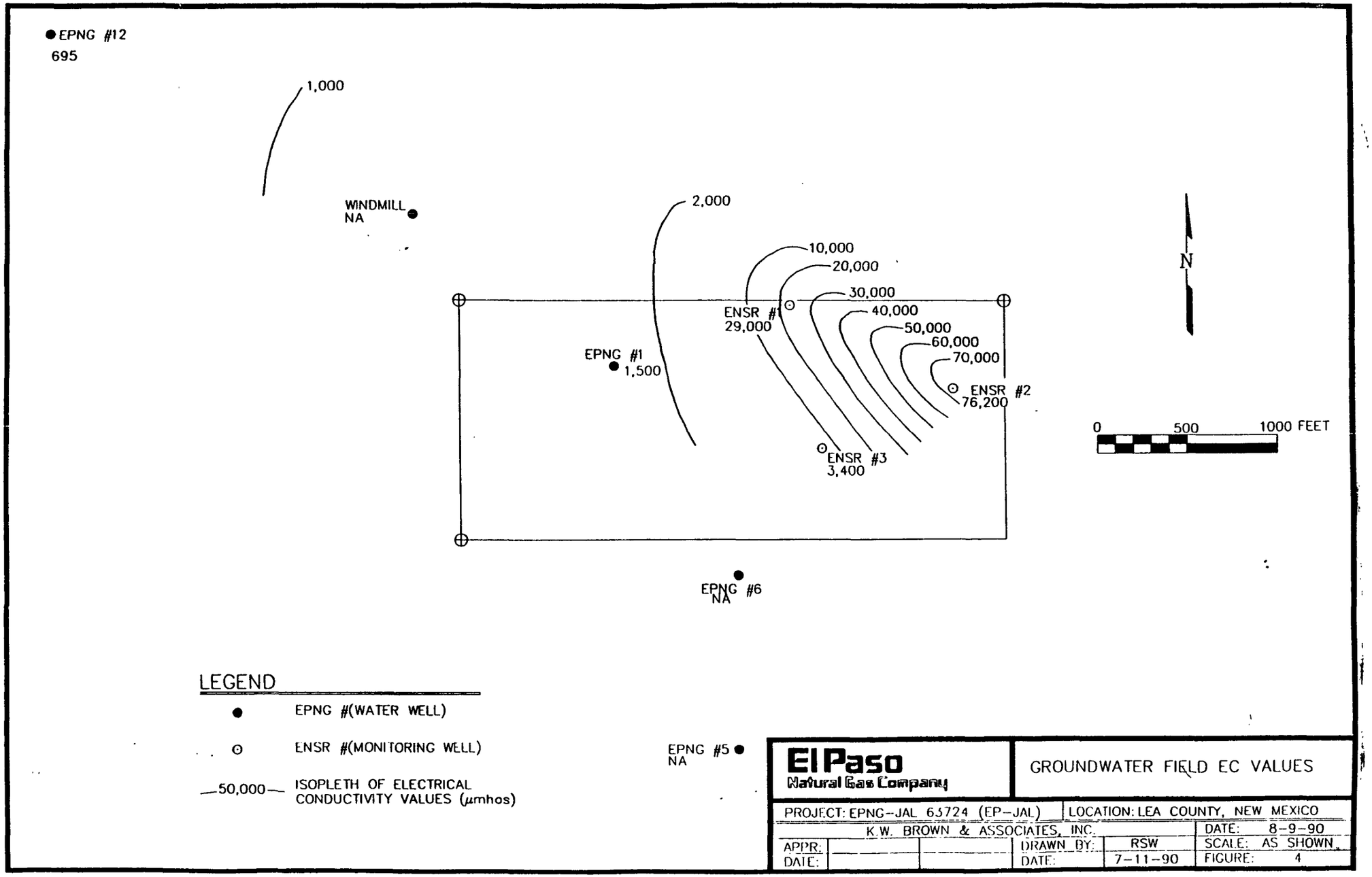
● PROPOSED MONITORING WELL

El Paso Natural Gas Company					PROPOSED MONITORING WELLS
PROJECT: EPNG–JAL 63724 (EPJAL)				LOCATION: LEA COUNTY, NEW MEXICO	
K.W. BROWN & ASSOCIATES, INC.					DATE: 8–14–90
APPR:			DRAWN BY:	RSW	SCALE: AS SHOWN
DATE:			DATE:	8–13–90	FIGURE: 12



El Paso Natural Gas Company				PREDICTED EC CONCENTRATIONS	
PROJECT: EPNG–JAL 63724 (EPJAL)				LOCATION: LEA COUNTY, NEW MEXICO	
K.W. BROWN & ASSOCIATES, INC.					DATE: 8-14-90
APPR:			DRAWN BY:	RSW	SCALE: AS SHOWN
DATE:			DATE:	8-13-90	FIGURE: 10


EPNG #12
ND
WINDMILL
NOT SAMPLED
BENZENE 7.3
ETHYLBENZENE 1.0
XYLENES 2.1
1,2-DICHLOROBENZENE 16.0
2-METHYLNAPHTHALENE 10.0
ENSR #1
N
EPNG #1
BENZENE 0.5
ENSR #2
0 500 1000 FEET
BENZENE 1.7
PENTACHLOPHENOL 16.0
BIS (2-ETHYLHEXYL) PHTHALATE 190.0
ENSR #3
BENZENE 90.0
ETHYLBENZENE 21.0
XYLENES 30.0
TOLUENE 71.0
NAPHTHALENE 200.0
PENTACHLOROPHENOL 55.0
2-METHYLPHENOL 14.0
4-METHYLPHENOL 22.0
PHENOL 430.0
FLUORENE TRACE
EPNG #6
NOT SAMPLED
LEGEND
EPNG #(WATER WELL)
ENSR #(MONITORING WELL)
EPNG #5
NOT SAMPLED
El Paso Natural Gas Company
ORGANIC CONSTITUENTS DETECTED (μg/ℓ)
PROJECT: EPNG--JAL 63724 (EP-JAL)
LOCATION: LEA COUNTY, NEW MEXICO
K.W. BROWN & ASSOCIATES, INC.
DATE: 8-9-90
APPR:
DRAWN BY: RSW
SCALE: AS SHOWN
DATE:
DATE: 7-11-90
FIGURE: 5


EPNG #12
695
1,000
WINDMILL
NA
2,000
10,000
20,000
30,000
40,000
50,000
60,000
70,000
ENSR #1
29,000
EPNG #1
1,500
ENSR #2
76,200
ENSR #3
3,400
EPNG #6
NA
EPNG #5
NA
N
0
500
1000 FEET
LEGEND
EPNG #(WATER WELL)
ENSR #(MONITORING WELL)
50,000 ISOPLETH OF ELECTRICAL CONDUCTIVITY VALUES (μmhos)
El Paso Natural Gas Company
GROUNDWATER FIELD EC VALUES
PROJECT: EPNG-JAL 63724 (EP-JAL)
LOCATION: LEA COUNTY, NEW MEXICO
K.W. BROWN & ASSOCIATES, INC.
DATE: 8-9-90
APPR:
DATE:
DRAWN BY: RSW
DATE: 7-11-90
SCALE: AS SHOWN
FIGURE: 4

EXPANDED HYDROGEOLOGY STUDY FOR THE EL PASO NATURAL GAS COMPANY JAL 4 FACILITY: PHASE 2

Work Copy

RECEIVED
APR 29 1991
OIL CONSERVATION DIV.
SANTA FE

prepared for

El Paso Natural Gas Company
El Paso, Texas

prepared by

K. W. Brown & Associates, Inc.
500 Graham Road
College Station, Texas 77845

January 1991

Sidney H. Johnson
Project Manager

Michael P. Sherrier
Contributing Author

Michael Trojan
Division Director/Regional Manager

Robert C. Speake, Jr.
QC Reviewer

TABLE OF CONTENTS

LIST OF FIGURES

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1.0 INTRODUCTION

In August 1990, K. W. Brown & Associates, Inc. (KWB&A) prepared a report (KWB&A, 1990) that addressed the hydrogeologic setting of the El Paso Natural Gas Company (EPNG) Jal 4 facility (Jal 4). In addition to presenting the hydrogeologic setting, the report offered information on the regional and local geology as well as the climatic setting. Since this information is fully discussed in the Phase 1 report, it will not be repeated here. Rather, this report will focus on events that have transpired since the submittal of the Phase 1 report.

Events conducted under the Phase 2 effort include installing four monitoring wells and one piezometer, conducting a pump test to empirically determine hydraulic conductivity, storativity, and transmissivity of the aquifer, and calibrating the model which was used in Phase 1 with site specific data gathered during the Phase 2 investigation. Although four monitoring wells were installed, only three are functional. A full discussion on the monitoring well installation is presented in Section 3.1.

2.0 REVIEW OF PHASE 1 REPORT—PERTINENT POINTS

The Phase 1 effort indicated Jal 4 is situated over the Ogallala aquifer. Water quality in the area upgradient of Jal 4, characterized by EPNG well 12 (EPNG 12), was relatively good as compared to water retrieved from downgradient wells. Depth to water at the site was approximately 100 to 110 feet and the groundwater was found to exist under unconfined conditions. The hydraulic gradient was determined to be 0.0018 ft/ft and the flow direction was determined to be to the southeast.

It was also determined that the area receives an average annual precipitation of 8 inches and the surface soils are of a sandy texture. Texture of the underlying sediments varies from sandy to cemented sandstones and caliche.

Analytical results for groundwater samples collected from on-site monitoring wells illustrated a large concentration of saline water in the area where old-wastewater ponds were once located. The configuration of the saline plume was determined to trend from the northwest to the southeast along the axis of the groundwater flow direction. In addition to identifying the presence of "saltwater", several organic constituents, including but not limited to BETX, naphthalenes, and phenols were identified in the Phase 1 investigation.

Groundwater data known and assumed about the site were used to predict the configuration of the plume identified. Since firm data for each of the hydrologic parameters were not available during Phase 1, reasonable estimates were made. The computer simulation illustrated the plume extended from Jal 4 to the southeast, under Highway 18, for a distance of approximately 300 feet.

3.0 WELL INSTALLATION, DEVELOPMENT, AND SURVEY

Information presented in this section describes the installation and completion of the monitoring wells installed by KWB&A during the Phase 2 investigation.

3.1 WELL INSTALLATION

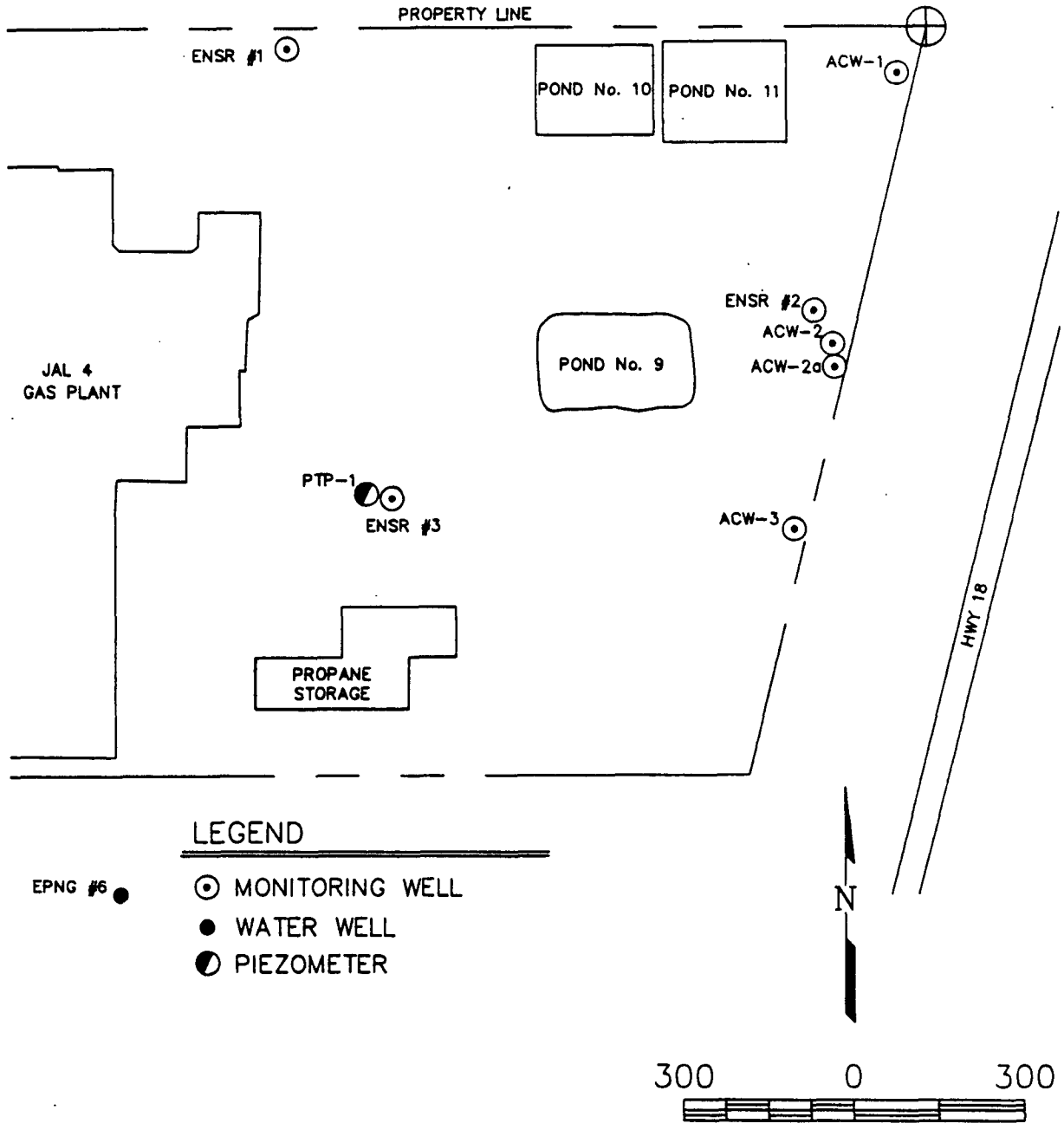
A total of four monitoring wells and one piezometer were installed during the Phase 2 field activities. It was originally intended that three monitoring wells would be installed, however, one of the wells could not be developed properly and it was necessary to install a replacement well. The locations of all monitoring wells are illustrated on Figure 1; the ACW-series wells were installed during the Phase 2 effort. Locations for the ACW wells were selected so they would be perpendicular to axis of the documented groundwater plume. Additionally, they were placed to the east as far as possible, while remaining on EPNG property, in an effort to further define the downgradient configuration of the plume.

Each of the wells, and the piezometer, were installed by West Texas Water Well Service. The drill rig used was a Badger 2000 rotary that could drill either on air or using water/mud. Each of the wells at the site was drilled using the rotary mud wash and completed using 4-inch schedule 40 PVC flush-thread casing with 0.010 machine slot screens. Stainless-steel centralizers were used to hold the PVC screen in the center of the bore hole during completion. An 8/16 Brady sand was tremmied in place around the screen and a bentonite seal was placed above the sand. The thickness of the seal ranged from 2 feet to 11 feet. A standard neat cement was used to seal the annular space from the bentonite seal to the ground surface. The well head assembly consists of a locking steel casing and a 4'x4'x4" concrete pad. Construction details and the geologic logs are included in Appendix A.

During the first field trip, conducted November 12-17, 1990, two of the three monitoring wells and the piezometer were successfully installed. One of the wells, ACW-2, would not produce sufficient water to allow the well to be developed. Therefore, the decision was made to install a replacement well. The replacement well is designated as ACW-2a and was installed on December 10, 1990.

3.2 WELL DEVELOPMENT

Upon completion, a 4-inch submersible pump was used to purge water from each of the wells. During purging, the pH, electrical conductivity (EC), and the temperature of the well was monitored. As these values stabilized and the turbidity of the purged water cleared, the well was considered completely developed and ready for sampling. As part of the well development



El Paso Natural Gas Company

LOCATION OF MONITORING WELLS.

PROJECT: 637090006 115 (EPJAL2)			LOCATION: LEA COUNTY, NM		
K.W. BROWN & ASSOCIATES, INC.					DATE: 01/28/91
APPR:	S.L.C	S.L. Johnson	DRAWN BY:	RMM	SCALE: 1" = 300'
DATE:	1.21.91	1-29-91	DATE:	11/27/90	FIGURE: 1

Analytical results for the samples indicate the presence of benzene in each of the three wells; the remaining volatiles appear in one or more of the wells. With the exception of the presence of 36 µg/L benzene in ACW-2a, all concentrations for volatiles are below the standards established by the New Mexico Water Quality Control Commission (WQCC). Phenols, as measured by an analytical method to quantify "total phenols", is above the 0.005 mg/L standard. Figure 2 graphically illustrates the concentrations of constituents noted in the ACW wells. For comparison purposes, values from the ENSR wells obtained during the Phase 1 report have been included to illustrate the concentrations of constituents present in the ENSR wells. In addition to the relative concentrations of organic constituents, the figure presents concentrations of some inorganic indicators.

Without exception, the total dissolved solid (TDS) content of the groundwater extracted from the ACW wells is above the upper WQCC limit for usable water. However, as was discussed in the Phase 1 report, groundwater being sampled by the monitoring wells is from an area which is impacted by past wastewater disposal practices at Jal 4. Therefore, the high TDS of the water is not representative of background water quality.

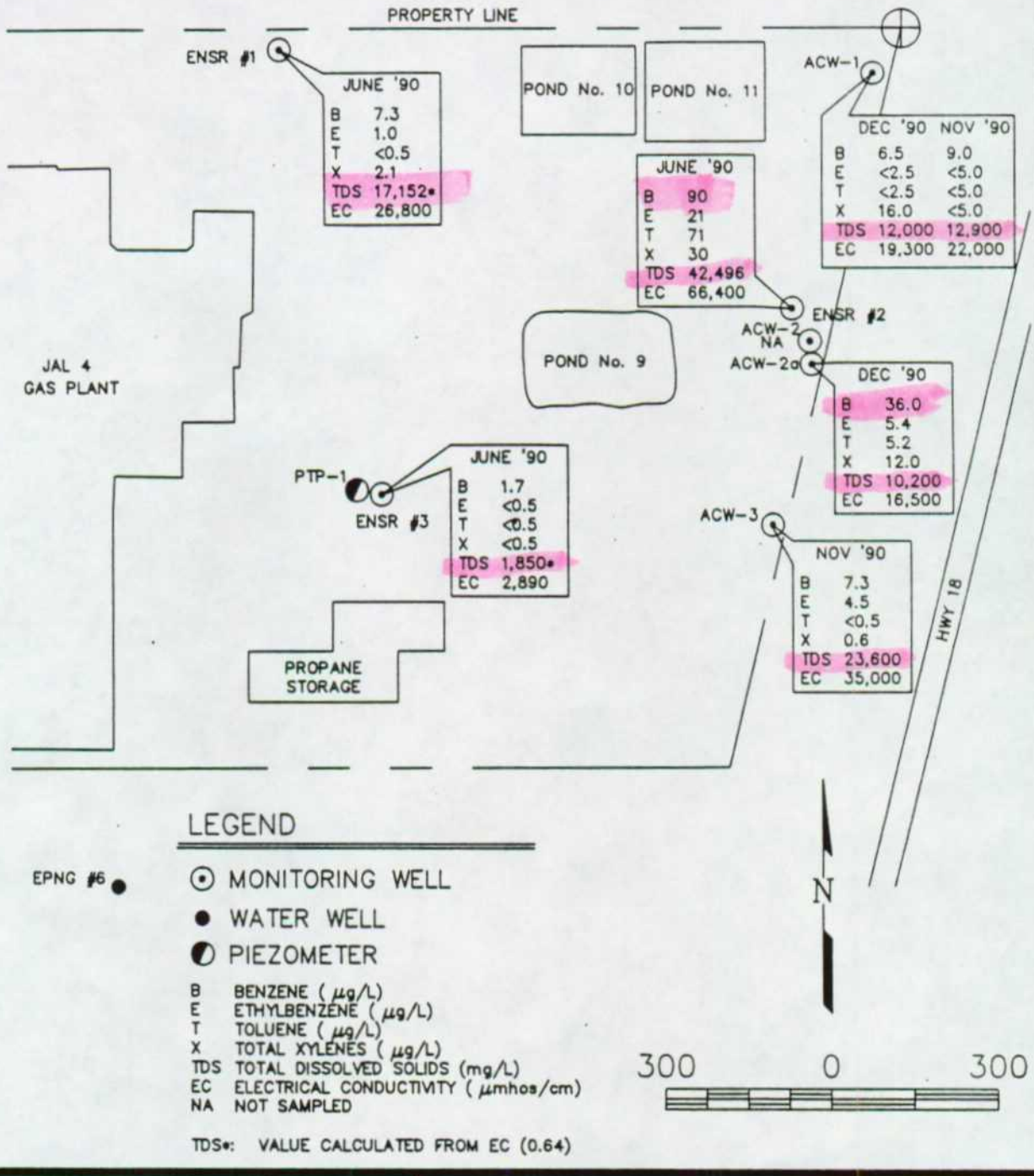
The quality of the local groundwater was established during Phase 1 by sampling EPNG well 12, which is located upgradient of the facility. A complete discussion on the water quality for this well is presented in Section 3.3 of the Phase 1 report. In general terms, however, it can be stated that the water quality from EPNG 12, as determined by major cations and anions, is considerably better than that measured in monitoring wells. Furthermore, the disparity in water quality can be illustrated by comparing EC values for EPNG 12 (background) and the ACW wells (downgradient). EPNG 12 has an EC value of 695 µmhos/cm, whereas the average EC value for the three ACW wells is 24,500 µmhos/cm.

Comparison of the EC values measured during Phase 2 with those gathered during Phase 1, indicate the configuration of the plume, as it was presented on Figure 4 of the Phase 1 report, were reasonably accurate. Specifically, the concentrations noted in the ACW wells fall within the predicted EC isopleths.

Numerical values for organic and inorganic parameters from Phase 2 are presented in Table 3 and Appendix B.

3.5 WELL SURVEY

Each of the ACW monitoring wells, and the piezometer, were surveyed by KWB&A field personnel. Although the survey can't be certified, the locations and elevations are considered to be accurate. The elevations for the ACW wells were established by back-sighting on ENSR 2. The elevation of ENSR 2 was then used as a benchmark to calculate the elevation of the well. Likewise, ENSR 3 was used as a benchmark for the survey of the piezometer. Table 4 lists the



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CONSTITUENTS DETECTED IN MONITORING WELLS.

PROJECT: 637090006 115 (EPJAL2)			LOCATION: LEA COUNTY, NM		
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casing elevations established for the wells and the piezometer; ENSR wells and EPNG wells are included for completeness.

Table 3. Laboratory Results.

Parameter	WQCC Standard	ACW-1 11/16/90	ACW-1 12/14/90	ACW-2a 12/13/90	ACW-3 11/16/90
Total phenols (mg/L)	0.005	0.15	0.07	0.24	0.10
Total dissolved solids (mg/L)	1,000 lower, 10,000 upper	12,900	12,000	10,200	23,600
Electrical conductivity (µmhos/cm)	No standard	22,000	19,300	16,500	35,000
Benzene (µg/L)	10	9.0	6.5	36	7.3
Ethylbenzene (µg/L)	750	<5.0	<2.5	5.4	4.5
Toluene (µg/L)	750	<5.0	<2.5	5.2	<0.5
Total xylenes (µg/L)	620	<5.0	16	12	0.6

Table 4. Well Elevations.

Well Identification	Casing Elevation (ft. above MSL)
ACW-1	3,300.87
ACW-2	3,301.07
ACW-2a	3,300.88
ACW-3	3,300.34
PTP-1 (Piezometer)	3,304.41
ENSR 1	3,305.40
ENSR 2	3,301.60
ENSR 3	3,303.80
EPNG 1	3,308.60
EPNG 5	3,308.90
EPNG 6	3,305.30
EPNG 12	3,324.90

4.0 AQUIFER CHARACTERISTICS

The primary focus of the Phase 2 effort was to gather accurate data for physical aquifer characteristics needed to predict the migration of the plume at the site. To this end, a piezometer was installed near ENSR 3 for the sole purpose of conducting a pump test. The piezometer was designated as PTP-1 (Pump Test Piezometer). The completion detail for this piezometer is included in Appendix A. Data from the pump test was used in conjunction with analytical data from the monitoring wells.

4.1 PUMP TEST

By pumping a well and observing the behavior of adjacent wells screened at similar depths, one can calculate the transmissivity[1] and storage coefficient[2] of the aquifer by the application of an appropriate method of analysis. These numbers define the geometry of the cone-of-depression surrounding a pumping well. For example, an aquifer having high transmissivity will have a very broad cone-of-depression, extending for, in some cases, miles in all directions away from the pumping well. Conversely, an aquifer possessing a low value for transmissivity will have a cone-of-depression that is tightly wrapped around the pumping well. Additionally, an aquifer with a low storage coefficient, for a given rate of pumpage, will generate more drawdown[3] than an aquifer having a higher storage coefficient (Freeze and Cherry, 1979). By having these hydraulic descriptors available, it is possible to model the hydraulics of an aquifer system.

On November 12, 1990, the first of two separate pump tests was conducted. This pump test, however, did not continue to a satisfactory conclusion. Approximately 52 minutes into the test, the pump failed in such a manner that it could not be repaired in the field. An attempt was made to analyze the data collected during this "brief" pump test to determine whether or not useful data could be extracted. It was decided that the test was simply too short to offer credible data. Therefore, a decision was made to repeat the test at a later date.

The second pump test was conducted during December. The methods and results presented in the following sections are from the second pump test.

---

1 Transmissivity is defined as the rate at which water of prevailing kinematic viscosity is transmitted through a unit width of aquifer under a unit hydraulic gradient (Todd, 1980).

2 Storage coefficient is defined as the volume of water that an aquifer releases from or takes into storage per unit surface area of aquifer per unit change in the component of hydraulic head oriented normal to that surface (Todd, 1980).

3 Drawdown is simply the numerical difference between pumping and nonpumping water levels in an aquifer.

4.1.1 Pump Test Methods

Pretest conceptual modeling demonstrated that a sufficiently-high pumping rate (i.e., 20 GPM) could be maintained in the pumping well (ENSR-3) for inducing drawdown in the piezometer, without the generation of excessive drawdown in the pumping well. For the pump test, an Aeromotor A20B-75 submersible pump was used to withdraw water from ENSR-3. A gate valve and flow meter were used to control and determine the pumping rate during the test.

A two-channel data logger (SE1000B), manufactured by In-Situ, Inc. (Laramie, Wyoming), was used to collect readings of water levels via pressure transducer in both the pumping and observation well. This device was programmed to sample the transducers on a logarithmic interval for the first few minutes of the test, where it then assumed an arithmetic, or linear, sampling rate. By having values of water levels on a logarithmic schedule initially, it is possible to evaluate the effects of pumping during the early portion of the test. The SE1000B records readings from a pressure transducer placed below the expected level of drawdown. For the observation well, the pressure transducer was placed at a depth within the screened interval of the casing. The pressure transducer for the pumping well was placed at the top of the pump, below the static water level.

4.1.2 Pump Test Procedure

Water level measurements were taken in the pumping well prior to initiation of the pump test. This procedure was performed to obtain a baseline value for the pre-pumping water level in each well and to calibrate the data logger.

The pump test began at 11:38 am and ended at 5:28 pm on December 11, 1990. From the start of the test, the gate valve was fully opened to obtain the highest pumping rate possible. An average pump rate of 13.37 GPM was maintained during the test.

4.1.3 Results of Pump Test

The variation in drawdown vs time for the observation well is presented in Figure 3. The figure shows that during pumping, the recorded drawdown in the observation well ranged from 0 to 1.1 feet. Figure 3 also shows the recovery curve for the observation well. The recorded recovery in the observation well ranged from 1.1 to 0.09 feet.

The raw data obtained by the data logger for the pumping and recovery periods are available in Appendix C. The recovery portion of the time/drawdown curve for PTP-1 was analyzed using the type curve solution of the Theis equation. The Theis equation assumes nonsteady, radial flow in a confined aquifer, without vertical leakage from overlying or underlying aquitards, and constant well discharge. Although it was determined that the aquifer was unconfined, the drawdown to saturated thickness ratio was acceptable to warrant application of the Theis method. Based upon the type curve solution of the recovery data, the values of transmissivity, storage coefficient, and hydraulic conductivity are given in Table 5.

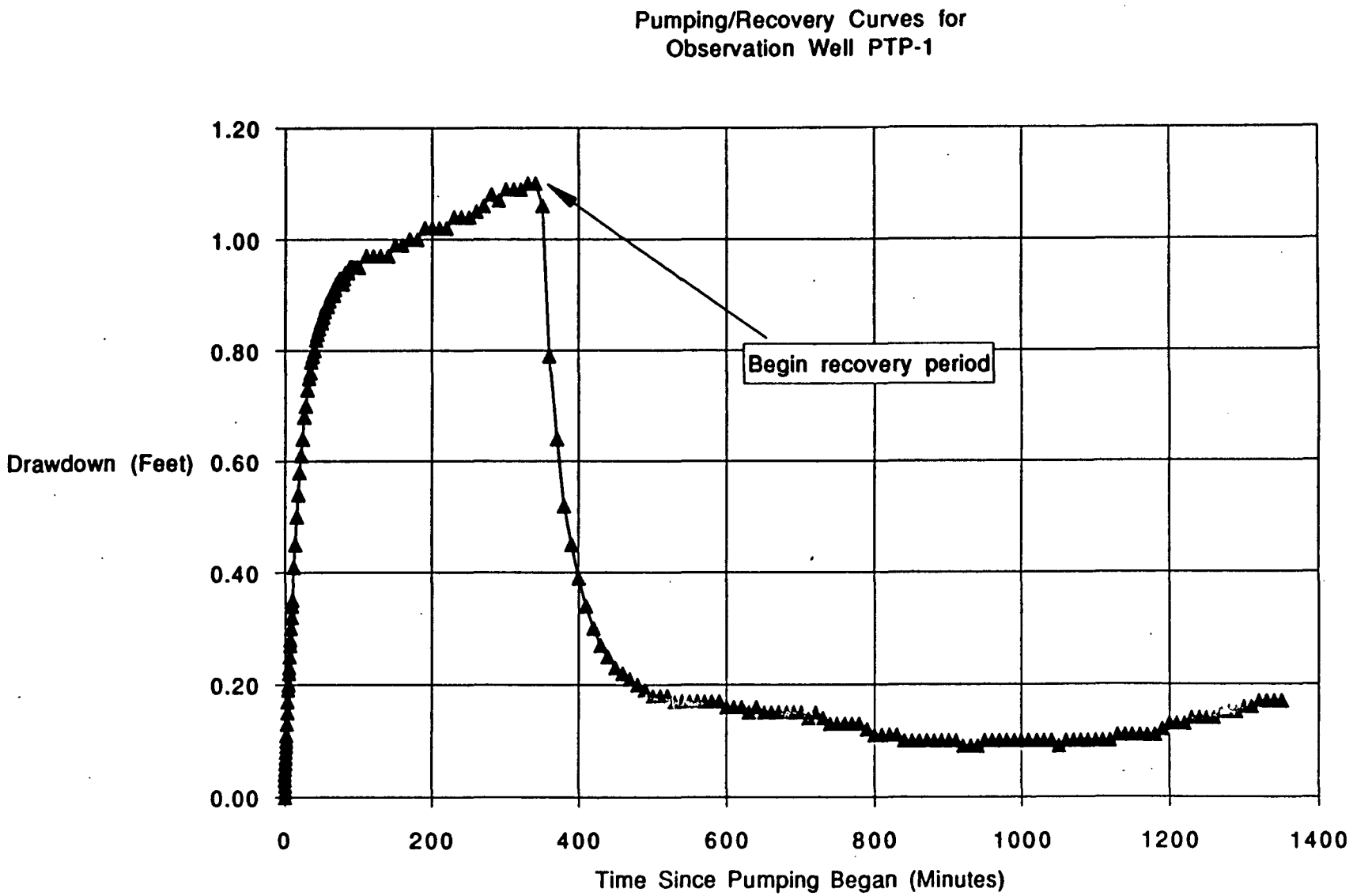


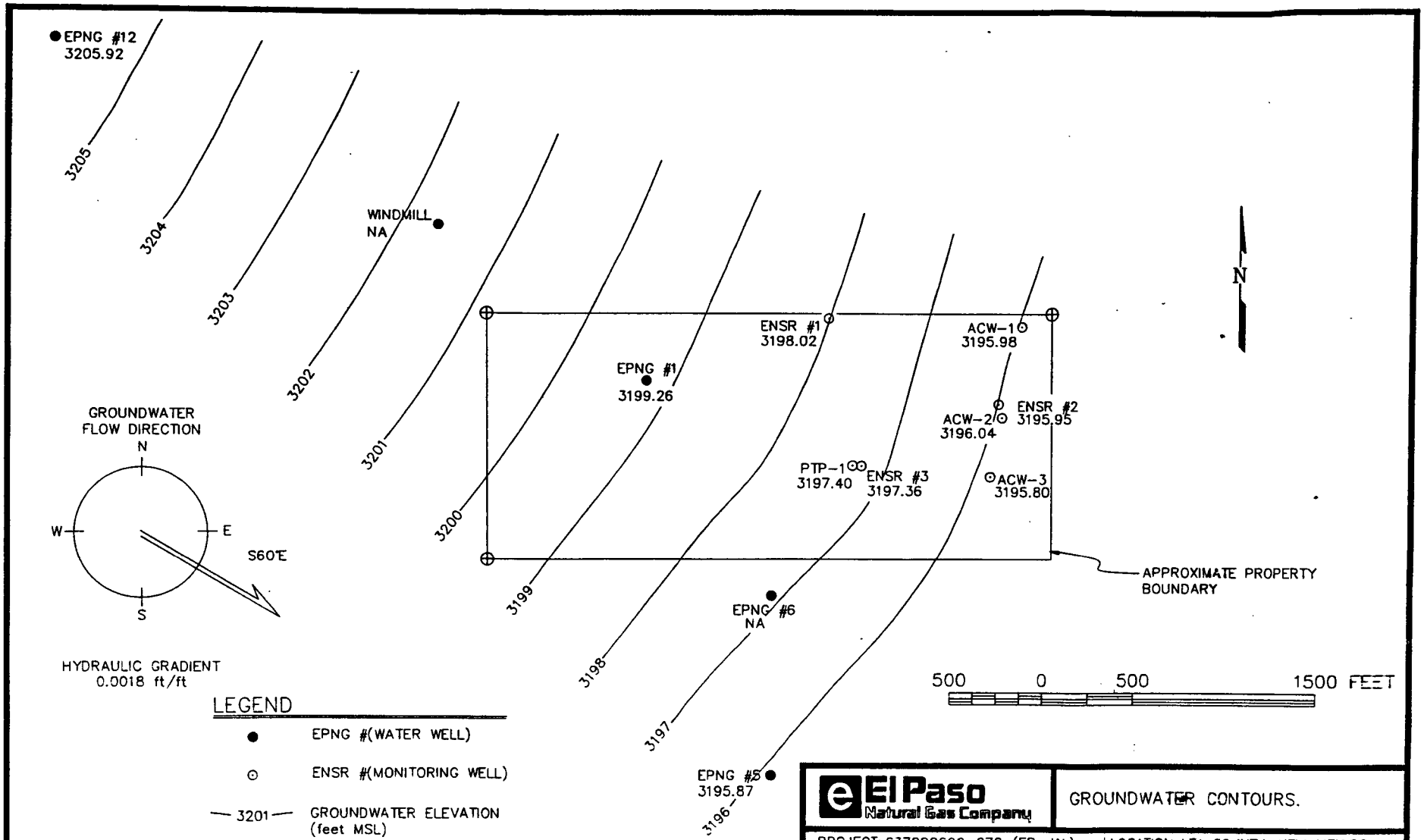
Figure 3. Pumping/Recovery Curves for Observation Well PTP-1.

Table 5. Results of Pump Test.

Observation Well	Transmissivity		Storage Coefficient		Hydraulic Conductivity
	Theis Analysis:	Theis Recovery:	Theis Analysis:	Theis Recovery:	
PTP-1	6,128 GPD/FT	3,800 GPD/FT	0.0152	Not Possible	4.5×10^{-3} cm/sec

4.2 HYDRAULIC GRADIENT AND FLOW DIRECTION

The hydraulic gradient and flow direction were established by Phase 1 data and were thoroughly explained in the Phase 1 report. It was determined during the Phase 2 effort that the hydraulic gradient was stable at 0.0018 ft/ft. Likewise, a southeast groundwater flow direction was again confirmed. In fact, the direction of groundwater flow did not differ from that presented in the Phase 1 report. The Phase 1 report documented a flow direction of N125°E (S55°E) and the Phase 2 data indicates a flow direction of N120°E (S60°E). Figure 4 illustrates the groundwater contours as determined by Phase 2 data. Methods used to make the Phase 2 determinations are consistent with the methods described in Section 4.3 of the Phase 1 report.



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GROUNDWATER CONTOURS.

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K.W. BROWN & ASSOCIATES, INC.				DATE:	01-28-91
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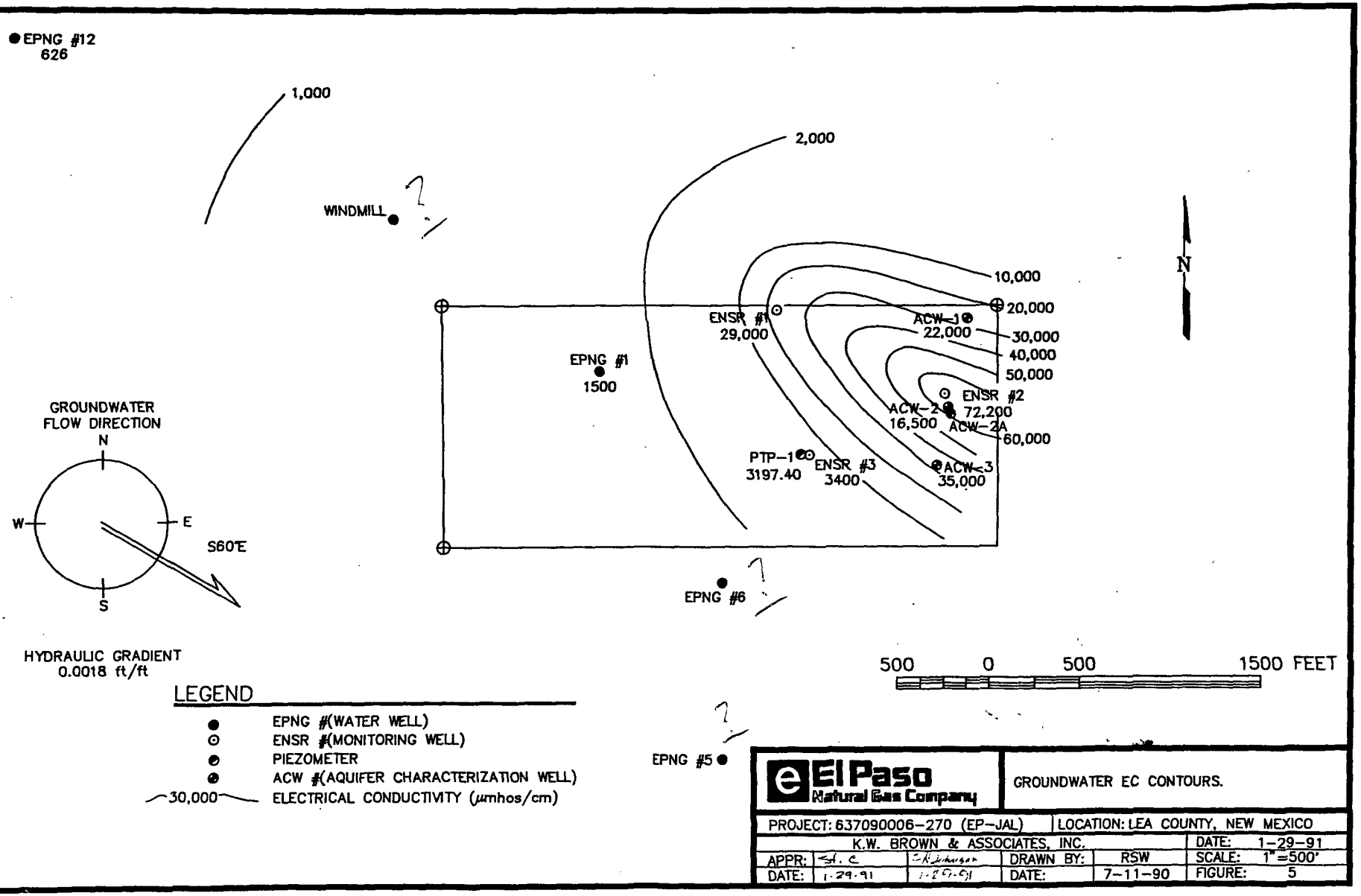
DATE:	1-28-91	1-29-91	DATE: 7-11-90	FIGURE:	4

5.0 PLUME CONFIGURATION

The configuration of the plume as it was presented on Figure 4 and discussed in Section 4.5 of the Phase 1 report are considered to be reasonably accurate. This assessment is based on data collected for the ACW monitoring wells which support the predictions made by the Phase 1 report. Figure 5 collectively illustrates the EC data collected from the Phase 1 sampling effort and data from Phase 2. From this figure, it is apparent that the plume is oriented in a northwest to southeast position. Likewise, it is clearly evident that the plume is restricted to the area where wastewater ponds were previously located. Predictions of the southeast extent of the plume have been calculated using a contaminant transport model. Results of this effort are offered in Section 6.4.

The conclusion reached during Phase 1 that the groundwater quality beneath the area where the wastewater ponds were located has been impacted by past activities, was supported by Phase 2 data. Specifically, the electrical conductivity of groundwater in the area of the old ponds was drastically greater than background and trace levels of organic constituents were present. Additionally, each of the ACW wells exhibited a distinctive "propane" odor (i.e., mercaptans were present).

It is interesting to note the difference in water quality between ENSR-3 and ACW-3. ENSR-3 is relatively clean when compared to the other monitoring wells. However, ACW-3 yields water which contains trace levels of organic constituents and elevated levels of salts (as suggested by EC and TDS). The most plausible cause for the difference is their location relative to the now closed wastewater ponds. ENSR-3 is in an upgradient position of the ponds (e.g., Ponds 6 and 7) and ACW-3 is in a downgradient position.



El Paso Natural Gas Company

GROUNDWATER EC CONTOURS.

PROJECT: 637090006-270 (EP-JAL)			LOCATION: LEA COUNTY, NEW MEXICO		
K.W. BROWN & ASSOCIATES, INC.					DATE: 1-29-91
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DATE:	1-29-91	1-29-91	DATE:	7-11-90	FIGURE: 5

6.0 GROUNDWATER MODELING

A thorough discussion of the model used to predict the configuration of the plume is presented in the Phase 1 report (Section 4.6). Moreover, predictions on the configuration and "character" of the plume were also presented in the Phase 1 report. However, the Phase 1 modeling effort was hampered because site-specific data were not available concerning the physical characteristics of the aquifer. Also, the locations of the ENSR monitoring wells (those used for the Phase 1 work) were not optimum for predicting plume configuration and migration. Hence, the Phase 2 effort was undertaken to better position monitoring wells and to collect accurate values for physical aquifer characteristics.

Unlike the previous sections of this report, where the reader is referred back to the Phase 1 report for information, this section on groundwater modeling has been extracted from the first report in its entirety. This was done because the modeling effort is the keystone of the Phase 2 effort and a complete discussion is warranted even though it is, in many respects, redundant with the Phase 1 report. In reading this section, it will become apparent that much of the text is identical; however, the numerical values have been revised to reflect Phase 2 data.

6.1 DESCRIPTION OF THE MODEL

The mathematical model used to simulate groundwater flow and solute transport in the uppermost aquifer at the Jal 4 site is a two-dimensional finite-difference model that computes values of hydraulic head (sum of pressure and elevation heads) and reactive or nonreactive solute concentration on a rectangular grid having equal spacing between nodes. The model was written by Konikow and Bredehoeft (1978), and is typically referred to as the USGS Method of Characteristics (MOC) model. The program is capable of generating transient or steady-state solutions for the hydraulic head field.

In a review of mathematical models for the U.S. Nuclear Regulatory Agency (NRC), Thomas et al. (1982) state that MOC "... is a well-tested and well-documented code that would be well-suited for solving single-aquifer problems. Its high degree of acceptance makes it stand out among solute transport codes ..."

The model has undergone verification by comparison with several analytical models and has demonstrated excellent comparisons (Thomas et al., 1982). Field validation has been carried out for chloride movement at the Rocky Mountain Arsenal (Konikow, 1977), and for radionuclide transport at the National Reactor Testing Station (Robertson, 1974).

6.2 MODEL ASSUMPTIONS

In order to effect a practical solution to complex hydrogeologic problems, a number of simplifying assumptions have been invoked by the model authors (Konikow and Bredehoeft, 1978); the following is a synopsis of those assumptions

1. Darcy's Law is valid and hydraulic head gradients are the only significant driving mechanism for fluid flow.
2. The porosity and hydraulic conductivity of the aquifer are constant in time, and porosity is uniform in space.
3. Gradients of fluid density, viscosity, and temperature do not affect the velocity distribution.
4. Ionic and molecular diffusion are negligible contributors to the total dispersive flux.
5. Vertical variations in head and concentration are negligible (i.e., computed values of head and concentration are averaged over the thickness of the aquifer).
6. The aquifer is homogeneous and isotropic with respect to the coefficients of longitudinal and transverse dispersivity.

There are no reasons to believe that Darcy's Law is not valid for description of the flow system at Jal 4. Factors governing the validity of Darcy's Law are: (a) fluid density, (b) pore fluid velocity, (c) average pore (grain size) diameter, and (d) dynamic fluid viscosity. Readers trained in the field of fluid mechanics will recognize these factors as those variables that define the Reynolds Number:

$$N_R = \frac{\rho V D}{\mu} \quad \text{..... (1)}$$

Where: N_R = Reynolds Number

ρ = fluid density

V = pore fluid velocity

D = average pore (grain size) diameter

μ = dynamic fluid viscosity

Most agree that the upper limit for the validity of Darcy's Law is when the N_R rises above the range 1 to 10. Thus, given the prevailing conditions at Jal 4, it is asserted that assumption (1) is met at both waste management areas.

Obviously, porosity and hydraulic conductivity are spatially-varying quantities for naturally-occurring aquifers. Without extensive field and laboratory measurements, the spatial distribution of the parameters remains unknown. The assignment of point estimates for porosity represents a significant departure from reality, and the application of assumption (2)

is questionable. Given the limitations constraining the study, however, the approximation of some variables by point estimates and supplementing these estimates with site-specific values is deemed acceptable.

The high levels of EC in the groundwater beneath Jal 4 (i.e., up to 70,000 µmhos/cm), suggest a significant concentration of dissolved salts. It is possible that the groundwater contains salt levels in sufficient quantities to affect its density and viscosity. Although groundwater temperature may remain fairly constant throughout the year, density and viscosity will probably vary as a function of position (laterally and vertically) within the aquifer, and assumption (3) may not be valid.

The dispersion coefficient is generally defined as follows (Freeze and Cherry, 1979):

$$D_l = \alpha_l v_l + D^* \quad \text{..... (2)}$$

Where: D_l = coefficient of hydrodynamic dispersion
α_l = dispersivity along flow path l
v_l = average linear groundwater velocity
D^* = coefficient of molecular diffusion

For assumption (4) to be met, the first term in equation (2) must overshadow the second term; a quick calculation shows this to be the case:

Let α_l = 100 feet (selected through trial and error)
v_l = 9 feet/year (based on field data)
D^* = 5×10^{-9} ft^2/sec (Freeze and Cherry, 1979)
$\alpha_l v_l$ = 2.9×10^{-5} ft^2/sec

Thus, the first term dominates the expression by four orders-of-magnitude, and the contribution to the dispersion coefficient by the diffusion coefficient is negligible.

With regard to assumption (5), where vertical gradients are absent, the variation of hydraulic head with depth is nonexistent. That is to say that, along a vertical line, the total head is constant, and this portion of assumption (5) is valid. The vertical variation of solute concentration with depth is much less known, and the viability of assumption (5) in this regard is in question. However, the small aquifer thickness at Jal 4 should aid in uniform mixing of solute.

Finally, it is generally recognized that dispersivity is a scale-dependent quantity. Molz et al. (1983) summarized the problematic nature of dispersivity measurement as follows: "... the greater the travel distance in a tracer test used to measure dispersivity, the larger the dispersivity value that is calculated." This phenomenon is largely attributed to vertical variations in aquifer hydraulic conductivity. Thus, at the current level of knowledge regarding dispersivity,

precise spatial distributions for this parameter are very difficult to determine. Assumption (6) is considered to be reasonable in light of the absence of concrete methods with which to measure field values of longitudinal and transverse dispersivity.

6.3 INPUT REQUIREMENTS

The principal data required by the model to generate a solution are given in Table 6. Table 7 lists all of the parameter values used during the model runs. The model runs illustrate calibration of the model (Run 1) and recovery of impacted groundwater. The calculations are discussed below and the computer output is included as Appendix D.

Model Calibration

Hydraulic head contours were generated from water level measurements made in the monitoring wells on-site. These wells included ENSR-1, -2, -3, ACW-1, -2a, -3 and EPNG-1.

The primary constituent focused on during calibration was EC. EC was used as the "contaminant" in the model, and the assumption was made that no adsorption processes would be simulated. That is, the modeled contaminant would move at the velocity of the groundwater.

The procedure generally involved identifying parameters with the least-known values, and utilizing those as the parameters that would be varied throughout the trial-and-error procedure. For this analysis, pond water EC, pond leakage rate, and longitudinal and transverse dispersivity were the most-unknown parameters available.

The remainder of the parameters, such as transmissivity, aquifer recharge, and porosity were estimated by the modelers based on experience and knowledge of the site, or were determined empirically through field testing.

It was assumed that the ponds had leaked at a constant rate, with constant pond water EC, for a period of 30 years. Thus, Run 1 extended from 1961 through 1990. Figure 6 is a graph of observed versus computed EC. For a good calibration, these data points should lie on a 45-degree line. As is apparent from an examination of this figure, all data points lie on a 45-degree line, or deviate slightly. ACW-2a is the only well that does not fit well. EC is overpredicted at this location, suggesting that perhaps this well would need to be pumped for an additional time to achieve steady-state conditions. The configuration of the plume at the end of the calibration run is illustrated in Figure 7.

6.4 GROUNDWATER MODELING RESULTS

Information presented in this section is intended to provided qualitative predictions on the status of groundwater conditions at the site. Because it was necessary to make assumptions to supplement the available site-specific data, the numerical values presented are not offered

Table 6. Input Requirements for the USGS MOC Solute Transport Model.

Parameter	Spatially[1] Varying?	Temporally[2] Varying?
Number of time steps	N/A	Yes
Simulation duration (Years)	N/A	N/A
Number of nodes in X-direction	N/A	No
Number of nodes in Y-direction	N/A	No
X-direction nodal spacing (Feet)	No	No
Y-direction nodal spacing (Feet)	No	No
Number of pumping or injection wells	Yes	N/A
Flow rate of pumping or injection wells (Ft3/sec)	Yes	Yes
Effective porosity	No	No
Longitudinal dispersivity (Feet)	No	No
Transverse dispersivity (Feet)	No	No
X-direction transmissivity (Ft2/sec)	Yes	No
Y-direction transmissivity (Ft2/sec)	Yes	No
Storage coefficient	No	No
Distribution coefficient (cm3/g)	No	No
Aquifer bulk density (g/cm3)	No	No
Half-life of solute (Seconds)	N/A	N/A
Saturated thickness of aquifer (Feet)	Yes	No
Diffuse discharge/recharge (Ft/sec)	Yes	No
Initial water table or piezometric surface elevation (Feet)	Yes	N/A
Initial solute concentration in aquifer (mg/L)	Yes	N/A
Vertical hydraulic conductivity of confining layer (Ft/sec)	Yes	No
Thickness of confining layer (Feet)	Yes	No
Source dimensions (Feet)	Yes	No
Source concentrations (mg/L)	Yes	No
Constant head boundaries (Feet)	Yes	No
No-flow boundaries	Yes	No

[1] Does the quantity vary in a horizontal plane?

[2] Does the quantity vary in time?

Table 7. Input Data–USGS MOC Groundwater Flow/Contaminant Transport Model.

Parameter	Calibration Value
Number of columns	20
Number of rows	20
Column width (Feet)	200
Row height (Feet)	200
Max. no time steps	30
Duration (Years)	30
Storage coefficient	0
Porosity	0.2
Longitudinal dispersivity (Feet)	100
Transverse dispersivity (Feet)	30
Transmissivity (Feet^2/day)	9.48E-03
Distribution coefficient (cm^3/g)	0
Aquifer thickness (Feet)	65
Hydraulic conductivity (cm/sec.)	4.45E-03
Aquifer recharge (In./Yr.)	0.1
Pond 1; Cell 3 leakage rate (Feet/year)	20.5
Pond 7; Cell 2 leakage rate (Feet/year)	12.6
Pond 7; Cell 4 leakage rate (Feet/year)	11.0
Pond 11; Cell 5 leakage rate (Feet/year)	14.2
Pond 1; Cell 3 water EC (mmhos/cm)	150
Pond 7; Cell 2 water EC (mmhos/cm)	75
Pond 7; Cell 4 water EC (mmhos/cm)	40
Pond 11; Cell 5 water EC (mmhos/cm)	120

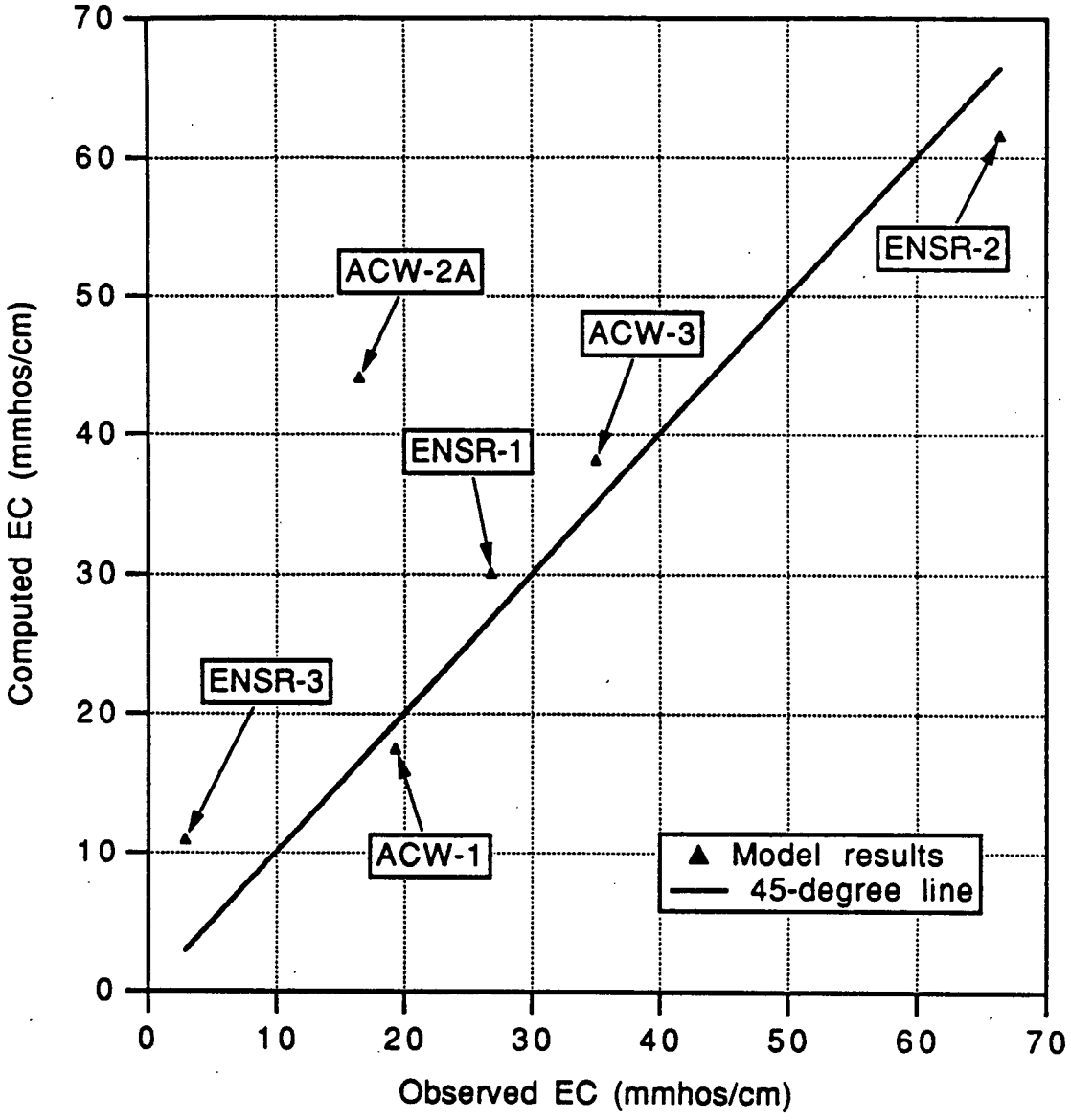
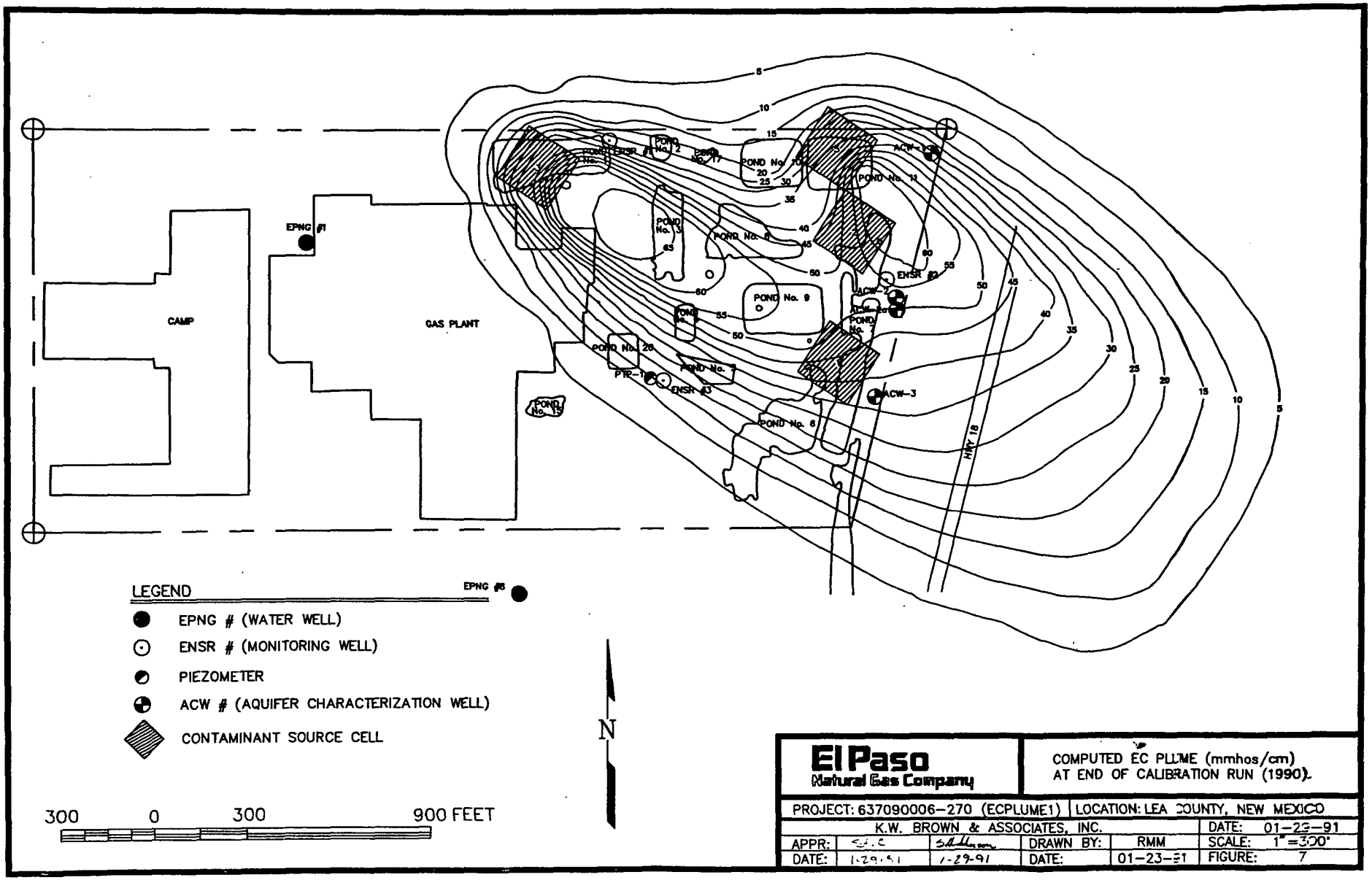


Figure 6. Correlation of Observed and Computed EC.


CAMP
GAS PLANT
EPNG #1
EPNG #5
POND No. 1
POND No. 2
POND No. 3
POND No. 4
POND No. 5
POND No. 6
POND No. 7
POND No. 8
POND No. 9
POND No. 10
POND No. 11
POND No. 12
POND No. 13
POND No. 14
POND No. 15
POND No. 16
POND No. 17
POND No. 18
POND No. 19
POND No. 20
ENSR #1
ENSR #2
ENSR #3
PIZ-1
ACW-1
ACW-2
ACW-3
ACW-4
HWY 18
5
10
15
20
25
30
35
40
45
50
55
60
65
LEGEND
EPNG # (WATER WELL)
ENSR # (MONITORING WELL)
PIEZOMETER
ACW # (AQUIFER CHARACTERIZATION WELL)
CONTAMINANT SOURCE CELL
N
300 0 300 900 FEET
El Paso Natural Gas Company
COMPUTED EC PLUME (mmhos/cm) AT END OF CALIBRATION RUN (1990).
PROJECT: 637090006-270 (ECPLUME1)
LOCATION: LEA COUNTY, NEW MEXICO
K.W. BROWN & ASSOCIATES, INC.
DATE: 01-23-91
APPR: DATE: 1-29-91
DRAWN BY: RMM
DATE: 01-23-91
SCALE: 1"=300'
FIGURE: 7

as quantitatively-precise results. Nevertheless, the modeling results are considered to be representative of future conditions at the site.

Results from the groundwater modeling exercise indicate that the axis of the plume is oriented from the northwest to the southeast along the prevailing groundwater flow direction. The area affected by the plume encompasses the majority of the plant which at one time was occupied by wastewater ponds as well as an area to the southeast of the EPNG eastern property line. The lateral extent of the plume, as predicted by the model, extends to the east beyond Highway 18 for a distance of approximately 1,100 feet. This 1,100-foot distance corresponds with the 5,000 µmhos EC contour (roughly equivalent to a TDS of 3,200 mg/L). These EC and TDS values do not represent "background" conditions. Rather, they approximate the lower range for livestock use. Table 8 illustrates the recommended TDS drinking water values for livestock.

Table 8. Total Dissolved Solids in Drinking Water for Livestock.

Animal Type	TDS (mg/L)
Small Animals	3,000
Poultry	5,000
Other Animals	7,000

Source: Freeze and Cherry, 1979.

7.0 REMEDIATION

Remediation alternatives presented in the Phase 1 report were limited to a pump-and-treat scenario. Limiting remediation to this type of option is based on two factors: the high concentration of salt in the plume and the low levels of organics present. This situation does not warrant *in situ* treatment to deal with the organic constituents. In fact, the low concentrations and the high salinity would ensure that treatment would be costly and largely ineffective. Additionally, the pump-and-treat remedial approach was suggested because it is believed that the New Mexico Oil Conservation Division will require this type of remediation, if remediation is required.

One option which was not suggested in Phase 1, but which may need to be considered, is the "do nothing" option. Although a plume has been documented, and the source of the plume is most certainly from EPNG operations, it is not known what the overall surrounding water quality is like. The Phase 1 effort documented that the water upgradient from the facility is relatively good. However, the area around Jal 4 is clearly an oil and gas producing area and these areas are notorious for impacting groundwater. Therefore, it is possible that although Jal 4 is situated on "good" water, it may be that on a regional scale the groundwater quality has been degraded. If indeed this is the case, OCD may be receptive to a "do nothing" approach. The "do nothing" approach would further be strengthened if EPNG can demonstrate that there are no receptors in a downgradient location.

Since no one can predict the stance to be adopted by OCD, a remedial action plan which calls for the withdrawal and injection of groundwater has been developed. A total of eight pumping configurations were explored to determine the optimum approach. Options investigated ranged from a single pumping well to an entire well field consisting of 17 pumping wells located across the entire plume. Table 9 lists the characteristics of each pump-and-treat option and a qualitative assessment of the effectiveness of each design. Of the eight configurations, three are discussed in the following sections to illustrate the range of pump-and-treat scenarios. *[For the purpose of this exercise, the µmhos/cm concentrations of the groundwater were converted to mmhos/cm (example: 10,000 µmhos/cm = 10 mmhos/cm).]*

In reviewing these options it will be important to note that they will require the installation of wells on property not owned by EPNG. As such, special consideration may be warranted.

Table 9. Summary of Pump-and-Treat Options.

Pump-and-Treat Option	No. Prod. Wells (Rate)	No. Inj. Wells (Rate)	Net Pumpage (GPM)	Duration (Years)	Remarks	Results
1	3 (10 GPM)	0	30	5 (1990 - 1995)	Wells spotted in plume "hot spots."	Poor
2	4 (10 GPM)	6 (6.67 GPM)	0	5 (1990 - 1995)	Same as #1 with addition of six injection wells and one additional pumping well. Net pumpage is 0 (soil flushing problem).	Poor
3	4 (10 GPM)	8 (5 GPM)	0	5 (1990 - 1995)	Net pumpage is 0.	Fair
4	4 (10 GPM)	8 (4 GPM)	8	5 (1990 - 1995)	Same as #3 except injection well pump rate is decreased to 4 GPM, yielding a net pumpage of 8 GPM.	Fair
5	4 (10 GPM)	8 (4 GPM)	8	5 (1990 - 1995)	Same as #4 except injection wells are shut in after five years. Pumping wells are allowed to pump for an additional five years.	Excellent. Plume has been split, however and a portion remains across Highway 18.
	4 (10 GPM)	0	40	5 (1995-2000)		
6	1 (20 GPM)	0	20	5 (1990 - 1995)	Only one production well is specified in this option.	Poor
7	1 (20 GPM)	0	20	5 (1990 - 2000)	Same as #6 except duration is increased to 10 years.	Poor
8	17 (5 GPM)	0	85	5 (1990 - 1995)	Wells are spotted on 400-foot centers and are located within the 10 mmhos/cm contour.	Fair
	13 (5 & 20 GPM)	0	110	5 (1995 - 2000)	Four production wells are shut-in after five years. Pump rate of three centerline wells is increased to 20 GPM.	Excellent

what model used to generate figures ?

where are results of options 2,3,4,6,7 ?

7.1 PUMP-AND-TREAT REMEDIAL OPTIONS

As stated previously, three of the eight pump-and-treat remedial options were selected to illustrate the range of alternatives. The following text highlights the main components of these options.

Option #1: Three pumping wells in the plume "hot spots."

This option consisted of locating a pumping well within each of the highest EC concentrations in the plume. Figure 8 illustrates the location of each of the three pumping wells. Based on firsthand knowledge of the aquifer, these wells were pumped at 10 gallons per minute (GPM). It is doubtful that a pumping rate in excess of this value can be sustained for a significant period of time. Net pumpage was 30 GPM.

A simulation duration of five years was chosen. The simulation was initiated at the end of the calibration period, and extended from 1990 to 1995. As is obvious upon examination of Figure 8, there has been some progress toward remediating the plume, but a significant mass of salt remains in the aquifer.

Option #5: Eight injection wells and four production wells

This option consisted of a total of eight injection wells and four pumping wells, all located within the property boundary of Jal 4. Figure 9 shows the location of each well. Each injection well injected water at an EC level of 0 mmhos/cm and at a rate of 4 GPM. Each production well was pumped at 10 GPM, yielding a net withdrawal of groundwater from the aquifer of 8 GPM. This option also spanned the period 1990-1995.

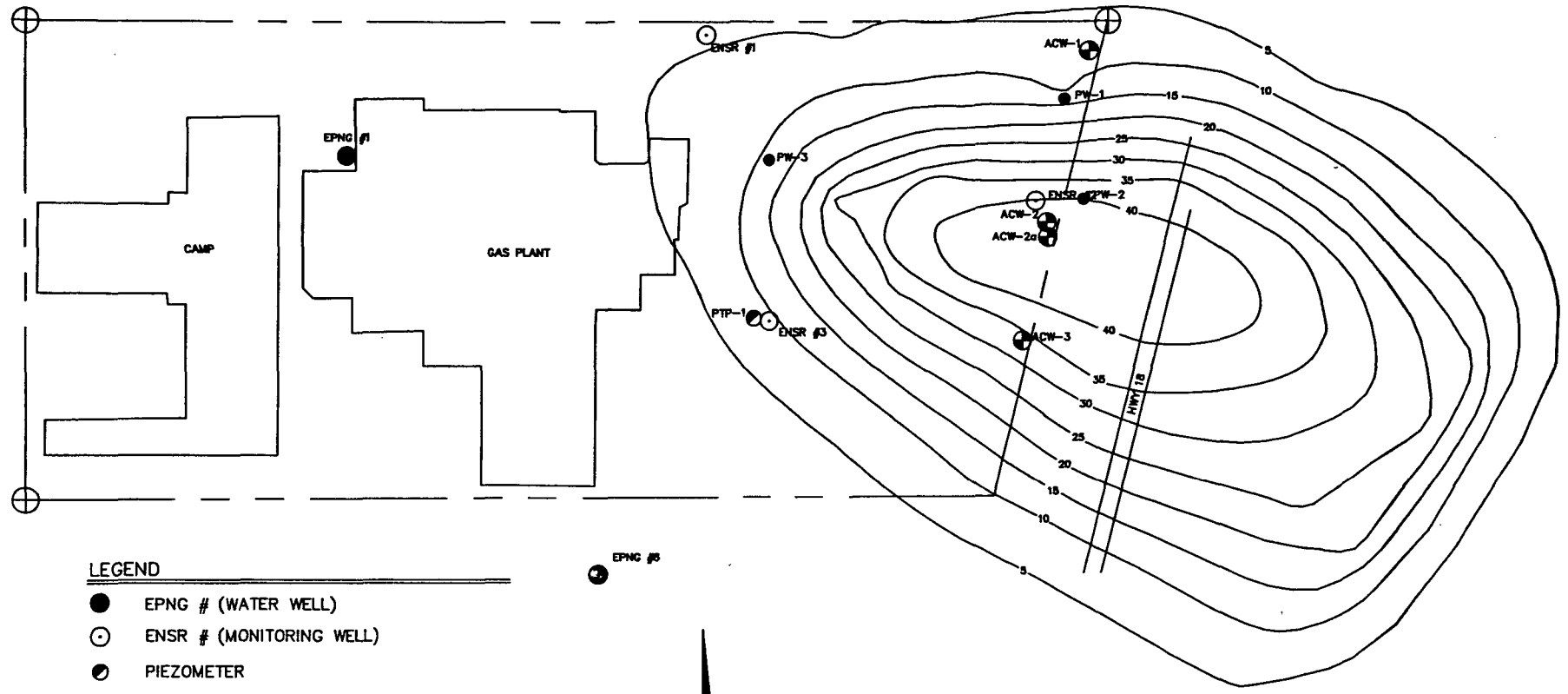
After five years, the injection wells were shut-in, and the recovery wells were allowed to pump for an additional five years (1995-2000) at 10 GPM.

As shown by Figure 9, the portion of the plume on EPNG property has been remediated to below 5 mmhos/cm. But, the portion of the plume that has migrated offsite, located to the east of Highway 18, remains at EC levels as high as 30 mmhos/cm, indicating the need for pumping/injection in this area.

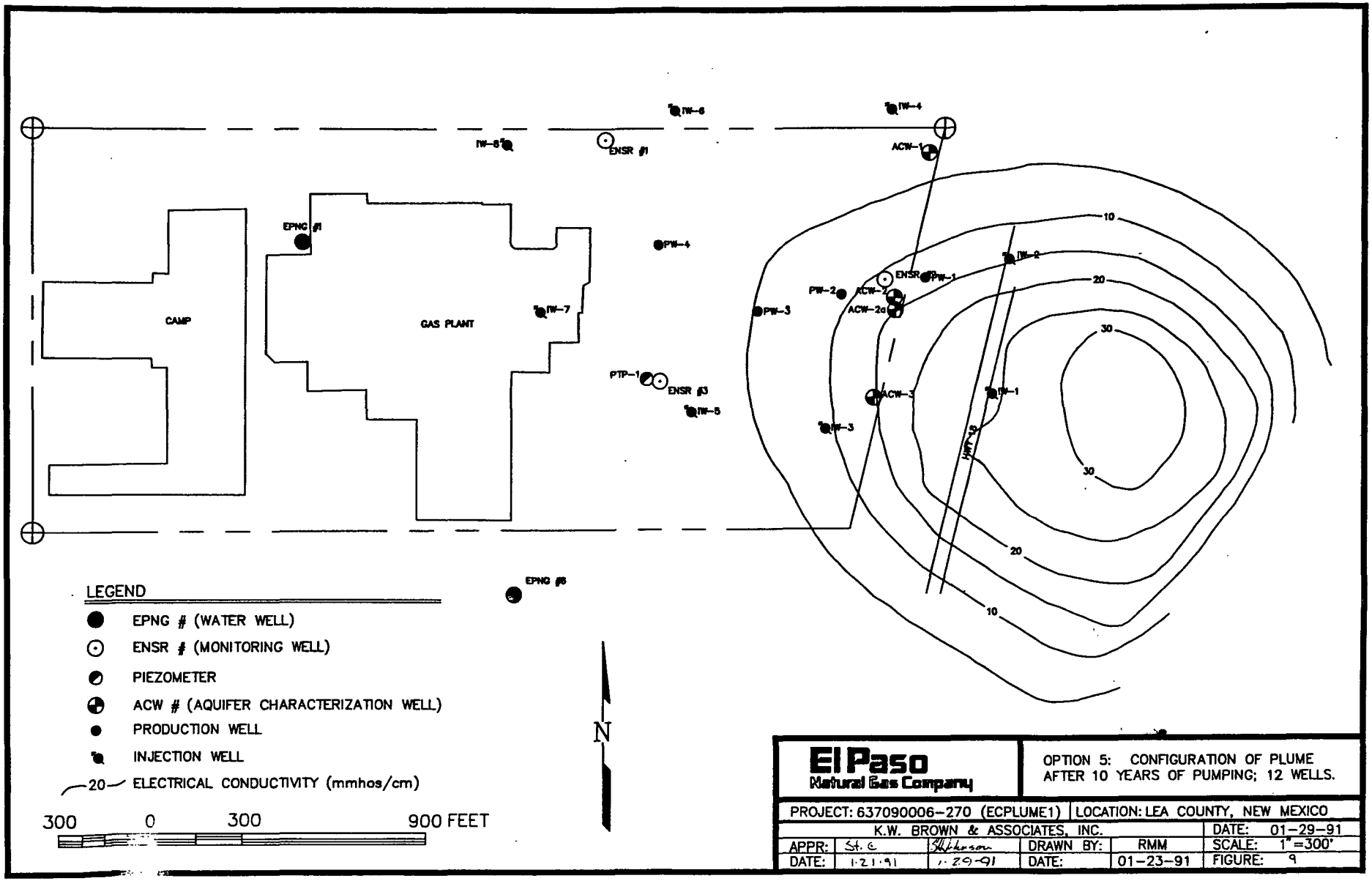
Option #8: Well field

This option employs 17 pumping wells spotted throughout the plume. The intent of this option was to determine the maximum effort that would have to be expended to most effectively diminish EC levels of the groundwater beneath Jal 4.

The well field was designed by locating wells on 400-foot centers within the 10 mmhos/cm contour, as defined by the EC distribution at the end of the calibration period. Each well was pumped at 5 GPM for five years (1990-1995). After five years, four production wells were shut-in, and the three wells that were located on the centerline of the plume at that time were in-



El Paso Natural Gas Company			OPTION 1: CONFIGURATION OF PLUME AFTER 5 YEARS OF PUMPING; 3 WELLS.		
PROJECT: 637090006-270 (ECPLUME1)			LOCATION: LEA COUNTY, NEW MEXICO		
K.W. BROWN & ASSOCIATES, INC.					DATE: 01-29-91
APPR:	[illegible]	[illegible]	DRAWN BY:	RMM	SCALE: 1"=300'
DATE:	1-21-91	1-29-91	DATE:	01-23-91	FIGURE: 8



El Paso Natural Gas Company			OPTION 5: CONFIGURATION OF PLUME AFTER 10 YEARS OF PUMPING; 12 WELLS.		
PROJECT: 637090006-270 (ECPLUME1)			LOCATION: LEA COUNTY, NEW MEXICO		
K.W. BROWN & ASSOCIATES, INC.					DATE: 01-29-91
APPR:	St. C	Stephenson	DRAWN BY:	RMM	SCALE: 1"=300'
DATE:	1-21-91	1-29-91	DATE:	01-23-91	FIGURE: 9

creased to 20 GPM. The balance of the wells was left to pump at 5 GPM. This segment extended from 1995-2000.

Figure 10 indicates that the highest computed EC contour is 8 mmhos/cm (5,120 mg/L TDS), a value that is below the computed upper WQCC standard of 15.6 mmhos/cm (10,000 mg/L TDS). Thus, Option #8 appears to be the most effective at moderating the groundwater contamination associated with Jal 4.

7.2 PUMP-AND-TREAT REMEDIAL COSTS

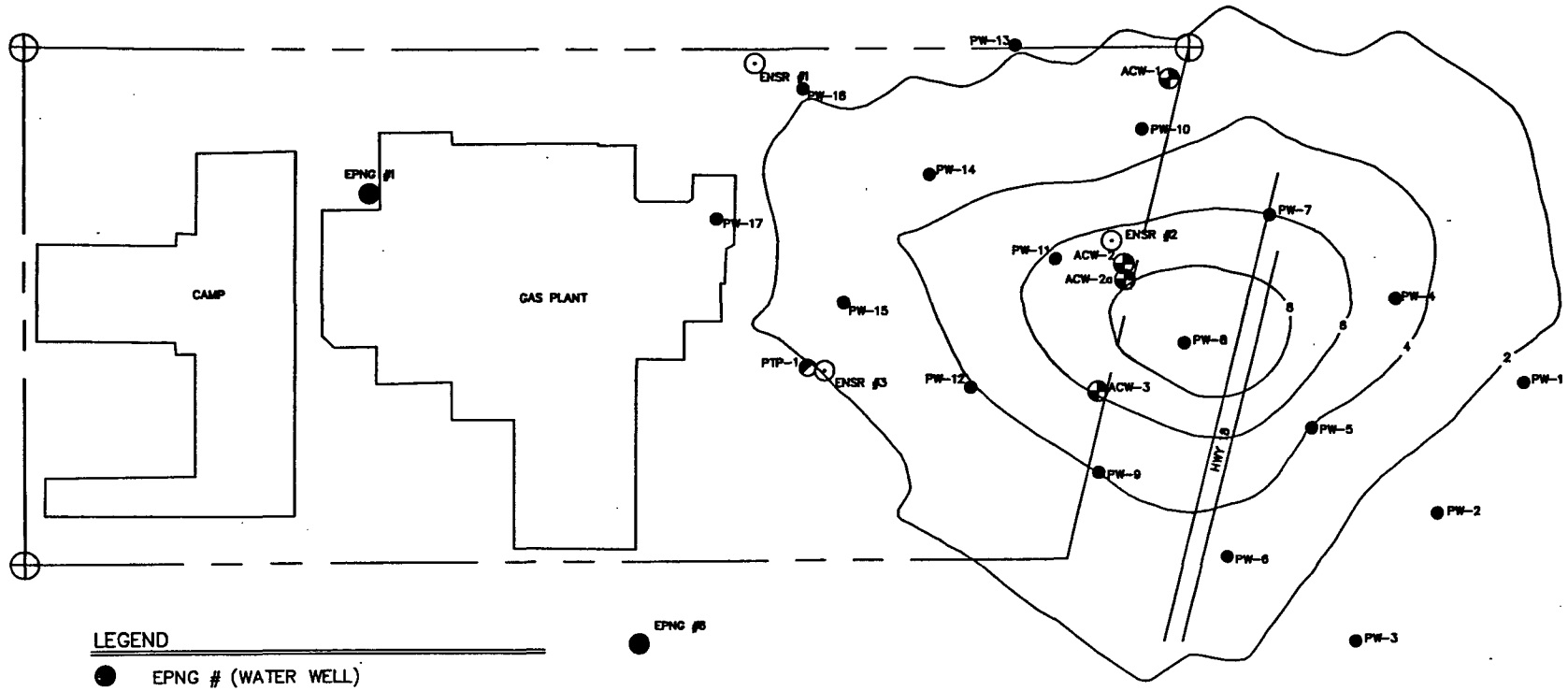
To calculate the costs of the three remedial options presented, unit costs were devised for each element. The primary element of the cost estimate is the installation of the wells and oversight of their installation. Disposal costs have not been included; it is assumed that EPNG will be able to use the EPNG injection well that is situated near the northern boundary of Jal 4. Ancillary costs associated with the wells include plumbing between the recovery wells and the disposal well, running electricity to each of the wells, and annual analytical requirements. Also, maintenance costs have been excluded since it is anticipated that EPNG personnel from the Jal Lab will be able to supervise the system. Table 10 presents the estimated costs for the remedial effort. These costs are offered for comparison purposes only. Itemized costs would be required prior to implementing any activities.

Table 10. Estimated Remedial Costs.

Item	Option #1	Option #5	Option #8
Wells required	3 Pumping wells	4 Pumping wells/ 8 Injection wells	17 Pumping wells
Well installation and materials (3)	$18,000	$41,000	$95,000
Electrical	$14,250 (1)	$18,250 (1)	$45,500 (2)
Plumbing	$1,200 (6)	$1,200 (6)	$3,200 (7)
Annual analytical (4)	$600	$800	$4,800
Consulting costs (5)	$19,600	$35,600	$44,100
Total cost	$53,650	$96,850	$192,600

Note 1: Assumes 1,500 feet of wire installed at $3.50/ft + pump savers.
Note 2: Assumes 7,000 feet of wire installed at $3.50/ft.
Note 3: Assumes a $5,000/well installation cost for pumping wells. Assumes a $2,000/well installation cost for injection wells.
Note 4: Assumes two samples per year for TDS,EC, BETX and total phenols. Two additional samples per year for EC and TDS. Annual cost per pumping well = $200.
Note 5: Costs associated with the installation of wells and field report at the completion of the project. Groundwater modeling would require additional costs.
Note 6: Assumes 2,000 feet of pipe installed at $0.60/ft.
Note 7: Assumes 8,000 feet of pipe installed at $0.60/ft.

From these cost estimates, it is clearly evident that effective remediation of the site will be costly. It is equally evident that remediation will only address a portion of the problem in that,



El Paso Natural Gas Company			OPTION 8: CONFIGURATION OF PLUME AFTER 10 YEARS PUMPING; 17 WELLS.		
PROJECT: 637090006-270 (ECPLUME1)			LOCATION: LEA COUNTY, NEW MEXICO		
K.W. BROWN & ASSOCIATES, INC.					DATE: 01-29-91
APPR:	S.H.C	Signature	DRAWN BY:	RMM	SCALE: 1"=300'
DATE:	1-21-91	1-29-91	DATE:	01-23-91	FIGURE: 10

although the groundwater quality is improved, it is not returned to background conditions. Also, the remediation will require time to be effective. During the remediation period, there will be a need for routine maintenance and monitoring. It is also conceivable that during the course of the remediation effort the data being collected will suggest that modifications to the system will be needed.

8.0 CONCLUSIONS AND RECOMMENDATION

Conclusions derived from the Phase 2 effort in many respects parallel those offered in the Phase 1 report. The presence of a groundwater contaminant plume whose origin is seemingly tied to the past operation of the wastewater ponds was confirmed. Likewise, the southeasterly groundwater flow direction and the low hydraulic gradient, as presented in Phase 1, were verified.

The waste constituents noted in the groundwater plume during Phase 2 were consistent with Phase 1 findings. Although the analytical list was drastically reduced for the second phase, the constituents noted included BETX, phenols, and elevated levels of salt (as determined by measuring TDS and EC). Interpretation of the Phase 1 and Phase 2 data clearly suggest a source of recharge to the aquifer which contained volatile hydrocarbons, phenolic compounds, naphthenes, and large quantities of salt.

Need more analyses of pH, Cation/Anion Ratio

Physical testing determined the aquifer had a hydraulic conductivity of 4.5 x 10-3 cm/sec, a transmissivity of 6,128 GPD/ft, and a storage coefficient of 0.0152. These values are appropriate for the type of aquifer documented at the site. Moreover, these values approximated the values assumed for the modeling effort conducted during Phase 1.

It is our assessment that only two options, or a variation between the two options, will be appropriate. These options are: (a) justify to OCD the "do nothing" approach or, (b) implement a pump-and-treat system. The merits of choosing either approach will focus on salts present in the groundwater, not organics. This position is warranted because the levels of organics are low and the current TDS of the water renders it unusable. Therefore, any remediation that may be required must deal with removal of salts. If the salts are removed, it is reasonable to predict that the organics will be addressed.

but still above WQCC stds and background Levels

It is our recommendation that EPNG explore all aspects of the "do nothing" option prior to instigating additional work at the site. If the pump-and-treat option is ultimately required, our calculations predict that a minimum of 10 years will be required to remove just a portion of the plume. It will be possible to speed up the process by installing higher capacity wells, more wells, or both. Given the pump-and-treat option is based on the assumption that recovered water can be injected near the site, it will be important to determine the capacity of the injection well. Hence, prior to selecting a final well field design, it will be necessary to gain information on the performance of the injection well.

In the event recovery of the groundwater plume is required, and the injection well is deemed unsuitable, it will be necessary to explore options such as treating the water by reverse osmosis

What about vertical definition of plume ? (i.e. deep wells)

Need to complete definition of plume boundaries

or trucking the water to a different disposal well. In either case, the costs for the project will increase dramatically.

9.0 REFERENCES

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Todd, D. K. 1980. Groundwater Hydrology. Second Edition. John Wiley & Sons, Inc., New York, NY.

El Paso
Natural Gas Company

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-541-2600

March 18, 1991

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Christie Gas Corporation
Attn: Mr. Joe Christie
Barton Oaks Plaza Two, Suite 515
901 MoPac Expressway South
Austin, TX 78746

Re: Discharge Plan for EPNG's Jal No. 4 Plant

Dear Mr. Christie:

The New Mexico Oil Conservation Division (OCD) administers through delegation, all New Mexico Water Quality Control Commission (WQCC) regulations pertaining to surface and groundwater at natural gas processing plants.

Section 3-111 of the WQCC regulations states that with respect to the transfer of a discharge plan, "... the transferor shall notify the transferee in writing of the existence of the discharge plan, and shall deliver or send by certified mail to the director a copy of such written notification, together with a certification or other proof that such notification has in fact been received by the transferee. Upon receipt of such notification, the transferee shall have the duty to inquire into all of the provisions and requirements contained in such discharge plan, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in the divisions's file or files concerning such discharge plan."

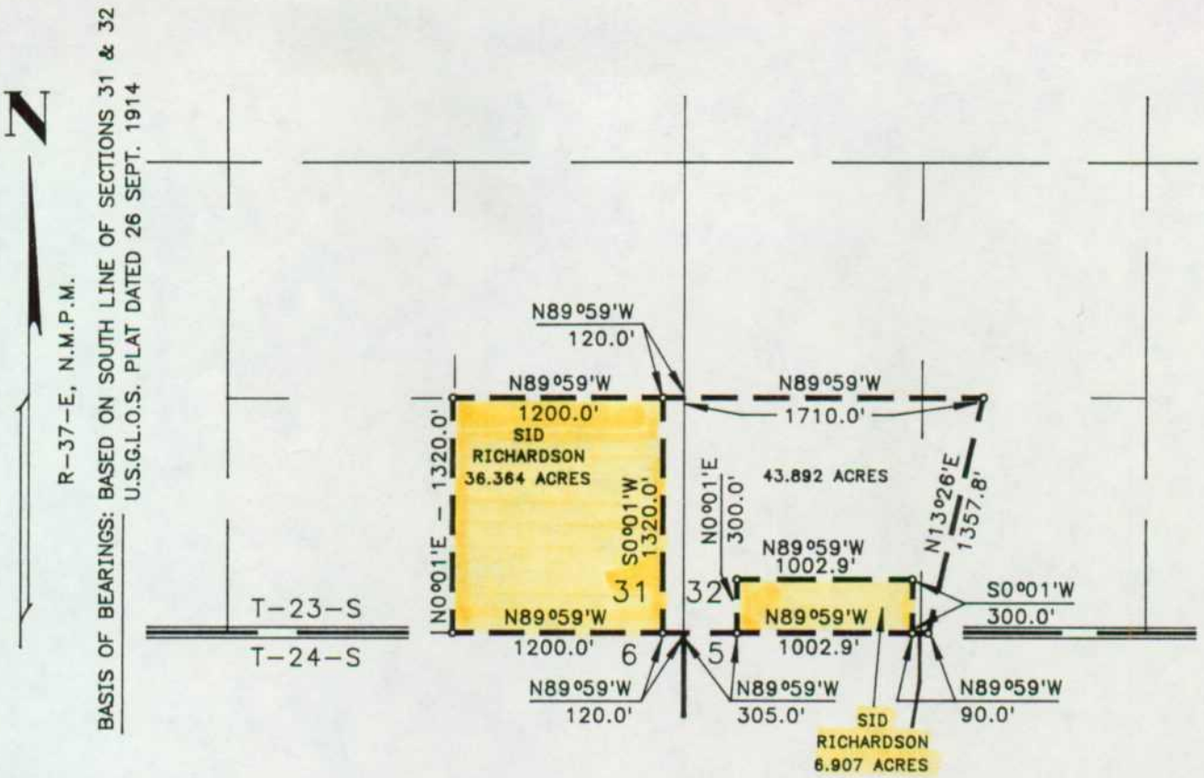
Please consider this letter to be written notification of the existence of a discharge plan for the Jal No. 4 Plant. A copy of the discharge plan will be sent to you under separate cover. The current discharge plan for the facility has expired and it will be necessary to submit and gain approval of a new discharge plan prior to beginning operations at the facility.

If you have any questions concerning this matter, please contact me at 915/541-2323.

Sincerely,

Philip L. Baca, P.E.
Sr. Compliance Engineer

cc: Mr. William J. LeMay
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504-2088



PLAN

SCALE: 1"=1000'

OWNERSHIP

SUBDIVISION	OWNER	LESSEE	ACRES
	SID RICHARDSON CARBON & GASOLINE CO.		6.907
	SID RICHARDSON CARBON & GASOLINE CO.		36.364
	E. P. N. G. CO.		43.892

REF. DWG.:

REVISIONS

NO.	DATE	TO	W.O.
		PRINT RECORD	

ENG. REC.		DATE
DRAWN	FB	1/11/90
CHECKED	MG	12 Jan. 90
CHECKED		
PROJ. APP.		
SURVEYED		12/9/89
CGC NO.		GEN190
R/W NO.		
W.O.		

El Paso NATURAL GAS COMPANY

JAL NO.4 PLANT
PROPERTY FOR SALE TO SID RICHARDSON
SECTION 31 & 32, T-23-S, R-37-E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SCALE NOTED | DWG. NO. 5004.1-X-22 | REV.

FM92 (Rev. 8/88)

LAW OFFICES OF
CHRISTIE, BERRY & DUNBAR
1700 NORTH STANTON
EL PASO, TEXAS 79902
915/532-3638

JOE CHRISTIE
MARK BERRY
EDWARD W. DUNBAR
MICHAEL C. CROWLEY
ANGELICA J. BARILL

JOHN A. YEAGER
OF COUNSEL

901 MOPAC EXPWY. SOUTH
SUITE 515
AUSTIN, TEXAS 78746
512/327-9510

March 6, 1991

Mr. Howard L. Holder
El Paso Natural Gas Company
P. O. Box 1492
El Paso, Texas 79978

Dear Mr. Holder:

This is to confirm the agreement reached today wherein El Paso Natural Gas Company ("El Paso") promises to sell and Joe Christie or his assignee ("Christie") promises to buy the following real and personal property presently located and owned by El Paso and located approximately 11 miles north of Jal, New Mexico on State Highway 18 (known as the Jal No. 4 Field Plant) and described as follows:

> SE/4 SE/4, Section 31, S/2 SW/4, West T & N, R.R.R.O.W., Section 32, T-23-S, R-37-E, Lea County, New Mexico. Also portions of Lots 3 & 4, SW/4 NW/4 and W/2 SW/4 of Section 5, T-24-S, R-37-E, N.M.P.M., lying West of Texas - New Mexico R.O.W.

This contract of sale is subject to the following terms and conditions:

1. Excluded from this sale is all property previously sold to the Sid Richardson Company;

2. Purchase price to be paid on date of closing is $100,000.00;

3. Closing will be no earlier than March 31, 1991. El Paso agrees to use its best efforts to obtain an extension from the appropriate New Mexico authorities so that the closing date can be extended to April 30, 1991.

4. Prior to closing, El Paso will make appropriate personnel and all relevant records available to Christie so that Christie can conduct a due diligence investigation of the property. Such records will include but not be limited to, all records and correspondence from any State or Federal regulatory agency with jurisdiction over environmental matters concerning the property.

5. If, prior to closing, in the sole opinion of Christie there exists a reason or Christie should not purchase the property, Christie will notify El Paso of such fact. If Christie's objection cannot be resolved by mutual agreement between El Paso and Christie, then Christie may either waive his objections and proceed with the purchase or notify El Paso of his desire to cancel the contract.

6. The property is, and will be at closing, free and clear of all liens, claims and encumbrances.

7. The personal property and equipment will be sold on a "where is, as is" basis.

Accepted and agreed to this the 6th day of March, 1991 by

Joe Christie, Purchaser

and

El Paso Natural Gas Company by

Howard L. Holder

JC/as

El Paso
Natural Gas Company

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-541-2600

February 26, 1991

New Mexico Oil Conservation Division
Attn: Mr. Dave Boyer
P.O. Box 2088
Santa Fe, NM 87504

Subject: El Paso Natural Gas Company's (EPNG) Jal No. 4 Plant
- Disposal of Nonfriable Transite and Mole Sieve Beads

Dear Mr. Boyer:

Please consider this letter to be a follow-up to our phone conversation of February 25, 1991. During that conversation we discussed EPNG's demolition of the Jal No. 4 "A" gasoline plant. Specifically, we discussed the following items:

- Disposal of Nonfriable Transite: During our conversation it was agreed to that in light of recent NESHAP regulation changes concerning transite, the transite may be disposed of on-site. As indicated to you during our phone conversation, the transite is in the form of building siding and will be wrapped in polyethylene plastic and buried on-site.

- Disposal of Mole Sieve Beads: The beads have been analyzed for hazardous wastes and were found to be free of any hazardous waste. Thus it was agreed to that the beads may be applied to grade or buried in a pit at the facility. The beads will be spread across the surface of the plant facility.

During our phone conversation, you mentioned the status of the old brine pits. Specifically, you reminded me that the brine pits must either be closed or repaired by March 31, 1991. A final decision with respect to EPNG's plan of action with respect to the pits is anticipated shortly.

If you have any questions concerning this matter, please feel free to contact me at 915/541-2323.

Sincerely,

Philip L. Baca, P.E.
Sr. Compliance Engineer

PLB:asg

OCD, EPNG Meeting on Jal #4 - 9/24/90 - 1030 hrs

Participants
- Bill Olson - OCD
- Roger Anderson - OCD
- Phil Baca - EPNG
- Dave Boyer - OCD
- Don Payne - EPNG

PB. handed out maps of - MW locations
- Predicted EC Conc.
- Organic Constituents detected
- Field EC

	Cl⁻ (ppm)
ENSR # 1	11,000
# 2	3,000
# 3	1,000
EPNG # 1	72

Questions:
1) Do have problem
2) Best locations for MW's
~~3) Injection wells~~

K.W Brown wanted 4 wells along Hwy 18 as shown on 1st figure. Revised to 3 wells along Hwy 18

Propose

1-) 3 wells along Hwy 18
2-) Piezometer adjacent to EXSR #3, for observation well for pump test

GW flow to SE

* Wells completed below water table up to 17' below

New MW's will be screened across water table

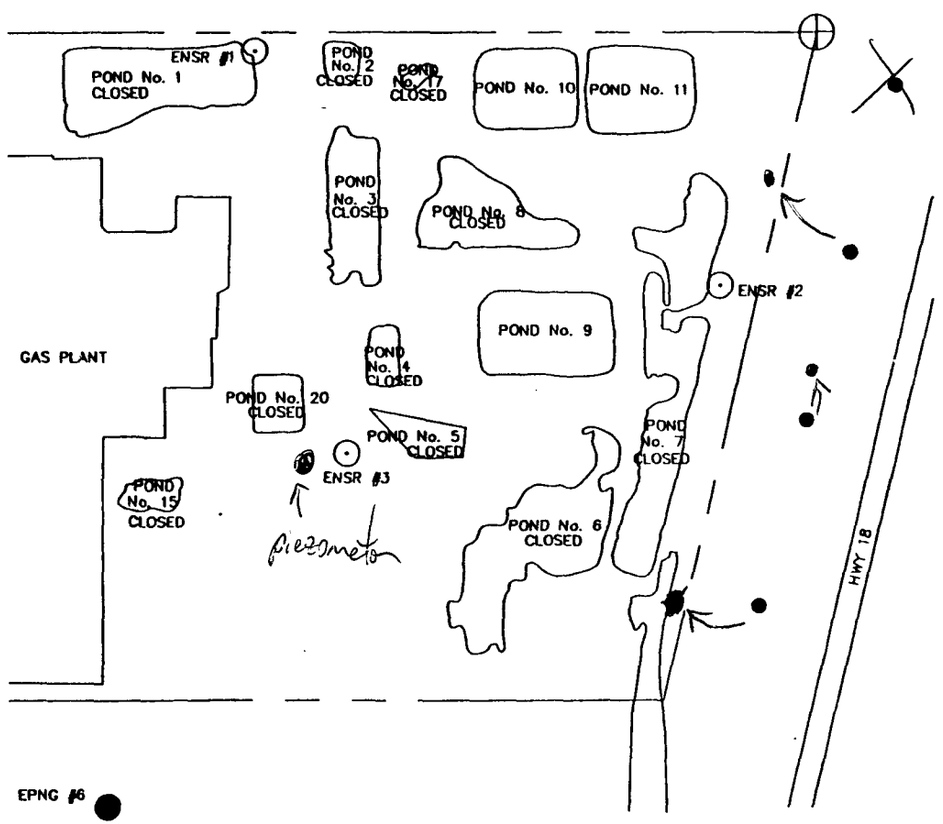
No wells can be observed by sight across Hwy

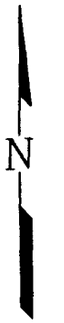
P.B. To what extent are you responsible for pre 1977 contamination (ie pre-regulation & WOCC) Cont. from old ponds and new?

O.P. Currently dispose in injection well

O.D If have contaminants in new wells will have to go further east. Will evaluate after reviewing info from new wells
Do analyses for - A+H purgeable
PAH's
Nitrate
Major Cations / Anions

P.B Expect drilling Oct 1990 with report in 6-8 weeks following drilling





0 100 200 300 400 FEET

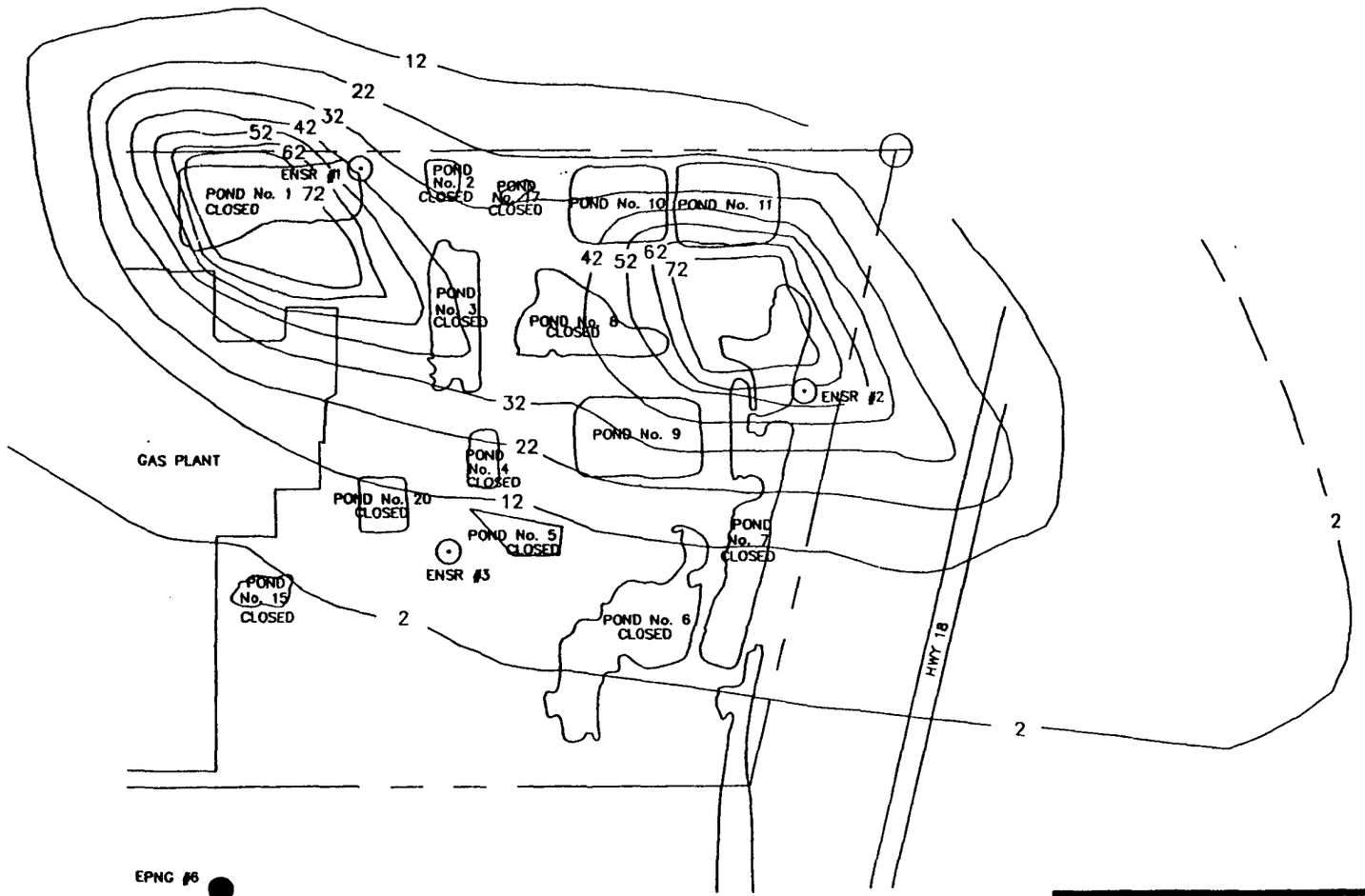
LEGEND

● PROPOSED MONITORING WELL

El Paso Natural Gas Company

PROPOSED MONITORING WELLS

PROJECT: EPNG–JAL 63724 (EPJAL)				LOCATION: LEA COUNTY, NEW MEXICO	
K.W. BROWN & ASSOCIATES, INC.					DATE: 8-14-90
APPR:			DRAWN BY:	RSW	SCALE: AS SHOWN
DATE:			DATE:	8-13-90	FIGURE: 12



N

0 100 200 300 400 FEET

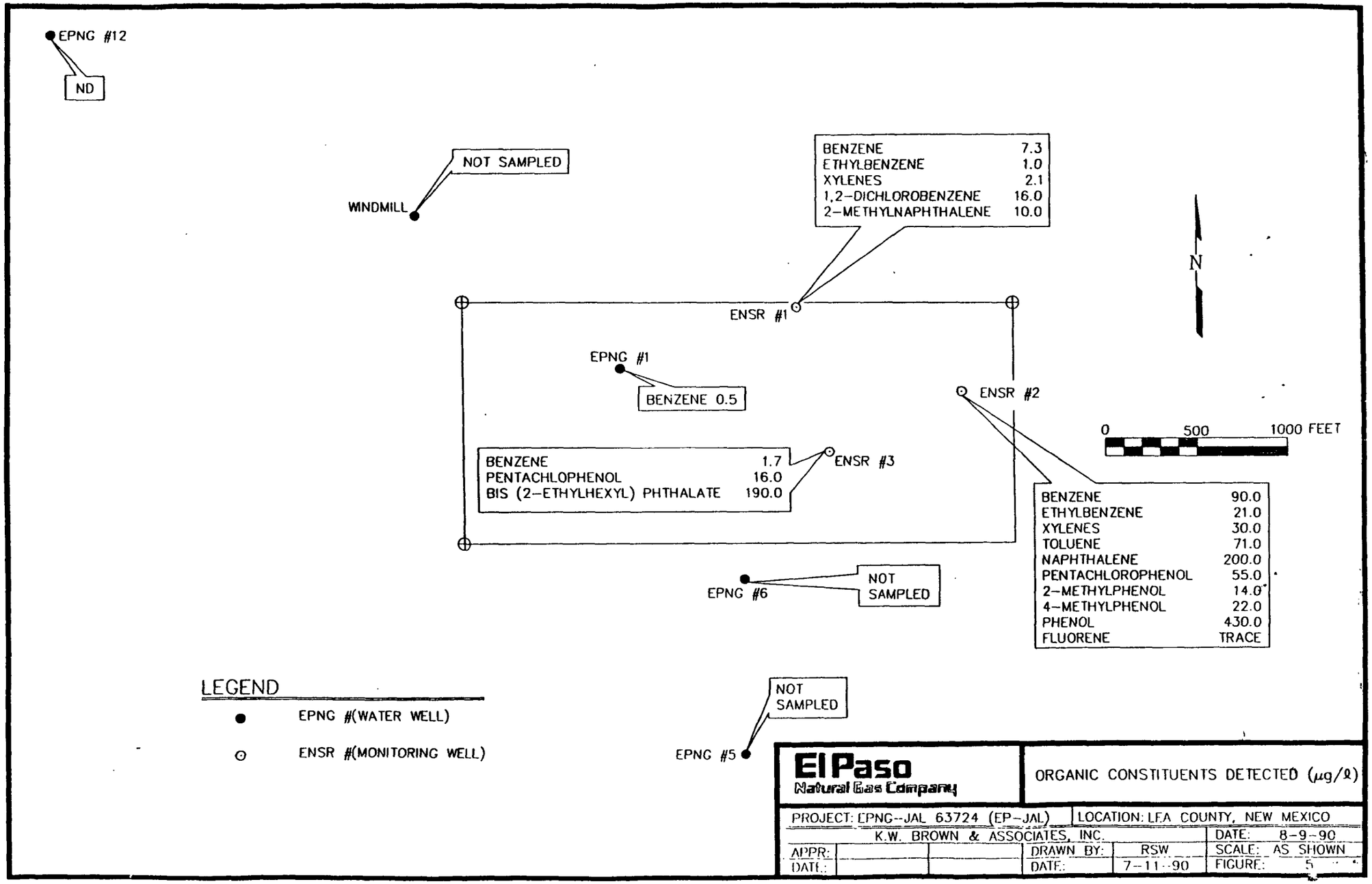
LEGEND

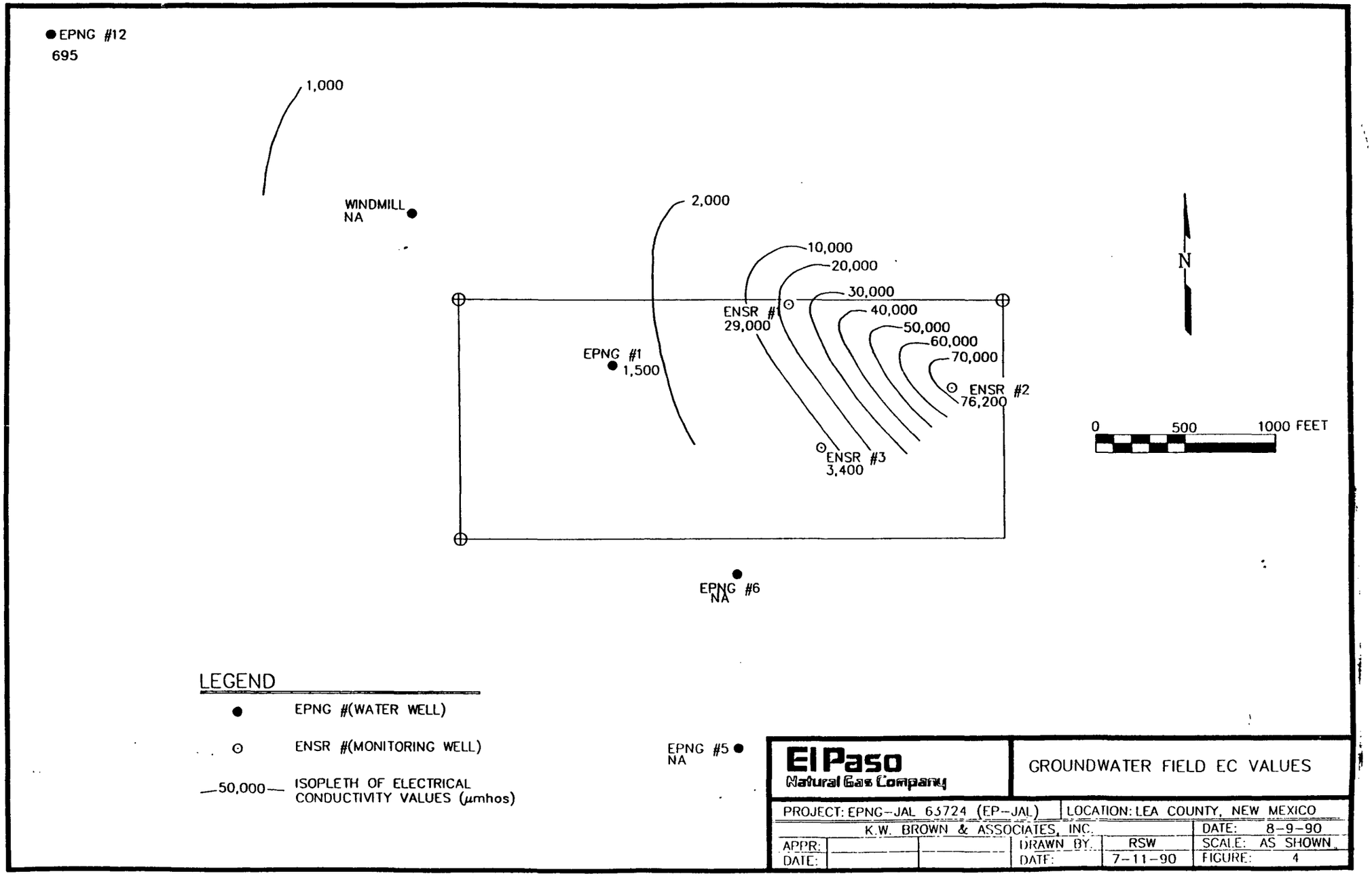
—12— ELECTRICAL CONDUCTIVITY (μmhos/cm x 1000)

El Paso Natural Gas Company

PREDICTED EC CONCENTRATIONS

PROJECT: EPNG–JAL 63724 (EPJAL)				LOCATION: LEA COUNTY, NEW MEXICO	
K.W. BROWN & ASSOCIATES, INC.					DATE: 8–14–90
APPR:			DRAWN BY:	RSW	SCALE: AS SHOWN
DATE:			DATE:	8–13–90	FIGURE: 10


EPNG #12
ND
WINDMILL
NOT SAMPLED
BENZENE 7.3
ETHYLBENZENE 1.0
XYLENES 2.1
1,2-DICHLOROBENZENE 16.0
2-METHYLNAPHTHALENE 10.0
ENSR #1
N
EPNG #1
BENZENE 0.5
ENSR #2
0 500 1000 FEET
BENZENE 1.7
PENTACHLOPHENOL 16.0
BIS (2-ETHYLHEXYL) PHTHALATE 190.0
ENSR #3
BENZENE 90.0
ETHYLBENZENE 21.0
XYLENES 30.0
TOLUENE 71.0
NAPHTHALENE 200.0
PENTACHLOROPHENOL 55.0
2-METHYLPHENOL 14.0
4-METHYLPHENOL 22.0
PHENOL 430.0
FLUORENE TRACE
EPNG #6
NOT SAMPLED
LEGEND
EPNG #(WATER WELL)
ENSR #(MONITORING WELL)
EPNG #5
NOT SAMPLED
El Paso Natural Gas Company
ORGANIC CONSTITUENTS DETECTED (µg/ℓ)
PROJECT: EPNG--JAL 63724 (EP-JAL)
LOCATION: LEA COUNTY, NEW MEXICO
K.W. BROWN & ASSOCIATES, INC.
DATE: 8-9-90
APPR:
DATE:
DRAWN BY: RSW
DATE: 7-11-90
SCALE: AS SHOWN
FIGURE: 5


EPNG #12
695
1,000
WINDMILL
NA
2,000
10,000
20,000
30,000
40,000
50,000
60,000
70,000
ENSR #1
29,000
EPNG #1
1,500
ENSR #2
76,200
ENSR #3
3,400
N
0
500
1000 FEET
EPNG #6
NA
EPNG #5
NA
LEGEND
EPNG #(WATER WELL)
ENSR #(MONITORING WELL)
50,000 ISOPLETH OF ELECTRICAL CONDUCTIVITY VALUES (μmhos)
El Paso Natural Gas Company
GROUNDWATER FIELD EC VALUES
PROJECT: EPNG-JAL 63724 (EP-JAL)
LOCATION: LEA COUNTY, NEW MEXICO
K.W. BROWN & ASSOCIATES, INC.
DATE: 8-9-90
APPR:
DATE:
DRAWN BY: RSW
DATE: 7-11-90
SCALE: AS SHOWN
FIGURE: 4

DRAIN LINE TESTING PROCEDURE

for

SID RICHARDSON CARBON & GASOLINE CO.

JAL NO. 4 PLANT

LEA COUNTY, NEW MEXICO

January 7, 1991

SUMMARY

This drain line testing plan sets forth the methods and procedures which Sid Richardson Carbon & Gasoline Co. proposes to use to verify the integrity of the underground drain system at the Jal No. 4 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 Jal No. 4 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 pressure. This will assure that all underground piping is tested.

Drain Line Testing Procedures for Jal No. 4 Plant

Introduction

The following procedures are arranged to allow testing of various sections of the drain system with the plant in operation.

The test sequence should be arranged so water from one section can be routed into the next section to be tested where possible. This should shorten filling time and provide more economical use of water.

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 hydrostatic test pump unnecessary. The higher pressures will require 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 will contain significant amounts of Hydrogen Sulfide (H_2S) will be opened and tested observing all prescribed safety precautions and procedures.

2. Line sizes, tap numbers and locations of valves are shown on drawing No. J4-D-001, "Drain System". The entire test procedure is directly related to information on this drawing.

3. All drain and block valves which are lubricated plug valves, should be lubricated in the closed position to minimize possibility of leakage.

4. Before installing expandable plugs, clean the interior portion of the pipe where plug seal will contact pipe wall to assure proper sealing.

5. Use new gaskets when installing blind plates in flange unions and tighten flange bolts evenly to prevent tilting of flange faces and leakage.

6. Filling a test section should always be 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 procedures 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.

8. After test pressure has been applied and stabilized, system will be isolated and test will last for (1) one hour. This is to be a static pressure test. Introduction of additional pressure will void previous time interval and will require restarting 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 gasket will cause leakage at the blind plate installations.

    d. Other points to check for system leakage are: loose screwed fittings and valves, stem packing (or bonnet) leakage on gate or globe valves, worn seating surfaces in ball valves, unseated gate or globe valves, 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.

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 reference 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 periodically and a written report sent to the West Texas Area Manager with copies to Engineering and the file at the Plant.

15. The open drain collection point is open to the atmosphere and will be tested annually by filling with water and gauging any drop in level over a 4 hour period.

Line: 6"/8" Open Drain Line from "A" Compressor Building to Junction with 10" Open Drain Line.

1) a. Install threaded plug in South Basement drain line in "A" Compressor Building;

   b. Close valves on oil cooling water sidestream filter drain;

   c. Close valves on jacket water sidestream filter drain.

2) a. Install expandable plug in drain from containment apron No. 5;

   b. Install expandable plug in drain from containment apron No. 11;

   c. Install expandable plug in 6" drain from water treater backwash sump;

   d. Install expandable plug in drain from containment apron No. 9;

   e. Install expandable plugs in 2" drains in Auxiliary Building.

3) a. Install plug in 8" stopple fitting at junction with 10" water treater backwash drain line.

   b. Open valve at tap No. 14 for venting;

   c. Using tap F26 at 8" stopple fitting, fill system with water until all air/gas is displaced from line.

4) Install properly zeroed recorder on tap No. 14 then stabilize system pressure using fill tap F26.

5) Raise pressure to 20 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

6) If static pressure cannot be maintained as specified, refer to General Instruction, Item 9.

7) At the end of testing period, chart shall be removed and retained for permanent record and will be identified as indicated in General Instruction, Item 12.

8) Upon completion of test:

   a. Release test presure;

   b. Remove expandable and threaded plugs from:

      (1) 6" Water treater backwash sump drain;
      (2) Containment Apron No. 11;
      (3) Containment Apron No. 5;
      (4) Containment Apron No. 9;
      (5) South Basement drain in "A" Compressor Building
      (6) 2" Drains in Auxiliary Building

Line: 6"/8" Open Drain Line from "A" Compressor Building to Junction 10" Open Drain Line - Cont'd

c. Position drain valves at oil and jacket cooling water sidestream filters for normal operation.

d. Remove plug from 8" stopple fitting at junction with 10" water treater backwash line;

e. Close and plug all vent and fill taps.

9) Proceed to test on 10" water treater backwash line.

Line: 10" Open Drain Line - Section I

1) Close valve on 4" floor drain from "A" Compressor Building at junction with 10" open drain line near old "C" Compressor Inlet Regulator Run.

2) a. Install 10" expandable plug in drain line in water treater backwash sump;

   b. Install 10" expandable plug in drain line at open drain collection point;

3) a. Install plug in 8" stopple fitting at junction with "C" Compressor Plant open line near corner of block fence.

4) a. Open valve at Tap F27 for venting;

   b. Using Tap F29 at open drain collection point, fill system with water until all air is displaced from the line;

   c. Close valve at Tap F27.

5) Install properly zeroed recorder on Tap F27 then stabilize system pressure.

6) Raise pressure to 20 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

7) If static pressure cannot be maintained as specified, refer to General Instruction, Item 9.

8) At the end of testing period, chart shall be removed and retained for permanent record and will be identified as indicated in General Instruction, Item 12.

9) Upon completion of test:

   a. Release test pressure;

   b. Remove expandable plugs from drain in water treater backwash sump.

   c. Remove plug from 8" stopple fitting at junction with 10" near block fence corner and secure;

   d. Open 4" valve in line from Compressor Building Drain;

   e. Close and plug all vent and fill valves.

Line: 4" Drain from "A" Compressor Building to 10" Line

1) a. Close 4" valve at west side of building near jacket water surge tank;

   b. Close 4" valve at junction with 10" open drain line near "C" Compressor Inlet Regulator Run;

   c. Close valve on drain from waste heat boiler blowdown drum;

   d. Close valves on drains from sample coolers.

2) a. Open valves on Taps F33 and F36 for venting;

   b. Using Tap F32 in 4" drain at junction with 10" drain, fill system with water until all air is displaced from the lines;

   c. Close valves at Taps F33 and F36.

3) Install properly zeroed recorder on Tap F32 then stabilize system pressure.

4) Raise pressure to 20 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

5) If static pressure cannot be maintained as specified, refer to General Instruction, Item 9.

6) At the end of testing period, chart shall be removed and retained for permanent record and will be identified as indicated in General Instruction, Item 12.

7) Upon completion of test:

   a. Release test pressure;

   b. Open 4" valve at junction with 10" drain;

   c. Open valves on waste heat boiler blowdown drum and sample coolers;

   d. Open 4" valves at west side of building near jacket water surge tank;

   e. Close and plug all vents and fill valves.

Line: 3" Closed Drain from 66" I.D. Low Pressure System Inlet Scrubber to South Storage Tank (Off-Site)

1) a. Close (2) 4" block valves on dump from inlet scrubber;

   b. Close 4" valve on pressure drain at junction with 3" drain to tank;

   c. Close 3" valve in line at hydrocarbon storage tanks;

   d. Lubricate in closed position 2" valve on (2) siphon drains on 24" and 30" headers and (1) valve on manual dump on inlet scrubber.

2) a. Open valve on Tap F40 near 3" valve at tanks;

   b. Open valve on Tap F41 on dump valve piping for venting;

   c. Using Tap F38 near 4" to 3" junction, fill system with water until all gas/air is displaced from lines;

   d. Close valves on Taps F40 and F41.

3) Install properly zeroed recorder on Tap F38 and stabilize system pressure.

4) Raise pressure to 20 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

5) If static pressure cannot be maintained as specified, refer to General Instruction, Item 9.

6) At the end of testing period, chart shall be removed and retained for permanent record and will be identified as indicated in General Instruction, Item 12.

7) Upon completion of test:

   a. Release test pressure;

   b. Open 3" valve in line at storage tank;

   c. Open 4" valve at 4" to 3" junction;

   d. Open (2) 4" valves on dump from inlet scrubber;

   e. Position 2" siphon drain valves, and 2" manual drain valves for normal operation;

   f. Close and plug all vents and fill valves.

Line: 4" Closed Drain from "C" Compressor Area to Junction with 3" Line to Off-Site South Storage Tank

1) a. Close (2) 2" block valves on dumps from "C" compressor inlet scrubber;

   b. Close (2) 4" block valves on dump from "A" compressor suction scrubber;

   c. Close 1" valve on sump pump discharge at the north end of "A" Compressor Building;

   d. Close 4" valve on closed drain line at junction with 3" line near 66" I.D. Low Pressure inlet scrubber.

2) a. Open valve on Tap F37 for venting;

   b. Open valve on Tap F39 at "A" compressor suction scrubber;

   c. Using Tap No. 21 at "C" compressor inlet scrubber, fill system with water until all air is displaced from lines;

   d. Close valves on Taps F37 and F39.

3) Install properly zeroed recorder on Tap F37 and stabilize system pressure.

4) Raise pressure to 20 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

5) If static pressure cannot be maintained as specified, refer to General Instruction, Item 9.

6) At the end of testing period, chart shall be removed and retained for permanent record and will be identified as indicated in General Instruction, Item 12.

7) Upon completion of test:

   a. Release test pressure;

   b. Open 4" valve at junction with 3" line near 66" I.D. Low Pressure inlet scrubber;

   c. Open (2) 2" block valves on dumps from "C" compressor inlet scrubber;

   d. Open 1" valve on sump pump discharge piping;

   e. Open block valve on dump from "A" Compressor Plant suction scrubber;

   f. Close and plug all vents and fill valves.

Line: 3" Closed Drain From Valve at Inlet Gas Cleaners (V6 & V6A) to East Field Hydrocarbon Separator North of Plant

1) a. Close 3" ball valve on line east of inlet gas cleaners;

   b. Close valve at inlet of east field hydrocarbon separator north of Plant.

2) a. Open valve at Tap F49, on hydrocarbon separator inlet piping, for venting;

   b. Using Tap F43, at 3" ball valve, fill system with water until all gas is displaced from the line;

   c. Close valve at Tap F49.

3) Install properly zeroed recorder on Tap F49 then stabilize system pressure using Tap F43.

4) Raise pressure to 80 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

5) If static test pressure cannot be maintained as specified, refer to General Instruction, Item 9.

6) At the end of testing period, chart shall be removed and retained for permanent record and will be identified as indicated in General Instruction, Item 12.

7) Upon completion of test:

   a. Release test pressure

   b. Open valve at inlet of east hydrocarbon separator;

   c. Open 3" ball valve in line, east of inlet gas cleaners;

   d. Close and plug all vents and fill valves.

Line: 4" Closed Drain to Hydrocarbon Separators and Tanks North of Plant

1) a. At south end of "A" compressor suction and discharge headers, lubricate (in the closed position) (5) 2" plug valves on siphon drains;

b. At the "A" compressor gas cooling fin-fan, lubricate (4) 2" drain valves on the bottom of the headers: (1) East side and (3) West side;

c. Close 2" block valve on dump at 3rd stage suction scrubber "A" compressor;

d. Close 2" block valves on dump at 2nd stage suction scrubber "A" compressor;

e. Lubricate 2" siphon drain valves on north end of 10" 3rd stage discharge header and 12" 3rd stage suction header;

f. Lubricate (3) 2" drain valves beneath north end of 16" 1st stage discharge, 16" 2nd stage suction and 12" 2nd stage discharge;

g. Close block valve on dump from 3rd stage discharge scrubber;

h. Close (2) 1" valves on ESD Valve Operator Volume Tanks;

i. Close valve on 1" line from 10" water leg at junction with 4" pressure drain header;

j. Install blind plate between 2" check valve and 2" ANSI 150 flange at southeast corner of 10" 2nd stage discharge header at "C" compressor gas cooling fin-fan;

k. Install blind plate between 2" check valve and 2" ANSI 150 flange in drain from 18" 1st stage discharge header at the northwest corner of "C" compressor fin-fan;

l. Close 2" block valve on dump from "C" Plant 2nd stage suction scrubber;

m. Lubricate 2" valve on siphon drain on 20" inlet gas line at inlet gas cleaners (V6 & V6A);

n. Close 3" ball valve (at transition in line size from 4" to 3") located east of inlet gas cleaners.

2) a. Open valve on Tap F42 at 3" ball valve, for venting;

b. Open valve on Tap F45 at east side of "A" compressor fin-fan;

c. Open valve on Tap F46 below block valve on dump from 2nd stage scrubber;

d. Using Tap No. 15, fill system with water until all air/gas is displaced from lines;

e. Close valves on Taps F42, F45 and F46.

3) Install properly zeroed recorder on Tap No. 22 and stabilize system pressure.

4) Raise pressure to 80 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

5) If static pressure cannot be maintained as specified, refer to General Instruction, Item 9.

6) At the end of testing period, chart shall be removed and retained for permanent record and will be identified as indicated in General Instruction, Item 12.

7) Upon completion of test:

a. Release test pressure;

b. Open 3" ball valve in line to hydrocarbon separator north of Plant;

c. Open 2" block valve on dump from "C" Plant 2nd stage suction scrubber;

d. Remove blind plates from lines at check valves at "C" compressor fin-fan;

e. Open 1" valve on drain line from 10" water leg at junction with 4" pressure drain header;

f. Position (2) 1" valves for normal operation on ESD Operator Volume Tanks;

g. Open block valve on dump from 3rd stage discharge scrubber;

h. Open 2" block valve on dump at "A" compressor 2nd stage scrubber;

i. Open 2" block valve on dump at "A" compressor 3rd stage suction scrubber;

8) Close and plug all vents and fill valves.

Line: 2"/4" Closed Drain from Open Drain Collection Point Pump to Field Storage Tanks No. 22 & 33

1) a. Close (2) 2" block valves on dumps from inlet gas scrubbers (V6 & V6A) and lubricate.

   b. Close valves on line at inlet to field Tanks No. 22 & 33.

2) a. Open valve on Tap F50, at Field Tank, for venting;

   b. Disconnect 2" piping at pump discharge and install plug with Tap.

   c. Using Tap at pump fill system with water until all gas is displaced from line.

3) Install properly zeroed recorder on Tap F50 then stabilize system pressure using Tap at pump.

4) Raise pressure to 50 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

5) If static pressure cannot be maintained as specified, refer to General Instruction, Item 9.

6) At the end of testing period, chart shall be removed and retained for permanent record and will be identified as indicated in General Instruction, Item 12.

7) Upon completion of test:

   a. Release test pressure;

   b. Open valve on line at inlet to Field Tank;

   c. Position block valves on dump from Stop Tank for normal operator;

   d. Close and plug vents and fill valves.

Martin Water Laboratories, Inc.
WATER CONSULTANTS SINCE 1953
BACTERIAL AND CHEMICAL ANALYSES

P. O. BOX 1468
MONAHANS, TEXAS 79756
(915) 943-3234 or 563-1040

709 W. INDIANA
MIDLAND, TEXAS 79701
(915) 683-4521

To: Mr. Chuck Womble
P. O. Box 1311
Jal, NM 88252

Laboratory No. 19747
Sample received 1-2-97
Results reported 1-13-97

Company: Sid Richardson Carbon & Gasoline Company
County: Lea, NM
Field:
Lease: Jal Plant #4

Subject: To make the determinations listed below on water sample from water supply well #16. Sample taken 1-2-97.

Determination	mg/l	EPA Maximum Contaminant Level for Drinking Water mg/l
Arsenic, as As	<0.01	0.05
Chromium, as Cr	<0.03	0.10
Copper, as Cu	<0.01	1.0
Lead, as Pb	<0.002	0.015
Mercury, as Hg	<0.002	0.002
Benzene	<0.004	0.005
Toluene	<0.004	--
Ethyl Benzene	<0.004	--
Total Xylenes	<0.004	--

Notation: Test methods in compliance with U. S. Environmental Protection Agency Regulations (SW-846; Third Edition - July, 1992).

Remarks: The undersigned certifies the above to be true and correct to the best of his knowledge and belief.

Waylan C. Martin, M.A.

FEB 21 19[illegible]

P. O. BOX 1468
MONAHANS, TEXAS 79756
PH. 943-3234 OR 563-1040

Martin Water Laboratories, Inc.

709 W. INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

TO: Mr. Chuck Womble
P. O. Box 1311, Jal, NM 88252

LABORATORY NO. 19746
SAMPLE RECEIVED 1-2-97
RESULTS REPORTED 1-13-97

COMPANY Sid Richardson Carbon & Gasoline LEASE Jal Plant #4
FIELD OR POOL
SECTION BLOCK SURVEY COUNTY Lea STATE NM
SOURCE OF SAMPLE AND DATE TAKEN:
NO. 1 Raw water - taken from water supply well #16. 1-2-97
NO. 2 Maximum contents for drinking water as recommended by the Texas Dept. of Health.
NO. 3
NO. 4
REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES

	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.				
pH When Sampled				
pH When Received	7.24			
Bicarbonate as HCO_3	195			
Supersaturation as $CaCO_3$, Carbonate, as CO_3	0			
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$				
Calcium as Ca				
Magnesium as Mg				
Sodium and Potassium	51			
Sulfate as SO_4	43	300		
Chloride as Cl	21	300		
Iron as Fe	1.4	0.3		
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated				
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide				
Resistivity, ohms/m at 77° F.				
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				
Nitrate, as N	0.6	10.0		
Potassium, as K	2			
Total Dissolved Solids @ 180°C.	286	1,000		

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks: The undersigned certifies the above to be true and correct to the best of his knowledge and belief.

FEB 21 [illegible]
[illegible] Division

RECEIVED
JAN 22 1997
R & D DEPARTMENT
Sid Richardson Carbon & Gasoline Co.

Form No. 3

By
Waylan C. Martin, M.A.

Martin Water Laboratories, Inc.
WATER CONSULTANTS SINCE 1953
BACTERIAL AND CHEMICAL ANALYSES

P.O. BOX 1468
MONAHANS, TEXAS 79756
PH. 943-3234 or 563-1040

709 W. INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

To: Mr. Larry Copeland
201 Main Street
Fort Worth, TX 76102

Laboratory No. 1091262 AA1016
Sample received 10-24-91
Results reported 11-4-91

Company: Sid Richardson Carbon & Gasoline Company
County: Lea, NM
Field:
Lease: Jal Plant #4

Subject: To make the determinations listed below on water sample from water supply well #16. Sample taken 10-24-91 by Tom Elrod, Martin Water Laboratories, Inc.

Determination	mg/l	EPA Maximum Contaminant Level for Drinking Water mg/l
Arsenic, as As	<0.01	0.05
Chromium, as Cr (Total)	<0.03	0.05
Copper, as Cu	<0.01	0.05
Lead, as Pb	<0.01	0.05
Mercury, as Hg	<0.002	0.002
Benzene	<0.005	0.005
Toluene	<0.005	--
Ethyl Benzene	<0.005	--
Total Xylenes	<0.005	--

NOTATION: Sampling procedure and test methods in compliance with U.S. Environmental Protection Agency Regulations (SW-846; Third Edition - Nov. 1986).

Remarks: The undersigned certifies the above to be true and correct to the best of his knowledge and belief.

W. Reagan White, B.S.

P. O. BOX 1468
MONAHANS, TEXAS 79756
PH. 943-3234 OR 563-1040

Martin Water Laboratories, Inc.

709 W. INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

LABORATORY NO. 1091261
SAMPLE RECEIVED 10-24-91
RESULTS REPORTED 11-4-91

TO: Mr. Larry Copeland
201 Main Street, Fort Worth, TX 76102

COMPANY Sid Richardson Carbon & Gasoline LEASE Jal Plant #4
FIELD OR POOL Company
SECTION ___ BLOCK ___ SURVEY ___ COUNTY Lea STATE NM
SOURCE OF SAMPLE AND DATE TAKEN:
NO. 1 Raw water - taken from water supply well #16. 10-24-91
NO. 2 Maximum contents for drinking water as recommended by the Texas Dept. of Health.
NO. 3
NO. 4
REMARKS: Sample taken by Tom Elrod, Martin Water Laboratories, Inc.

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.				
pH When Sampled				
pH When Received	7.19			
Bicarbonate as HCO_3	215			
~~Solfate as CaCO3~~ Carbonate, as CO_3	0			
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$				
Calcium as Ca				
Magnesium as Mg				
Sodium and/or Potassium	44			
Sulfate as SO_4	51	300		
Chloride as Cl	23	300		
Iron as Fe	0.04	0.3		
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated				
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide				
Resistivity, ohms/m at 77° F.				
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				
Nitrate, as N	0.8	10.0		
Potassium, as K	4			
Total Dissolved Solids @ 180°C.	331	1,000		

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks The undersigned certifies the above to be true and correct to the best of his knowledge and belief.

Form No. 3

By W. Reagan White
W. Reagan White, B.S.

MATERIALS AT JAL #4 - COMPRESSION FACILITY

Air
Ambitrol
Methanol
Calgons LCS-20T
Crude Oil
Gasoline (Unleaded)
Chevron Hydraulic Fluid Aviation "A"
H_2S
K & W Copper Coat
Natural Gas (Sweet)
Natural Gas (Sour)
Field Gas (Unprocessed)
Marvel Mysterial Oil
Varsol 1
WD-40
Fire Extinguishing Angent
Mobil DTE Heavy Oil
Mobil ALMO 527 Oil
Citgo Pacemaker 10-35 - Need
Mobil DTE Heavy Medium - Need
Rarus 427 Oil - Need
Snoop
ZEP 45
Produced Water
Sum-Clean Soap
Propane
Diesel

BIG THREE INDUSTRIES, INC.
P. O. BOX 3047
HOUSTON, TEXAS 77253

MATERIAL SAFETY DATA SHEET

I – GENERAL INFORMATION

PRODUCT NAME: AIR	EMERGENCY TELEPHONE NO.: (713) 868-0202
MANUFACTURERS NAME: Big Three Industries, Inc.	TRADE NAME AND SYNONYMS: AIR (Atmospheric Air) (Breathing Air) (Compressed Air)
	CHEMICAL NAME AND SYNONYMS: Air

ISSUE DATE	PRODUCT ID. NO.	FORMULA	CHEMICAL FAMILY	CAS NUMBER
APRIL 1, 1984	UN-1002	–	–	026 635 885

II – HAZARDOUS INGREDIENTS

HAZARDOUS MIXTURES OF LIQUIDS AND GASES	O/O	TLV
Oxygen	20.9	–
Nitrogen	78.0	–
Argon	.1	–
Air supplied by Big Three Industries is compressed atmospheric air which has been filtered and dryed, it is not synthetic air made of a mixture of oxygen and nitrogen.		

III – PHYSICAL DATA

BOILING POINT: –317.8°F (–194.3°C) @ 1 ATM	SPECIFIC GRAVITY (Air = 1): 1.0 at 70°F (21.1°C) and 1 ATM
VAPOR PRESSURE: N/A	PERCENT, VOLATILE BY VOLUME (O/O): N/A
DENSITY: At 70°F (21.1°C) and 1 ATM 0.07493 lb/cu ft	EVAPORATION RATE: N/A
SOLUBILITY IN WATER: 2.92 SCC/100CC H_2O @ 32°F (0°C)	MATERIAL AT NORMAL CONDITION: [ ] LIQUID [ ] SOLID [XXX] GAS
EXPANSION RATIO (LIQUID TO GAS): N/A (Gas)	
APPEARANCE AND ODOR: Colorless, Odorless Gas	

IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): N/A [ ] CLOSED CUP [ ] OPEN CUP	FLAMMABILITY LIMITS IN AIR (O/O BY VOL): LOWER N/A UPPER N/A
EXTINGUISHING MEDIA: Use media appropriate for surrounding area.	
SPECIAL FIRE FIGHTING PROCEDURES: None	
UNUSUAL FIRE AND EXPLOSION HAZARD: None	

V — HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	UNUSUAL CHRONIC TOXICITY	ROUTES OF EXPOSURE
None Established	None	

EFFECTS OF OVEREXPOSURE

None

EMERGENCY AND FIRST AID PROCEDURES

None

VI — REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
[ ] UNSTABLE [XX] STABLE	None

INCOMPATABILITY (MATERIALS TO AVOID)

None

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
[ ] MAY OCCUR [XX] WILL NOT OCCUR	None

VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

None

WASTE DISPOSAL METHOD

Secure cylinder and blow down slowly to the atmosphere.

VIII — SPECIAL PROTECTIVE INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

None

VENTILATION	LOCAL EXHAUST	SPECIAL
None	—	—
	MECHANICAL	OTHER
	—	—

PROTECTIVE GLOVES	EYE PROTECTION
N/A	Safety glasses are recommended when handling high pressure cylinders.

OTHER PROTECTIVE EQUIPMENT

None

IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Follow general safety rules for handling compressed gas cylinders, found in CGA Pamphlet P-1.

DOT LABELING	VALVE CONNECTION NUMBER
Green Label	CGA 346 or CGA 950 (Pin Indexed)

OTHER PRECAUTIONS

Secure cylinders when in use. Keep valve protection cap in place when cylinder not in use.

Material Safety Data Sheet

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 07666 Page: 1

Product Name: AMBITROL (R) FL 50 COOLANT

Effective Date: 01/22/91 Date Printed: 06/11/92 MSDS:000584

1. INGREDIENTS: (% w/w, unless otherwise noted)

Ethylene Glycol	CAS# 000107-21-1	47-55%
Diethylene Glycol	CAS# 000111-46-6	<3%
Water	CAS# 007732-18-5	<50%
Dipotassium phosphate	CAS# 007758-11-4	<5%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

2. PHYSICAL DATA:

BOILING POINT: 229F, 109C
VAP. PRESS: Approx. 2.5 mmHg @ 20C
VAP. DENSITY: Not applicable
SOL. IN WATER: Completely miscible
SP. GRAVITY: 1.084 @ 60/60F, 16C
APPEARANCE: Red liquid.
ODOR: Information not available.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: PMCC

FLAMMABLE LIMITS
LFL: Not applicable.
UFL: Not applicable.

EXTINGUISHING MEDIA: Water fog, carbon dioxide, dry chemical.

FIRE & EXPLOSION HAZARDS: After 50% of the initial volume has evaporated, the residual solution will burn at temperatures above 290F when exposed to an ignition source.

FIRE-FIGHTING EQUIPMENT: Wear positive-pressure, self-contained breathing apparatus.

4. REACTIVITY DATA:

(Continued on page 2 , over)

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4. REACTIVITY DATA: (CONTINUED)

STABILITY: (CONDITIONS TO AVOID) Not considered to be a problem under normal storage conditions.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Oxidizing material

HAZARDOUS DECOMPOSITION PRODUCTS: After water has volatilized, burning will produce carbon monoxide, carbon dioxide, and water.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small spills: Cover with absorbent material, soak up and sweep into drums for disposal. Large spills: Dike around spill and pump into suitable containers for disposal or reprocessing.

DISPOSAL METHOD: Burn in approved incinerator in accordance with local, state, and federal regulations.

6. HEALTH HAZARD DATA:

EYE: Essentially nonirritating to eyes. Vapors or mists may irritate eyes.

SKIN CONTACT: Prolonged or repeated exposure not likely to cause significant skin irritation. May cause more severe response if skin is abraded (scratched or cut).

SKIN ABSORPTION: A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The dermal LD50 has not been determined. Repeated skin exposure to large quantities may result in absorption of harmful amounts.

INGESTION: Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Amounts ingested incidental to industrial handling are not likely to cause injury; however, ingestion of larger amounts could cause serious injury, even death. The oral LD50 for rats is 8200 mg/kg. Single oral dose toxicity is expected to be moderate to humans even though tests with animals show a lower degree of toxicity.

(Continued on page 3)

Material Safety Data Sheet

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 07666 Page: 1

Product Name: AMBITROL (R) FL 50 COOLANT

Effective Date: 01/22/91 Date Printed: 06/11/92 MSDS:000584

1. INGREDIENTS: (% w/w, unless otherwise noted)

Ethylene Glycol	CAS# 000107-21-1	47-55%
Diethylene Glycol	CAS# 000111-46-6	<3%
Water	CAS# 007732-18-5	<50%
Dipotassium phosphate	CAS# 007758-11-4	<5%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

2. PHYSICAL DATA:

BOILING POINT: 229F, 109C
VAP. PRESS: Approx. 2.5 mmHg @ 20C
VAP. DENSITY: Not applicable
SOL. IN WATER: Completely miscible
SP. GRAVITY: 1.084 @ 60/60F, 16C
APPEARANCE: Red liquid.
ODOR: Information not available.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: PMCC

FLAMMABLE LIMITS
LFL: Not applicable.
UFL: Not applicable.

EXTINGUISHING MEDIA: Water fog, carbon dioxide, dry chemical.

FIRE & EXPLOSION HAZARDS: After 50% of the initial volume has evaporated, the residual solution will burn at temperatures above 290F when exposed to an ignition source.

FIRE-FIGHTING EQUIPMENT: Wear positive-pressure, self-contained breathing apparatus.

4. REACTIVITY DATA:

(Continued on page 2 , over)

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6. HEALTH HAZARD DATA: (CONTINUED)

INHALATION: At room temperature, exposures to vapors are minimal due to low vapor pressure. If heated or sprayed as an aerosol, concentrations may be attained that are sufficient to cause irritation and other effects.

SYSTEMIC & OTHER EFFECTS: Excessive exposure may cause irritation to upper respiratory tract. Observations in animals include formation of bladder stones after repeated oral doses of diethylene glycol. Observations in animals include kidney and liver effects and deposition of calcium salts in various tissues after long-term dietary intake of ethylene glycol. Based on data from long-term animal studies, diethylene glycol is not believed to pose a carcinogenic risk to man. Ethylene glycol did not cause cancer in long-term animal studies. Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major and possibly only route of exposure to produce birth defects. Exposures by inhalation (tested nose-only in animals to prevent ingestion) or skin contact, the primary routes of occupational exposure, had minimal or essentially no effect on the fetus. Birth defects are unlikely from exposure to diethylene glycol. Exposures having no adverse effects on the mother should have no effect on the fetus. Diethylene glycol has not interfered with reproduction in animal studies. In studies on rats, ethylene glycol has been shown not to interfere with reproduction. In studies on mice, ingestion of ethylene glycol in large amounts caused a small decrease in the number of litters/pair, live pups/litter, and in live pup weight. Results of in vitro (test tube) mutagenicity tests have been negative.

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower.

INGESTION: If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything to an unconscious person.

INHALATION: Remove to fresh air if effects occur. Consult a physician.

NOTE TO PHYSICIAN: Consult standard literature. Supportive care. Treatment based on judgment of the physician in response to

(Continued on page 4 , over)

7. FIRST AID: (CONTINUED)

reactions of the patient. In the treatment of intoxication by ethylene glycol, the use of ethanol, hemodialysis and intravenous fluids to control acidosis should be considered. N. Eng. J. Med. 304:21 1981. If burn is present, treat as any thermal burn, after decontamination.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): Ethylene glycol: ACGIH TLV and OSHA PEL are 50 ppm Ceiling. Diethylene glycol: AIHA WEEL is 50 ppm. total; 10 mg/m3, aerosol only.

VENTILATION: Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator.

SKIN PROTECTION: Use impervious gloves when prolonged or frequently repeated contact could occur.

EYE PROTECTION: Use safety glasses. If vapor exposure causes eye discomfort, use a full-face respirator.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Avoid skin and eye contact. Avoid ingestion. Avoid breathing vapors or mists.

Trace quantities of ethylene oxide (EO) may be present in this product. While these trace quantities could accumulate in headspace areas of storage and transport vessels, they are not expected to create a condition which will result in EO concentrations greater than 0.5 ppm (8 hour TWA) in the breathing zones of the workplace for appropriate applications. OSHA has established a permissible exposure limit of 1.0 ppm 8 hr TWA for EO. (Code of Federal Regulations Part 1910.1047 of Title 29)

MSDS STATUS: Revised section 8.

For information regarding state/provincial and federal regulations see The Regulatory Information Section.
(R) Indicates a trademark of The Dow Chemical Company

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REGULATORY INFORMATION: (Not meant to be all-inclusive--selected regulations represented.)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSD Sheet for health and safety information.

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
ETHYLENE GLYCOL	000107-21-1	47 -55 %

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard
A delayed health hazard

Mallinckrodt
Material Safety Data

Emergency Phone Number: 314-982-5000

Mallinckrodt, Inc., Science Products Division, P.O. Box M, Paris, KY 40361.

METHYL ALCOHOL

PRODUCT IDENTIFICATION:

Synonyms: Wood alcohol; methanol; carbinol

Formula CAS No: 67-56-1

Molecular Weight: 32.04

Chemical Formula: CH_3OH

Hazardous Ingredients: None.

PRECAUTIONARY MEASURES

DANGER! MAY BE FATAL IF SWALLOWED.
HARMFUL IF INHALED. FLAMMABLE!
MAY CAUSE BLINDNESS. CAUSES IRRITATION.

Keep away from heat, sparks and flame.
Avoid breathing vapor...
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

EMERGENCY/FIRST AID

In all cases call a physician immediately. If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes.
SEE SECTION 5.

DOT Hazard Class: Flammable Liquid

SECTION 1 Physical Data

Appearance: Clear, colorless liquid.

Odor: Characteristic odor.

Solubility: Miscible with water.

Boiling Point: 64.5°C (148°F)

Melting Point: -98°C (-144°F)

Specific Gravity: 0.8

Vapor Density (Air=1): 1.1

Vapor Pressure (mm Hg): 97 at 20°C (68°F)

Evaporation Rate: (BuAc=1): 5.9

SECTION 2 Fire and Explosion Information

Fire:
Flammable. Flashpoint: 11°C (52°F) (CC).
Autoignition temperature: 385°C (725°F).
Flammable limits, in air, % by volume:
lel = 6.7; uel = 36.

Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Moderate explosion hazard and dangerous fire hazard when exposed to heat, sparks or flames.

Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire. Vapors can flow along surfaces to distant ignition source and flash back.

SECTION 3 Reactivity Data

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
Carbon oxides and formaldehyde may form when heated to decomposition.

Hazardous Polymerization:
This substance does not polymerize.

Incompatibilities:
Strong oxiding agents such as nitrates, perchlorates or sulfuric acid. Will attack some forms of plastics, rubber, and coatings. May react with metallic aluminium and generate hydrogen gas.

SECTION 4 Leak/Spill Disposal Information

Ventilate area of leak or spill. Remove all sources of ignition. Clean-up personnel require protective clothing and respiratory protection from vapors. Contain and recover liquid when possible. Collect as hazardous waste and atomize in a suitable RCRA approved combustion chamber, or absorb with vermiculite, dry sand, earth or similar material for disposal as hazardous waste in a RCRA approved facility. Do not flush to sewer.

Reportable Quantity (RQ)(CWA/CERCLA) : 5000 lbs.

Ensure compliance with local, state and federal regulations.

NFPA Ratings: Health: 1 Flammability: 3 Reactivity: 0

Mallinckrodt, Inc., Science Products Division, P.O. Box M, Paris, KY 40361.

Addendum to Material Safety Data Sheet

REGULATORY STATUS

This Addendum Must Not Be Detached from the MSDS

Identifies SARA 313 substance(s)

Any copying or redistribution of the MSDS must include a copy of this addendum

(Chem.Key: METOL)

Hazard Categories for SARA Section 311/312 Reporting

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

Product or Components of Product:	SARA EHS Sect. 302 RQ (lbs.)	SARA EHS Sect. 302 TPQ (lbs.)	SARA Section 313 Chemicals Name List	SARA Section 313 Chemicals Chemical Category	CERCLA Sec.103 RQ (lbs.)	RCRA Sec. 261.33
METHYL ALCOHOL (67-56-1)	No	No	Yes	No	5000	U154

SARA Section 302 EHS RQ: Reportable Quantity of Extremely Hazardous Substance, listed at 40 CFR 355.
SARA Section 302 EHS TPQ: Threshold Planning Quantity of Extremely Hazardous Substance. An asterisk (*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity = 10,000 LBS.
SARA Section 313 Chemicals: Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.
CERCLA Sec. 103: Comprehensive Enviromental Response, Compensation and Liability Act (Superfund). Releases to air, land or water of these hazardous substances which exceed the Reportable Quantity (RQ) must be reported to the National Response Center, (800-424-8802); Listed at 40 CFR 302.4
RCRA: Resource Conservation and Reclamation Act. Commercial chemical product wastes designated as acute hazards and toxic under 40 CFR 261.33

SECTION 5 Health Hazard Information

A. EXPOSURE / HEALTH EFFECTS

Inhalation:
A slight irritant to the mucous membranes. Toxic effects exerted upon nervous system, particularly the optic nerve. Once absorbed into the body, it is very slowly eliminated. Symptoms of overexposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. A person may get better but then worse again up to 30 hours later.

Ingestion:
Toxic. Symptoms parallel inhalation. Can intoxicate and cause blindness. Usual fatal dose: 100-125 milliliters.

Skin Contact:
Methyl alcohol is a defatting agent and may cause skin to become dry and cracked. Skin absorption can occur; symptoms may parallel inhalation exposure.

Eye Contact:
Irritant. Continued exposure may cause eye lesions.

Chronic Exposure:
Marked impairment of vision and enlargement of the liver has been reported. Repeated or prolonged exposure may cause skin irritation.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

B. FIRST AID

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:
If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. Call physician immediately.

Skin Exposure:
Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Exposure:
Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

C. TOXICITY DATA (RTECS, 1982)

Oral rat LD50: 5628 mg/kg. Skin rabbit: 20 gm/kg. Aquatic toxicity rating TLm 96: Over 1,000. Mutation data cited. Reproductive effects data cited.

SECTION 6 Occupational Control Measures

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):
200 ppm (TWA) (skin)
250 ppm (STEL) (skin)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

Personal Respirators: (NIOSH Approved)
If the TLV is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or self-contained breathing apparatus.

Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.

Eye Protection:
Use chemical safety goggles. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

SECTION 7 Storage and Special Information

Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Storage and use areas should be No Smoking areas. Spark-proof tools and explosion-proof equipment should be used in the storage and handling area.

MATERIAL SAFETY DATA SHEET

Calgon Corporation
P.O. Box 1346
Pittsburgh, PA 15230-1346

24 Hour Emergency Telephone—(412)777-8000

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: LCS-20

CHEMICAL DESCRIPTION: Aqueous alkaline solution
PRODUCT CLASS: Water treatment
MSDS CODE: 0559-06-11-92

Section 2. HAZARDOUS INGREDIENTS AND EXPOSURE LIMITS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Sodium nitrite	7632-00-0	15	None established	None established
Sodium tetraborate pentahydrate	12179-04-3	4	TWA 10 mg/m^3	TWA 1 mg/m^3
Sodium hydroxide	1310-73-2	~ 1	Ceiling 2 mg/m^3	Ceiling 2 mg/m^3

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

DANGER!
May cause severe eye and skin damage.
May be harmful if swallowed or if mist inhaled.
May cause respiratory tract irritation.
Nitrites may react with organic amines in the body to form carcinogenic nitrosamines.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, ingestion, inhalation of mist

TARGET ORGANS: Blood, eyes, skin, mucous membranes

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with pre-existing diseases of the cardiovascular system and bone marrow may have increased susceptibility to the toxic effects of excessive exposure to nitrites.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may cause irreversible eye damage upon contact depending on the length of exposure, solution concentration and first aid measures.

SKIN CONTACT: This product may produce severe irritation upon contact with the skin. If not removed promptly, burns may result. Sodium nitrite and sodium tetraborate pentahydrate may be absorbed through damaged skin in amounts that may produce systemic toxicity similar to that produced by ingestion, if the area of exposure and amount absorbed are large. No allergic skin reaction is expected.

INGESTION: Ingestion of this product may cause severe irritation or burns of the mucous membranes of the mouth, throat, esophagus and stomach. This product would be considered to be toxic by ingestion because as little as one gram of sodium nitrite may be fatal to humans. Ingestion of large amounts may cause nausea, vomiting, headaches, cyanosis (bluish skin resulting from reduced oxygen-carrying capacity of the blood due to methemoglobin production), weakness, shortness of breath, a marked fall in blood pressure, collapse, convulsions, coma, and possibly death. Nitrites have been shown to convert in the stomachs of lab animals to potentially carcinogenic nitrosamines.

INHALATION: Product mist may irritate the respiratory tract, if inhaled. Large amounts may cause systemic effects, as nitrites and borates are readily absorbed by lung tissue.

SUBCHRONIC, CHRONIC:
No applicable information was found concerning any potential health effects resulting from subchronic or chronic exposure to the product.

Repeated small doses of nitrites cause a fall in blood pressure, rapid pulse, headache, and visual disturbances. Nitrites have been implicated in an increased incidence of cancer. They may react with organic amines in the body to form carcinogenic nitrosamines. Repeated or prolonged exposure to nitrites may cause methemoglobinemia (decreased oxygen-carrying capacity of the blood). Pregnant women should minimize exposure to nitrites since the developing fetus may be adversely affected by the nitrite-induced methemoglobinemia.

Chronic absorption of small amounts of tetraborates causes mild gastroenteritis and dermatitis. Neither type of systemic poisoning has been reported to occur occupationally.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical aid immediately. Wash clothing before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give large quantities of water. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: > 200°F
This product is not flammable or combustible. If all the water in the product is allowed to evaporate, however, it should be noted that sodium nitrite is a strong oxidizer.

LOWER FLAMMABLE LIMIT: Not available UPPER FLAMMABLE LIMIT: Not available

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use extinguishing media appropriate for the surrounding fire.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

FIRE & EXPLOSION HAZARDS: Product emits toxic gases under fire conditions.

DECOMPOSITION PRODUCTS: Oxides of nitrogen, disodium oxide

NFPA RATINGS: Health = 3 Flammability = 0 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wearing appropriate personal protective equipment, contain spill, collect onto non-combustible absorbent like sand or earth and place into suitable container. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Prevent entry into sewers and waterways.

Section 7. HANDLING AND STORAGE

HANDLING: Do not get in eyes, on skin or clothing.
Avoid breathing mist.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.

STORAGE: Do not store near combustible materials.
Product must be maintained at 38°F or higher. Protect from low temperatures.

MATERIAL SAFETY DATA SHEET

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield
SKIN PROTECTION: Chemical resistant gloves and protective clothing
RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Use local exhaust ventilation where mist or spray may be generated.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not available

SOLUBILITY IN WATER: Complete

VAPOR PRESSURE: Similar to water

SPECIFIC GRAVITY: 1.16 @ 25°C

VAPOR DENSITY (air = 1): Similar to water

pH: ~ 12

% VOLATILE BY WEIGHT: ~ 78

FREEZING POINT: Not available

APPEARANCE AND ODOR: Clear, yellow liquid.

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Keep from contact with clothing and other combustible materials. Protect from low temperatures.

INCOMPATIBILITY: Strong reducers, acids, amines

DECOMPOSITION PRODUCTS: Oxides of nitrogen, disodium oxide

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
No information available on the formulated product.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Sodium nitrite	85 mg/kg	Not available	5500 ug/m^3
Sodium tetraborate pentahydrate	3.2 - 3.4 g/kg	> 2 g/kg	Not available
Sodium hydroxide	140-340 mg/kg	1350 mg/kg	Not available

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:

Aquatic toxicity data:

48 hr LC_{50} (Daphnia magna): 560 ppm
96 hr LC_{50} (fathead minnow): 940 ppm
48 hr LC_{50} (mysid shrimp): 284 ppm
7-day NOEC (mysid shrimp): 50 ppm
7-day LOEC (mysid shrimp): 100 ppm
96 hr LC_{50} (sheepshead minnow): 5400 ppm
7-day NOEC (sheepshead minnow): 2500 ppm
7-day LOEC (sheepshead minnow): 5000 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: If the pH is greater than or equal to 12.5, discarded product would be considered a RCRA Hazardous Waste based on the characteristic of corrosivity. The EPA Hazardous Waste Number would be D002.

DISPOSAL: Dispose of in accordance with local, state and federal regulations. Prevent entry into sewers or waterways.

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:

Class/Division: 6.1 (RQ at beginning of Proper Shipping Name if shipped in container > 667 lb)
Proper Shipping Name: Poisonous liquid, n.o.s. (contains Sodium nitrite)
Label: Keep away from food.
Packing Group: III
ID Number: UN 2810

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous

TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory. (Sodium tetraborate pentahydrate is not on the TSCA Inventory, but its anhydrous form is listed under CAS# 1330-43-4.)

MATERIAL SAFETY DATA SHEET

CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
Sodium nitrite	100 lb
Sodium hydroxide	1000 lb

Product RQ: 667 lb (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
No ingredients listed in this section			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[yes]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
No ingredients listed in this section		

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3* Flammability = 0 Reactivity = 0
Personal Protective Equipment = X (to be specified by user depending on use conditions)

*There are potential chronic health effects to consider.

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Reason for reissue: Update to new format.

PREPARED BY: P.J. Maloney

Material Safety Data Sheet

Prepared According to the OSHA Hazard Communication Standard (29 CFR 1910.1200).
(Formerly Called MATERIAL INFORMATION BULLETIN)

Chevron

Crude Oil

DANGER! HARMFUL OR FATAL IF SWALLOWED
VAPOR HARMFUL
SOME CRUDE OILS MAY EMIT HYDROGEN SULFIDE (H_2S)
PROLONGED OR REPEATED SKIN CONTACT MAY BE HARMFUL
FLAMMABLE

TYPICAL COMPOSITION

Petroleum crude oils(CAS 8002-05-9) are naturally-occuring complex mixtures of hydrocarbons containing variable proportions of paraffins, naphthenes and aromatics and the following:
Small amounts of organic compounds containing sulfur (trace to 8%), nitrogen and oxygen. Trace quantities of heavy metal such as nickel, vanadium and lead.
Hydrogen sulfide gas (H_2S) may be present in some crude oils and may collect in the headspace of enclosed vessels.

EXPOSURE STANDARD

No Federal OSHA exposure standard or ACGIH TLV has been established for this material. Continued on page 3.

PHYSIOLOGICAL & HEALTH EFFECTS	EMERGENCY & FIRST AID PROCEDURES
Eyes	
May cause eye irritation.	Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open. If irritation persists, see a doctor.
Skin	
Expected to cause no more than minor skin irritation, but prolonged or frequently repeated skin contact may be harmful. See Additional Health Data.	Remove contaminated clothing. Wash skin thoroughly with soap and water. See a doctor if irritation occurs. Launder contaminated clothing.
Inhalation	
Crude oil may contain irritating and highly toxic hydrogen sulfide gas. Breathing the vapor may be irritaing to the respiratory tract and can cause central nervous system effects. See Additional Health Data.	If respiratory irritation or any signs or symptoms as described in this MSDS occur, move the person to fresh air. If any of these effects continue, see a doctor.
Ingestion	
May be toxic by ingestion. Note to Physician: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis. See Additional Health Data.	If swallowed, give water or milk. DO NOT make person vomit except on advice of medical personnel. If advice cannot be obtained, take person and container to nearest emergency treatment center.

Material Safety Data Sheet

Crude Oil

ADDITIONAL HEALTH DATA

Signs and symptoms of central nervous system effects may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. Affected persons usually experience complete recovery when removed from the exposure area.

Hydrogen sulfide (H_2S), which may be liberated from crude petroleum, is toxic. Because of the rapid occurrence of olfactory fatigue and the likelihood that the odor of crude oil will mask the odor of H_2S, odor is an unreliable indicator of its presence. Ingestion of large quantities of crude oil may result in toxicity due to the formation of H_2S. Signs and symptoms resulting from overexposure to H_2S include respiratory irritation, headaches, dizziness, nausea, gastrointestinal disturbances, coughing, a sensation of dryness and pain in the nose, throat and chest, confusion and unconsciousness. H_2S concentrations of 1000-2000 ppm may be immediately hazardous to life; death has occurred following exposures to 600 ppm.

Some crude oils may contain benzene which can accumulate in the headspace of enclosed vessels. Repeated or prolonged breathing of benzene vapors has been associated with the development of chromosomal damage in experimental animals and various blood diseases in humans ranging from aplastic anemia to leukemia (a form of cancer). All of these diseases can be fatal. Petroleum crude oils may also contain varying amounts of polynuclear aromatic hydrocarbons which have been shown to cause skin cancer after prolonged and frequent contact with the skin of test animals. Various crude oils have also been shown to cause skin cancer in laboratory animals under similar exposure conditions. While brief or intermittent skin contact or breathing of crude oil vapor is not expected to cause cancer in human beings, we strongly recommend that good hygiene practices and the precautions outlined in this bulletin be followed when handling crude oil.

The Federal OSHA exposure standard for hydrogen sulfide (H_2S) is 20 ppm (a ceiling value). It may be exceeded (up to 50 ppm) for 10 minutes in any 8-hour period in which no other measurable exposure occurs. The ACGIH (1985-86) TLV is 10 ppm (8-hour time weighted average).

SPECIAL PRECAUTIONS

Wash before eating, smoking or drinking.

DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed.

ADDITIONAL HEALTH DATA
See following pages

SPECIAL PROTECTIVE INFORMATION
Eye Protection: Do not get in eyes. Eye contact can be avoided by wearing chemical safety goggles.
Skin Protection: Avoid prolonged or frequently repeated skin contact with this material. Skin contact can be minimized by wearing impervious protective clothing including gloves.
Respiratory Protection: No special respiratory protection is normally required. However, if operating conditions create high airborne concentrations, the use of an approved respirator is recommended. Note: If any of the applicable H_2S exposure standards are likely to be exceeded, only supplied air respiratory protection can be used.
Ventilation: No special ventilation is usually necessary. However, if operating conditions create high airborne concentrations of this material, special ventilation may be needed.
Comment: Toxic quantities of hydrogen sulfide (H_2S) may be present in storage tanks and bulk transport vessels which contain or have contained fuel oil. Persons opening or entering these compartments should first determine if H_2S is present. See Special Protective Information. As an indicator of H_2S concentration, the rotten eggs odor is unreliable because it may be masked by other odors. Therefore DO NOT ATTEMPT RESCUE WITHOUT WEARING APPROVED SUPPLIED-AIR OR self contained breathing equipment.

FIRE PROTECTION
Flash Point: <15-93+°C
Autoignition Temp.: NDA
Flammability Limits: NDA
Extinguishing Media: CO_2, Dry Chemical, Foam, Water Fog. Do not use water spray or a direct stream of water.
Special Fire Fighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus. See Hazardous Decomposition Products. Read the entire MSDS.

SPECIAL PRECAUTIONS
See following pages

ENVIRONMENTAL PROTECTION
Environmental Impact: This material is considered to be a water pollutant and releases of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.
Precautions if Material is Released or Spilled: Eliminate all open flame in vicinity of spill or released vapor. Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Special Protective Information. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.
Waste Disposal Methods: Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

REACTIVITY DATA
Stability (Thermal, Light, etc.): Stable
Incompatibility (Materials to Avoid): May react with strong oxidizing materials.
Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor and may produce oxides of nitrogen and sulfur; incomplete combustion can produce carbon monoxide.
Hazardous Polymerization: Will not occur.

PHYSICAL PROPERTIES
Solubility: Insoluble in water. Soluble in hydrocarbon solvents.
Appearance (Color, Odor, etc.): Amber to black viscous liquid with mild pungent to sulfurous odor.
Boiling Point: <100-1000+°F
Melting Point: NDA
Specific Gravity: 0.75-1.02
Vapor Pressure: 0-14 psia
Vapor Density (Air=1): NDA
Percent Volatile (Volume %): 5-40
Evaporation: NDA
Viscosity: 100--100+ SUS @ 100°F

NDA = No Data Available

9.0 ENVIRONMENTAL DATA

Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 313 - Toxic Chemicals

This product is not known to contain any components in concentrations above *de minimis* levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA.

Section 311/312 - Hazard Categories

This product may meet one or more of the criteria for the hazard categories defined in 40 CFR Part 370 as established by Sections 311 and 312 of SARA as indicated below:

Immediate (Acute) Health Hazard	No	Sudden Release of Pressure Hazard	No
Delayed (Chronic) Health Hazard	No	Reactive Hazard	No
Fire Hazard	No		

Section 302 - Extremely Hazardous Substances

This product is not known to contain any components in concentrations greater than one percent that are listed as Extremely Hazardous Substances in 40 CFR Part 355 pursuant to the requirements of Section 302(a) of SARA.

Clean Water Act (CWA)

Under the CWA, discharges of crude oil and petroleum products to surface water without proper Federal and State permits must be reported immediately to the National Response Center at (800) 424-8802.

Comprehensive Environmental Response, Compensation, & Liability Act (CERCLA) Section 102 Hazardous Substances

As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance.

New Jersey Worker and Community Right-to-Know Act

Petroleum Oil.

California Proposition 65 (The Safe Drinking Water and Toxics Enforcement Act)

This material contains components that are known to the State of California to be:

Carcinogenic: No Teratogenic: No

Federal Regulations:

Reported in TSCA Inventory as:	Product	Components
CITGO Gas Engine Oils, SUS 30-399		X

10.0 LABELING

NOTE

This product has been determined not to be a physical or a health hazard as defined by the OSHA Hazard Communication Standard.

Avoid prolonged skin contact with used motor oil. Continuous contact has caused skin cancer in laboratory animals. After draining oil, wash skin thoroughly with soap and water. Launder contaminated clothing before reuse.

11.0 REFINED PETROLEUM OILS

The products listed on page one of this MSDS contains one or more of the following base oils.

Chemical / Common Name	CAS #
Solvent Refined Light Paraffinic Distillate	64741-89-5
Solvent Refined Heavy Paraffinic Distillate	64741-88-4
Solvent Dewaxed Heavy Paraffinic Distillate	64742-65-0
Hydrotreated Light Paraffinic Distillate	64742-55-8
Hydrotreated Neutral Lubricating Oil	72623-87-1
Hydrotreated High Viscosity Neutrnl Lubricating Oil	72623-85-9

Mobil

MOBIL OIL CORPORATION MATERIAL SAFETY DATA BULLETIN

REVISED:12/30/92

I. PRODUCT IDENTIFICATION

MOBIL RARUS 427

SUPPLIER:
MOBIL OIL CORP.

CHEMICAL NAMES AND SYNONYMS:
PET. HYDROCARBONS AND ADDITIVES

USE OR DESCRIPTION:
COMPRESSOR OIL

24-HOUR EMERGENCY (CALL COLLECT):
(609) 737-4411

CHEMTREC:
(800) 424-9300

PRODUCT AND MSDS INFORMATION:
(800) 662-4525

II. TYPICAL CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE: Amber Liquid ODOR: Mild PH: NA
VISCOSITY AT 40 C, CS: 102.0
VISCOSITY AT 100 C, CS: 11.3
FLASH POINT F(C): > 490(232) (ASTM D-92)
MELTING POINT F(C): NA POUR POINT F(C): 20(-7)
BOILING POINT F(C): > 600(316) VOC: < 5.00(Wt. %); 0.367 lbs/gal
RELATIVE DENSITY, 15/4 C: 0.88 SOLUBILITY IN WATER: Negligible
VAPOR PRESSURE-mm Hg 20C: < .1

NA=Not Applicable NE=Not Established D=Decomposes
FOR FURTHER INFORMATION, CONTACT YOUR LOCAL MARKETING OFFICE.

III. POTENTIALLY HAZARDOUS INGREDIENTS

None

SEE SECTIONS XII AND XIII FOR REGULATORY AND FURTHER COMPOSITIONAL DATA.

IV. HEALTH HAZARD DATA

--- INCLUDES AGGRAVATED MEDICAL CONDITIONS, IF ESTABLISHED ---
THRESHOLD LIMIT VALUE: 5.00 mg/m3 Suggested for Oil Mist
EFFECTS OF OVEREXPOSURE: Not expected to be a problem.

V. EMERGENCY AND FIRST AID PROCEDURES

--- FOR PRIMARY ROUTES OF ENTRY ---
EYE CONTACT: Flush thoroughly with water. If irritation persists, call a physician.
SKIN CONTACT: Wash contact areas with soap and water.
INHALATION: Not expected to be a problem.
INGESTION: Not expected to be a problem. However, if greater than 1/2 liter(pint) ingested, immediately give 1 to 2 glasses of water and call a physician, hospital emergency room or poison control center for assistance. Do not induce vomiting or give anything by mouth to an unconscious person.

********** VI. FIRE AND EXPLOSION HAZARD DATA **********

FLASH POINT F(C): > 450(232) (ASTM D-92)
FLAMMABLE LIMITS. LEL: .6% UEL: 7.0%
EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical and water fog.
SPECIAL FIRE FIGHTING PROCEDURES: Water or foam may cause frothing. Use water to keep fire exposed containers cool. Water spray may be used to flush spills away from exposure. For fires in enclosed areas, firefighters must use self-contained breathing apparatus. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.
UNUSUAL FIRE AND EXPLOSION HAZARDS: None.
NFPA HAZARD ID: Health: 0, Flammability: 1, Reactivity: 0

********** VII. REACTIVITY DATA **********

STABILITY (Thermal, Light, etc.): Stable
CONDITIONS TO AVOID: Extreme heat.
INCOMPATIBILITY (Materials to Avoid): Strong oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide.
HAZARDOUS POLYMERIZATION: Will not occur.

********** VIII. SPILL OR LEAK PROCEDURE **********

ENVIRONMENTAL IMPACT: Report spills as required to appropriate authorities. U. S. Coast Guard regulations require immediate reporting of spills that could reach any waterway including intermittent dry creeks. Report spill to Coast Guard toll free number (800) 424-8802. In case of accident or road spill notify CHEMTREC (800) 424-9300.
PROCEDURES IF MATERIAL IS RELEASED OR SPILLED: Adsorb on fire retardant treated sawdust, diatomaceous earth, etc. Shovel up and dispose of at an appropriate waste disposal facility in accordance with current applicable laws and regulations, and product characteristics at time of disposal.
WASTE MANAGEMENT: Product is suitable for burning in an enclosed, controlled burner for fuel value or disposal by supervised incineration. Such burning may be limited pursuant to the Resource Conservation and Recovery Act. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at any government approved waste disposal facility. Use of these methods is subject to user compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

********** IX. SPECIAL PROTECTION INFORMATION **********

EYE PROTECTION: No special equipment required.
SKIN PROTECTION: No special equipment required. However, good personal hygiene practices should always be followed.
RESPIRATORY PROTECTION: No special requirements under ordinary conditions of use and with adequate ventilation.
VENTILATION: No special requirements under ordinary conditions of use and with adequate ventilation.

********** X. SPECIAL PRECAUTIONS **********

HANDLING: This material is not intended for use in air compressors for breathing applications.

********** XI. TOXICOLOGICAL DATA **********

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): Slightly toxic ---Based on testing of similar products and/or the components.

DERMAL TOXICITY (RABBITS): Slightly toxic ---Based on testing of similar products and/or the components.

INHALATION TOXICITY (RATS): Not applicable ---Harmful concentrations of mists and/or vapors are unlikely to be encountered through any customary or reasonably foreseeable handling, use, or misuse of this product.

EYE IRRITATION (RABBITS): Expected to be non-irritating. ---Based on testing of similar products and/or the components.

SKIN IRRITATION (RABBITS): Expected to be non-irritating. ---Based on testing of similar products and/or the components.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

Severely solvent refined and severely hydrotreated mineral base oils have been tested at Mobil Environmental and Health Sciences Laboratory by dermal application to rats 5 days/week for 90 days at doses significantly higher than those expected during normal industrial exposure. Extensive evaluations including microscopic examination of internal organs and clinical chemistry of body fluids, showed no adverse effects.

---CHRONIC TOXICOLOGY (SUMMARY)---

The base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of similar oils showed no evidence of carcinogenic effects.

********** XII. REGULATORY INFORMATION **********

GOVERNMENTAL INVENTORY STATUS: All components registered in accordance with TSCA.

Transport Information:

DOT:

Shipping Name: Not applicable
Hazard Class: Not applicable

US OSHA HAZARD COMMUNICATION STANDARD: Product assessed in accordance with OSHA 29 CFR 1910.1200 and determined not to be hazardous.

RCRA INFORMATION: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity, or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

U.S. Superfund Amendments and Reauthorization Act (SARA) Title III: This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (311/312 - FORMERLY 302) REPORTABLE HAZARD CATEGORIES: None

This product contains no chemicals reportable under SARA (313) toxic release program.

THE FOLLOWING PRODUCT INGREDIENTS ARE CITED ON THE LISTS BELOW:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS
*** NO REPORTABLE INGREDIENTS ***		

--- REGULATORY LISTS SEARCHED ---

1 = ACGIH ALL	6 = IARC 1	11 = TSCA 4	17 = CA P65	22 = MI 293	
2 = ACGIH A1	7 = IARC 2A	12 = TSCA 5a2	18 = CA RTK	23 = MN RTK	
3 = ACGIH A2	8 = IARC 2B	13 = TSCA 5e	19 = FL RTK	24 = NJ RTK	
4 = NTP CARC	9 = OSHA CARC	14 = TSCA 6	20 = IL RTK	25 = PA RTK	
5 = NTP SUS	10 = OSHA Z	15 = TSCA 12b	21 = LA RTK	26 = RI RTK	
		16 = WHMIS			

CARC = CARCINOGEN; SUS = SUSPECTED CARCINOGEN

NOTE: MOBIL PRODUCTS ARE NOT FORMULATED TO CONTAIN PCBS.

********** XIII. INGREDIENTS **********

INGREDIENT DESCRIPTION	PERCENT	CAS NUMBER
CONTAINS THE FOLLOWING BASE OIL:	> 95.00	
DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC		64742-54-7
ALKYL AMIDES	< 3.00 NJT	800967-5095P

********** APPENDIX **********

FOR MOBIL USE ONLY: MHC: 1* 1* NA 0* 0*, MPPEC: A, PPEC: A, US92-554
APPROVE CCODE:3 10/08/92 REQ: US - MARKETING

****

INFORMATION GIVEN HEREIN IS OFFERED IN GOOD FAITH AS ACCURATE, BUT WITHOUT GUARANTEE. CONDITIONS OF USE AND SUITABILITY OF THE PRODUCT FOR PARTICULAR USES ARE BEYOND OUR CONTROL; ALL RISKS OF USE OF THE PRODUCT ARE THEREFORE ASSUMED BY THE USER AND WE EXPRESSLY DISCLAIM ALL WARRANTIES OF EVERY KIND AND NATURE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. NOTHING IS INTENDED AS A RECOMMENDATION FOR USES WHICH INFRINGE VALID PATENTS OR AS EXTENDING LICENSE UNDER VALID PATENTS. APPROPRIATE WARNINGS AND SAFE HANDLING PROCEDURES SHOULD BE PROVIDED TO HANDLERS AND USERS.

****

PREPARED BY: MOBIL OIL CORPORATION
ENVIRONMENTAL HEALTH AND SAFETY DEPARTMENT, PRINCETON, NJ
FOR FURTHER INFORMATION, CONTACT:
MOBIL OIL CORPORATION, PRODUCT FORMULATION AND QUALITY CONTROL
3225 GALLOWS ROAD, FAIRFAX, VA 22037 (800) 227-0707 X3265

MOBIL OIL CORPORATION MATERIAL SAFETY DATA BULLETIN

REVISED: 01/12/89

I. PRODUCT IDENTIFICATION

MOBIL DTE OIL HEAVY MEDIUM

SUPPLIER:
MOBIL OIL CORP.

CHEMICAL NAMES AND SYNONYMS:
PET. HYDROCARBONS AND ADDITIVES

USE OR DESCRIPTION:
STEAM TURBINE OIL

HEALTH EMERGENCY TELEPHONE:
(212) 883-4411

TRANSPORT EMERGENCY TELEPHONE:
(800) 424-9300 (CHEMTREC)

PRODUCT TECHNICAL INFORMATION:
(800) 662-4525

II. TYPICAL CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE: ASTM 2.5 LIQUID ODOR: MILD PH: NA
VISCOSITY AT 100 F, SUS: 334.7 AT 40 C, CS: 64.6
VISCOSITY AT 210 F, SUS: 54.5 AT 100 C, CS: 8.4
FLASH POINT F(C): > 400(204) (ASTM D-92)
MELTING POINT F(C): NA POUR POINT F(C): 20(-7)
BOILING POINT F(C): > 600(316)
RELATIVE DENSITY, 15/4 C: 0.877 SOLUBILITY IN WATER: NEGLIGIBLE
VAPOR PRESSURE-MM HG 20C: < .1

NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES
FOR FURTHER INFORMATION, CONTACT YOUR LOCAL MARKETING OFFICE.

III. INGREDIENTS

	WT PCT (APPROX)	EXPOSURE LIMITS MG/M3	PPM	SOURCES (AND NOTES)
POTENTIALLY HAZARDOUS INGREDIENTS:				
NONE				
OTHER INGREDIENTS:				
REFINED MINERAL OILS	>95			
ADDITIVES AND/OR OTHER INGREDS.	< 5			

SEE SECTION XII FOR COMPONENT REGULATORY INFORMATION.

SOURCES: A=ACGIH-TLV, A*=SUGGESTED-TLV, M=MOBIL, O=OSHA, S=SUPPLIER
NOTE: LIMITS SHOWN FOR GUIDANCE ONLY. FOLLOW APPLICABLE REGULATIONS.

IV. HEALTH HAZARD DATA

--- INCLUDES AGGRAVATED MEDICAL CONDITIONS, IF ESTABLISHED ---
THRESHOLD LIMIT VALUE: 5.00 MG/M3 SUGGESTED FOR OIL MIST
EFFECTS OF OVEREXPOSURE: SLIGHT SKIN IRRITATION.

V. EMERGENCY AND FIRST AID PROCEDURES

--- FOR PRIMARY ROUTES OF ENTRY ---

EYE CONTACT: FLUSH WITH WATER.
SKIN CONTACT: WASH CONTACT AREAS WITH SOAP AND WATER.
INHALATION: NOT EXPECTED TO BE A PROBLEM.
INGESTION: NOT EXPECTED TO BE A PROBLEM. HOWEVER, IF GREATER THAN 1/2 LITER(PINT) INGESTED, IMMEDIATELY GIVE 1 TO 2 GLASSES OF WATER AND CALL A PHYSICIAN, HOSPITAL EMERGENCY ROOM OR POISON CONTROL CENTER FOR ASSISTANCE. DO NOT INDUCE VOMITING OR GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

********** VI. FIRE AND EXPLOSION HAZARD DATA **********
FLASH POINT F(C): > 400(204) (ASTM D-92)
FLAMMABLE LIMITS. LEL: .6 UEL: 7.0
EXTINGUISHING MEDIA: CARBON DIOXIDE, FOAM, DRY CHEMICAL AND WATER FOG.
SPECIAL FIRE FIGHTING PROCEDURES: WATER OR FOAM MAY CAUSE FROTHING. USE WATER TO KEEP FIRE EXPOSED CONTAINERS COOL. WATER SPRAY MAY BE USED TO FLUSH SPILLS AWAY FROM EXPOSURE. FOR FIRES IN ENCLOSED AREAS, FIREFIGHTERS MUST USE SELF-CONTAINED BREATHING APPARATUS. PREVENT RUNOFF FROM FIRE CONTROL OR DILUTION FROM ENTERING STREAMS OR DRINKING WATER SUPPLY.
UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE
NFPA HAZARD ID: HEALTH: 0, FLAMMABILITY: 1, REACTIVITY: 0

********** VII. REACTIVITY DATA **********
STABILITY (THERMAL, LIGHT, ETC.): STABLE
CONDITIONS TO AVOID: EXTREME HEAT
INCOMPATIBILITY (MATERIALS TO AVOID): STRONG OXIDIZERS
HAZARDOUS DECOMPOSITION PRODUCTS: CARBON MONOXIDE.
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

********** VIII. SPILL OR LEAK PROCEDURE **********
ENVIRONMENTAL IMPACT: REPORT SPILLS AS REQUIRED TO APPROPRIATE AUTHORITIES. U. S. COAST GUARD REGULATIONS REQUIRE IMMEDIATE REPORTING OF SPILLS THAT COULD REACH ANY WATERWAY INCLUDING INTERMITTENT DRY CREEKS. REPORT SPILL TO COAST GUARD TOLL FREE NUMBER 800-424-8802.
PROCEDURES IF MATERIAL IS RELEASED OR SPILLED: ADSORB ON FIRE RETARDANT TREATED SAWDUST, DIATOMACEOUS EARTH, ETC. SHOVEL UP AND DISPOSE OF AT AN APPROPRIATE WASTE DISPOSAL FACILITY IN ACCORDANCE WITH CURRENT APPLICABLE LAWS AND REGULATIONS, AND PRODUCT CHARACTERISTICS AT TIME OF DISPOSAL.
WASTE MANAGEMENT: PRODUCT IS SUITABLE FOR BURNING IN AN ENCLOSED, CONTROLLED BURNER FOR FUEL VALUE OR DISPOSAL BY SUPERVISED INCINERATION. SUCH BURNING MAY BE LIMITED PURSUANT TO THE RESOURCE CONSERVATION AND RECOVERY ACT. IN ADDITION, THE PRODUCT IS SUITABLE FOR PROCESSING BY AN APPROVED RECYCLING FACILITY OR CAN BE DISPOSED OF AT ANY GOVERNMENT APPROVED WASTE DISPOSAL FACILITY. USE OF THESE METHODS IS SUBJECT TO USER COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS AND CONSIDERATION OF PRODUCT CHARACTERISTICS AT TIME OF DISPOSAL.

********** IX. SPECIAL PROTECTION INFORMATION **********
EYE PROTECTION: NO SPECIAL EQUIPMENT REQUIRED.
SKIN PROTECTION: NO SPECIAL EQUIPMENT REQUIRED. HOWEVER, GOOD PERSONAL HYGIENE PRACTICES SHOULD ALWAYS BE FOLLOWED.
RESPIRATORY PROTECTION: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE VENTILATION.
VENTILATION: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE VENTILATION.

********** X. SPECIAL PRECAUTIONS **********
NO SPECIAL PRECAUTIONS REQUIRED.

********** XI. TOXICOLOGICAL DATA **********

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): LD50: > 5 G/KG SLIGHTLY TOXIC(ESTIMATED) --- BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

DERMAL TOXICITY (RABBITS): LD50: > 2 G/KG SLIGHTLY TOXIC(ESTIMATED) --- BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

INHALATION TOXICITY (RATS): NOT APPLICABLE ---HARMFUL CONCENTRATIONS OF MISTS AND/OR VAPORS ARE UNLIKELY TO BE ENCOUNTERED THROUGH ANY CUSTOMARY OR REASONABLY FORESEEABLE HANDLING, USE, OR MISUSE OF THIS PRODUCT.

EYE IRRITATION (RABBITS): EXPECTED TO BE NON-IRRITATING. ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

SKIN IRRITATION (RABBITS): MAY CAUSE SLIGHT IRRITATION ON PROLONGED OR REPEATED CONTACT. ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

SEVERELY SOLVENT REFINED AND SEVERELY HYDROTREATED MINERAL BASE OILS HAVE BEEN TESTED AT MOBIL ENVIRONMENTAL AND HEALTH SCIENCES LABORATORY BY DERMAL APPLICATION TO RATS 5 DAYS/WEEK FOR 90 DAYS AT DOSES SIGNIFICANTLY HIGHER THAN THOSE EXPECTED DURING NORMAL INDUSTRIAL EXPOSURE. EXTENSIVE EVALUATIONS INCLUDING MICROSCOPIC EXAMINATION OF INTERNAL ORGANS AND CLINICAL CHEMISTRY OF BODY FLUIDS, SHOWED NO ADVERSE EFFECTS.

---CHRONIC TOXICOLOGY (SUMMARY)---

THE BASE OILS IN THIS PRODUCT ARE SEVERELY SOLVENT REFINED AND/OR SEVERELY HYDROTREATED. TWO YEAR MOUSE SKIN PAINTING STUDIES OF SIMILAR OILS SHOWED NO EVIDENCE OF CARCINOGENIC EFFECTS.

********** XII. REGULATORY INFORMATION **********

GOVERNMENTAL INVENTORY STATUS: ALL COMPONENTS REGISTERED IN ACCORDANCE WITH TSCA.

D.O.T. SHIPPING NAME: NOT APPLICABLE

D.O.T. HAZARD CLASS: NOT APPLICABLE

US OSHA HAZARD COMMUNICATION STANDARD: PRODUCT ASSESSED IN ACCORDANCE WITH OSHA 29 CFR 1910.1200 AND DETERMINED NOT TO BE HAZARDOUS.

RCRA INFORMATION: THE UNUSED PRODUCT, IN OUR OPINION, IS NOT SPECIFICALLY LISTED BY THE EPA AS A HAZARDOUS WASTE (40 CFR, PART 261D); DOES NOT EXHIBIT THE HAZARDOUS CHARACTERISTICS OF IGNITABILITY, CORROSIVITY, OR REACTIVITY, AND IS NOT FORMULATED WITH THE METALS CITED IN THE EP TOXICITY TEST. HOWEVER, USED PRODUCT MAY BE REGULATED.

U.S. SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III:
THIS PRODUCT CONTAINS NO "EXTREMELY HAZARDOUS SUBSTANCES".

SARA 302) REPORTABLE HAZARD CATEGORIES: NONE

THIS PRODUCT CONTAINS NO CHEMICALS REPORTABLE UNDER SARA (313) TOXIC RELEASE PROGRAM.

THE FOLLOWING PRODUCT INGREDIENTS ARE CITED ON THE LISTS BELOW:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS
*** NO REPORTABLE INGREDIENTS ***		

--- KEY TO LIST CITATIONS ---

1 = OSHA Z, 2 = ACGIH, 3 = IARC, 4 = NTP, 5 = NCI,
6 = EPA CARC, 7 = NFPA 49, 8 = NFPA 325M, 9 = DOT HMT, 10 = CA RTK,
11 = IL RTK, 12 = MA RTK, 13 = MN RTK, 14 = NJ RTK, 15 = MI 293,
16 = PL RTK, 17 = PA RTK, 18 = CA P65.

--- NTP, IARC, AND OSHA INCLUDE CARCINOGENIC LISTINGS ---

NOTE: MOBIL PRODUCTS ARE NOT FORMULATED TO CONTAIN PCBS.

****

INFORMATION GIVEN HEREIN IS OFFERED IN GOOD FAITH AS ACCURATE, BUT WITHOUT GUARANTEE. CONDITIONS OF USE AND SUITABILITY OF THE PRODUCT FOR PARTICULAR USES ARE BEYOND OUR CONTROL; ALL RISKS OF USE OF THE PRODUCT ARE THEREFORE ASSUMED BY THE USER AND WE EXPRESSLY DISCLAIM ALL WARRANTIES OF EVERY KIND AND NATURE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. NOTHING IS INTENDED AS A RECOMMENDATION FOR USES WHICH INFRINGE VALID PATENTS OR AS EXTENDING LICENSE UNDER VALID PATENTS. APPROPRIATE WARNINGS AND SAFE HANDLING PROCEDURES SHOULD BE PROVIDED TO HANDLERS AND USERS.

****

PREPARED BY: MOBIL OIL CORPORATION
ENVIRONMENTAL AFFAIRS AND TOXICOLOGY DEPARTMENT, PRINCETON, NJ
FOR FURTHER INFORMATION, CONTACT:
MOBIL OIL CORPORATION, PRODUCT FORMULATION AND QUALITY CONTROL
3225 GALLOWS ROAD, FAIRFAX, VA 22037 (703) 849-3265

********** APPENDIX **********

FOR MOBIL USE ONLY: (FILL NO: RL1286C2**02) MCN: , MHC: 1* 1* NA 0* 1*, MPPEC: A, PPEC: A, US88-477 APPROVE 09/12/88

MATERIAL SAFETY DATA SHEET

Shell 97002 (REV 1-83)

MSDS NUMBER ▶ 51,260-3 PAGE 1 OF 4

SECTION I	NAME		
PRODUCT ▶	Super Regular - Unleaded Gasoline		
CHEMICAL/ SYNONYMS ▶	Petrol		
CHEMICAL FAMILY ▶	Hydrocarbon		
SHELL CODE ▶	04350	C.A.S. NUMBER ▶	Mixture

24 HOUR EMERGENCY ASSISTANCE

SHELL 713-473-9461
CHEMTREC 800-424-9300

HAZARD RATING
LEAST 0 ▶ SLIGHT 1 ▶ MODERATE 2 ▶ HIGH 3 ▶ EXTREME 4

HEALTH	2
FIRE	4
REACTIVITY	0

SECTION II INGREDIENTS

COMPOSITION	%	TOXICITY DATA
Super Regular - Unleaded Gasoline	100	Not Determined
A complex combination of hydrocarbons largely C-4 through C-12. Benzene content typically from 0.5% to 2.5%. May contain up to 10% of various oxygenated hydrocarbons, such as aliphatic alcohols and ethers. Also contains small amounts of other additives which are not considered to be hazardous at the concentrations used.		

SECTION III HEALTH INFORMATION

Inhalation: WARNING. Minimize breathing vapors. Repeated or prolonged exposures to high concentration of vapor may cause pulmonary irritation, headache, dizziness, nausea, incoordination, loss of consciousness or even death

Ingestion: Harmful or fatal if swallowed resulting in nausea, vomiting, diarrhea and restlessness. Aspiration of vomitus and/or gasoline may lead to severe lung damage and even death.

Skin Contact: Prolonged and repeated liquid contact can cause defatting and drying of the skin resulting in skin irritation and dermatitis. Some components of gasoline may be absorbed through the skin.

NOTE: (1) It has been reported that chronic inhalation exposure to an unleaded motor gasoline, which was fully vaporized, has produced kidney and liver cancers in some laboratory rodents. The studies were sponsored by the American Petroleum Institute. The API test material used was blended to represent a typical unleaded motor gasoline. Shell unleaded gasoline has not been evaluated in this type of animal test. (2) Repeated high level benzene exposure may produce injury of the blood-forming tissues causing blood abnormalities and possibly leukemia; however, exposures to such high levels are not likely to be encountered in gasoline vapor due to the low benzene content.

SECTION IV OCCUPATIONAL EXPOSURE LIMITS

No OSHA limits have been established.
ACGIH/TLV = 300 ppm (8-hours TWA); TLV-STEL = 500 ppm
NOTE: THE ACGIH/TLV limit of 300 ppm is under review. In the interim, minimize exposure to a level which is practical and attainable.

SECTION V EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove victim to fresh air and provide oxygen if breathing is difficult. Give artificial respiration if not breathing. Get medical attention.

SKIN CONTACT: Flush with water while removing contaminated clothing and shoes. Follow by washing with soap and water. Do not reuse clothing or shoes until cleaned. If irritation persists, get medical attention.

EYE CONTACT: Flush with water for 15 minutes while holding eyelids open. Get medical attention.

INGESTION: Do not induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Get medical attention.*

*NOTE TO THE PHYSICIAN: If more than 2.0 ml per kg has been ingested and vomiting has not occurred, emesis should be induced with medical supervision. Keep victim's head below hips to prevent aspiration. If symptoms such as loss of gag reflex, convulsions or unconsciousness occur before emesis, gastric lavage using a cuffed endotracheal tube should be considered.

SECTION VI PHYSICAL DATA

BOILING POINT (°F) ▶	100-425 Approx.	MELTING POINT (°F) ▶	N.A.	VAPOR PRESSURE (mmHg) ▶	7-14.5 PSI (Reid)
SPECIFIC GRAVITY (H_2O=1) ▶	0.72-0.76	% VOLATILE BY VOLUME ▶	100 (at 415°F)	VAPOR DENSITY (AIR=1) ▶	3.5
SOLUBILITY IN WATER ▶	Negligible	EVAPORATION RATE (BUTYL ACETATE=1) ▶	N.A.	N.A.= Not Available	

APPEARANCE AND ODOR

Clear to light amber color; clear and bright liquid. Characteristic petroleum-hydrocarbon odor.

SECTION VII FIRE AND EXPLOSION HAZARDS

FLASH POINT AND METHOD USED	FLAMMABLE LIMITS/% VOLUME IN AIR ▶	LOWER	UPPER
-40°F Tag Closed Tester		1.3	7.6

EXTINGUISHING MEDIA

Use water fog, foam, dry chemical or CO_2. Do not use a direct stream of water. Product will float and can be reignited on surface of water.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS

Danger. Extremely Flammable. Clear fire area of unprotected personnel and isolate. Do not enter confined fire space without full bunker gear including a positive pressure NIOSH approved self-contained breathing apparatus. Cool fire exposed containers with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapors are heavier than air accumulating in low areas and traveling along ground away from the handling site.

Do NOT weld, heat or drill on or near container. However, if emergency situations require drilling, only trained emergency personnel should drill.

SECTION VIII REACTIVITY

STABILITY ▶ [ ] UNSTABLE [X] STABLE | HAZARDOUS POLYMERIZATION ▶ [ ] MAY OCCUR [X] WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID

Avoid heat, sparks, open flames and strong oxidizing agents. Prevent vapor accumulation.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide and other unidentified organic compounds can be formed upon combustion.

SECTION IX EMPLOYEE PROTECTION

RESPIRATORY PROTECTION

Under conditions of potential high exposure, the use of a NIOSH-approved respirator is recommended (see Section X). Per 29 CFR 1910.134 use either an atmosphere-supplying respirator or an air-purifying respirator for organic vapors. For service station personnel protection, see Section XI.

PROTECTIVE CLOTHING

As required to minimize skin and eye contact, wear impervious gloves, eye protection, and other protective clothing.

ADDITIONAL PROTECTIVE MEASURES

Use explosion-proof ventilation as required to control vapor concentrations.

SECTION X ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURES

DANGER! EXTREMELY FLAMMABLE. Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking.
Large spills: Isolate hazard area; deny entry to unnecessary personnel. Wear appropriate respirator and protective clothing. Shut off source of leak if safe to do so; dike and contain. Water fog may be useful in suppressing vapor cloud; contain run-off. Remove with vacuum trucks or pump to storage/salvage vessels. Soak up residue with an absorbent such as clay, sand or other suitable material; place in D.O.T. authorized non-leaking containers for proper disposal. Flush area with water only if flush solutions can be contained and gasoline is recoverable.
Small spills: Take up with an absorbent material such as sand or clay and dispose as above.

WASTE DISPOSAL

Recovered product should be recycled. Waste generated during cleanup which is discarded as a solid waste should be disposed of at a facility approved under RCRA regulations for hazardous waste (See Sec. XIII).

ENVIRONMENTAL HAZARDS

This product is an "oil" under the Clean Water Act. KEEP OUT OF SURFACE WATERS AND ANY WATER COURSES OR SEWERS ENTERING OR LEADING TO SURFACE WATERS. See Section XIII.

MATERIAL SAFETY DATA SHEET

Shell

97005 (REV. 7-82)

MSDS NUMBER ▶ 51,260-3

SECTION XI SPECIAL PRECAUTIONS

DANGER! EXTREMELY FLAMMABLE. Avoid heat, sparks, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. All handling equipment must be grounded to prevent sparking. Harmful or fatal if swallowed. Do not siphon gasoline by mouth.

FOR USE AS A MOTOR FUEL ONLY. Do not use as a cleaning solvent or for other non-motor fuel uses.

Wash with soap and water before eating, drinking, smoking or using toilet facilities. Launder contaminated clothing before reuse. Under normal working conditions at service stations, a respirator is not warranted. If a major spill occurs, get upwind and notify local emergency personnel. Remember explosion and fire is the most immediate danger.

SECTION XII TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION ▶

[X] FLAMMABLE LIQUID	[ ] COMBUSTIBLE LIQUID	[ ] OXIDIZING MATERIAL	[ ] NON-FLAMMABLE GAS
[ ] FLAMMABLE SOLID	[ ] POISON,CLASS A	[ ] CORROSIVE MATERIAL	[ ] NOT HAZARDOUS BY D.O.T. REGULATIONS
[ ] FLAMMABLE GAS	[ ] POISON,CLASS B	[ ] IRRITATING MATERIAL	[ ] OTHER—Specify below

D.O.T. PROPER SHIPPING NAME

Gasoline

OTHER REQUIREMENTS

D.O.T. I.D. # UN1203, Guide No. 27

SECTION XIII OTHER REGULATORY CONTROLS

EPA,FDA,OSHA,USDA,CPSC,etc.

EPA - Resource Conservation and Recovery Act (RCRA) Regulations
As produced, this material is a product and not a waste. If discarded or intended to be discarded as is, it is a liquid ignitable hazardous waste as defined in RCRA (40 CFR 261.21). The EPA hazardous waste number is D001. Free liquid ignitable wastes are banned from disposal by landfilling bulk or in containers. Product recovery and recycling are recommended where possible.

EPA - Clean Water Act (CWA)
This product is classified as an oil under Section 311 of the Clean Water Act. Spills entering (a) surface waters or (b) any watercourses or sewers entering/leading to surface waters that cause a sheen MUST be reported to the National Response Center, 800-424-8802.

BE SAFE

READ OUR PRODUCT SAFETY INFORMATION ...AND PASS IT ON

(PRODUCT LIABILITY LAW REQUIRES IT)

John P Lepori
Manager

SHELL OIL COMPANY
PRODUCT SAFETY AND COMPLIANCE
OIL AND CHEMICAL PRODUCTS
P.O. BOX 4320
HOUSTON,TEXAS 77210

DATE PREPARED
May 05, 1983

Chevron U.S.A. Inc.

Material Information Bulletin

(Approved – "Essentially Similar" to Form OSHA 20, Material Safety Data Sheet)

CHEVRON AVIATION HYDRAULIC FLUID A

CMS 247707

DANGER!
HARMFUL OR FATAL IF SWALLOWED
MAY CAUSE SKIN IRRITATION
COMBUSTIBLE
KEEP OUT OF REACH OF CHILDREN

TYPICAL COMPOSITION

Hydrocarbon base oils	84.0%
Additive	15.5%
Tricresylphosphate*	0.5%

*Contains less than 0.1% ortho isomer.

EXPOSURE STANDARD

The suggested Threshold Limit Value is 5 mg/m^3 (milligrams of material per cubic meter of air) for a daily 8-hour exposure. This is the OSHA exposure standard and the Threshold Limit Value for mineral oil mists.

PHYSIOLOGICAL & HEALTH EFFECTS

Expected to cause no more than minor eye irritation. Application into the eyes of rabbits produced slight membrane irritation.

This material is a primary skin irritant. Application onto the skin of rabbits produced severe erythema and edema. See Additional Health Data.

Not expected to be acutely toxic by inhalation but inhalation of oil mists at levels above the exposure standard can cause respiratory irritation or discomfort.

Not expected to be acutely toxic by ingestion. The acute oral LD_{50} (rat) was greater than 5 g/kg. **Note to Physician:** Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

EMERGENCY & FIRST AID PROCEDURES

Eyes

Wash eyes with fresh water for at least 15 minutes. If irritation continues, see a doctor.

Skin

Wash skin thoroughly with soap and water. See a doctor if any of the signs and symptoms described in this bulletin develop or if any skin irritation occurs. Launder contaminated clothing.

Inhalation

If respiratory irritation or discomfort occur when breathing the dust or mist, move the person to fresh air. If irritation or discomfort continue or if any other signs or symptoms occur, see a doctor.

Ingestion

If swallowed, DO NOT make person vomit. Call a doctor immediately.

ADDITIONAL HEALTH DATA

Not expected to be toxic by skin absorption. The acute dermal LD_{50} for rabbits was greater than 5 g/kg.

SPECIAL PROTECTIVE INFORMATION

Eye Protection: No special eye protection is necessary.

Skin Protection: Avoid contact with skin or clothing. Skin contact can be minimized by wearing impervious protective clothing including rubber gloves.

Respiratory Protection: If operating conditions create airborne concentrations which exceed the exposure standard, the use of an approved respirator is recommended.

Ventilation: Use this material only in well ventilated areas.

Other: If skin contact can occur, washing facilities for skin should be available nearby.

FIRE PROTECTION

Liquid evaporates and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85°F.

Flash Point: (P-M) 80°C (Min.)
Autoignition Temp.: NDA
Flammability Limits: NDA

Extinguishing Media: CO_2, Dry Chemical, Foam, Water Spray.

Special Fire Fighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective eqiupment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire bulletin.

SPECIAL PRECAUTIONS

See Page 3.

ENVIRONMENTAL PROTECTION

Environmental Impact: This material is not expected to present any environmental problems other than those associated with oil spills.

Precautions if Material is Released or Spilled: Eliminate all open flames in vicinity of spill or released vapor. Clean up spills as soon as possible, observing precautions in Special Protective Information. Absorb large spills with absorbent clay, diatomaceous earth, or other suitable material. A fire or vapor hazard may exist since these cleanup materials will only absorb liquid; they will not absorb vapor.

Waste Disposal Methods: Place contaminated materials in disposable containers and bury in an approved dumping area.

REACTIVITY DATA

Stability (Thermal, Light, etc.): Stable.

Incompatibility (Materials to Avoid): May react with strong oxidizing materials.

Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

PHYSICAL PROPERTIES

Solubility: Miscible in hydrocarbons; insoluble in water.

Appearance (Color, Odor, etc.): Clear red liquid.

Boiling Point: NDA
Melting Point: n/a
Specific Gravity: 0.85
Vapor Pressure (mm Hg & Temp.): NDA
Vapor Density (Air = 1): NDA
Percent Volatile (Volume %): NDA
Evaporation (= 1): NDA
Pour Point: -60°C (Max.)
Viscosity: 14 cSt @ 40°C

n/a = Not Applicable
NDA = No Data Available

SUPPLEMENT

Material Information Bulletin

CHEVRON Aviation Hydraulic Fluid A **CMS 247707**

SPECIAL PRECAUTIONS

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

Contains Petroleum Distillate.
DO NOT USE OR STORE near flame, sparks or hot surfaces.
USE ONLY IN WELL VENTILATED AREA.
Keep container closed.
DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

CAUTION! Do not use pressure to empty drum or explosion may result.

CRR-6745(C)(10M-9-79) Printed in U.S.A.
No. 818 - Rev. 12/80

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT
SCHENECTADY, N. Y. 12305
Phone: (518) 385-4085 DIAL COMM 8*235-4085

MATERIALS INFORMATION SERVICES

No. 52

HYDROGEN SULFIDE

Date July 1979

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: HYDROGEN SULFIDE
DESCRIPTION: A flammable toxic gas, usually supplied as a liquid in steel containers under its own vapor pressure. It is also a by-product of certain chemical processes or from decomposition of sulfur containing organic material.
OTHER DESIGNATIONS: Sulfuretted Hydrogen, H_2S, CAS# 007 783 064
MANUFACTURER: Available from several producers, including Air Products & Chemicals, Inc. Industrial Gas Div., Matheson Gas Products, and Union Carbide Corp., Linde Div.

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Hydrogen Sulfide Impurities can include traces (0.01-0.1%) of CH_3SH, CO_2, CS_2, COS, and SO_2. *Current OSHA acceptable ceiling concentration. Also 50 ppm exposure is allowed for 10 minutes if no other measurable exposure occurs during the day. ACGIH (1978) 8-hr TWA is 10 ppm with a 15 ppm STEL. NIOSH (1977) recommended that workplace exposure be limited to 15 mg/m^3 or 10 ppm (10 minute sampling) and that continuous monitoring for H_2S be used if the potential exposure is 70 mg/m^3 or higher.	>98	Ceiling level 20 ppm* or 30 mg/m^3 Human, Inhalation LCLo 600 ppm/30 min Rat, Inhalation LC_{50} 713 ppm/1 hr

SECTION III. PHYSICAL DATA

Boiling point, 1 atm, deg C	-60.3	Density of liquid at b.p., g/ml	0.993
Vapor pressure at 25 C, atm	19.6	Freezing point, 1 atm, deg C	-85.5
Vapor density (Air=1)	1.2	Molecular weight	34.08

Water solubility, 1 atm, Vol.gas/Vol.H_2O:
At 0 C ---------- 4.4
At 20 C ---------- 2.6
At 40 C ---------- 1.9

Appearance & Odor: A colorless gas with an offensive odor (rotten eggs) at low concentrations; odor detectable above 0.03 ppm, and offensive at about 3 ppm. Olfactory fatigue in a few minutes; odor sensation lost immediately at >200 ppm.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air Volume %	LOWER	UPPER
Gaseous above -60 C	500 F (260 C)		4.3	46

Extinguish fire by stopping flow of gas. Use a water spray to cool fire-exposed containers and to protect those involved in stopping gas flow.

Hydrogen sulfide gas can flow along surfaces for considerable distances, reach a distant ignition source and flash back. A dangerous fire hazard; a moderate explosion hazard.

Firefighters must use eye protection and self-contained breathing apparatus. H_2S can be irritating to moist skin. In a fire situation possible hazard from exploding or rocketing cylinders.

SECTION V. REACTIVITY DATA

This is a stable material when properly stored in cylinders at room temperature. It does not polymerize. However, it is a highly flammable, acidic gas; it can be dangerously reactive with strong nitric acid, sodium peroxide or other oxidizing agents. Much heat can be generated on reaction with alkaline materials such as soda lime or barium oxide (especially in the presence of mercurous or nickel oxide). Copper powder can catalyze the oxidation of an air-hydrogen sulfide mixture. Hydrogen sulfide produces sulfur dioxide when burned in excess air or sulfur when burned with excess H_2S.

Hydrogen sulfide is corrosive to many materials when moist. (It forms a weak acid in water solution.) Iron and steel are suitable for handling dry H_2S; brass can be acceptable.

SECTION VI. HEALTH HAZARD INFORMATION

TLV 10 ppm (See Sect. II)

H_2S is an irritant to all moist tissues. Irritancy of eyes and respiratory tract begins above 20 ppm and increases with concentration and exposure time. The sense of smell is immediately paralyzed on exposure at 200 ppm. Less than half hour exposure at about 300-500 ppm can result in headache, dizziness, staggering gait, nausea, and dryness & pain in the respiratory tract (followed later by bronchitis & pulmonary edema). Even a few minutes exposure above 600 ppm can be dangerous, with increasing systemic & CNS involvement in addition to irritancy and edema. Paralysis of the breathing centers can occur after a few breaths at 1000-2000 ppm, followed by collapse and quick death if removal to fresh air and restoral of breathing is not rapidly accomplished. Liquid H_2S is corrosive to skin and eyes; it also causes cold burns. FIRST AID:

Eye or Skin Contact: Flush affected area well with running water for at least 15 minutes. Get prompt medical help for eye contact. (See ophthalmologist if possible.)

Inhalation: (Warning! Because of the hazards of high H_2S levels, would-be rescuers must use good judgment to minimize their own personal risk.) Remove victim to fresh air immediately! Restore breathing with an oxygen resucitator or administer oxygen (or oxygen containing 5% CO_2) if breathing is difficult. Keep warm and at rest. Get medical help promptly!

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel immediately if leakage or release of H_2S is suspected. Evacuate area at 50 ppm. Supply explosion-proof ventilation. Remove all sources of ignition. Those who are involved in "clean-up" must use full protective gear (Sect. VIII). Detect minor leaks with bubble formation from soap solution coating or with $CdCl_2$ solution (yellow precipitate with H_2S). Isolate and stop leakage. Prevent escape of gas when possible. Seal faulty cylinders if possible and return to manufacturer (a leaking cylinder cannot be shipped).

Disposal - Waste material or contents of leaky containers which cannot be sealed can be collected with an alkaline scrubber to form a sulfide, or the gas can be burned under controlled conditions with a scrubber to remove SO_2 from the effluent. Follow Federal, State, & local regulations for disposal & for handling sulfides or sulfites from scrubbers.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide engineering controls to keep worker exposure to H_2S at as low a level as feasible. Enclosure of the process is recommended. An explosion-proof exhaust hood with greater than 100 fpm face velocity can be used. (Scrubbing of exhaust air before discharge to the environment will likely be required.) Self-contained breathing equipment, approved for H_2S use, must be available for nonroutine and emergency use. (Extra self-contained breathing equipment should be stored in areas not likely to be contaminated in an emergency.) Eye protection is needed! At high concentrations full protective clothing may be needed.

Use gloves and safety goggles when working with H_2S. Additional protective clothing may be needed to prevent contact with H_2S or solutions of H_2S, depending on the work conditions.

Eye wash stations must be readily available to areas of handling and use.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Follow good practice in handling cylinders of this flammable gas under pressure. Cylinders have fusible safety plugs which melt above 163 F. Store in cool, well-ventilated fire resistant area (outside or detached storage preferred) away from sources of heat and ignition, away from oxidizing agents, and out of direct sunlight. Ground lines and equipment used with H_2S to reduce possibility static spark initiated fire or explosion.

Where H_2S is regularly used or present, install continuous monitoring system with alarms. Do not depend on sense of smell. Train workers in hazards, safe practices, first aid. Use trained workers in pairs.

Provide pre-placement and regular (≤3-year) medical exams to workers with emphasis on eyes, nervous system, & respiratory system.

DATA SOURCE(S) CODE: 1-9, 11, 17, 19, 23, 24

APPROVALS: MIS, CRD J. M. Nuiya

Industrial Hygiene and Safety

MEDICAL REVIEW: 12/79

MATERIAL SAFETY DATA SHEET #1516

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.
K & W Products	213 693-8228
ADDRESS (Number, Street, City, State, and ZIP Code)	
8319 S. Allport Ave., Santa Fe Springs, Ca. 90670	
CHEMICAL NAME AND SYNONYMS	**TRADE NAME AND SYNONYMS**
Gasket compound, anti-seize	K & W Copper-Coat Gask. Comp.
CHEMICAL FAMILY	**FORMULA**
Resin, Rubber, Petro chemical	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS *Hexane			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES Resins, anti-oxidants			OTHERS		
OTHERS Tackifiers					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	0.78
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	80
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	none		

APPEARANCE AND ODOR Copper Colored suspension, viscous, hexane solvent odor

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
47 F Open cup			

EXTINGUISHING MEDIA
CO^2 extinguisher, or dry chemical extinguisher

SPECIAL FIRE FIGHTING PROCEDURES
Same as for gasoline

UNUSUAL FIRE AND EXPLOSION HAZARDS

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE
Same as for volatile solvents. Avoid contact, use adequate ventilation
Do not inhale, Harmful if swallowed.

EMERGENCY AND FIRST AID PROCEDURES If ingested do not induce vomiting. Call a physician immediately. Remove person to fresh air. Artificial respiration if needed. Flush with copious amounts of running water, if contact with skin after removal with kerosene. Then wash with warm water and soap.

SECTION VI - REACTIVITY DATA

STABILITY	**UNSTABLE**		**CONDITIONS TO AVOID**
	STABLE	x	Fire or flame

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 Remove with kerosene solvent, under ventilation only. Avoid fire, flame, or spark

WASTE DISPOSAL METHOD Discard in open ventilation area only, or bury.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*

VENTILATION	**LOCAL EXHAUST**	**SPECIAL**
	MECHANICAL *(General)*	**OTHER**

PROTECTIVE GLOVES	**EYE PROTECTION**

OTHER PROTECTIVE EQUIPMENT Use in well ventilated area.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING No special precuations. Other than adequate ventilation. Avoid contact with body, avoid inhaling.

OTHER PRECAUTIONS Avoid heat, flame and sparks

Material Safety Data Sheet
To comply with OSHA's Hazard Communication Standard, CFR 1910.1200.

IDENTITY (As Used on Label and List)	Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.
Natural Gas	
SECTION I	CAS # See Haz Comp. Sec II
Manufacturer's Name: Parker & Parsley Dev. Co.	Emergency Telephone Number: (915) 683-8432
Address: 303 W. Wall, Midland, Texas 79701	Telephone Number for Information: (915) 683-8432
	Date Prepared: June 30, 1994

SECTION II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity)		OSHA PEL	ACGIH TLV	Other Limits Recommended	%(Optional)
Methane (CAS 74-82-8)	88%				
Ethane (CAS 74-84-0)	7%	NDA	NDA		
[illegible]pane (CAS 74-98-6)	2.5%				
[illegible]nes (CAS 106-97-8)	.5%				
[illegible]rogen (CAS 7727-37-9)	1.5%				
Carbon Dioxide (CAS 124-38-9)	.5%				

Hydrogen sulfide gas (H_2S) may be present in some natural gas streams and may accumulate in low lying areas or areas with poor air circulation at toxic levels.

SECTION III - Physical/Chemical Characteristics *NDA - No Data Available, N/A - Not Applicable

Boiling Point	Specific Gravity (H_2O = 1)
162°C	See Gas Density
Vapor Pressure	**Melting Point**
760 mm Hg @ -162°C	-184°C
Vapor Density (AIR = 1)	**Evaporation Rate**
NDA	NDA

Solubility in Water
Soluble in petroleum hydrocarbons. Slightly soluble in alcohol and ether; only slightly soluble in water.

Appearance and Odor
An odorless, colorless, tasteless gas. (If H_2S is present in low concentrations, there will be a strong rotten egg odor)
WARNING: DO NOT DEPEND ON SENSE OF SMELL TO DETECT THE PRESENCE OF H_2S.

SECTION IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Autoignition Temp.	% Volatility	LEL	UEL
<-162°C	482° - 632°C	100%	4%	15%

Extinguishing Media
[illegible]op gas flow. Use water spray for cooling.

Special Fire Fighting Procedures
For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire MSDS.

SECTION IV (Cont'd) - Fire and Explosion Hazard Data

Unusual Fire and Explosion Hazards

Natural gas presents an extreme fire hazard. Gas forms mixtures with air which can become explode violently on contact with any source of ignition. DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed.

SECTION V - Reactivity Data

Stability (Thermal, Light, etc.): Stable Incompatibility (Material to Avoid): Explosive with air, oxygen, chlorine, bromine pentafluoride, chlorine dioxide, and other oxygen and halogen sources.
Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.
Hazardous Polymerization: Will not occur.

SECTION VI - Physiological & Health Effects

Not expected to cause eye irritation. Not expected to be irritating to the skin. Breathing high concentrations of natural gas may produce asphyxia by displacement of room air. Not expected to be an ingestion problem.
Signs and symptoms which proceed asphyxia may include rapid respiration, loss of mental alertness and coordination, dizziness, nausea and vomiting. Continued exposure may result in prostration, convulsions, coma and death.

Emergency First Aid Procedures

Eyes: Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open. If irritation persists, see a doctor.
Skin: Not Applicable
Inhalation: If there are signs or symptoms as described in this MSDS due to breathing this material, move the person to fresh air. If breathing has stopped, apply artificial respiration. Call medical personnel.
Ingestion: Since this material is not expected to be an ingestion problem, no first aid procedures are required.

SECTION VII - Environmental Protection

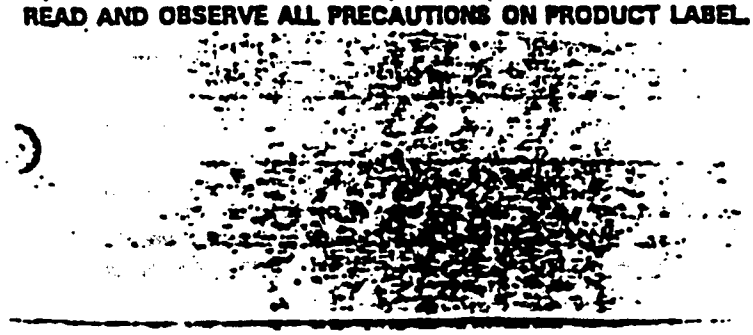
Environmental Impact: NDA
Precautions if Material is Released or Spilled: Eliminate all sources of ignition in vicinity of released gas. Stop gas flow. Provide adequate ventilation to assure there is no significant displacement of oxygen in the room air. Otherwise, evacuate the area and do not allow anyone to return until it is safe to do so.
Waste Disposal Methods: N/A

SECTION VIII - Protective Information/Control Measures

Eye Protection: No special eye protection is necessary.
Skin Protection: No special skin protection is necessary.
Respiratory Protection: No special respiratory protection is normally required. However, if operating conditions create high airborne concentrations, the use of an approved respirator is recommended. NOTE: If any of the applicable H_2S exposure standards are likely to be exceeded, only supplied air respiratory protection can be used.
Ventilation: No special ventilation is usually necessary. However, if operating conditions create high airborne concentrations of this material, special ventilation may be needed.
Comment: Toxic quantities of hydrogen sulfide (H_2S) may be present in gas streams and vessels which contain or have contained natural gas. Persons opening or entering these departments should first determine if H_2S is present. As an indicator of H_2S concentration, the rotten egg odor is unreliable because the sense of smell is lost after limited exposure to hydrogen sulfide gas. Therefore DO NOT ATTEMPT RESCUE WITHOUT WEARING APPROVED SUPPLIED-AIR OR self-contained breathing equipment.

Special Precautions

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.



T[illegible]aterial safety data sheet and the information it contains is offered to you in good faith as accurate. We have obtained [illegible]mation contained in this data sheet from sources outside this company, which we believe to be generally reliable [illegible]cluding, but not limited to, other Material Safety Data Sheets. No warranty, express or implied of merchantability, fitness for a particular purpose or otherwise is made. We believe this information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as permission or a recommendation for the use of any product or material in any manner that might present a hazard to personnel, damage the environment or violate laws or regulatory standards. No warranty is made, either express or implied, and Parker & Parsley Petroleum Company and its subsidiaries shall not be liable for any incidental or consequential damages arising directly or indirectly in connection with the purchase, use, storage or handling of this product.

MATERIAL SAFETY DATA SHEET

		NFPA*		
Trade Name:	Sour Natural Gas	Health	0	Extremely Hazardous
Synonyms:	Poison Gas Hydrogen Sulfide gas Acid Gas	Fire	4	Very Flammable
		Reactivity	0	Stable

CAS Reg. No.: Mixture

* Assignment based on our evaluation.

I. GENERIC COMPOSITION/INGREDIENTS

Material	%	Hazard Data
Methane (CH_4) CAS Reg. No. 74-82-8	Typically >90%	Simple asphyxiant
Hydrogen Sulfide (H_2S) CAS Reg. No. 7783-06-4	Variable 0-400,000 ppm in air	Inhalation: Immediately dangerous to life and health above 300 ppm; possible eye, nose and throat irritations above 10 ppm.

II. PHYSICAL DATA

Boiling Point: 760 mmHg
°C (°F) --161 (--258)

Melting Point: NA

Specific Gravity
(H_2O = 1) NA

Vapor Pressure: Gas
(mmHg, @ 25°C)

Vapor Density: <1.0
(Air = 1)

Solubility in H_2O: Nil
(% by Wt.)

Volatiles: Gas
(% by Vol.)

Evaporation Rate: Gas
(Butyl Acetate=1)

Appearance and Odor: Colorless gas. Presence of hydrogen sulfide causes rotten egg odor. Sense of smell may diminish after exposure for short period.

ND = No Data
NA = Not Applicable
Revised: 12/15/89

III. FIRE AND EXPLOSION DATA

Flash Point: =>-40 (=>-40) [°C (°F)]

Autoignition Temperature: >260 (>500) [°C (°F)]

Flammable Limits in Air: Lower: ~3.0 Upper: ~12.5 (% by Vol.)

Extinguishing Media: Stop flow - CO_2, dry chemical, foam.

Special Fire Fighting Procedure: Stop flow

Unusual Fire or Explosion Hazard: May form explosive mixtures in air.

IV. HEALTH HAZARD INFORMATION

Toxicity Summary: Moderately toxic: gases are simple asphyxiants and/or anesthetic. Ingestion of >1 oz. of liquids may be harmful or fatal.

Listed as Carcinogen or Potential Carcinogen by:

	NTP	IARC	OSHA
Benzene	Yes	Category 1	Yes

Acute Exposure Symptoms:

Inhalation:	Concentrations of vapors above 1% may cause anesthesia, nausea, vomiting, or lung irritation. Condensate may contain H_2S, and exposure above 300 ppm is immediately dangerous to life or health.
Skin Contact:	Contact with compressed material may cause freezing burns, drying, cracking (dermatitis).
Skin Absorption:	No probable hazard.
Eye Contact:	Irritating
Ingestion:	Ingestion of liquid portion (at room temperature) may cause burning of mouth.

Chronic Effects: Prolonged, repeated dermal contact may cause drying, cracking or dermatitis. OSHA has concluded benzene can cause leukemia in humans and has established a TWA of 1 ppm, and STEL of 5 ppm,. Prolonged, repeated exposure may have leukemogenic effects if air concentrations of 1 ppm is exceeded.

First Aid:

Inhalation:	Remove to fresh air. Respiratory support if necessary. Seek medical aid.
Skin:	Wash with soap and water.
Eyes:	Flush with large volumes of water. Seek medical aid.
Ingestion:	Do not induce vomiting. Seek medical aid.

Notes to Physician:
- High aspiration risk. For large amounts, careful gastric lavage.
- Eructation and gastroenteritis may be complications.
- Aspiration may cause chemical pneumonitis or lipoid pneumonia.

V. REACTIVITY DATA

Conditions Contributing to Instability: None

Incompatibility: Strong Oxidants

Hazardous Decomposition Products (thermal unless otherwise specified): CO, CO_2, SO_2

Conditions Contributing to Hazardous Polymerization: None

VI. SPILL OR LEAK PROCEDURES

Follow accepted industry practices and/or local, state and federal regulations. Check before handling.

VII. SPECIAL PROTECTION INFORMATION

Hazardous Components	OSHA TWA	OSHA STEL
Hydrogen Sulfide	10 ppm	15 ppm

Ventilation Requirements: Maintain below Lower Flammable Limit. Maintain adequate oxygen concentrations to support life. Above TWA use NIOSH-approved pressure-demand respiratory equipment.

Specific Personal Protective Equipment:

Respiratory:	Use NIOSH-approved pressure-demand respiratory protection above TWA.
Eyes:	Safety goggles if handling pressurized material.
Gloves:	Not required.
Other Clothing or Equipment:	None

VIII. SPECIAL PRECAUTIONS

Precautionary Statements: None

Storage: Flammable, poison gas.

ND = No Data
NA = Not Applicable
Revised: 12/15/89

Additional Precautions:

The information below is given to call attention to the issue of "Naturally Occurring Radioactive Materials." Although Radon-222 levels which may be in the product represented by this MSDS do not present any direct Radon exposure hazard, customers should be aware of the potential for Radon daughter buildup within their processing systems, whatever the source of their product streams. Radon-222 is a naturally occurring radioactive gas which can be a contaminant in natural gas. During processing, Radon tends to concentrate in liquefied petroleum gas streams and in product streams having similar boiling point range. Industry experience has shown that this product may contain small amounts of Radon-222 and its radioactive "daughters". The actual concentration of Radon-222 and radioactive daughters in the delivered product is dependent on the geographical source of the natural gas and storage time prior to delivery. Process equipment, e.g. lines, filters, pumps and reaction units, may accumulate radioactive daughters and emit gamma radiation during operation. A potential external radiation hazard exists at or near any pipe, valve, or vessel containing a Radon-enriched stream, or containing internal deposits of radioactive material due to the transmission of gamma radiation through its wall. Field studies reported in the literature and conducted by company personnel at selected sites have not shown any conditions that subject workers to cumulative exposures in excess of general population limits. Equipment emitting gamma radiation should be presumed to be internally contaminated with alpha-emitting decay products which may be a hazard if inhaled or ingested. Before maintenance operations that require the opening of contaminated process equipment begin, the flow of gas should be stopped for four hours to allow the gamma radiation to drop to background levels. Protective equipment such as coveralls, gloves, and respirators (NIOSH/MSHA-approved for high efficiency filtration of particulates and radionuclides, or supplied-air) should be worn by personnel entering a vessel or working on contaminated process equipment to prevent skin contamination, ingestion or inhalation of any residues containing alpha radiation. Airborne contamination ma be minimized by handling scale and/or contaminated materials in a wet state.

TEXACO
MATERIAL SAFETY DATA SHEET

NOTE: Read and understand Material Safety Data Sheet before handling or disposing of product.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATERIAL IDENTITY

Product Code and Name:
08081 NATURAL GASOLINE

Chemical Name and/or Family or Description:
Natural Gasoline

Manufacturer's Name and Address:
TEXACO REFINING AND MARKETING, INC
P.O. Box 7812
Universal City, CA 91608

Telephone Numbers:

Transportation Emergency	-Company	: (914) 831-3400
	CHEMTREC	: (800) 424-9300
Health Emergency	-Company	: (914) 831-3400
General MSDS Assistance		: (914) 838-7204
Technical Information	-Fuels	: (914) 838-7336
	-Chemical	: (512) 459-6543
	-Lubricant/ Antifreezes	: (800) 782-7852
	-Additives	: (713) 235-6278
	-Solvents	: (800) 876-3738

2. COMPOSITION/INFORMATION ON INGREDIENTS

THE CRITERIA FOR LISTING COMPONENTS IN THE COMPOSITION SECTION IS AS FOLLOWS: CARCINOGENS ARE LISTED WHEN PRESENT AT 0.1 % OR GREATER. COMPONENTS WHICH ARE OTHERWISE HAZARDOUS ACCORDING TO OSHA ARE LISTED WHEN PRESENT AT 1.0 % OR GREATER; NON-HAZARDOUS COMPONENTS ARE LISTED AT 3.0 % OR GREATER. THIS IS NOT INTENDED TO BE A COMPLETE COMPOSITIONAL DISCLOSURE. REFER TO SECTION 14 FOR APPLICABLE STATES' RIGHT TO KNOW AND OTHER REGULATORY INFORMATION.

Product and/or Component(s) Carcinogenic According to:

OSHA	IARC	NTP	OTHER	NONE
-	X	-	Y	-

Composition: (Sequence Number and Chemical Name)

Seq.	Chemical Name	CAS Number	Range in %
01 *	Natural gasoline	8006-61-9	100.00

PRODUCT IS HAZARDOUS ACCORDING TO OSHA (1910.1200).
* COMPONENT IS HAZARDOUS ACCORDING TO OSHA

Exposure Limits referenced by Sequence Number in the Composition Section

Seq.	Limit	
01	300	ppm TWA-OSHA
01	500	ppm STEL-OSHA
01	300	ppm TWA-ACGIH
01	500	ppm STEL-ACGIH

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Appearance:
Water white liquid

Odor:
Hydrocarbon odor

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

3. HAZARD IDENTIFICATION (CONT)

WARNING STATEMENT

DANGER ! EXTREMELY FLAMMABLE LIQUID AND VAPOR
VAPOR MAY CAUSE FLASH FIRE
HARMFUL IF INHALED
MAY CAUSE DIZZINESS AND DROWSINESS
ASPIRATION HAZARD IF SWALLOWED -
CAN ENTER LUNGS AND CAUSE DAMAGE

ATTENTION ! POSSIBLE CANCER HAZARD - MAY CAUSE CANCER BASED ON ANIMAL DATA

HMIS			NFPA		
Health:	1	Reactivity: 0	Health:	1	Reactivity: 0
Flammability:	4	Special : -	Flammability:	4	Special : -

POTENTIAL HEALTH EFFECTS

	EYE	SKIN	INHALATION	INGESTION
Primary Route of Exposure:	X	X	X	-

EFFECTS OF OVEREXPOSURE

Acute:

Eyes:
May cause minimal irritation, experienced as temporary discomfort.

Skin:
Brief contact may cause slight irritation. Prolonged contact, as with clothing wetted with material, may cause more severe irritation and discomfort, seen as local redness and swelling.

Other than the potential skin irritation effects noted above, acute (short term) adverse effects are not expected from brief skin contact; see other effects, below, and Section 11 for information regarding potential long term effects.

Prolonged, widespread, or repeated skin contact may result in the absorption of potentially harmful amounts of material.

Inhalation:
Vapors or mist may cause irritation of the nose and throat.

Inhalation may cause dizziness, drowsiness, euphoria, loss of coordination, disorientation, headache, nausea, and vomiting. In poorly ventilated areas or confined spaces, unconsciousness and asphyxiation may result. Prolonged or repeated overexposure may result in the absorption of potentially harmful amounts of material.

Ingestion:
If more than several mouthfuls are swallowed, abdominal discomfort, nausea, and diarrhea may occur. Aspiration may occur during swallowing or vomiting resulting in lung damage.

Sensitization Properties:
Unknown.

Chronic:
Repeated skin contact may cause a persistent irritation or dermatitis.

Medical Conditions Aggravated by Exposure:
Because of its irritating properties, repeated skin contact may aggravate an existing dermatitis (skin condition).

Other Remarks:
None

4. FIRST AID MEASURES

Eyes:
Flush eyes with plenty of water for several minutes. Get medical attention if eye irritation persists.

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

4. FIRST AID MEASURES (CONT)

Skin:
Wash skin with plenty of soap and water until all traces of material are removed. Remove and clean contaminated clothing (See Other Instructions). Destroy non-resistant footwear. Get medical attention if skin irritation persists or contact has been prolonged.

Ingestion:
If person is conscious and can swallow, give two glasses of water (16 oz.) but do not induce vomiting. If vomiting occurs, give fluids again. Have medical personnel determine if evacuation of stomach or induction of vomiting is necessary. Do not give anything by mouth to an unconscious or convulsing person.

Inhalation:
If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Other Instructions:
Remove and dry-clean or launder clothing soaked or soiled with this material before reuse. Dry cleaning of contaminated clothing may be more effective than normal laundering. Inform individuals responsible for cleaning of potential hazards associated with handling contaminated clothing.

Aspiration of this product during induced emesis may result in severe lung injury. If evacuation of stomach is necessary, use method least likely to cause aspiration, such as gastric lavage after endotracheal intubation. Contact a Poison Center for additional treatment information.

5. FIRE-FIGHTING MEASURES

Ignition Temperature - AIT (degrees F):
Not applicable

Flash Point (degrees F):
< 20 (PMCC)

Flammable Limits (%):
Lower: 1
Upper: 6

Recommended Fire Extinguishing Agents And Special Procedures:
Fight fire from protected location or maximum possible distance. Use dry chemical, foam, carbon dioxide, or water spray. Use water spray to cool fire-exposed containers.

Unusual or Explosive Hazards:
Danger! Extremely flammable materials may release vapors that travel long distances, ignite, and flash back. Containers may explode in a fire. Do not expose to heat, sparks, flame, static, or other sources of ignition. When handling, use non-sparking tool, ground and bond all containers.

Explosive air-vapor mixtures may form.

Extinguishing Media Which Must Not Be Used:
Not determined.

Special Protective Equipment for Firefighters:
Wear full protective clothing and positive pressure breathing apparatus.

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

6. ACCIDENTAL RELEASE MEASURES (Transportation Spills: CHEMTREC (800)424-9300)

Procedures in Case of Accidental Release, Breakage or Leakage:
Eliminate all ignition sources including internal combustion engines and power tools. Ventilate area. Barricade the immediate hazard area. Stay upwind and warn of possible downwind explosion hazard. Avoid breathing vapor. Avoid contact with skin, eyes, or clothing. Pressure demand air supplied respirators should always be worn when the airborne concentration of the contaminant or oxygen is unknown. Otherwise, wear respiratory protection and other personal protective equipment as appropriate for the potential exposure hazard. Contain spill if possible. Remove with inert absorbent. Prevent entry into sewers and waterways.

7. HANDLING AND STORAGE

Precautions to be Taken in Handling:
Use spark-proof tools. Material may be at elevated temperatures and/or pressures. Exercise care when opening bleeders and sampling ports.

Storage:
Ground and bond shipping container, transfer line, and receiving container. Keep away from heat, sparks, flame, and other sources of ignition.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Equipment (Type)

Eye/Face Protection:
Safety glasses, chemical type goggles, or face shield recommended to prevent eye contact.

Skin Protection:
Gloves resistant to petroleum distillates are recommended to minimize skin contact. The most effective glove materials are Nitrile rubber, Teflon, or Viton for prolonged contact with gasoline. Protective clothing such as coveralls or boots should be also be worn where contact with product is likely. Launder or dry clean soiled clothes.

Respiratory Protection:
Airborne concentrations should be kept to lowest levels possible. If vapor, mist or dust is generated and the occupational exposure limit of the product, or any component of the product, is exceeded, use appropriate NIOSH or MSHA approved air purifying or air supplied respirator after determining the airborne concentration of the contaminant. Air supplied respirators should always be worn when airborne concentration of the contaminant or oxygen content is unknown.

Ventilation:
Use explosion-proof equipment to maintain adequate ventilation to meet occupational exposure limits, if applicable (see below), prevent accumulation of explosive air-gas mixtures, and avoid significant oxygen displacement. Oxygen levels should be at least 19.5% in confined spaces or other work areas (OSHA value).

Exposure Limit for Total Product:
None established for product.
For gasoline: OSHA PEL-TWA 300 ppm; STEL 500 ppm.
ACGIH TLV-TWA 300 ppm; STEL 500 ppm.
TEXACO TLV-TWA 100 ppm.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
Water white liquid

Odor:
Hydrocarbon odor

Boiling Point (degrees F):
Not applicable.

Melting/Freezing point (degrees F):
Not applicable.

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

9. PHYSICAL AND CHEMICAL PROPERTIES (CONT)

Specific Gravity (water=1):
Not determined.

pH of undiluted product:
Not applicable.

Vapor Pressure:
Not applicable.

Viscosity:
Not determined.

VOC Content:
Not determined.

Vapor Density (air=1):
Not applicable.

Solubility in Water (%):
Not applicable.

Other. None

10. STABILITY AND REACTIVITY

This Material Reacts Violently With:
(If Others is checked below, see comments for details)

Air	Water	Heat	Strong Oxidizers	Others	None of These
-	-	X	-	-	-

Comments:
None

Products Evolved When Subjected to Heat or Combustion:
Toxic levels of carbon monoxide, carbon dioxide, irritating aldehydes and ketones.

Hazardous Polymerizations: DO NOT OCCUR

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION(ANIMAL TOXICITY DATA)

Median Lethal Dose

Oral:
LD50 Believed to be > 5.00 g/kg (rat) practically non-toxic

Inhalation:
Not determined.

Dermal:
LD50 Believed to be > 2.00 g/kg (rabbit) practically non-toxic

Irritation Index, Estimation of Irritation (Species)

Skin:
(Buehler) .50 - 3.00 /8.0 (rabbit) slightly irritating

Eyes:
(Draize) Believed to be < 15.00 /110 (rabbit) no appreciable effect

Sensitization:
Not determined.

Other:
Studies in laboratory rats and mice exposed to constant levels of wholly vaporized unleaded gasoline for six hours per day, five days per week for two years caused kidney damage and kidney cancer in male rats and liver tumors in female mice. Many scientists do not believe that the male rat is an appropriate predictor of human kidney disease and are not in agreement on the relationship between liver tumors in laboratory animals and humans.

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

12. DISPOSAL CONSIDERATIONS

Waste Disposal Methods

This product (as presently constituted) has the RCRA characteristics of ignitability, and, if discarded in its present form, would have the hazardous waste number of D001. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because product uses, transformations, mixtures, processes, etc. may change the classification to non-hazardous, or hazardous for reasons other than, or in addition to ignitability.

Remarks

Do not allow to enter drains or sewers. Can cause explosion.

13. TRANSPORT INFORMATION,

Transportation

DOT:

Proper Shipping Name:
Gasoline

Hazard Class:
Not applicable

Identification Number: UN1203

Packing Group: II

Label Required:
Flammable liquid

IMDG:

Proper Shipping Name:
Not evaluated

ICAO:

Proper Shipping Name:
Not evaluated

TDG:

Proper Shipping Name:
Not evaluated

14. REGULATORY INFORMATION

Federal Regulations:

SARA Title III:

Section 302/304 Extremely Hazardous Substances

Seq.	Chemical Name	CAS Number	Range in %
None			

Section 302/304 Extremely Hazardous Substances (CONT)

Seq	TPQ	RQ
None		

Section 311 Hazardous Categorization:

Acute	Chronic	Fire	Pressure	Reactive	N/A
-	X	X	-	-	-

Section 313 Toxic Chemical

Chemical Name	CAS Number	Concentration
None		

CERCLA 102(a)/DOT Hazardous Substances: (+ indicates DOT Hazardous Substance)

Seq.	Chemical Name	CAS Number	Range in %
None			

CERCLA/DOT Hazardous Substances (Sequence Numbers and RQ's):

Seq.	RQ
None	

TSCA Inventory Status:
This product, or its components, are listed on or are exempt from the Toxic Substance Control Act (TSCA) Chemical Substance Inventory.

Other:
None.

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

14. REGULATORY INFORMATION (CONT)

State Regulations:

California Proposition 65:

The following detectable components of this product are substances, or belong to classes of substances, known to the State of California to cause cancer and/or reproductive toxicity.

Chemical Name	CAS Number
None	

States Right-to-know Regulations:

Chemical Name	State Right-to-know
Natural gasoline	CT,FL,IL,MA,NJ,RI

State list: CT (Connecticut), FL (Florida), IL (Illinois), MI (Michigan), LA (Louisiana), MA (Massachusetts), NJ (New Jersey), PA (Pennsylvania), RI (Rhode Island)

International Regulations:

WHMIS Classification:
Not determined

Canada Inventory Status:
This product, or its components, are listed on or are exempt from the Canadian Domestic Substance List (DSL).

EINECS Inventory Status:
This product, or its components, are listed on or are exempt from the European Inventory of Existing Chemical Substances (EINECS) or the European List of Notified Chemical Substances (ELINCS).

Australia Inventory Status:
This product, or its components, are listed on or are exempt from the Australian Inventory of Chemical Substances (AICS).

Japan Inventory Status:
Not determined.

15. ENVIRONMENTAL INFORMATION

Aquatic Toxicity:
Not determined.

Mobility:
Not determined.

Persistence and Biodegradability:
Not determined.

Potential to Bioaccumulate:
Not determined.

Remarks:
None

16. OTHER INFORMATION

Texaco recommends that all exposures to this product be minimized by strictly adhering to recommended occupational controls procedures to avoid any potential adverse health effects.

THE INFORMATION CONTAINED HEREIN IS BELIEVED TO BE ACCURATE. IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT FOR PURPOSE OF HAZARD COMMUNICATION AS PART OF TEXACO'S PRODUCT SAFETY PROGRAM. IT IS NOT INTENDED TO CONSTITUTE PERFORMANCE INFORMATION CONCERNING THE PRODUCT. NO EXPRESS WARRANTY, OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE WITH RESPECT TO THE PRODUCT OR THE INFORMATION CONTAINED HEREIN. DATA SHEETS ARE AVAILABLE FOR ALL TEXACO PRODUCTS. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL TEXACO PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE AND YOU ARE ENCOURAGED AND REQUESTED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

16. OTHER INFORMATION (CONT)

TO DETERMINE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, USER SHOULD CONSULT HIS LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. TEXACO DOES NOT UNDERTAKE TO FURNISH ADVICE ON SUCH MATTERS.

Since the last mailing for this customer code, the following sections have been revised:
7,11,14,16,17.

Date: 12-08-95 New X Revised, Supersedes: 07-05-95
Date printed: 05-22-96

Inquiries regarding MSDS should be directed to:
Texaco Inc.
Manager, Product Safety
P.O. Box 509
Beacon, N.Y. 12508

PLEASE SEE NEXT PAGE FOR PRODUCT LABEL

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

17. PRODUCT LABEL

Label Date: 12-08-95

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

08061 NATURAL GASOLINE

WARNING STATEMENT

DANGER ! EXTREMELY FLAMMABLE LIQUID AND VAPOR
VAPOR MAY CAUSE FLASH FIRE
HARMFUL IF INHALED
MAY CAUSE DIZZINESS AND DROWSINESS
ASPIRATION HAZARD IF SWALLOWED -
CAN ENTER LUNGS AND CAUSE DAMAGE

ATTENTION ! POSSIBLE CANCER HAZARD - MAY CAUSE CANCER BASED ON ANIMAL DATA

PRECAUTIONARY MEASURES

-Keep away from heat, sparks or flame.
-Use only with adequate ventilation.
-Avoid breathing vapor, mist, or gas.
-Avoid contact with eyes, skin, and clothing.
-Keep container closed.
-Wash thoroughly after handling.

FIRST AID

Eye Contact:
Flush eyes with plenty of water for several minutes. Get medical attention if eye irritation persists

Skin Contact:
Wash skin with plenty of soap and water until all traces of material are removed. Remove and clean contaminated clothing (See Other Instructions). Destroy non-resistant footwear. Get medical attention if skin irritation persists or contact has been prolonged.

Ingestion:
If person is conscious and can swallow, give two glasses of water (16 oz.) but do not induce vomiting. If vomiting occurs, give fluids again. Have medical personnel determine if evacuation of stomach or induction of vomiting is necessary. Do not give anything by mouth to an unconscious or convulsing person.

Inhalation:
If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Note to Physician:
Aspiration of this product during induced emesis may result in severe lung injury. If evacuation of stomach is necessary, use method least likely to cause aspiration, such as gastric lavage after endotracheal intubation. Contact a Poison Center for additional treatment information.

FIRE

In case of fire, use water spray, dry chemical, foam or carbon dioxide. Water may be ineffective on flames. Use water spray to keep containers cool and protect personnel attempting to stop the leak.

Chemical Name	CAS Number	Range in %
* Natural gasoline	8006-61-9	100.00

PRODUCT IS HAZARDOUS ACCORDING TO OSHA (1910.1200).
* COMPONENT IS HAZARDOUS ACCORDING TO OSHA.

Pennsylvania Special Hazardous Substance(s)	CAS Number	Range in %
None		

HMIS			NFPA		
Health: 1	Reactivity: 0		Health: 1	Reactivity: 0	
Flammability: 4	Special : -		Flammability: 4	Special : -	

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

17. PRODUCT LABEL (CONT)
Label Date: 12-08-95

RLG

Transportation
DOT:
Proper Shipping Name:
Gasoline
Hazard Class:
Not applicable
Identification Number: UN1203
Packing Group: II
Label Required:
Flammable liquid

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flame or heat. Keep container closed and drum bungs in place.

Manufacturer's Name and Address:
TEXACO REFINING AND MARKETING, INC
P.O. Box 7613
Universal City, CA 91608

TRANSPORTATION EMERGENCY Company: (914) 831-3400
CHEMTREC (800) 424-9300

HEALTH EMERGENCY Company: (914) 831-3400

Oryx Energy Company
Material Safety Data Sheet

Oryx Energy Company
PO Box 2880
Dallas, TX 75221-2880
Emergency Phone Number: (214) 357-1082

Revision Date: 10/18/91
Supersedes: 08/23/89

SECTION 1 IDENTIFICATION

Product Name: . . . FIELD SALES GAS (UNPROCESSED)
Chemical Family: . Aliphatic and Aromatic Hydrocarbon Mixture
CAS Registry #: . . 8006-14-2
DOT Number: . . . . UN 1971

CHEMICAL SYNONYMS OR ALIASES
NATURAL GAS
METHANE
LEASE GAS
WELL HEAD GAS

SECTION 2 HAZARDOUS INGREDIENTS

Components	Gas Volume Lower %age	Gas Volume Upper %age	OSHA PEL	ACGIH TLV	OSHA Ceiling
METHANE	60.00	95.00	NA	Asphyxiant	NA
ETHANE	3.00	15.00	NA	Asphyxiant	NA
PROPANE	2.00	10.00	1000 ppm	Asphyxiant	NA
ISOBUTANE	0.00	5.00	NA	NA	NA
N-BUTANE	0.00	10.00	800 ppm	800 ppm	NA
PENTANE	0.00	3.00	600 ppm	600 ppm	NA
HEXANE	0.00	2.00	50 ppm	50 ppm	NA
ISOHEXANE	0.00	2.00	500 ppm	500 ppm	NA
HEPTANES-OCTANES (C_7-C_8)	0.00	3.00	NA	NA	NA
HYDROGEN SULFIDE	0.00	20.00	10 ppm	10 ppm	20 ppm
CARBON DIOXIDE	0.00	10.00	10,000 ppm	5000 ppm	NA
NITROGEN	0.00	10.00	NA	Asphyxiant	NA
BENZENE	0.00	0.50	1 ppm	10 ppm	NA

SECTION 3 PHYSICAL DATA

(Properties very widely. Values given are typical.)

Boiling Point . . . . . -259 to -200 °F
Melting Point . . . . . NA
Specific Gravity (H_2O=1) NA
Vapor Pressure . . . . . Gas
Vapor Density (Air=1) . . 0.6
Solubility in Water . . . 0.4% @ 20 °C

pH Information . . . . . NA
% Volatiles 100
Evaporation Rate (Ethyl ether=1) Gas
Appearance . . . . . Colorless gas
Odor . . . . . Natural gas odor (unless non-odorized)

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

(Properties very widely. Values given are typical.)

Flash Point . . . . . Flammable Gas
Autoignition Temp . . . . . 900 to 1170 °F
Lower Explosive Limit (LEL) . 3.8% by volume
Upper Explosive Limit (UEL) . 17.0% by volume
Spec. Hazard . . . . . None

NFPA CLASS
HEALTH 1
FIRE 4
REACTIVITY . . 0
OTHER 0

HAZARD RATING
0 - Least 3 - High
1 - Slight 4 - Extreme
2 - Moderate

FIRE AND EXPLOSION HAZARDS
Flammable gas.

EXTINGUISHING MEDIA
Dry chemical powder. Carbon dioxide.

FIRE FIGHTING INSTRUCTIONS
Shut off source. Allow fire to burn itself out if no risk to surroundings, otherwise use extinguishing media. Cool exposed containers with water spray. Wear self-contained breathing apparatus when fire fighting in confined space. This material may contain H_2S, a poisonous gas. Toxic sulfur dioxide is produced from burning hydrogen sulfide. Refer to DOT Emergency Response Guidebook for first response information.

SECTION 5 HEALTH HAZARD INFORMATION

ROUTES OF EXPOSURE AND EFFECTS

(INHALATION) Excessive exposure may cause central nervous system effects, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure and death.

DANGER! Benzene has been shown to cause blood and bone marrow disorders, such as cancer and leukemia by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), and the Occupational Safety and Health Administration (OSHA).

DANGER! Hydrogen sulfide vapors may accumulate in confined spaces or areas of limited circulation. Concentration may be immediately dangerous to life and health (IDLH) on a single exposure.

(SKIN) . . . Not determined/No data.

(EYE) . . . . No eye effect expected.

(INGESTION) . Cannot reasonably be ingested.

FIRST AID

(INHALATION) Move person to fresh air. If not breathing, give artificial respiration, obtain medical assistance.

(SKIN) . . . None normally required.

(EYE) . . . . None normally required.

(INGESTION) . None normally required. Small amounts which accidentally enter mouth should be rinsed out until taste of it is gone.

SECTION 6 REACTIVITY

STABILITY: Stable HAZARDOUS POLYMERIZATION: No

Incompatible Materials: Strong oxidizers

Hazardous Decomposition Products: Combustion produces carbon monoxide and asphyxiants, and toxic sulfur dioxide if H_2S is present.

SECTION 7 SPILL OR LEAK PROCEDURES

CLEANUP PROCEDURES

Prevent ignition; stop leak; ventilate area. Use water spray to disperse vapors. Keep upwind of leak. Evacuate until gas has dispersed. Enter only with appropriate protective equipment. (See Section 8)

WASTE DISPOSAL METHOD

Vent to atmosphere until vapors are dispersed. Waste product or contaminated material will be considered hazardous if flash point is less than 140°F requiring disposal at an approved hazardous waste facility.

SECTION 8 SPECIAL PROTECTION INFORMATION

VENTILATION
Use only with adequate ventilation. Ventilate as needed to comply with acceptable exposure limit. (See Section 2)

PROTECTIVE EQUIPMENT
(EYE) . . . . None normally needed.

(GLOVES) . . None normally needed.

(RESPIRATOR) Concentration-in-air determines protection needed. Use only NIOSH certified respiratory protection.

(OTHER) . . . None normally needed.

SECTION 9 SPECIAL PRECAUTIONS

STORAGE AND HANDLING CONDITIONS
Keep away from heat, sparks, and flame. Keep equipment and piping free of leaks and enclosures well ventilated. Consult NFPA and OSHA standards. Closed system required for handling. Gas is lighter than air and may accumulate in unventilated roof areas.

DANGER! This product may contain benzene, a known carcinogen. Observe all protective measures to avoid excessive exposure.

DANGER! This product may contain hydrogen sulfide, a poisonous gas. Observe all protective measures to avoid excessive exposure.

SECTION 10 PRECAUTIONARY LABEL

This product may be "OFFSPEC" for one or more reasons which must be determined by the purchaser. Hydrogen sulfide, a poisonous gas, may be present at concentrations which are immediately dangerous to life in field sales gas. Routine chemical assay for hydrogen sulfide is highly recommended to determine proper precautions and safeguards. Consult contract or other documentation. This gas is highly flammable and is lighter than air. Gas may travel considerable distances to a source of ignition and flames may flash back. Consult appropriate NFPA codes before handling. Refer to U.S. Dept. of Transportation regulations for transportation and placarding requirements. State and local codes may apply to use and handling of this material.

DANGER! This product may contain benzene, a known carcinogen. Observe all protective measures to avoid excessive exposure.

DANGER! This product may contain hydrogen sulfide, a poisonous gas. Observe all protective measures to avoid excessive exposure.

Disclaimer of Liability

The information in this MSDS was obtained from sources which we believe are reliable. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

This MSDS was prepared for and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

Form Approved
Budget Bureau No. 44-R1397
Approval Expires April 30, 1971

Form No. LSB-005-4
May 1969

U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: Marvel Oil Company, Inc.	EMERGENCY TELEPHONE NO.: 914-937-4000
ADDRESS (Number, Street, City, State, and ZIP Code): 331 N. Main St., Port Chester, N.Y. 10573	
CHEMICAL NAME AND SYNONYMS: Not applicable	TRADE NAME AND SYNONYMS: Marvel Mystery Oil
CHEMICAL FAMILY: Petroleum Hydrocarbon	FORMULA: Mixture of Petroleum Products

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS	30		FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	313	SPECIFIC GRAVITY (H_2O=1)	.9
VAPOR PRESSURE (mm Hg.)	2 mm Hg. @ 68°	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____=1)	
SOLUBILITY IN WATER	negligible		
APPEARANCE AND ODOR			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): 140° F.	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA: Water spray - foam dry chemical - CO_2			
SPECIAL FIRE FIGHTING PROCEDURES: None			
UNUSUAL FIRE AND EXPLOSION HAZARDS: Do not store or mix with strong oxidants.			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

Mild irritation to skin and eyes.

EMERGENCY AND FIRST AID PROCEDURES

In case of skin contact wash with soap and water.
If splashed in eyes flush with clear water until irritation subsides.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	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

Recover free liquid. Add absorbent to spill area.

WASTE DISPOSAL METHOD

Incinerate absorbed material under safe conditions.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Normally not needed.

VENTILATION	LOCAL EXHAUST Not needed	SPECIAL
	MECHANICAL *(General)* Not needed	OTHER

PROTECTIVE GLOVES Normally not needed

EYE PROTECTION Normally not needed

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep away from heat and open flame.

OTHER PRECAUTIONS

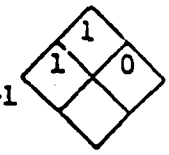
Contains refined petroleum distillates. If swallowed, do not induce vomiting.

Shell

Material Safety Data Sheet

MSDS 60270-1

RATING



S-11764-2 (2-79)

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 TELLUS® Oil 68
CHEMICAL FAMILY: Hydrocarbon	FORMULA: Code 65211

SECTION II — 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		
Zinc Dithiophosphate	0.9					
Polymethacrylate	0.3					

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	Light colored oil. Slight odor.		

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	FLAMMABLE LIMITS	LEL	UEL
410°F PMCC	N.A.		

EXTINGUISHING MEDIA: Dry chemical type preferred.

SPECIAL FIRE FIGHTING PROCEDURES: None special.

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

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 ca[illegible]

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 vapor 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

[illegible]

DATE April. 1979

EXXON CHEMICAL

MATERIAL SAFETY DATA SHEET

EXXON CHEMICAL AMERICAS, P.O. BOX 3272, HOUSTON, TEXAS 77001
A Division of EXXON CHEMICAL COMPANY, A Division of EXXON CORPORATION

VARSOL 1 SOLVENT

PAGE: 1
DATE PREPARED: MAY 12, 1992
NO.: 92890627

SECTION 1 PRODUCT IDENTIFICATION & EMERGENCY INFORMATION

PRODUCT NAME: VARSOL 1 Solvent

CHEMICAL NAME:
Not Applicable: Blend CAS 8052-41-3

CHEMICAL FAMILY:
Petroleum Hydrocarbon

PRODUCT DESCRIPTION:
Clear colorless liquid with a petroleum odor.

EMERGENCY TELEPHONE NUMBERS: EXXON CHEMICAL AMERICAS 713-870-6000
CHEMTREC 800-424-9300

SECTION 2 HAZARDOUS INGREDIENT INFORMATION

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR1910.1200, based on the following compositional information:

COMPONENT	OSHA HAZARD
Petroleum hydrocarbons	Combustible
Stoddard Solvent	OSHA PEL; ACGIH TLV
Trimethylbenzene	OSHA PEL; ACGIH TLV

For additional information see Section 3.

SECTION 3 HEALTH INFORMATION & PROTECTION

NATURE OF HAZARD

EYE CONTACT:
Slightly irritating but does not injure eye tissue.

SKIN CONTACT:
Frequent or prolonged contact may irritate and cause dermatitis.
Low order of toxicity.
Skin contact may aggravate an existing dermatitis condition.

INHALATION:
High vapor/aerosol concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

INGESTION:
Small amounts of this product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, possibly progressing to death.
Minimal toxicity.

FIRST AID

EYE CONTACT:
Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:
Flush with large amounts of water; use soap if available.
Remove grossly contaminated clothing, including shoes, and launder before reuse.

INHALATION:
Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.

INGESTION:
If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

ACUTE TOXICITY DATA IS AVAILABLE UPON REQUEST.

WORKPLACE EXPOSURE LIMITS

OSHA REGULATION 29CFR1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:
A TWA of 100 ppm (525 mg/m3) for Stoddard Solvent.
A TWA of 25 ppm (125 mg/m3) for Trimethyl Benzene.

THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:
a TWA of 100 ppm (525 mg/m3) for Stoddard Solvent.
a TWA of 25 ppm (123 mg/m3) for Trimethyl Benzene.

EXXON RECOMMENDS THE FOLLOWING OCCUPATIONAL EXPOSURE LIMITS:
100 ppm total hydrocarbon based on composition.

PRECAUTIONS

SPECIAL PRECAUTIONS:
Health studies have shown that many petroleum hydrocarbons pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists or fumes should be minimized.

PERSONAL PROTECTION:
For open systems where contact is likely, wear safety glasses with side shields, long sleeves, and chemical resistant gloves.
Where contact may occur, wear safety glasses with side shields.
Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA approved respirators may be necessary to prevent overexposure by inhalation.

VENTILATION:
The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces. See respiratory protection recommendations.

EXXON CHEMICAL

MATERIAL SAFETY DATA SHEET

EXXON CHEMICAL AMERICAS, P.O. BOX 3272, HOUSTON, TEXAS 77001
A Division of EXXON CHEMICAL COMPANY, A Division of EXXON CORPORATION

SECTION 4 FIRE & EXPLOSION HAZARD

FLASHPOINT: 100 Deg F. METHOD: TCC NOTE: Minimum
FLAMMABLE LIMITS: LEL: 2.1 UEL: 13.3 @ 77 Deg F. . NOTE: Approximate
AUTOIGNITION TEMPERATURE: 490 Deg F. NOTE: Approximate

GENERAL HAZARD:

Combustible Liquid, can form combustible mixtures at temperatures at or above the flashpoint.
Static Discharge, material can accumulate static charges which can cause an incendiary electrical discharge .
"Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.
Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel.
Isolate "fuel" supply from fire.
Use foam, dry chemical, or water spray to extinguish fire.
Avoid spraying water directly into storage containers due to danger of boilover.
This liquid is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode.

HAZARDOUS COMBUSTION PRODUCTS:

No unusual

SECTION 5 SPILL CONTROL PROCEDURE

LAND SPILL:

Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the National Response Center.
Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust.
Recover by pumping (use an explosion proof or hand pump) or with a suitable absorbent.
Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

EXXON CHEMICAL

MATERIAL SAFETY DATA SHEET

EXXON CHEMICAL AMERICAS, P.O. BOX 2272, HOUSTON, TEXAS 77001
A Division of EXXON CHEMICAL COMPANY, A Division of EXXON CORPORATION

WATER SPILL:
Remove from surface by skimming or with suitable adsorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in non-confined waters. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 6 NOTES

HAZARD RATING SYSTEMS:
This information is for people trained in:
National Paint & Coatings Association's (NPCA)
Hazardous Materials Identification System (HMIS)
National Fire Protection Association (NFPA 704)
Identification of the Fire Hazards of Materials

	NPCA-HMIS	NFPA 704
HEALTH	1	0
FLAMMABILITY	2	2
REACTIVITY	0	0

KEY
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

SECTION 7 REGULATORY INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):
DOT PROPER SHIPPING NAME:
Petroleum Naphtha UN 1255
Combustible Liquid
DOT HAZARD CLASS: Combustible Liquid
DOT IDENTIFICATION NUMBER: UN 1255
NAME: Naphtha, petroleum

FLASHPOINT: 100 Deg F. METHOD: TCC NOTE: Minimum

TSCA:
This product is listed on the TSCA Inventory as a UVCB (Unknown, Variable Composition or Biological) Chemical at CAS Registry Number 8052-41-3

CERCLA:
If this product is accidentally spilled, it is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). We recommend you contact local authorities to determine if there may be other local reporting requirements.

SARA TITLE III:
Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories:
Delayed Health, Fire.
This product contains the following Section 313 Reportable Ingredients:

COMPONENT	CAS NO.	MAXIMUM %
1,2,4 Trimethylbenzene	95-63-6	4.0

SECTION 8 TYPICAL PHYSICAL & CHEMICAL PROPERTIES

SPECIFIC GRAVITY:
0.80 at 60

VAPOR PRESSURE, mmHg at °F:
2 at 68 Approximate

SOLUBILITY IN WATER, WT. % AT °F:
Less than 0.01 at 77

VISCOSITY OF LIQUID, CST AT °F:
1 at 77 Approximate

SP. GRAV. OF VAPOR, at 1 atm (Air=1):
3.50 Calculated

FREEZING/MELTING POINT, °F:
1

EVAPORATION RATE, n-Bu Acetate=1:
Less than 0.1

BOILING POINT, °F:
315 to 394

SECTION 9 REACTIVITY DATA

STABILITY:
Stable

HAZARDOUS POLYMERIZATION:
Will not occur

CONDITIONS TO AVOID INSTABILITY:
Not Applicable

MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:
Halogens, molten sulfur, strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS:
None

SECTION 10 STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD:
Yes, use proper grounding procedure

STORAGE TEMPERATURE, °F:
Ambient

LOADING/UNLOADING TEMPERATURE, °F:
Ambient

STORAGE/TRANSPORT PRESSURE, mmHg:
Atmospheric

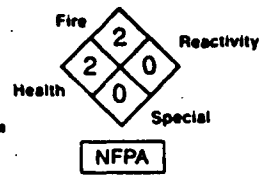
VISC. AT LOADING/UNLOADING TEMP., cST:
1

REVISION SUMMARY:
Since MAY 8,1992 this MSDS has been revised in Section(s):
3

REFERENCE NUMBER:	DATE PREPARED:	SUPERSEDES ISSUE DATE:
HDHA-C-26038	May 12,1992	May 8,1992

FOR ADDITIONAL PRODUCT INFORMATION, CONTACT YOUR TECHNICAL SALES REPRESENTATIVE
FOR ADDITIONAL HEALTH/SAFETY INFORMATION, CALL 713-870-6884

WD-40®



MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Manufacturer:	WD-40 Company	Telephone:	
		Emergency Only:	1 (800) 424-9300 (CHEMTREC)
Address:	1061 Cudahy Place (92110) P.O. Box 80607 San Diego, California 92138-9021	Information:	(619) 275-1400
		Chemical Name:	Organic Mixture
		Trade Name:	WD-40 Aerosol

II. HAZARDOUS INGREDIENTS

Chemical Name	CAS Number	%	Exposure Limit ACGIH/OSHA
Aliphatic Petroleum Distillates	8052-41-3	50	100 ppm (PEL)
A-70 Hydrocarbon Propellant	68476-85-7	25	1000 ppm (PEL)
Petroleum Base Oil	64742-65-0	> 15	5 mg/M³ (TWA)
Non-hazardous Ingredients		< 10	

III. PHYSICAL DATA

Boiling Point:	NA	Evaporation Rate:	Not determined
Vapor Density (air = 1):	Greater than 1	Vapor Pressure:	55±5 PSI @ 70°F
Solubility in Water:	Insoluble	Appearance:	Light amber
Specific Gravity (H_2O = 1):	.710 @ 70°F	Odor:	Characteristic odor
Percent Volatile (volume):	80%		

IV. FIRE AND EXPLOSION

Flash Point:	NA to aerosol cans
Flammable Limits:	(propellant portion) [Lel] 1.8% [Uel] 9.5%
Extinguishing Media:	CO_2, Dry Chemical, Foam
Special Fire Fighting Procedures:	None
Unusual Fire and Explosion Hazards:	Considered "extremely flammable" under Consumer Product Safety Commission regulations.

V. HEALTH HAZARD / ROUTE(S) OF ENTRY

Threshold Limit Value

Aliphatic Petroleum Distillates (Stoddard solvent) lowest TLV (ACGIH 100 ppm.)

Symptoms of Overexposure

Inhalation (Breathing): May cause anesthesia, headache, dizziness, nausea and upper respiratory irritation.
Skin Contact: May cause drying of skin and or irritation.
Eye Contact: May cause irritation, tearing and redness.
Ingestion (Swallowed): May cause irritation, nausea, vomiting and diarrhea.

First Aid Emergency Procedures

Ingestion (Swallowed): Do not induce vomiting, seek medical attention.
Eye Contact: Immediately flush eyes with large amounts of water for 15 minutes.
Skin Contact: Wash with soap and water.
Inhalation (Breathing): Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.

DANGER!

Aspiration Hazard: If swallowed can enter lungs and may cause chemical pneumonitis. Do not induce vomiting. Call Physician immediately.

Suspected Cancer Agent

Yes_____ No_X_ The components in this mixture have been found to be noncarcinogenic by NTP, IARC and OSHA.

VI. REACTIVITY DATA

Stability:	Stable X	Unstable
Conditions to avoid:	NA	
Incompatability:	Strong oxidizing materials	
Hazardous decomposition products:	Thermal decomposition may yield carbon monoxide and/or carbon dioxide.	
Hazardous polymerization:	May occur	Will not occur X

VII. SPILL OR LEAK PROCEDURES

Spill Response Procedures

Spill unlikely from aerosol cans. Leaking cans should be placed in plastic bag or open pail until pressure has dissipated.

Waste Disposal Method

Empty aerosol cans should not be punctured or incinerated; bury in land fill. Liquid should be incinerated or buried in land fill. Dispose of in accordance with local, state and federal regulations.

VIII. SPECIAL HANDLING INFORMATION

Ventilation:	Sufficient to keep solvent vapor less than TLV.
Respiratory Protection:	Advised when concentrations exceed TLV.
Protective Gloves:	Advised to prevent possible skin irritation.
Eye Protection:	Approved eye protection to safeguard against potential eye contact, irritation or injury.
Other Protective Equipment:	None required.

IX. SPECIAL PRECAUTIONS

Keep from sources of ignition, do not take internally. Avoid excessive inhalation of spray particles. Do not puncture, incinerate or store container above 120°F. Keep from children.

X. TRANSPORTATION DATA

Domestic Surface

Description:	Consumer Commodity
Hazard Class:	ORM-D
ID No.:	NONE
Label Required:	Consumer Commodity (ORM-D)

Domestic Air

Description:	Consumer Commodity (Flammable Gas-Aerosol products)
Hazard Class:	ORM-D
ID No:	NONE
Label Required:	Consumer Commodity (ORM-D-AIR)

SIGNATURE: R. Miles TITLE: Technical Director

REVISION DATE: March 1990 SUPERSEDES: January 1989

NA = Not applicable NDA = No data available < = Less than > = More than

-130
-700
-900

MATERIAL SAFETY DATA SHEET

Received from Vendor 8-18-88

HALON 1211
QUICK IDENTIFIER (or Plain Common Name)

Manufacturer's Name: ANSUL FIRE PROTECTION, WORMALD U.S., INC
Emergency Telephone No.: (715) 735-7411

Address: One Stanton Street, Marinette, WI 54143-2542
Other Information Calls: Same

Prepared By: Safety and Health Department
Date Prepared: June 1, 1986

SECTION 1 — IDENTITY

Common Name (used on label) (Trade Name and Synonyms): Halon 1211, BCF
CAS No.: N/A

Chemical Name: Bromochlorodifluoromethane
Chemical Family: Halogenated Hydrocarbon

Formula: CF_2ClBr

SECTION 2 — INGREDIENTS

PART A — HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (Chemical and common name(s))	%	CAS No.	ACGIH TLV	Acute Toxicity Data
Bromochlorodifluoromethane	Greater than 99	353-59-3	Not listed	inh rat LC_{LO} 32 ppm/15 M

PART B — OTHER INGREDIENTS

Other Component(s) (Chemical and common name(s))	%	CAS No.	Acute Toxicity Data
None	N/A	N/A	N/A

SECTION 3 — PHYSICAL AND CHEMICAL CHARACTERISTICS (Fire and Explosion Data)

Boiling Point: 26 °C
Specific Gravity (H_2O=1): 1.83
Vapor Pressure (mm Hg): 37.5 psi @ 70 °F
Percent Volatile by Volume (%): 100
Vapor Density (Air = 1): 5.7
Evaporation Rate (Butyl acetate = 1): gas at room temperature
Solubility in Water: Negligible
Reactivity in Water: Unreactive
Appearance and Odor: Colorless, sweet odor

Flash Point: None to boiling
Flammable Limits in Air % by Volume: N/A
Extinguisher Media: N/A
Auto-Ignition Temperature: N/A

Special Fire Fighting Procedures: THIS IS AN EXTINGUISHING AGENT. Use water to cool fire-exposed cylinders or other containers. Self-contained breathing apparatus with full facepiece and protective clothing when re-entering unventilated fire areas where product has been used.

Unusual Fire and Explosion Hazards: Containers are equipped with pressure and temperature relief devices, but rupture may occur under fire conditions and toxic decomposition by-products may be formed if used in fires over 900 °F.

SECTION 4 — PHYSICAL HAZARDS

Stability: Unstable ☐ Conditions to Avoid
Stable ☒ Decomposes under fire conditions above 900 °F.

Incompatibility (Materials to Avoid): Active metals, such as aluminum and magnesium, and fires of metal hydrides

Hazardous Decomposition Products: Thermal decomposition: BCF begins decomposing at temperatures above 900 °F to give free halogens, halogen acids, and small amounts of carbonyl halides. These by-products have a sharp irritating odor. They are dangerous even in low concentrations, and in sufficient concentrations, can result in personal injury or death.

Hazardous Polymerization: May Occur ☐ Conditions to Avoid
Will Not Occur ☒ N/A

NOTE: As used in Ansul extinguishers or cylinders, Halon 1211 is a gas compressed under pressures up to 200 psi

SECTION 5 — HEALTH HAZARDS

Threshold Limit Value: OSHA nuisance dust limit of 15 mg/M^3 or ACGIH Nuisance dust value of 10 mg/M^3 for the eight hour time-weighted average

Routes of Entry

Eye Contact: Mildly irritating for a short period of time

Skin Contact: May be mildly irritating

Inhalation: Treat as a mineral dust irritant to the respiratory tract

Ingestion: Not an expected route of entry

Signs and Symptoms — **Acute Overexposure:** Transient cough, shortness of breath

Chronic Overexposure: Talcosis, pulmonary fibrosis.

Medical Conditions Generally Aggravated by Exposure: Reactive airway

Chemical Listed as Carcinogen or Potential	National Toxicology Program	IARC Monographs	OSHA
	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

SECTION 6 — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Flush with large amounts of water: if irritation persists, seek Medical attention

Skin Contact: Wash with soap and water: if irritation persists, seek Medical attention

Inhalation: Remove victim to fresh air. Seek Medical attention if discomfort continues

Ingestion: If patient is conscious, give large amounts of water and induce vomiting. Seek Medical help.

SECTION 7 — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type): Dust mask where dustiness is prevalent, or TLV exceeded. Mechanical filter respirator if exposure is prolonged

Ventilation — **Local Exhaust:** Discretionary — **Mechanical (General):** Recommended

Protective Gloves: N/A — **Eye Protection:** Recommended as mechanical barrier for prolonged exposure

Other Protective Clothing or Equipment: If irritation occurs, long sleeves and impervious gloves should be worn.

SECTION 8 — SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage: Should be stored in original container or Ansul fire extinguisher.

Other Precautions: Do not mix agents

Steps to be Taken in Case Material is Released or Spilled: Sweep up

Waste Disposal Methods: Dispose of in compliance with local, state, and federal regulations

N/A = Not Applicable NDA = No Data Available

722-3196-985

REVISION

MATERIAL SAFETY DATA SHEET

Received from Vendor 8-18-88

HALON 1301, FREON FE 1301
QUICK IDENTIFIER (or Plant Common Name)

Manufacturer's Name: ANSUL FIRE PROTECTION, WORMALD U.S., INC
Emergency Telephone No.: (715) 735-7411

Address: One Stanton Street, Marinette, WI 54143-2542
Other Information Calls: Same

Prepared By: Safety and Health Department
Date Prepared: June 1, 1986

SECTION 1 — IDENTITY

Common Name (used on label) (Trade Name and Synonyms): Halon 1301, Freon FE 1301
CAS No.: 75-63-8

Chemical Name: Monobromotrifluoromethane
Chemical Family: Halogenated Methane

Formula: $CBrF_3$

SECTION 2 — INGREDIENTS

PART A — HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (Chemical and common name(s))	%	CAS No.	ACGIH TLV	Acute Toxicity Data
Monobromotrifluoromethane	Greater than 99	75-63-8	1,000 ppm	ihl (rat) 211.2 mg/L 4 hrs.

PART B — OTHER INGREDIENTS

Other Component(s) (Chemical and common name(s))	%	CAS No.	Acute Toxicity Data
None	N/A	N/A	N/A

SECTION 3 — PHYSICAL AND CHEMICAL CHARACTERISTICS (Fire and Explosion Data)

Boiling Point: -72.0 °F
Specific Gravity (H_2O = 1): 1.57
Vapor Pressure (mm Hg): 199.0 psi @ 70 °F

Percent Volatile by Volume (%): 100
Vapor Density (Air = 1): 5.2
Evaporation Rate (_____ = 1): N/A Gas at room temperature

Solubility in Water: Negligible
Reactivity in Water: Unreactive

Appearance and Odor: Colorless gas, sweet odor

Flash Point: None
Flammable Limits in Air % by Volume: N/A
Extinguishing Media: N/A
Auto-Ignition Temperature: N/A

Special Fire Fighting Procedures: THIS IS AN FIRE EXTINGUISHING AGENT. Use water to cool fire-exposed cylinders or other containers. Self-contained breathing apparatus with full facepiece and protective clothing when re-entering unventilated fire areas where product has been used.

Unusual Fire and Explosion Hazards: Containers are equipped with pressure and temperature relief devices, but rupture may occur under fire conditions and toxic decomposition by-products may be formed if used in fires over 900 °F.

SECTION 4 — PHYSICAL HAZARDS

Stability: Unstable ☐ Conditions to Avoid ☒ Stable — Decomposes under fire conditions above 900 °F.

Incompatibility (Materials to Avoid): Active metals and fires involving metal hydrides.

Hazardous Decomposition Products: Thermal decomposition at temperatures above 900 °F forming hydrogen fluoride and hydrogen bromides. These by-products have a sharp irritating odor. They are dangerous even in low concentrations, and in sufficient concentrations can result in personal injury or death.

Hazardous Polymerization: May Occur ☐ Will Not Occur ☒ Conditions to Avoid: N/A

NOTE: As used in Ansul extinguishers or cylinders, Halon 1301 is a gas compressed under pressure up to 360 psi at 70 °F.

SECTION 5 — HEALTH HAZARDS

Threshold Limit Value: OSHA nuisance dust limit of 15 mg/M^3 or ACGIH Nuisance dust value of 10 mg/M^3 for the eight hour time-weighted average

Routes of Entry

Eye Contact: Mildly irritating for a short period of time

Skin Contact: May be mildly irritating

Inhalation: Treat as a mineral dust irritant to the respiratory tract

Ingestion: Not an expected route of entry

Effects and Symptoms — Acute Overexposure: Transient cough, shortness of breath

Chronic Overexposure: Chronic fibrosis of the lung

Medical Conditions Generally Aggravated by Exposure: Reactive airway

Chemical Listed as Carcinogen or Potential	National Toxicology Program	IARC Monographs	OSHA
	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

SECTION 6 — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Flush with large amounts of water. If irritation persists, seek Medical attention

Skin Contact: Wash with soap and water; if irritation persists, seek Medical attention

Inhalation: Remove victim to fresh air. Seek Medical attention if discomfort continues

Ingestion: If patient is conscious, give large amounts of water and induce vomiting. Seek Medical help

SECTION 7 — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type): Dust mask where dustiness is prevalent, or TLV exceeded. Mechanical filter respirator if exposure is prolonged.

Ventilation: Local Exhaust: Discretionary — Mechanical (General): Recommended

Protective Gloves: N/A — **Eye Protection:** Recommended as mechanical barrier for prolonged exposure

Other Protective Clothing or Equipment: If irritation occurs, long sleeves and impervious gloves should be worn

SECTION 8 — SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage: Should be stored in original container or Ansul fire extinguisher.

Other Precautions: Do not mix agents

Steps to be Taken in Case Material is Released or Spilled: Sweep up

Waste Disposal Methods: Dispose of in compliance with local, state, and federal regulations

N/A = Not Applicable NDA = No Data Available

Received from Vendor 8-18-88

PURPLE-K
QUICK IDENTIFIER (or Plant Common Name)

Manufacturer's Name: ANSUL FIRE PROTECTION, WORMALD U.S., INC
Emergency Telephone No.: (715) 735-7411

Address: One Stanton Street Marinette, WI 54143-2542
Other Information Code: Same

Prepared By: Safety and Health Department
Date Prepared: June 1 1986

SECTION 1 — IDENTITY

Common Name (used on label) (Trade Name and Synonyms): Purple-K Dry Chemical Extinguishing Agent
CAS No: N/A

Chemical Name: N/A This is a mixture
Chemical Family: Mixture

Formula: N/A

SECTION 2 — INGREDIENTS

PART A — HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (chemical and common name(s))	%	CAS No	ACGIH TLV	Acute Toxicity Data
Muscovite Mica	Less than 5	12001-26-2	20 mppcf*	NDA
Magnesium Aluminum Silicate	Less than 10	8031-18-3	10 mg/M^3	NDA

*Million particles per cubic foot

PART B — OTHER INGREDIENTS

Other Component(s) (chemical and common name(s))	%	CAS No	Acute Toxicity Data
Potassium Bicarbonate	Greater than 90	298-14-16	NDA
Methyl Hydrogen Polysiloxane	Less than 1	63148-57-2	NDA
Purple Pigment	Less than .05	68308-41-8	NDA
Red Pigment	Less than .05	1103-38-4	NDA

SECTION 3 — PHYSICAL AND CHEMICAL CHARACTERISTICS (Fire and Explosion Data)

Boiling Point: N/A
Specific Gravity (H_2O = 1): N/A
Vapor Pressure (mm Hg): N/A
Percent Volatile by Volume (%): N/A
Vapor Density (Air = 1): N/A
Evaporation Rate (= 1): N/A
Solubility in Water: Slight
Reactivity in Water: N/A
Appearance and Odor: Violet colored powder, no characteristic odor

Flash Point: None
Flammable Limits in Air % by Volume: N/A
Extinguishing Media: N/A
Auto-ignition Temperature: N/A
Special Fire Fighting Procedures: N/A THIS IS AN EXTINGUISHING AGENT

Unusual Fire and Explosion Hazards: None

SECTION 4 — PHYSICAL HAZARDS

Stability: Unstable ☐ Conditions to Avoid
Stable ☒ N/A

Incompatibility (Materials to Avoid): Strong acids, NaK alloy and $NH_4H_2PO_4$

Hazardous Decomposition Products: CO_2

Hazardous Polymerization: May Occur ☐ Conditions to Avoid
Will Not Occur ☒ N/A

SECTION 5 — HEALTH HAZARDS

Threshold Limit Value: 1000 ppm is the OSHA PEL and the ACGIH TLV

Effects of Entry: The effects of exposure to Halon 1301 should disappear quickly upon removal from exposure. LC_{50} rats greater than 800,000 ppm (v/v)/4 hr

Eye Contact: The liquid form of this material can produce chilling sensations and discomfort.

Skin Contact: Evaporation of liquid from the skin can produce chilling sensations. Frostbite can occur.

Inhalation: Vapor is heavier than air and can cause suffocation by reducing oxygen available for breathing. Breathing very high concentrations of vapor can cause lightheadedness, giddiness, shortness of breath, and may lead to narcosis, cardiac irregularities, unconsciousness or even death.

Ingestion: Ingestion is not likely to occur since this material is gas at room temperature.

Signs and Symptoms: Acute Overexposure: Dizziness, impaired coordination, reduced mental acuity, and cardiac effects can occur. Unconsciousness or even death in high concentrations with longer exposures.

Chronic Overexposure: None known when occupational exposures are below the TLV

Medical Conditions Generally Aggravated by Exposure: Cardiac problems

Chemical Listed as Carcinogen or Potential: National Toxicology Program: Yes ☐ No ☐ — IARC Monographs: Yes ☐ No ☐ — OSHA: Yes ☐ No ☐

SECTION 6 — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes while holding lids open. If redness, itching or a burning sensation develops, get Medical attention. Treat for frostbite if necessary.

Skin Contact: Wash the material off the skin with copious amounts of soap and water for at least 15 minutes. If redness, itching, or burning occurs, get Medical attention. Treat for frostbite if necessary.

Inhalation: Remove victim to fresh air. If cough or other respiratory symptoms occur, consult medical personnel. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Consult Medical personnel.

Ingestion: Ingestion is not likely to occur since this material is gas at room temperature.

NOTE TO PHYSICIAN: Product is an asphyxiant and can induce cardiac muscle sensitization to circulating epinephrine-like compounds. Do NOT give adrenalin or similar sympathommetic drugs. Do NOT allow victim to exercise until 24 hours following specific exposures. Freeze burns of mucosal tissue can develop following specific exposures.

SECTION 7 — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type): Not normally necessary if controls are adequate. For high concentrations exceeding 10%, or if exposure is prolonged, use positive pressure air-supplied respirator.

Ventilation: Local Exhaust: Recommended to control exposures. See mechanical. — Mechanical (General): Recommended in low areas or indoors where vapors may collect.

Protective Gloves: Plastic if working with liquid

Eye Protection: Chemical goggles recommended. Full faceshield in addition if splashing of liquid form is possible.

Other Protective Clothing or Equipment: Eye wash and safety showers are good safety practice in work areas when working with liquefied product.

SECTION 8 — SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage: Store as a liquefied compressed gas in DOT approved pressure vessels away from high temperatures. If cylinder is not connected to a system, it must be safety capped to protect against actuation of valve and release of agent.

Other Precautions: Note incompatibility information in Section 4.

Steps to be Taken in Case Material is Released or Spilled: Evacuate area; ventilate to outside atmosphere. Cool or remove hot, metal surfaces or source of non-extinguished flames.

Waste Disposal Method: Dispose of in compliance with all local, state, and federal regulations.

N/A = Not Applicable NDA = No Data Available

ANSUL MATERIAL SAFETY DATA SHEET

Received from Vendor 8-18-88

PLUS-FIFTY B
QUICK IDENTIFIER (or Trade Common Name)

Manufacturer's Name: ANSUL FIRE PROTECTION, WORMALD U.S., INC
Emergency Telephone No.: (715) 735-7411

Address: One Stanton Street, Marinette, WI 54143-2542
Other Information Calls: Same

Prepared By: Safety and Health Department
Date Prepared: June 1, 1988

SECTION 1 — IDENTITY

Common Name (used on label) (Trade Name and Synonyms): Plus-Fifty B Dry Chemical Extinguishing Agent
CAS No.: N/A

Chemical Name: N/A This is a mixture
Chemical Family: Mixture

Formula: N/A

SECTION 2 — INGREDIENTS

PART A — HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (Chemical and common name(s))	%	CAS No.	ACGIH TLV	Acute Toxicity Data
Muscovite Talc	Less than 5	1318-94-1	20 mppcf*	NDA

*Million particles per cubic-foot

PART B — OTHER INGREDIENTS

Other Component(s) (Chemical and common name(s))	%	CAS No.	Acute Toxicity Data
Sodium Bicarbonate	Greater than 95	144-55-8	Oral LD_{50} (rat) 4220 mg/kg
Magnesium Stearate	Less than 1	557-04-0	NDA
Blue Pigment (Hostaperm Blue)	Less than 0.5	00147-14-8	Oral LD_{50} (rat) 6400 mg/kg

SECTION 3 — PHYSICAL AND CHEMICAL CHARACTERISTICS (Fire and Explosion Data)

Boiling Point: N/A
Specific Gravity (H_2O = 1): N/A
Vapor Pressure (mm Hg): N/A

Percent Volatile by Volume (%): N/A
Vapor Density (Air = 1): N/A
Evaporation Rate (= 1): N/A

Solubility in Water: Slight
Reactivity in Water: Unreactive

Appearance and Odor: Blue colored powder, no characteristic odor

Flash Point: None
Flammable Limits — % by Volume: N/A
Extinguishing Media: N/A
Auto-Ignition Temperature: N/A

Special Fire Fighting Procedures: N/A THIS IS AN EXTINGUISHING AGENT

Unusual Fire and Explosion Hazards: None

SECTION 4 — PHYSICAL HAZARDS

Stability: Unstable ☐ Conditions to Avoid
Stable ☒ N/A

Incompatibility (Materials to Avoid): Strong acids, Na K alloy and $NH_4H_2PO_4$

Hazardous Decomposition Products: CO_2

Hazardous Polymerization: May Occur ☐ Conditions to Avoid
Will Not Occur ☒ N/A

SECTION 5 — HEALTH HAZARDS

Threshold Limit Value: None listed in ACGIH or OSHA

Routes of Entry

Eye Contact: The effects of exposure to Halon 1211 should disappear quickly upon removal from exposure.

Skin Contact: The liquid form of this material can produce chilling sensations and discomfort.

Inhalation: Systemically toxic concentrations are unlikely to be absorbed through the skin in man. Evaporation of liquid from the skin can produce chilling sensations. Skin injury does not result.

Ingestion: Exposures to concentrations of this material above 4% for longer than one (1) minute can cause toxic side effects.

Signs and Symptoms: Ingestion is not likely to occur since this material is gas at room temperature.

Acute Overexposure: Dizziness, impaired coordination, reduced mental acuity, and cardiac effects above 4% concentration in excess of one minute. Unconsciousness or even death in heavier concentrations with longer exposures.

Chronic Overexposure: Unknown

Medical Conditions Generally Aggravated by Exposure: Cardiac problems

Chemical Listed as Carcinogen or Potential: National Toxicology Program: Yes ☐ No ☐ IARC Monographs: Yes ☐ No ☐ OSHA: Yes ☐ No ☐

SECTION 6 — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes while holding lids open. If redness, itching or a burning sensation develops, get Medical attention.

Skin Contact: Wash the material off the skin with copious amounts of soap and water for at least 15 minutes. If redness, itching, or burning occurs, get Medical attention.

Inhalation: Remove victim to fresh air. If cough or other respiratory symptoms occur consult Medical personnel. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Consult Medical personnel.

Ingestion: If patient is conscious, give 1 or 2 glasses of warm water to drink and get Medical attention. DO NOT INDUCE VOMITING. Have victim lie down and keep warm.

NOTE TO PHYSICIAN: Product is an asphyxiant and can induce cardiac muscle sensitization to circulating epinephrine-like compounds. Do NOT give adrenalin or similar sympathomimetic drugs. Do NOT allow victim to exercise until 24 hours following specific exposures. Freeze burns of mucosal tissue can develop following specific exposures

SECTION 7 — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type): Not normally necessary if controls are adequate. For high concentrations exceeding 4%, or if exposure is prolonged, use positive pressure air-supplied respirator.

Ventilation: Local Exhaust: Recommended to control exposures. See mechanical. Mechanical (General): Recommended in low areas or indoors where vapors may collect.

Protective Gloves: Plastic if working with liquid.

Eye Protection: Chemical goggles recommended. Full faceshield in addition if splashing of liquid form is possible.

Other Protective Clothing or Equipment: Eye wash and safety showers are good safety practice in work area when working with liquefied product.

SECTION 8 — SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage: Store as a liquefied compressed gas in DOT approved pressure vessels away from high temperatures. If cylinder is not connected to a system, it must be safety capped to protect against actuation of valve and release of agent.

Other Precautions: Note incompatibility information in Section 4.

Steps to be Taken in Case Material is Released or Spilled: Evacuate area: ventilate to outside atmosphere. Cool or remove hot metal surfaces or source of non-extinguished flames.

Waste Disposal Method: Dispose of in compliance with local, state, and federal regulations.

N/A = Not Applicable NDA = No Data Available

Mobil

600189-00 Page 1 of 4

MOBIL OIL CORPORATION MATERIAL SAFETY DATA BULLETIN

REVISED:12/30/92

********** I. PRODUCT IDENTIFICATION **********

MOBIL DTE OIL HEAVY

SUPPLIER:
MOBIL OIL CORP.
CHEMICAL NAMES AND SYNONYMS:
PET. HYDROCARBONS AND ADDITIVES
USE OR DESCRIPTION:
STEAM TURBINE OIL

24-HOUR EMERGENCY (CALL COLLECT):
(609) 737-4411
CHEMTREC:
(800) 424-9300
PRODUCT AND MSDS INFORMATION:
(800) 662-4525

********** II. TYPICAL CHEMICAL AND PHYSICAL PROPERTIES **********

APPEARANCE: Amber Liquid ODOR: Mild PH: NA
VISCOSITY AT 40 C, CS: > 90.0
VISCOSITY AT 100 C, CS: 11.4
FLASH POINT F(C): > 410(210) (ASTM D-92)
MELTING POINT F(C): NA POUR POINT F(C): 20(-7)
BOILING POINT F(C): > 600(316) VOC: < 3.00(Wt. %); 0.22 lbs/gal
RELATIVE DENSITY, 15/4 C: 0.881 SOLUBILITY IN WATER: Negligible
VAPOR PRESSURE-mm Hg 20C: < .1

NA=Not Applicable NE=Not Established D=Decomposes

FOR FURTHER INFORMATION, CONTACT YOUR LOCAL MARKETING OFFICE.

********** III. POTENTIALLY HAZARDOUS INGREDIENTS **********

None

SEE SECTIONS XII AND XIII FOR REGULATORY AND FURTHER COMPOSITIONAL DATA.

********** IV. HEALTH HAZARD DATA **********

--- INCLUDES AGGRAVATED MEDICAL CONDITIONS, IF ESTABLISHED ---

THRESHOLD LIMIT VALUE: 5.00 mg/m3 Suggested for Oil Mist
EFFECTS OF OVEREXPOSURE: Slight skin irritation.

********** V. EMERGENCY AND FIRST AID PROCEDURES **********

--- FOR PRIMARY ROUTES OF ENTRY ---

EYE CONTACT: Flush thoroughly with water. If irritation persists, call a physician.
SKIN CONTACT: Wash contact areas with soap and water.
INHALATION: Not expected to be a problem.
INGESTION: Not expected to be a problem. However, if greater than 1/2 liter(pint) ingested, immediately give 1 to 2 glasses of water and call a physician, hospital emergency room or poison control center for assistance. Do not induce vomiting or give anything by mouth to an unconscious person.

Mobil

MOBIL DTE OIL HEAVY 600189-00 Page 3 of 4

********** XI. TOXICOLOGICAL DATA **********

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): Slightly toxic ---Based on testing of similar products and/or the components.

DERMAL TOXICITY (RABBITS): Slightly toxic ---Based on testing of similar products and/or the components.

INHALATION TOXICITY (RATS): Not applicable ---Harmful concentrations of mists and/or vapors are unlikely to be encountered through any customary or reasonably foreseeable handling, use, or misuse of this product.

EYE IRRITATION (RABBITS): Expected to be non-irritating. ---Based on testing of similar products and/or the components.

SKIN IRRITATION (RABBITS): May cause slight irritation on prolonged or repeated contact. ---Based on testing of similar products and/or the components.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

Severely solvent refined and severely hydrotreated mineral base oils have been tested at Mobil Environmental and Health Sciences Laboratory by dermal application to rats 5 days/week for 90 days at doses significantly higher than those expected during normal industrial exposure. Extensive evaluations including microscopic examination of internal organs and clinical chemistry of body fluids, showed no adverse effects.

---CHRONIC TOXICOLOGY (SUMMARY)---

The base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of similar oils showed no evidence of carcinogenic effects.

********** XII. REGULATORY INFORMATION **********

GOVERNMENTAL INVENTORY STATUS: All components registered in accordance with TSCA.

Transport Information:

DOT:

Shipping Name: Not applicable
Hazard Class: Not applicable

US OSHA HAZARD COMMUNICATION STANDARD: Product assessed in accordance with OSHA 29 CFR 1910.1200 and determined not to be hazardous.

RCRA INFORMATION: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity, or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

U.S. Superfund Amendments and Reauthorization Act (SARA) Title III:
This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (311/312 - FORMERLY 302) REPORTABLE HAZARD CATEGORIES: None

This product contains no chemicals reportable under SARA (313) toxic release program.

THE FOLLOWING PRODUCT INGREDIENTS ARE CITED ON THE LISTS BELOW:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS
PHOSPHORODITHOIC ACID, O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2:1) (ZDDP) (.03%)	68649-42-3	22

--- REGULATORY LISTS SEARCHED ---

1 = ACGIH ALL	6 = IARC 1	11 = TSCA 4	17 = CA P65	22 = MI 293	
2 = ACGIH A1	7 = IARC 2A	12 = TSCA 5a2	18 = CA RTK	23 = MN RTK	
3 = ACGIH A2	8 = IARC 2B	13 = TSCA 5e	19 = FL RTK	24 = NJ RTK	
4 = NTP CARC	9 = OSHA CARC	14 = TSCA 6	20 = IL RTK	25 = PA RTK	
5 = NTP SUS	10 = OSHA Z	15 = TSCA 12b	21 = LA RTK	26 = RI RTK	
		16 = WHMIS			

CARC = CARCINOGEN; SUS = SUSPECTED CARCINOGEN

NOTE: MOBIL PRODUCTS ARE NOT FORMULATED TO CONTAIN PCBS.

XIII. INGREDIENTS

INGREDIENT DESCRIPTION	PERCENT	CAS NUMBER
CONTAINS THE FOLLOWING BASE OILS:	> 95.00	
DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC		64742-54-7
PHOSPHORIC ACID, TRIS(METHYLPHENYL) ESTER	0.05	1330-78-5

APPENDIX

FOR MOBIL USE ONLY: MHC: 1* 1* NA 0* 1*, HPPEC: A, PPEC: , US92-629
APPROVE CCODE:3 10/08/92 REQ: US - MARKETING

PREPARED BY: MOBIL OIL CORPORATION
ENVIRONMENTAL HEALTH AND SAFETY DEPARTMENT, PRINCETON, NJ
FOR FURTHER INFORMATION, CONTACT:
MOBIL OIL CORPORATION, PRODUCT FORMULATION AND QUALITY CONTROL
3225 GALLOWS ROAD, FAIRFAX, VA 22037 (800) 227-0707 X3265

MOBIL OIL CORPORATION MATERIAL SAFETY DATA BULLETIN

REVISED: 12/08/89

I. PRODUCT IDENTIFICATION

MOBIL ALMO 527

SUPPLIER:
MOBIL OIL CORP.

CHEMICAL NAMES AND SYNONYMS:
PET. HYDROCARBONS AND ADDITIVES

USE OR DESCRIPTION:
ROCK DRILL LUBRICANT

HEALTH EMERGENCY TELEPHONE:
(609) 737-4411

TRANSPORT EMERGENCY TELEPHONE:
(800) 424-9300 (CHEMTREC)

PRODUCT TECHNICAL INFORMATION:
(800) 662-4525

II. TYPICAL CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE: ASTM 5.0 LIQUID ODOR: MILD PH: NA
VISCOSITY AT 100 F, SUS: 549.6 AT 40 C, CS: 105.0
VISCOSITY AT 210 F, SUS: 65.0 AT 100 C, CS: 11.2
FLASH POINT F(C): > 390(199) (ASTM D-92)
MELTING POINT F(C): NA POUR POINT F(C): -20(-29)
BOILING POINT F(C): > 600(316)
RELATIVE DENSITY, 15/4 C: 0.894 SOLUBILITY IN WATER: NEGLIGIBLE
VAPOR PRESSURE-MM HG 20C: < .1
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES
FOR FURTHER INFORMATION, CONTACT YOUR LOCAL MARKETING OFFICE.

III. INGREDIENTS

	WT PCT (APPROX)	EXPOSURE LIMITS MG/M3	PPM	SOURCES (AND NOTES)
POTENTIALLY HAZARDOUS INGREDIENTS:				
NONE				
OTHER INGREDIENTS:				
REFINED MINERAL OILS	>95			
ADDITIVES AND/OR OTHER INGREDS.	< 5			

SEE SECTION XII FOR COMPONENT REGULATORY INFORMATION.

SOURCES: A=ACGIH-TLV, A"=SUGGESTED-TLV, M=MOBIL, O=OSHA, S=SUPPLIER
NOTE: LIMITS SHOWN FOR GUIDANCE ONLY. FOLLOW APPLICABLE REGULATIONS.

IV. HEALTH HAZARD DATA

--- INCLUDES AGGRAVATED MEDICAL CONDITIONS, IF ESTABLISHED ---
THRESHOLD LIMIT VALUE: 5.00 MG/M3 (SOURCES: A,M,O) FOR OIL MIST
EFFECTS OF OVEREXPOSURE: SLIGHT EYE IRRITATION. SLIGHT SKIN IRRITATION.

V. EMERGENCY AND FIRST AID PROCEDURES

--- FOR PRIMARY ROUTES OF ENTRY ---
EYE CONTACT: FLUSH WITH WATER.
SKIN CONTACT: WASH CONTACT AREAS WITH SOAP AND WATER.
INHALATION: NOT EXPECTED TO BE A PROBLEM.
INGESTION: NOT EXPECTED TO BE A PROBLEM. HOWEVER, IF GREATER THAN 1/2 LITER(PINT) INGESTED, IMMEDIATELY GIVE 1 TO 2 GLASSES OF WATER AND CALL A PHYSICIAN, HOSPITAL EMERGENCY ROOM OR POISON CONTROL CENTER FOR ASSISTANCE. DO NOT INDUCE VOMITING OR GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

Mobil

********** VI. FIRE AND EXPLOSION HAZARD DATA **********

FLASH POINT F(C): > 390(199) (ASTM D-92)
FLAMMABLE LIMITS. LEL: .6 UEL: 7.0
EXTINGUISHING MEDIA: CARBON DIOXIDE, FOAM, DRY CHEMICAL AND WATER FOG.
SPECIAL FIRE FIGHTING PROCEDURES: WATER OR FOAM MAY CAUSE FROTHING. USE WATER TO KEEP FIRE EXPOSED CONTAINERS COOL. WATER SPRAY MAY BE USED TO FLUSH SPILLS AWAY FROM EXPOSURE. FOR FIRES IN ENCLOSED AREAS, FIREFIGHTERS MUST USE SELF-CONTAINED BREATHING APPARATUS. PREVENT RUNOFF FROM FIRE CONTROL OR DILUTION FROM ENTERING STREAMS OR DRINKING WATER SUPPLY.
UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE
NFPA HAZARD ID: HEALTH: 0, FLAMMABILITY: 1, REACTIVITY: 0

********** VII. REACTIVITY DATA **********

STABILITY (THERMAL, LIGHT, ETC.): STABLE
CONDITIONS TO AVOID: EXTREME HEAT
INCOMPATIBILITY (MATERIALS TO AVOID): STRONG OXIDIZERS
HAZARDOUS DECOMPOSITION PRODUCTS: CARBON MONOXIDE.
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

********** VIII. SPILL OR LEAK PROCEDURE **********

ENVIRONMENTAL IMPACT: REPORT SPILLS AS REQUIRED TO APPROPRIATE AUTHORITIES. U. S. COAST GUARD REGULATIONS REQUIRE IMMEDIATE REPORTING OF SPILLS THAT COULD REACH ANY WATERWAY INCLUDING INTERMITTENT DRY CREEKS. REPORT SPILL TO COAST GUARD TOLL FREE NUMBER 800-424-8802.
PROCEDURES IF MATERIAL IS RELEASED OR SPILLED: ADSORB ON FIRE RETARDANT TREATED SAWDUST, DIATOMACEOUS EARTH, ETC. SHOVEL UP AND DISPOSE OF AT AN APPROPRIATE WASTE DISPOSAL FACILITY IN ACCORDANCE WITH CURRENT APPLICABLE LAWS AND REGULATIONS, AND PRODUCT CHARACTERISTICS AT TIME OF DISPOSAL.
WASTE MANAGEMENT: PRODUCT IS SUITABLE FOR BURNING IN AN ENCLOSED, CONTROLLED BURNER FOR FUEL VALUE OR DISPOSAL BY SUPERVISED INCINERATION. SUCH BURNING MAY BE LIMITED PURSUANT TO THE RESOURCE CONSERVATION AND RECOVERY ACT. IN ADDITION, THE PRODUCT IS SUITABLE FOR PROCESSING BY AN APPROVED RECYCLING FACILITY OR CAN BE DISPOSED OF AT ANY GOVERNMENT APPROVED WASTE DISPOSAL FACILITY. USE OF THESE METHODS IS SUBJECT TO USER COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS AND CONSIDERATION OF PRODUCT CHARACTERISTICS AT TIME OF DISPOSAL.

********** IX. SPECIAL PROTECTION INFORMATION **********

EYE PROTECTION: NORMAL INDUSTRIAL EYE PROTECTION PRACTICES SHOULD BE EMPLOYED.
SKIN PROTECTION: NO SPECIAL EQUIPMENT REQUIRED. HOWEVER, GOOD PERSONAL HYGIENE PRACTICES SHOULD ALWAYS BE FOLLOWED.
RESPIRATORY PROTECTION: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE VENTILATION.
VENTILATION: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE VENTILATION.

********** X. SPECIAL PRECAUTIONS **********

MATERIALS MUST BE LABELED AS: SEE APPENDIX FOR PRECAUTIONARY LABEL. FL-388

********** XI. TOXICOLOGICAL DATA **********

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): LD50: > 5 G/KG SLIGHTLY TOXIC(ESTIMATED) --- BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

DERMAL TOXICITY (RABBITS): LD50: > 2 G/KG SLIGHTLY TOXIC(ESTIMATED) --- BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

INHALATION TOXICITY (RATS): LC50: >1 MG/L FOR 4 HRS.0/10 RATS DIED AT THIS DOSAGE LEVEL. NONTOXIC(ESTIMATED) ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

EYE IRRITATION (RABBITS): MAY CAUSE SLIGHT IRRITATION. ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

SKIN IRRITATION (RABBITS): MAY CAUSE SLIGHT IRRITATION ON PROLONGED OR REPEATED CONTACT. ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

OTHER ACUTE TOXICITY DATA: ****THIS MIXTURE OR A SIMILAR MIXTURE DID NOT RESULT IN ANY FATALITIES TO RATS AT CONCENTRATIONS (SEE INHALATION TOXICITY ABOVE) SUBSTANTIALLY HIGHER THAN THE 5 MG/M3 TLV SUGGESTED FOR OIL MISTS.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

SEVERELY SOLVENT REFINED AND SEVERELY HYDROTREATED MINERAL BASE OILS HAVE BEEN TESTED AT MOBIL ENVIRONMENTAL AND HEALTH SCIENCES LABORATORY BY DERMAL APPLICATION TO RATS 5 DAYS/WEEK FOR 90 DAYS AT DOSES SIGNIFICANTLY HIGHER THAN THOSE EXPECTED DURING NORMAL INDUSTRIAL EXPOSURE. EXTENSIVE EVALUATIONS INCLUDING MICROSCOPIC EXAMINATION OF INTERNAL ORGANS AND CLINICAL CHEMISTRY OF BODY FLUIDS, SHOWED NO ADVERSE EFFECTS.

---CHRONIC TOXICOLOGY (SUMMARY)---

THE BASE OILS IN THIS PRODUCT ARE SEVERELY SOLVENT REFINED AND/OR SEVERELY HYDROTREATED. TWO YEAR MOUSE SKIN PAINTING STUDIES OF SIMILAR OILS SHOWED NO EVIDENCE OF CARCINOGENIC EFFECTS.

********** XII. REGULATORY INFORMATION **********

GOVERNMENTAL INVENTORY STATUS: ALL COMPONENTS REGISTERED IN ACCORDANCE WITH TSCA.

D.O.T. SHIPPING NAME: NOT APPLICABLE

D.O.T. HAZARD CLASS: NOT APPLICABLE

US OSHA HAZARD COMMUNICATION STANDARD: THIS PRODUCT MAY BE USED IN CERTAIN APPLICATIONS WHERE MISTING CAN OCCUR. ACCORDING TO OSHA 29 CFR 1910.1200, CERTAIN MINERAL OIL MISTS MAY BE CONSIDERED HAZARDOUS IF THE WORKPLACE AIRBORNE CONCENTRATION EXCEEDS 5 MG/M3 (ACGIH TLV).

RCRA INFORMATION: THE UNUSED PRODUCT, IN OUR OPINION, IS NOT SPECIFICALLY LISTED BY THE EPA AS A HAZARDOUS WASTE (40 CFR, PART 261D); DOES NOT EXHIBIT THE HAZARDOUS CHARACTERISTICS OF IGNITABILITY, CORROSIVITY, OR REACTIVITY, AND IS NOT FORMULATED WITH THE METALS CITED IN THE EP TOXICITY TEST. HOWEVER, USED PRODUCT MAY BE REGULATED.

THIS PRODUCT HAS BEEN USDA APPROVED UNDER THE FOLLOWING CATEGORY: H2 - LUBRICANTS WITH NO FOOD CONTACT

U.S. SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III:
THIS PRODUCT CONTAINS NO "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (302) REPORTABLE HAZARD CATEGORIES: NONE

THIS PRODUCT CONTAINS NO CHEMICALS REPORTABLE UNDER SARA (313) TOXIC RELEASE PROGRAM.

THE FOLLOWING PRODUCT INGREDIENTS ARE CITED ON THE LISTS BELOW:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS
(OIL MIST)		1,2,10,11
ZINC (ELEMENTAL ANALYSIS) (0.07%)	7440-66-6	15
CHLORINE (ELEMENTAL ANALYSIS) .84%)	7782-50-5	15

--- KEY TO LIST CITATIONS ---

1 = OSHA Z, 2 = ACGIH, 3 = IARC, 4 = NTP, 5 = NCI,
6 = EPA CARC, 7 = NFPA 49, 8 = NFPA 325M, 9 = DOT HMT, 10 = CA RTK,
11 = IL RTK, 12 = MA RTK, 13 = MN RTK, 14 = NJ RTK, 15 = MI 293,
16 = FL RTK, 17 = PA RTK, 18 = CA P65.

--- NTP, IARC, AND OSHA INCLUDE CARCINOGENIC LISTINGS ---

NOTE: MOBIL PRODUCTS ARE NOT FORMULATED TO CONTAIN PCBS.

****

INFORMATION GIVEN HEREIN IS OFFERED IN GOOD FAITH AS ACCURATE, BUT WITHOUT GUARANTEE. CONDITIONS OF USE AND SUITABILITY OF THE PRODUCT FOR PARTICULAR USES ARE BEYOND OUR CONTROL; ALL RISKS OF USE OF THE PRODUCT ARE THEREFORE ASSUMED BY THE USER AND WE EXPRESSLY DISCLAIM ALL WARRANTIES OF EVERY KIND AND NATURE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. NOTHING IS INTENDED AS A RECOMMENDATION FOR USES WHICH INFRINGE VALID PATENTS OR AS EXTENDING LICENSE UNDER VALID PATENTS. APPROPRIATE WARNINGS AND SAFE HANDLING PROCEDURES SHOULD BE PROVIDED TO HANDLERS AND USERS.

****

PREPARED BY: MOBIL OIL CORPORATION
ENVIRONMENTAL AFFAIRS AND TOXICOLOGY DEPARTMENT, PRINCETON, NJ
FOR FURTHER INFORMATION, CONTACT:
MOBIL OIL CORPORATION, PRODUCT FORMULATION AND QUALITY CONTROL
3225 GALLOWS ROAD, FAIRFAX, VA 22037 (703) 849-3265

********** APPENDIX **********

FOR MOBIL USE ONLY: (FILL NO: RL92515DEM014) MCN: , MHC: 1* 1* 0* 1* 1*, MPPEC: A, PPEC: A, US89-540 APPROVE 11/22/89

****

PRECAUTIONARY LABEL TEXT:

CAUTION

WHEN USE CONDITIONS ARE LIKELY TO RESULT IN EXCESSIVE MISTING (GREATER THEN 5 MG/M3), PROVIDE ADEQUATE LOCAL VENTILATION OR RESPIRATORY PROTECTION.

ATTENTION

EMPTY CONTAINERS MAY CONTAIN PRODUCT RESIDUE, INCLUDING FLAMMABLE OR EXPLOSIVE VAPORS. DO NOT CUT, PUNCTURE OR WELD ON OR NEAR CONTAINER. ALL LABEL WARNINGS AND PRECAUTIONS MUST BE OBSERVED UNTIL THE CONTAINER HAS BEEN THOROUGHLY CLEANED OR DESTROYED.

REFER TO PRODUCT MATERIAL SAFETY DATA BULLETIN FOR FURTHER SAFETY AND HEALTH INFORMATION.

MOBIL OIL CORPORATION, NEW YORK, N.Y. 10017-5666 FL-388(3/85)

****

D.O.T. SHIPPING NAME: NOT APPLICABLE
D.O.T. HAZARD CLASS: NOT APPLICABLE

Material Safety
Data Sheet

SNOOP
September 1991

I. PRODUCT IDENTIFICATION

PRODUCT NAME: SNOOP

MANUFACTURER: Nupro Company
4800 East 345th Street
Willoughby, Ohio 44094

Telephone: (216) 951-7100
Emergency Telephone: (216) 951-7100
Chemtrec: (800) 424-9300

PRODUCT USE: Snoop is a liquid leak detector which is to be used on external surfaces only. Operating temperatures are between +27°F and 200°F (-3°C and +93°C).

II. INGREDIENTS

SNOOP does not contain any chemicals that meet the definition of Hazardous Chemical as defined in 29 CFR 1910.1200 or chemicals listed on the SARA Title III 313 list. SNOOP does not contain any "controlled products" as defined by Canada's Workplace Hazardous Materials Information System (WHMIS). All ingredients are on the TSCA inventory.

INGREDIENTS	CAS#	Wt %	PEL	LC 50	LD 50
Demineralized Water	7732-18-5	>90	none	none	none

III. HEALTH HAZARD INFORMATION

The following information is based on technical data available on the surfactant. Snoop is unlikely to cause any ill effects; however, like any chemical, Snoop may be slightly irritating to some individuals.

ROUTES OF ENTRY: Skin Contact: Yes Skin Absorption: No Eye Contact: Yes
Inhalation: No Ingestion: Yes

EFFECTS OF EXPOSURE:

ACUTE: May be slightly irritating to eyes and skin or if ingested.
CHRONIC: None Known
SENSITIZATION TO PRODUCT: None Known
SYNERGISTIC PRODUCTS: None Known
REPRODUCTIVE TOXICITY: None Known
MUTAGENICITY: None Known
TERATOGENICITY: None Known
CARCINOGENICITY: None of the ingredients of SNOOP are listed as carcinogens by NTP, IARC, or OSHA.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None Known

IV. FIRST AID PROCEDURES

EYES: Rinse with water for 15 minutes, seek medical attention if irritation develops.

SKIN: Rinse with water. If irritation develops, seek medical attention.

INGESTION: Unlikely to cause ill effects if ingested. If distress develops, seek medical attention.

INHALATION: Unlikely to be inhaled. However, if person is affected by vapors, remove to fresh air, seek medical attention.

V. PHYSICAL CHARACTERISTICS

BOILING POINT: 212° F/100° C
FREEZING POINT: <32° F (0° C)
EVAPORATION RATE: Not Applicable
SPECIFIC GRAVITY: 1.0
APPEARANCE AND ODOR: Colorless, odorless liquid
ODOR THRESHOLD: Not Determined
VAPOR PRESSURE(mm Hg): Not Applicable
VAPOR DENSITY(air=1): Not Applicable
pH: 7.0
SOLUBILITY IN WATER: Complete
% VOLATILE (BY VOLUME): Not Determined

VI. FIRE AND EXPLOSION INFORMATION

FLAMMABLE: No
FLASH POINT: None
EXTINGUISHING MEDIA: None
SPECIAL FIRE FIGHTING PROCEDURES: None
UNUSUAL FIRE AND EXPLOSION HAZARDS: None
FLAMMABILITY LIMITS IN AIR: UEL: None **LEL:** None
AUTOIGNITION TEMPERATURE: None
SENSITIVITY TO IMPACT: None
SENSITIVITY TO STATIC DISCHARGE: None known

VII. REACTIVITY INFORMATION

CHEMICAL STABILITY: Stable
HAZARDOUS POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION PRODUCTS: None
INCOMPATIBILITY (materials to avoid): Oxidizing agents
CONDITIONS TO AVOID: None

VIII. SPILL, LEAK AND DISPOSAL PROCEDURES

SPILL OR LEAK: Treat as a water spill, soak up liquid with absorbent material or rinse down drain.
DISPOSAL METHOD: Discarded product is not hazardous waste as defined in 40 CFR 261. Can be rinsed down the drain.
CONTAINER DISPOSAL: Empty containers are not hazardous waste. Dispose of in a responsible manner.
SPECIAL HANDLING/STORAGE REQUIREMENTS: Store between 45° F and 85° F (7° C to 29° C).

IX. SPECIAL PROTECTION INFORMATION

Under normal conditions Snoop does not require use of any special protection equipment. The following are suggested based on general chemical exposure.

VENTILATION: General ventilation acceptable.
RESPIRATORY PROTECTION: None Required
SKIN PROTECTION: Suggest rubber or impervious gloves.
EYE PROTECTION: Suggest safety glasses with side shields, or goggles.
OTHER PROTECTIVE EQUIPMENT: None Needed
PERSONAL HYGIENE: As with any chemical, practice good personal hygiene during and after use.

X. TRANSPORTATION AND LABELING INFORMATION

DOT SHIPPING NAME: None Required
DOT HAZARD CLASS: None
DOT LABEL: None Required

HMIS LABEL

HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
PPE	See Section IX

XI. PREPARATION INFORMATION

PREPARED BY: Regulated Materials Department
APPROVED BY: J.F. Sarakaitis
Director, Industrial Relations

4159

MATERIAL SAFETY DATA SHEET
AND SAFE HANDLING AND DISPOSAL INFORMATION

ZEP *CLEAN ACROSS AMERICA AND THROUGHOUT THE WORLD™*

ZEP MANUFACTURING COMPANY
P.O. BOX 2015
ATLANTA, GEORGIA 30301

JAL #3 PLANT

SID RICHARDSON CARBON & GAS CO (320)
3 M NORTH AND 1 M EAST OF JAL
JAL, NM 88252

07/01/95
ISSUE DATE: 12/20/94
SUPERSEDES:
ZEP 45
PRODUCT NO.: 0174 **Aerosol Lubricant**

SECTION I - EMERGENCY CONTACTS

TELEPHONE:
(404) 352-1680 *BETWEEN 8:00 AM - 5:00 PM (EST)*
MEDICAL EMERGENCY:
(404) 435-2973 *NON-OFFICE HOURS, WEEKENDS*
(404) 432-2873 *AND HOLIDAYS, PLEASE CALL YOUR*
(404) 424-4789 **LOCAL POISON CONTROL**
(404) 319-6151
(404) 242-3561
TRANSPORTATION EMERGENCY:
(404) 922-0923
CHEMTREC:
1-800-424-9300 **TOLL-FREE - ALL CALLS RECORDED**
DISTRICT OF COLUMBIA:
(202) 483-7616 **ALL CALLS RECORDED**

SECTION II - HAZARDOUS INGREDIENTS

DESIGNATIONS	TLV (PPM)	EFFECTS (SEE REVERSE)	% IN PROD.
@ " TRICHLOROETHYLENE " acetylene trichloride; 1-chloro-2,2-dichloroethylene; CAS # 79-01-6; RTECS # KX4550000	50	IRR CNS	40-50
" PARAFFIN OIL " blend of heavy and light naphthenic petroleum distillate; CAS # 64742-52-5; and CAS # 64742-53-6, RTECS # NONE, OSHA PEL-N/D, ACGIH OIL MIST LIMIT = 5mg/m3	N/D	IRR	15-25
" MINERAL SEAL OIL " (mineral oil); petrolatum; CAS # 64741-44-2, RTECS # PY8030000; ACGIH/OSHA OIL MIST LIMIT = 5mg/M3	N/A	IRR	5-15
" PROPRIETARY BLENDED SALTS OF OXYGENATED AND SULFONATED HYDROCARBONS " CAS # PROPRIETARY, RTECS # -NONE, OSHA/ACGIH OIL MIST LIMIT = 5 mg/m3	N/D	IRR	5-10
" BLEND OF [AMYL ACETATE; CAS # 628-63-7; RTECS # AJ1925000], [3-METHYL BUTYL ACETATE; CAS # 123-92-2, RTECS # NS9800000] & [2-METHYL BUTYL ACETATE; CAS # 624 -41-9, RTECS # NONE] " OSHA PEL-100 ppm for 628-63-7	100	CBL IRR	5-10
" 2-ETHYL HEXYL ALCOHOL " 2-ethyl-1-hexanol; ethylhexanol, CAS # 104-76-7, RTECS # MP0350000, OSHA PEL N/D	N/D	IRR CBL	5-10

@ Identifies chemicals listed under SARA-Section 313 for release reporting

SECTION III - HEALTH HAZARD DATA

Special Note: MSDS data pertains to the product as dispensed from the container. Adverse health effects would not be expected under recommended conditions of use (diluted) so long as prescribed safety precautions are practiced.

Acute Effects of Overexposure:
Inhalation of vapor can produce central nervous system depression, characterized by dizziness, headache, nausea, cardiac and/or respiratory depression, stupor, unconsciousness and death, in extreme cases. Exposure to high concentrations of vapor by direct contact or inhalation can be irritating to mucous membranes, such as eyes and upper respiratory tract. Severe eye exposure to liquid can cause reversible eye damage. Skin contact may cause a burning sensation and reddening of the skin. Introduction of solvent to the lungs, as in aspiration of vomitus fluids, may cause chemical pneumonia. Exposure to this product may aggravate existing respiratory and cardiac conditions. Inhalation of aerosol mist may produce chemical pneumonia.

Chronic Effects of Overexposure:
Repeated or prolonged contact by inhalation or skin absorption may produce liver or kidney damage or damage to the central nervous system, characterized by tingling or numbness in the extremities, blurred vision or confusion. Skin, which is defatted by repeated exposure to solvents, is more susceptible to irritation, infection, and dermatitis. None of the ingredients are listed as carcinogens by IARC, NTP, or OSHA.

Est'd PEL/TLV: Not established **Primary Routes of Entry:** Inh, Skin.

HMIS Codes: HEALTH 2,FLAM. 1,REACT. 1,PERS. PROTECT. X ,CHRONIC HAZ. YES

FIRST AID PROCEDURES:
Skin: Wash contaminated skin thoroughly with soap or a mild detergent. Apply a skin cream with lanolin. Get medical attention if irritation persists.
Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting upper and lower lids. Get medical attention at once.
Inhale: Move exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Get medical attention immediately.
Ingest: If this product is swallowed, do not induce vomiting. If victim is conscious give plenty of water to drink. Get medical attention at once.

SECTION IV - SPECIAL PROTECTION INFORMATION

Protective Clothing: Wear viton gloves or use gloves with demonstrated resistance to the ingredients in this product.
Eye Protection: Wear tight-fitting splash-proof safety glasses especially if contact lenses are worn.
Respiratory Protection: Keep face away from spray mist and do not breathe vapors.
Ventilation: Provide local exhaust/ventilation as needed to keep concentration of vapors below exposure limits (PEL/TLV)

SECTION V - PHYSICAL DATA

Boiling Point (°F):	189 INITIAL	**Specific Gravity:**	1.104	**Vapor Pressure (mmHg):**	N/D
Percent Volatile by Volume (%):	60	**Vapor Density (air = 1):**	N/D	**Evaporation Rate (CCL4 = 1):**	0.7
Solubility in Water:	NEGLIGIBLE	**pH (concentrate):**	N/A	**pH (use dilution of N/A):**	N/A

Appearance and Odor: A CLEAR, BROWN OILY LIQUID HAVING A STRONG, SWEET ODOR.

SECTION VI - FIRE AND EXPLOSION DATA

Flash Point (°F) (method used): NOT FLAMMABLE (CSMA)
Flammable Limits: LEL N/A UEL N/A
Extinguishing Media: Carbon dioxide, dry chemical and foam.
Special Fire Fighting: Wear self-contained positive pres. breathing apparatus.
Unusual Fire Hazards: Concentrated vapor may ignite if exposed to spark.

SECTION VII - REACTIVITY DATA

Stability: Stable
Incompatibility (avoid): Heat, open flame, spark, and oxidizing agents.
Polymerization: Will not occur.
Hazardous Decomposition: Hydrogen chloride, phosgene, and chlorine gas

SECTION VIII - SPILL AND DISPOSAL PROCEDURES

Steps to be Taken in Case Material is Released or Spilled:
Observe safety precautions in sections 4 & 9 during spill clean-up. Large spills are unlikely due to packaging. Spill may be absorbed on an inert absorbent material (Zep-O-Zorb), and placed in a suitable container for disposal. Wash area thoroughly with a detergent solution and rinse well with water.
Waste Disposal Method:
Product is consumed in use. Do not crush, puncture or incinerate spent containers. Large numbers of aerosol containers may require handling as a hazardous waste, but in most states total hazardous waste quantities less than 220 lbs per month may allow disposal in a chemical or industrial waste landfill. Consult local, state and federal agencies for the proper disposal method in your area.

RCRA Hazardous Waste Numbers: N/A-DISPOSE OF ACCORDING TO STATE/LOCAL GUIDELINES

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be Taken When Handling and Storing:
Do not store at temperatures above 120F, or in direct sunlight. Do not puncture or incinerate container. Do not breathe spray mists or vapors. Avoid prolonged contact with skin. Keep product out of eyes. Vapors are heavier than air and will accumulate at low points. Ventilation should include floor level exhausting. Keep out of the reach of children.

SECTION X - TRANSPORTATION DATA

DOT PROPER SHIPPING NAME Small sizes one gallon or less may be shipped as ORM-D: CONSUMER COMMODITY.
DOT Hazard Class: ORM-D
DOT I.D. Number: N/A **DOT Label/Placard:** ORM-D
EPA TSCA Chemical Inventory: ALL INGREDIENTS ARE LISTED
EPA CWA 40CFR Part 117 substance (RQ in a single container) TRICHLOROETHYLENE - 100 #

NOTICE

Thank you for your interest in, and use of, Zep products. Zep Manufacturing Co. is pleased to be of service to you by supplying this Material Safety Data Sheet for your files. Zep Manufacturing is concerned for your health and safety. Zep products can be used safely with proper protective equipment and proper handling practices consistent with label instructions and the MSDS. Before using any Zep product, be sure to read the complete label and the Material Safety Data Sheet.

As a further word of caution, Zep wishes to advise that serious accidents have resulted from the misuse of "emptied" containers. "Empty" containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, or other sources of ignition; they may explode or develop harmful vapors and possibly cause injury or death. Clean empty containers by triple rinsing with water or an appropriate solvent. Empty containers must be sent to a drum reconditioner before reuse.

TERMS AND ABBREVIATIONS USED IN THE MSDS, BY SECTION ALPHABETICALLY:

SECTION II: HAZARDOUS INGREDIENTS

CAR: Carcinogen - A chemical listed by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC) or OSHA as a definite or possible human cancer causing agent.
CAS #: Chemical Abstract Services Registry Number - A universally accepted numbering system for chemical substances.
CBL: Combustible - At temperatures between 100°F and 200°F chemical gives off enough vapor to ignite if a source of ignition is present as tested with a closed cup tester.
CNS: Central Nervous System depressant reduces the activity of the brain and spinal cord.
COR: Corrosive - Causes irreversible alterations in living tissue (e.g. burns).
DESIGNATIONS. Chemical and common names of hazardous ingredients.
EIR: Eye Irritant Only - Causes reversible reddening and/or inflammation of eye tissues.
EXPOSURE LIMITS. The time weighted average (TWA) airborne concentration at which most workers can be exposed without any expected adverse effects. Primary sources include ACGIH TLV's, and OSHA PEL's (TWA, STEL and ceiling limits).
ACGIH: American Conference of Governmental Industrial Hygienists.
CEILING: The concentration that should not be exceeded in the workplace during any part of the working exposure.
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit- A set of time weighted average exposure values, established by OSHA, for a normal 8-hour day and a 40-hour work week.
PPM: Parts per million - unit of measure for exposure limits.
(S) SKIN: Skin contact with substance can contribute to overall exposure.
STEL: Short Term Exposure Limit- Maximum concentration for a continuous 15-minute exposure period
TLV: Threshold Limit Value - A set of time weighted average exposure limits, established by the ACGIH, for a normal 8-hour day and a 40-hour work week.
FBL: Flammable - At temperatures under 100°F, chemical gives off enough vapor to ignite if a source of ignition is present as tested with a closed cup tester.
HAZARDOUS INGREDIENTS: Chemical substances determined to be potential health or physical hazards by the criteria established in the OSHA Hazard Communication Standard - 29 CFR 1910.1200
HTX: Highly toxic - the probable lethal dose for 70 kg (150 lb.) man and may be approximated as less than 6 teaspoons (2 tablespoons).
IRR: Irritant - Causes reversible effects in living tissues (e.g. inflammation) - primarily skin and eyes.
N/A: Not Applicable - Category is not appropriate for this product.
N/D: Not Determined - Insufficient information for a determination for this item.
RTECS #: Registry of Toxic Effects of Chemical Substances - an unreviewed listing of published toxicology data on chemical substances.
SARA: Superfund Amendments and Reauthorization Act - Section 313 designates chemicals for possible reporting for the Toxics Release Inventory.
SEN: Sensitizer - Causes allergic reaction after repeated exposure.
TOX: Toxic - The probable lethal dose for a 70 kg (150 lb.) man is one ounce (2 tablespoons) or more.

SECTION III: HEALTH HAZARD DATA

ACUTE EFFECT: An adverse effect on the human body from a single exposure with symptoms developing almost immediately after exposure or within a relatively short time.
CHRONIC EFFECT: Adverse effects that are most likely to occur from repeated exposure over a long period of time.
EST'D PEL/TLV: This estimated, time-weighted average, exposure limit, developed by using a formula provided by the ACGIH, pertains to airborne concentrations from the product as a whole. This value should serve as guide for providing safe workplace conditions to nearly all workers.
HMIS CODES: Hazardous Material Identification System - a rating system developed by the National Paint and Coating Association for estimating the hazard potential of a chemical under normal workplace conditions. These risk estimates are indicated by a numerical rating given in each of three hazard areas (Health/Flammability/Reactivity) ranging from a low of zero to a high of 4. A chronic hazard is indicted with a yes. Consult HMIS training guides for Personal Protection letter codes which indicate necessary protective equipment.
PRIMARY ROUTE OF ENTRY: The way one or more hazardous ingredients may enter the body and cause a generalized-systemic or specific-organ toxic effect.
ING: Ingestion - A primary route of exposure through swallowing of material.
INH: Inhalation - A primary route of exposure through breathing of vapors.
SKIN: A primary route of exposure through contact with the skin.

SECTION IV: SPECIAL PROTECTION INFORMATION

Where respiratory protection is recommended, use only MSHA and NIOSH approved respirators and dust masks
MSHA: Mine Safety and Health Administration
NIOSH: National Institute for Occupational Safety and Health.

SECTION V: PHYSICAL DATA

EVAPORATION RATE: It refers to the rate of change from the liquid state to the vapor state at ambient temperature and pressure in comparison to a given substance (e.g. water).
pH: A value representing the acidity or alkalinity of an aqueous solution (Acidic pH = 1; Neutral pH = 7, Alkaline pH = 14)
PERCENT VOLATILE: The percentage of the product (liquid or solid) that will evaporate at 212°F and ambient pressure.
SOLUBILITY IN WATER: A description of the ability of the product to dissolve in water.

SECTION VII: REACTIVITY DATA

HAZARDOUS DECOMPOSITION: Breakdown products expected to be produced upon product decomposition or fire.
INCOMPATIBILITY: Material contact and conditions to avoid to prevent hazardous reactions.
POLYMERIZATION: Indicates the tendency of the product's molecules to combine in a chemical reaction releasing excess pressure and heat.
STABILITY: Indicates the susceptibility of the product to spontaneously and dangerously decompose.

SECTION VIII: SPILL AND DISPOSAL PROCEDURES

RCRA WASTE NOS: RCRA (Resource Conservation and Recovery Act) waste codes (40 CFR 261) applicable to the disposal of spilled or unusable product from the original container.

SECTION X: TRANSPORTATION DATA

CWA: Clean Water Act
RQ: Reportable Quantity - The amount of the specific ingredient that, when spilled to the ground and can enter a storm sewer or natural waterbed, must be reported to the National Response Center, and other regulatory agencies
TSCA: Toxic Substances Control Act - a federal law requiring all commercial chemical substances to appear on an inventory maintained by the EPA.

DISCLAIMER

All statements, technical information and recommendations contained herein are based on available scientific tests or data which we believe to be reliable. The accuracy and completeness of such data are not warranted or guaranteed. We cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used. Zep assumes no liability or responsibility for loss or damage resulting from the improper use or handling of our products, from incompatible product combinations, or from the failure to follow instructions, warnings, and advisories in the product's label and Material Safety Data Sheet.

(Notice Revised 8/91)

Material Safety Data Sheet
To comply with OSHA's Hazard Communication Standard, CFR 1910.1200.

IDENTITY (As Used on Label and List)	
Produced Water	
SECTION I	CAS # 7783-06-4 Hydrogen Sulfide
Manufacturer's Name Parker & Parsley Development Co.	Emergency Telephone Number (915) 563-8432
Address 303 W. Wall, Midland, Texas 79701	Telephone Number for Information (915) 683-4768
Synonym: Sour Water	Date Prepared August 1, 1994

SECTION II - Hazardous Ingredients/Identity Information

Water.
Hydrogen Sulfide.
*Due to the extremely variable composition of the material, specific physical properties cannot be given.

WARNING: Hydrogen Sulfide gas may be present in produced water and may collect in the headspace of enclosed vessels at toxic levels.

w/H_2S Present	OSHA PEL	ACGIH TLV	Other Limits Recommended STEL	%(Optional)
	10 PPM	10 PPM	15 PPM	NDA

SECTION III - Physical/Chemical Characteristics *NDA - No Data Available, N/A - Not Applicable

Boiling Point	NDA	Specific Gravity (H_2O = 1)	NDA
Vapor Pressure	NDA	Melting Point	N/A
Vapor Density (AIR = 1)	NDA	Evaporation Rate	
With H^2S Present	1.21	(Butyl Acetate = 1)	NDA

Solubility in Water Appreciable, above 10%.

Appearance and Odor
Discolored, slightly oily water; may have odor of hydrogen sulfide. (If H_2S is present in low concentrations, there will be a strong rotten egg odor). WARNING: DO NOT DEPEND ON SENSE OF SMELL TO DETECT THE PRESENCE OF H_2S.

SECTION IV - Fire and Explosion Hazard Data

Flash Point	% Volatility	LEL	UEL
NDA	Relative to H_2S Concentration	4.0%	44.0%

Extinguishing Media
Carbon Dioxide, Dry Chemical or Water Fog produced by a special nozzle is effective but requires experience.

Special Fire Fighting Procedures
Do not enter any enclosed or confined space without proper protective equipment, including self-contained breathing apparatus. Read the entire MSDS.

Unusual Fire and Explosion Hazards

Due to extremely variable composition of the material, specific information cannot be given. Surface burning could occur i[illegible]re is sufficient oily top layer or H_2S concentration and a source of ignition. When H_2S is burned the formation of sulfur dioxide will occur.

SECTION V - Reactivity Data:

Stability (Thermal, Light, etc.): Stable **Incompatibility (Materials to Avoid):** Avoid contact with strong oxidizing materials.
Hazardous Decomposition Products: Hydrogen sulfide gas may be given off.
Hazardous Polymerization: Will not occur.

SECTION VI - Physiological & Health Effects

Eye: No significant irritation expected.
Skin: None required.
Inhalation: Vapors containing hydrogen sulfide may accumulate during storage or transport in the vapor space of storage tanks and vessels.
Ingestion: Expected to be slightly toxic.

Emergency First Aid Procedures

Eyes: Flush eyes with plenty of water.
Skin: Flush with water and wash with soap.
Inhalation: If worker is overcome, rescuer must wear self-contained breathing apparatus to remove worker from contaminated area. Give artificial repiration if not breathing. Give 100% oxygen if breathing is difficult. Get immediate medical attention.
Ingestion: If swallowed, induce vomiting. Get medical attention. **NOTE TO PHYSICIAN:** Depending upon the degree of overexposure, hydrogen sulfide (H_2S) poisoning results in impairment of cellular oxidative phosphorylation producing neurotoxicity, metabolic acidosis and cardiovascular damage. Administration of 100% oxygen and supportive care constitute the preferred treatment for hydrogen sulfide (H_2S) poisoning. Some clinicians choose to induce methemoglobin formation by administering sodium nitrite to patients with severe symptoms of H_2S toxicity and who are not rapidly improving with supportive care. This is based on: (a) a mechanism of toxicity for sulfide similar to that for cyanide, (b) binding of sulfide to methemoglobin, and (c) demonstration of an antidotal effect of methemoglobin in animals. Other [illegible]icians feel this treatment is of no benefit and some believe it may even be harmful. There are some anecdotal reports [illegible] no humans studies demonstrating that hyperbaric oxygen is more effective than 100% oxygen at atmospheric pressure Some physicians use hyperbaric oxygen to treat comatose patients who are not rapidly improving.

SECTION VII - Environmental Protection

Environmental Impact: This material is considered to be a water pollutant and releases of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.
Precautions if Material is Released or Spilled: Eliminate all open flame in vicinity of spill or released vapor. Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Special Protective Information. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.
Waste Disposal Methods: Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

SECTION VIII - Protective Information/Control Measures

Eye Protective Information: None required; however, use of safety glasses is good industrial practice.
Skin Protection: Not required.
Respiratory Protection: If operating conditions cause high vapor concentration or TLV is exceeded, use supplied-air respirator approved by NIOSH/MSHA.
Ventilation: No special ventilation is usually necessary. However, if operating conditions create high concentrations of H_2S, special ventilation will be needed.
Comment: Toxic quantities of hydrogen sulfide (H_2S) may be present in storage tanks and bulk transport vessels. Persons opening or entering these departments should first determine if H_2S is present. As an indicator of H_2S concentration, the rotten eggs odor is unreliable because it may be masked by other odors. Therefore DO NOT ATTEMPT WORK/RESCUE WITHOUT WEARING APPROVED SUPPLIED-AIR OR SELF CONTAINED BREATHING EQUIPMENT.

Special Precautions

Hydrogen sulfide (H_2S) gas may accumulate in storage tanks and bulk transport compartments containing produced water. [illegible]olonged breathing (greater than 15 minutes) of concentrations of H_2S around 15 ppm is prohibited by law; levels of 25 to 600 ppm will result in fluid in the lungs, and possibly death and concentrations around 1,000 ppm will caus[illegible] unconsciousness and death in a short period of time. Since the sense of smell rapidly becomes insensitive to this toxic, colorless gas, odor cannot be relied upon as an indicator of concentration of the gas. Always exercise caution when working around closed containers of produced water.

SECTION IX - Regulatory Information

DOT Shipping Name: Water
DOT Hazard Class/Division: None
DOT Identification Number: None

If H_2S is present additional placards are required.

DOT Shipping Name: Hydrogen Sulfide
DOT Hazard Class/Division: 2.3
DOT Identification Number: UN1053

MATERIAL SAFETY DATA SHEET

SUMMIT OIL COMPANY
9010 CR 2120
Tyler, Texas 75707
(903) 534-8021

DATE: 02/21/96 **REVISED: 02/21/96** **SUPERSEDES: 08/11/95**

I. PRODUCT IDENTIFICATION

Trade Name:	SUM-CLEAN
Chief Constituent:	TEA Dodecylbenzene Sulfonate
Hazardous Ingredients/OSHA:	2 - Butoxyethanol, (OSHA PEL - 25 ppm) (ACGIH TL - 25 ppm)
Carcinogenic Ingredients/OSHA/NTP/IARC:	None
Ingredients Regulated by SARA Title 3, Section 313:	2-Butoxyethanol

II. WARNING STATEMENTS

None

III. PHYSICAL AND CHEMICAL DATA

Appearance and Odor:	Clear green mobile liquid with distinct odor		
Specific Gravity:	1.05		
Boiling Point:	212°F	Evaporation Rate:	1.5
Vapor Pressure:	24 mm Hg.	Solubility in Water:	100%
pH	11 - 11.5		

IV. FIRE PROTECTION

Flash Point:	None
Extinguishing Media:	N/A
Special Firefighting Procedure:	None

V. REACTIVITY DATA

Thermal Stability:	Stable
Materials to Avoid:	Acids
Hazardous Polymerization:	Will not occur
Hazardous Decomposition Products:	None

VI. HEALTH HAZARD DATA

Exposure Limits:	Skin - TLV 50 ppm
Effects of Overexposure:	Dry skin, stings eyes. Harmful if swallowed.

VII. PHYSIOLOGICAL EFFECTS SUMMARY

ACUTE:

Eyes:	Irritant to eyes.
Skin:	Will dry skin in concentrated forms.
Respiratory System:	Not Determined (Avoid breathing mist)

CHRONIC: Exposure of rats by inhalation to 2-BE caused hemolysis, hemoglobinuria (blood in the urine) and a slight increase in liver weight. Other species, including man, were less sensitive or more resistant to hemolysis. The hemolytic effect in rats was transitory and/or reversible and not considered to be relevant to human health. Inhalation exposure of pregnant rabbits caused some lethality to the dam and fetus at 200 PPM, but there were no effects at 100 PPM and below. Inhalation exposure to pregnant rats caused irritancy to the dams and related fetotoxicity at 200 and 100 PPM, but there were no effects at 50 PPM and below. 2-BE did not cause birth defects in either study.

VIII. PRECAUTIONS FOR SAFE HANDLING

For general personal hygiene, wash hands thoroughly after handling material. Avoid contact with skin and eyes. Keep from freezing. If frozen, thaw and agitate before use.

IX. PROTECTION AND CONTROL MEASURES

Protective Equipment:	Rubber gloves, splash goggles and eye wash.
Respiratory Protection:	None
Ventilation:	N/A

X. EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:	Flush with water. If irritation persists, get medical attention.
Skin Contact:	Wash with soap and water.
Inhalation:	Remove to fresh air and if burning persists, call physician.
Ingestion:	Take one or two glasses of water and induce vomiting. Call a physician.

XI. NOTES

HAZARD RATING INFORMATION

	NPCA/HMIS	NFPA	KEY	
Health	1	1	4 = Severe	
Fire	0	0	3 = Serious	1 = Slight
Reactivity	0	0	2 = Moderate	0 = Minimal
Personal Protection	B			

XII. SPILL AND DISPOSAL PROCEDURES

Environmental Impact: Report spills as required to appropriate authorities. U. S. Coast Guard regulations require immediate reporting of spills that could reach any waterway including intermittent dry creeks. Report spill to Coast Guard Toll Free Number (800) 424-8802. In case of accident or road spill, notify Chemtrec (800) 424-9300.

Procedures if Material is Released or Spilled: Rinse with copious quantities of water to dilute. Sodium carbonate or calcium carbonate may be used to soak up liquid.

Waste Management: Material is considered non-hazardous and biodegradable as received. Spent material may be disposed of according to Federal, State and Local regulations in sewer system with water flush.

Toxic Substance Inventory Control Act: All components are included on the TSCA inventory and are in compliance with the TSCA.

FOR ADDITIONAL INFORMATION CONTACT:

SUMMIT OIL COMPANY
P. O. Box 131359
Tyler, Texas 75713
(903) 534-8021

Date Issued: 10-16-95
Supersedes: 07-05-95

TEXACO
MATERIAL SAFETY DATA SHEET

NOTE: Read and understand Material Safety Data Sheet before handling or disposing of product.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATERIAL IDENTITY

Product Code and Name:
60001 PROPANE
Chemical Name and/or Family or Description:
Aliphatic Hydrocarbon

Manufacturer's Name and Address:
TEXACO NATURAL GAS PLANTS
AND LIQUIDS DIVISION
P.O. Box 1650
Tulsa, OK 74102-1650

Telephone Numbers:

Transportation Emergency	-Company	: (914) 831-3400
	CHEMTREC	: (800) 424-9300
Health Emergency	-Company	: (914) 831-3400
General MSDS Assistance		: (914) 838-7204
Technical Information	-Fuels	: (914) 838-7336
	-Chemical	: (512) 459-6543
	-Lubricant/Antifreezes	: (800) 782-7852
	-Additives	: (713) 235-6278
	-Solvents	: (800) 876-3738

2. COMPOSITION/INFORMATION ON INGREDIENTS

THE CRITERIA FOR LISTING COMPONENTS IN THE COMPOSITION SECTION IS AS FOLLOWS: CARCINOGENS ARE LISTED WHEN PRESENT AT 0.1 % OR GREATER; COMPONENTS WHICH ARE OTHERWISE HAZARDOUS ACCORDING TO OSHA ARE LISTED WHEN PRESENT AT 1.0 % OR GREATER; NON-HAZARDOUS COMPONENTS ARE LISTED AT 3.0 % OR GREATER. THIS IS NOT INTENDED TO BE A COMPLETE COMPOSITIONAL DISCLOSURE. REFER TO SECTION 14 FOR APPLICABLE STATES' RIGHT TO KNOW AND OTHER REGULATORY INFORMATION.

Product and/or Component(s) Carcinogenic According to:

OSHA	IARC	NTP	OTHER	NONE
-	-	-	-	X

Composition: (Sequence Number and Chemical Name)

Seq.	Chemical Name	CAS Number	Range in %
	This product may be odorized. The odorant content may vary from 0-50 ppm; common odorants include mercaptans and thiopane.		
01	* Propane	74-98-6	100.00

PRODUCT IS HAZARDOUS ACCORDING TO OSHA (1910.1200).
* COMPONENT IS HAZARDOUS ACCORDING TO OSHA.

Exposure Limits referenced by Sequence Number in the Composition Section

Seq.	Limit
01	1000 ppm TWA-OSHA

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Appearance:
Gas
Odor:
If odorized will have rotten egg odor - otherwise, odorless

WARNING STATEMENT

DANGER ! FLAMMABLE GAS - MAY CAUSE FLASH FIRE
DELAYED EVAPORATION FROM CONTAMINATED CLOTHING MAY BE A FIRE HAZARD
LIQUID MAY CAUSE FROSTBITE
MAY CAUSE DIZZINESS AND DROWSINESS
GAS REDUCES OXYGEN AVAILABLE FOR BREATHING
GAS MAY ACCUMULATE IN CONFINED SPACES AND CAUSE SUFFOCATION
MAY CAUSE RESPIRATORY TRACT IRRITATION

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

3. HAZARD IDENTIFICATION (CONT)

HMIS			NFPA		
Health:	1	Reactivity: 0	Health:	1	Reactivity: 0
Flammability:	4	Special : -	Flammability:	4	Special : -

POTENTIAL HEALTH EFFECTS

	EYE	SKIN	INHALATION	INGESTION
Primary Route of Exposure:	X	X	X	-

EFFECTS OF OVEREXPOSURE

Acute:

Eyes:
Eye contact with liquid product or gas under pressure can cause frostbite (cold burns).

Skin:
Brief contact is not irritating.

Product is a gas - not expected to be absorbed through the skin.

Skin contact with liquid product can cause frostbite (cold burns).

Inhalation:
Gas may be irritating and cause discomfort in nose and throat, nasal discharge, and coughing. Prolonged overexposure may cause difficulty breathing.

Inhalation may cause dizziness, drowsiness, euphoria, loss of coordination, disorientation, headache, nausea, and vomiting. In poorly ventilated areas or confined spaces, unconsciousness and asphyxiation may result.

Ingestion:
Product is a gas - not expected to cause toxic effects due to ingestion.

This material is a gas. Gas or liquid under pressure may cause frostbite (cold burns).

Sensitization Properties:
Unknown.

Chronic:
No adverse effects have been documented in humans as a result of chronic exposure. Section 11 may contain applicable animal data.

Medical Conditions Aggravated by Exposure:
There is no evidence that this product aggravates an existing medical condition.

Other Remarks:
If purchased for consumer use, contains or may release alkyl mercaptans (e.g., methyl mercaptan, ethyl mercaptan). Mercaptan concentrations above permissible concentrations can cause headache, dizziness, nausea, vomiting, and diarrhea. At concentrations above 400 ppm, respiratory paralysis, causing unconsciousness and death can occur.

4. FIRST AID MEASURES

Eyes:
Flush eyes with plenty of water for several minutes. Get medical attention if eye irritation persists.

Skin:
Wash skin with plenty of soap and water for several minutes. Get medical attention if skin irritation develops or persists.

In case of cold burn, immediately place affected area in warm water (105 F) and keep at this temperature until circulation returns. Get medical attention.

If clothing becomes wetted, drench individual with water and remove contaiminated clothing if possible. Slowly warm affected area of skin.

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

4. FIRST AID MEASURES (CONT)

Ingestion:
No emergency care anticipated. This material is a gas at standard temperature and pressure.

Inhalation:
If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Other Instructions:
Overexposure to this material may sensitize the heart to catecholamine-induced arrhythmias. Do not administer catecholamines to overexposed individuals. Contact a Poison Control Center for further treatment information.

This material is an asphyxiant which may have anesthetic properties at high concentrations. If present in sufficient concentrations to reduce the oxygen level below 18% in inhaled air, rapid respiration, mental dullness, incoordination, poor judgement, nausea, and unconsciousness may result. Oxygen deficiency may occur without warning in areas where this gas may displace air.

NOTE TO EMERGENCY RESPONDERS: The odor of mercaptans such as methyl mercaptan or ethyl mercaptan is offensive and similar to rotten eggs. The presence of odors is not a reliable warning signal. DO NOT use odor to estimate the amount of mercaptan vapors present.

5. FIRE-FIGHTING MEASURES

Ignition Temperature - AIT (degrees F):
874
Flash Point (degrees F):
-156
Flammable Limits (%):
Lower: 2.3
Upper: 9.5

Recommended Fire Extinguishing Agents And Special Procedures:
Fight fire from protected location or maximum possible distance. Stop flow of gas before attempting to extinguish flames. Use water spray to cool fire-exposed containers and to protect persons attempting to stop the flow of gas. Use flooding quantities of water as fog or spary. Use dry chemical or carbon dioxide to extinguish flames.

Unusual or Explosive Hazards:
Danger! Readily forms explosive air-vapor mixtures; may release explosive vapors that travel, be ignited at remote locations, and flash back. Containers may explode in fire. Do not expose to heat, sparks, flame, static, or other sources of ignition. When handling, use non-sparking tool, ground and bond all containers.

Special Protective Equipment for Firefighters:
Wear full protective clothing and positive pressure breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES (Transportation Spills: CHEMTREC (800)424-9300)

Procedures in Case of Accidental Release, Breakage or Leakage:
Eliminate all ignition sources including internal combustion engines and power tools. Ventilate area. Keep people away. Stay upwind and warn of possible downwind explosion hazard. Avoid breathing vapor. Avoid contact with eyes, skin, or clothing. Pressure demand air supplied respirators should always be worn when the airborne concentration of the contaminant or oxygen is unknown. Otherwise, wear respiratory protection and other personal protective equipment as appropriate for the potential exposure hazard.

If more than 2,000,000 pounds of product is spilled, then report spill according to SARA 304 and/or CERCLA 102(a) requirements, unless product qualifies for the petroleum exemption (CERCLA Section 101(14)).

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

7. HANDLING AND STORAGE

Precautions to be Taken in Handling:

Use spark-proof tools. Material may be at elevated temperatures and/or pressures. Exercise care when opening bleeders and sampling ports.

Storage:

Ground and bond shipping container, transfer line, and receiving container. Keep away from heat, sparks, flame, and other sources of ignition.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Equipment (Type)

Eye/Face Protection:

Safety glasses, chemical type goggles, or face shield recommended to prevent eye contact.

Skin Protection:

Protective clothing such as coveralls or lab coats should be worn. Launder or dry-clean when soiled. Gloves and boots resistant to chemicals and petroleum distillates required. Insulated gloves also required if contact with liquid-cooled product or equipment is expected.

Respiratory Protection:

Airborne concentrations should be kept to lowest levels possible. If vapor, mist or dust is generated and the occupational exposure limit of the product, or any component of the product, is exceeded, use appropriate NIOSH or MSHA approved air purifying or air supplied respirator after determining the airborne concentration of the contaminant. Air supplied respirators should always be worn when airborne concentration of the contaminant or oxygen content is unknown.

Ventilation:

Use explosion-proof equipment to maintain adequate ventilation to meet occupational exposure limits, if applicable (see below), prevent accumulation of explosive air-gas mixtures, and avoid significant oxygen displacement. Oxygen levels should be at least 19.5% in confined spaces or other work areas (OSHA value).

Exposure Limit for Total Product:

Propane: OSHA PEL-TWA 1000 ppm.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Gas

Odor:

If odorized will have rotten egg odor - otherwise, odorless

Boiling Point (degrees F):

-44

Melting/Freezing point (degrees F):

-306

Specific Gravity (water=1):

.5074

pH of undiluted product:

Not applicable.

Vapor Pressure:

7600 mmHg at 80.6

Viscosity:

Not applicable.

VOC Content:

Not determined.

Vapor Density (air=1):

1.5

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< - LESS THAN > - GREATER THAN

9. PHYSICAL AND CHEMICAL PROPERTIES (CONT)

Solubility in Water (%):
< .1

Other: None

10. STABILITY AND REACTIVITY

This Material Reacts Violently With:
(If Others is checked below, see comments for details)

Air	Water	Heat	Strong Oxidizers	Others	None of These
-	-	X	X	-	-

Comments:
None

Products Evolved When Subjected to Heat or Combustion:
Toxic levels of carbon monoxide, carbon dioxide, irritating aldehydes and ketones.

Hazardous Polymerizations: DO NOT OCCUR

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION(ANIMAL TOXICITY DATA)

Median Lethal Dose

Oral:
Not applicable; material is a gas.

Inhalation:
Not determined.

Dermal:
Not applicable; material is a gas.

Irritation Index, Estimation of Irritation (Species)

Skin:
(Draize) Believed to be < .50 /8.0 (rabbit) no appreciable effect

Eyes:
(Draize) Believed to be < 15.00 /110 (rabbit) no appreciable effect

Sensitization:
Not determined.

Other:
None

12. DISPOSAL CONSIDERATIONS

Waste Disposal Methods
This product (as presently constituted) has the RCRA characteristics of ignitability, and, if discarded in its present form, would have the hazardous waste number of D001. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because product uses, transformations, mixtures, processes, etc. may change the classification to non-hazardous, or hazardous for reasons other than, or in addition to ignitability.

Remarks
Do not allow to enter drains or sewers. Can cause explosion.

13. TRANSPORT INFORMATION

Transportation

DOT:

Proper Shipping Name:
Propane

Hazard Class:
2.1

Identification Number: UN 1978

Packing Group:

Label Required:
Flammable gas

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
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13. TRANSPORT INFORMATION (CONT)

This product contains a DOT Hazardous Substance or Substances, listed in Section 14 of the MSDS. If the product's shipping container holds at least 2,000,000 lbs, then the DOT information must be accompanied with RQ notation, or, an otherwise 'Not Regulated' product will be classified as Environmentally Hazardous (solid/liquid) N.O.S., Class 9, unless the product qualifies for the petroleum exemption (49 CFR 171.8).

IMDG:
Proper Shipping Name:
Not evaluated

ICAO:
Proper Shipping Name:
Not evaluated

TDG:
Proper Shipping Name:
Not evaluated

14. REGULATORY INFORMATION

Federal Regulations:
SARA Title III:
Section 302/304 Extremely Hazardous Substances

Seq.	Chemical Name	CAS Number	Range in %
01	Methyl mercaptan (if odorized - 50 ppm max)	74-93-1	0.005

Section 302/304 Extremely Hazardous Substances (CONT)

Seq.	TPQ	RQ
01	500	100

Section 311 Hazardous Categorization:

Acute	Chronic	Fire	Pressure	Reactive	N/A
X	-	X	X	-	-

Section 313 Toxic Chemical

Chemical Name	CAS Number	Concentration
None		

CERCLA 102(a)/DOT Hazardous Substances: (+ indicates DOT Hazardous Substance)

Seq.	Chemical Name	CAS Number	Range in %
01+	Methyl mercaptan (if odorized - 50 ppm max)	74-93-1	0.005

CERCLA/DOT Hazardous Substances (Sequence Numbers and RQ's):

Seq.	RQ
01+	100

TSCA Inventory Status:
This product is listed on the Toxic Substance Control Act (TSCA) Chemical Substance Inventory.

Other:
None.

State Regulations:
California Proposition 65:
The following detectable components of this product are substances, or belong to classes of substances, known to the State of California to cause cancer and/or reproductive toxicity.

Chemical Name	CAS Number
None	

States Right-to-know Regulations:

Chemical Name	State Right-to-know
Propane	IL,MA,NJ,PA,RI

State list: CT (Connecticut), FL (Florida), IL (Illinois), MI (Michigan), LA (Louisiana), MA (Massachusetts), NJ (New Jersey), PA (Pennsylvania), RI (Rhode Island)

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
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14. REGULATORY INFORMATION (CONT)

International Regulations:
Export Notification (TSCA-12b):
This product may be subject to export notification under TSCA section 12(b); contains:
Methyl mercaptan (if odorized - 50 ppm max)

WHMIS Classification:
Class A: Compressed gas
Class B, Div 1: Flammable gas

Canada Inventory Status:
All components are listed on the Canadian Domestic Substance List (DSL).

EINECS Inventory Status:
All components are listed on the European Inventory of Existing Chemical Substances (EINECS).

Australia Inventory Status:
N.D.

Japan Inventory Status:
N.D.

15. ENVIRONMENTAL INFORMATION

Aquatic Toxicity:
Not determined.

Mobility:
Not applicable

Persistence and Biodegradability:
Not applicable.

Potential to Bioaccumulate:
Not applicable.

Remarks:
None

16. OTHER INFORMATION

Dispose of as a vapor, venting at a safe location, keeping gas below explosive limit (LEL).

The information below is given to call attention to the issue of "naturally occurring radioactive materials". Although radon-222 levels in this product do not present any direct radon exposure, customers should be aware of the potential of radon daughter product buildup within their processing streams whatever the source of their product streams. Radon-222 is a naturally occurring radioactive gas which can be a contaminant in natural gas. During subsequent processing, radon tends to be concentrated in the liquified petroleum gas stream and in product streams having a similar boiling point range. Industry experience has shown that this product may contain small amounts of radon-222 and its radioactive decay products, called radon "daughters". The actual concentration of Radon-222 and radioactive daughters in the process equipment (IE lines, filters, pumps and reactor units) may accumulate significant levels of radioactive daughters and show a gamma radiation reading during operation. A potential external radiation hazard exists at or near any pipe, valve or vessel containing a radon-enriched stream or containing internal deposits of radioactive material, due to the transmission of gamma radiation through its wall.
Field studies in the literature and conducted by company personnel at selected sites, have not shown any conditions that subject workers to cumulative exposures in excess of general population limits. Equipment emitting gamma radiation should be presumed to be internally contaminated with alpha-emitting decay products which may be a hazard if inhaled or ingested. During maintenance operations that require the opening of contaminated process equipment, the flow of gas should be stopped and a four hour delay enforced to allow the gamma radiation to drop to back-

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16. OTHER INFORMATION (CONT)

ground levels. Protective equipment E.G. coveralls, gloves and respirator (NIOSH/MSHA approved for high efficiency particulates and radionuclides, or supplied air) should be worn by personnel entering a vessel or working on contaminated process equipment to prevent skin contamination, ingestion or inhalation of any residue containing alpha radiation. Airborne contamination may be minimized by handling scale and/or contaminated materials in a wet state.

NFPA NO. 58 REQUIRES ODORIZATION OF PROPANE SOLD FOR GENERAL CONSUMER USE. ODORIZATION PROVIDES A METHOD OF DETECTION IN THE EVENT OF A LEAK. COMMON ODORANTS INCLUDE ETHYL MERCAPTAN AND THIOPANE.
A BRIEF SUMMARY OF THE SAFETY INFORMATION REGARDING THE ODORANT IS PROVIDED HERE. FOR MORE DETAILED INFORMATION, PLEASE REFER TO THE REFERENCE SECTION. DO NOT RELY ON ODOR TO WARN OF PRESENCE OF GAS. IT IS IMPORTANT TO NOTE THAT NO ODORANT IS EFFECTIVE 100% OF THE TIME UNDER ALL CONDITIONS. THE EFFECTIVENESS OF THE ODORANT CAN BE REDUCED BY EXPOSURE TO SMALL AMOUNTS OF OXYGEN, MOISTURE, RUST OR SCALE. IN ADDITION, THE ODORANT MAY BE ABSORBED BY SOIL, NEW TANK SURFACES, NEW PIPING, OR CERTAIN BUILDING MATERIALS SUCH AS MASONRY. WHENEVER AN EMPTY TANK IS FILLED, IT MUST BE COMPLETELY PURGED IN ACCORDANCE WITH NPGA BULLETIN 133-89 TO REMOVE AIR AND WATER. THE INTEGRITY OF UNDERGROUND PIPES SHOULD BE CHECKED PERIODICALLY. IF PROPANE LEAKS FROM AN UNDERGROUND PIPE, THE SOIL MAY ABSORB THE ODORANT AS THE GAS MIGRATES TO THE SURFACE, WHICH COULD LEAVE THE GAS UNDETECTED BY SMELL. IF A PROPANE SYSTEM HAS NOT BEEN USED FOR AN EXTENDED PERIOD, IT SHOULD BE THOROUGHLY CHECKED BEFORE CONTINUING USE.
CERTAIN PHYSICAL CIRCUMSTANCES SUCH AS COLDS, ALLERGIES, SMOKING, ALCOHOL, AGE OR STRONG COMPETING ODORS MAY AFFECT A PERSON'S ABILITY TO SMELL ANY ODOR. IN ADDITION, AS WITH ANY ODOR, CONTINUED EXPOSURE TO PROPANE ODORANT CAN REDUCE A PERSON'S ABILITY TO DETECT THE ODORANT.
REFERENCES
NPGA BULLETIN NO. 133-80 "PURGING NEW CONTAINERS"
NFPA BULLETIN NO. 58, "STORAGE AND HANDLING OF LIQUIFIED PETROLEUM GAS"

THE INFORMATION CONTAINED HEREIN IS BELIEVED TO BE ACCURATE. IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT FOR PURPOSE OF HAZARD COMMUNICATION AS PART OF TEXACO'S PRODUCT SAFETY PROGRAM. IT IS NOT INTENDED TO CONSTITUTE PERFORMANCE INFORMATION CONCERNING THE PRODUCT. NO EXPRESS WARRANTY, OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE WITH RESPECT TO THE PRODUCT OR THE INFORMATION CONTAINED HEREIN. DATA SHEETS ARE AVAILABLE FOR ALL TEXACO PRODUCTS. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL TEXACO PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE AND YOU ARE ENCOURAGED AND REQUESTED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

TO DETERMINE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, USER SHOULD CONSULT HIS LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. TEXACO DOES NOT UNDERTAKE TO FURNISH ADVICE ON SUCH MATTERS.

Since the last mailing for this customer code, the following sections have been revised:
3,4,14,16,17.

Date: 10-16-95 New X Revised, Supersedes: 07-05-95
Date printed: 10-25-95

Inquiries regarding MSDS should be directed to:
Texaco Inc.
Manager, Product Safety
P.O. Box 509
Beacon, N.Y. 12508

PLEASE SEE NEXT PAGE FOR PRODUCT LABEL

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

17. PRODUCT LABEL

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

60001 PROPANE

WARNING STATEMENT

DANGER !

FLAMMABLE GAS - MAY CAUSE FLASH FIRE
DELAYED EVAPORATION FROM CONTAMINATED CLOTHING MAY BE A FIRE HAZARD
LIQUID MAY CAUSE FROSTBITE
MAY CAUSE DIZZINESS AND DROWSINESS
GAS REDUCES OXYGEN AVAILABLE FOR BREATHING
GAS MAY ACCUMULATE IN CONFINED SPACES AND CAUSE SUFFOCATION
MAY CAUSE RESPIRATORY TRACT IRRITATION

PRECAUTIONARY MEASURES

-Keep away from heat, sparks or flame.
-Use only with adequate ventilation.
-This gas deadens sense of smell. Do not depend on odor to detect presence of gas.
-Do not enter storage areas or confined spaces unless adequately ventilated.
-Use supplied air respiratory protection for cleaning large spills or upon entry into tanks, vessels, or other confined spaces.
-Avoid breathing vapor, mist, or gas.
-Rescue procedures should be attempted ONLY after notifying others of emergency and ONLY if appropriate personal equipment is available.
-Wear insulated gloves if contact with liquid cooled equipment is expected.
-Keep container closed.
-Workers should wash exposed skin several times daily with soap and water.

FIRST AID

Eye Contact:
Flush eyes with plenty of water for several minutes. Get medical attention if eye irritation persists.

Skin Contact:
Wash skin with plenty of soap and water for several minutes. Get medical attention if skin irritation develops or persists.

In case of cold burn, immediately place affected area in warm water (105 F) and keep at this temperature until circulation returns. Get medical attention.

If clothing becomes wetted, drench individual with water and remove contaiminated clothing if possible. Slowly warm affected area of skin.

Ingestion:
No emergency care anticipated. This material is a gas at standard temperature and pressure.

Inhalation:
If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Note to Physician:
Overexposure to this material may sensitize the heart to catecholamine-induced arrhythmias. Do not administer catecholamines to overexposed individuals. Contact a Poison Control Center for further treatment information.
This material is an asphyxiant which may have anesthetic properties at high concentrations. If present in sufficient concentrations to reduce the oxygen level below 18% in inhaled air, rapid respiration, mental dullness, incoordination, poor judgement, nausea, and unconsciousness may result. Oxygen deficiency may occur without warning in areas where this gas may displace air.

N.D. - NOT DETERMINED N.A. - NOT APPLICABLE N.T. - NOT TESTED
< - LESS THAN > - GREATER THAN

17. PRODUCT LABEL (CONT)

FIRE

In case of fire, use dry chemical or carbon dioxide to extinguish flames. Use water spray to keep containers cool and protect personnel attempting to stop the flow of gas.

If more than 2,000,000 pounds of product is spilled, then report spill according to SARA 304 and/or CERCLA 102(a) requirements, unless product qualifies for the petroleum exemption (CERCLA Section 101(14)).

Chemical Name	CAS Number	Range in %

This product may be odorized. The odorant content may vary from 0-50 ppm; common odorants include mercaptans and thiopane.

*	Propane	74-98-6	100.00

PRODUCT IS HAZARDOUS ACCORDING TO OSHA (1910.1200).
* COMPONENT IS HAZARDOUS ACCORDING TO OSHA.

Pennsylvania Special Hazardous Substance(s)	CAS Number	Range in %
None		

HMIS			NFPA		
Health: 1	Reactivity: 0		Health: 1	Reactivity: 0	
Flammability: 4	Special : -		Flammability: 4	Special : -	

Transportation
DOT:
Proper Shipping Name:
Propane
Hazard Class:
2.1
Identification Number: UN 1978
Packing Group:
Label Required:
Flammable gas

This product contains a DOT Hazardous Substance or Substances, listed in Section 14 of the MSDS. If the product's shipping container holds at least 2,000,000 lbs, then the DOT information must be accompanied with RQ notation, or, an otherwise 'Not Regulated' product will be classified as Environmentally Hazardous (solid/liquid) N.O.S., Class 9, unless the product qualifies for the petroleum exemption (49 CFR 171.8).

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flame or heat. Keep container closed and drum bungs in place.

Manufacturer's Name and Address:
TEXACO NATURAL GAS PLANTS
AND LIQUIDS DIVISION
P.O. Box 1650
Tulsa, OK 74102-1650

TRANSPORTATION EMERGENCY	Company:	(914) 831-3400
	CHEMTREC:	(800) 424-9300
HEALTH EMERGENCY	Company:	(914) 831-3400

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

MATERIALS INFORMATION SERVICES

NO. 470

DIESEL FUEL OIL NO. 2-D

Date October 1981

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: DIESEL FUEL OIL NO. 2-D
DESCRIPTION: Mixture of petroleum hydrocarbons; a distillate oil of low sulfur content
OTHER DESIGNATIONS: ASTM D975, CAS # 068 476 346
MANUFACTURER: Available from many suppliers

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Diesel Fuel Oil No. 2-D		
Complex mixture of paraffinic, olefinic, naphthenic and aromatic hydrocarbons**	>95	8-hr TWA 5mg/m^3* (mineral oil mist)
Sulfur content	<0.5	
Benzene***	<100 ppm	

*Current OSHA standard and ACGIH (1981) TLV
**Diesel fuels tend to be low in aromatics and high in paraffinics. A min. Cetane No. of 40 is required (ASTM D613).
***A low benzene level reduces carcinogenic risk. Fuel oils can be exempted under the benzene standard (29 CFR 1910.1028)

SECTION III. PHYSICAL DATA

Boiling point range, deg F, ------- Ca 340-675 Specific gravity (H_2O=1) ---- <0.86
Solubility in water ---------- negligible Cloud point (wax), deg C --- Ca 0
Viscosity at 40 C, cSt ---------- 1.9-4.1

Appearance and Odor: Clear, bright liquid with a mild petroleum odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air % by volume	LOWER	UPPER
125F min (PM)	>500F		0.6	7.5

Extinguishing Media: Dry chemical, carbon dioxide, foam, water spray. Use a water spray to cool fire exposed containers. Use a smothering technique for extinguishing fire of this combustible liquid. Do not use a forced water stream directly on oil fire as this will only scatter the fire. Material is a OSHA Class II combustible liquid.
Firefighters should wear self-contained breathing apparatus and full protective clothing.

SECTION V. REACTIVITY DATA

This is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.
Incompatible with strong oxidizing agents; heating greatly increases fire hazard.
Thermal -oxidative degradation may yield various hydrocarbons and hydrocarbon derivatives (partial oxidation products), CO_2 and CO and SO_2.

GENERAL ELECTRIC

NO. 470

SECTION VI. HEALTH HAZARD INFORMATION

TLV 5 mg/m^3 oil (mist) (See Sect II)

Inhalation of excessive concentrations of vapor or mist can be irritating to the respiratory passages and can cause the following symptoms: headache, dizziness, nausea, vomiting, and loss of coordination. Prolonged or repeated skin contact may cause irritation of the hair follicles and block the sebaceous glands. This produces a rash of acne pimples and spots, usually on the arms and legs. (Good personal hygiene will prevent this).

Chemical pneumonitis may result when ingestion occurs and oil is aspirated in the lungs.

FIRST AID:

Eye Contact: Flush thoroughly with running water for 15 min. including under eyelids.

Skin Contact: Remove contaminated clothing. Wipe excess oil off with a dry cloth. Wash affected area well with soap and water.

Inhalation: Remove to fresh air. Restore and/or support breathing as required.

Ingestion: Do not induce vomiting.

Seek medical assistance for further treatment, observation and support.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel of leaks or spills. Remove sources of heat or ignition. Provide adequate ventilation. Clean-up personnel to use protection against liquid contact and vapor or mist inhalation. Contain spill by diking. Small spills can be contained by using absorbants, such as rags, straw, polyurethane foam, activated carbon, and sand. Clean up spills promptly to reduce fire or vapor hazards.

DISPOSAL: May be disposed of by a licensed waste disposal company, or by controlled incineration or burial in an approved landfill.

Follow Federal, State and Local regulations. Report large oil spills.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide adequate ventilation where operating conditions (heating or spraying) may create excessive vapors or mists. Use explosion-proof equipment. Provide approved respiratory apparatus for nonroutine or emergency use. Use an approved filter & vapor respirator when vapor/mist concentrations are high. Wear protective rubber gloves and chemical safety glasses where contact with liquid or high mist conc. may occur. Additional suitable protective clothing may be required depending on working conditions. An eye-wash fountain and washing facilities to be readily available near handling and use areas.

Launder soiled or contaminated clothing before reuse (at least weekly laundering of work clothes is recommended).

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, dry, well-ventilated area away from sources of open flame, heat, strong oxidizing agents, and ignition. Protect containers from physical damage. Use non sparking tools and explosion-proof electrical equipment. Prevent static electric sparks.

Avoid prolonged skin contact and breathing of vapors or mists.

No smoking in areas of use. Follow good hygienic practice in the use of this material. Do not wear oil contaminated clothing. Do not put oily rags into pockets. Wash exposed skin areas several times a day with soap and warm water when working with this material. DOT Classification: COMBUSTIBLE LIQUID

DATA SOURCE(S) CODE: 1,6,7,12

APPROVALS: MIS J. M. Nielsen

Industrial Hygiene and Safety 10-12-81

MEDICAL REVIEW: 21 October 1981

GENERAL ELECTRIC

CITGO Petroleum Corporation
P. O. Box 3758
Tulsa, OK 74102

Material Safety Data Sheet

Generic Name: CITGO Gas Engine Oils, SUS 450-2000 Date: January 25, 1996
Generic Code: GE-S1a

THIS GENERIC MSDS COVERS THE FOLLOWING CITGO PRODUCTS

Trade Name	Commodity Code Number
CITGO Pacemaker GEO 315	32-004
CITGO Pacemaker GEO 340	32-003
CITGO Pacemaker GEO 1015	32-210
CITGO Pacemaker GEO 1020	32-212
CITGO Pacemaker GEO 1035	32-032
CITGO Pacemaker GEO 1215	32-037
CITGO Pacemaker GEO 1230	32-035
CITGO Pacemaker GEO 1240	32-036
CITGO Pacemaker GEO Special	32-054
CITGO Pacemaker GEO 715	32-033
CITGO Pacemaker GEO 740	32-034
CITGO Pacemaker GEO 1615	32-047
CITGO Pacemaker GEO 1630	32-045
CITGO Pacemaker GEO 1640	32-046
CITGO Pacemaker GEO 815	32-026
CITGO Pacemaker GEO 830	32-027
CITGO Pacemaker GEO 840	32-028
CITGO Pacemaker GEO 935	32-030

Synonyms: Lubricating Oil
CAS No.: Mixture (Refer to Section 1)
CITGO Index No.: 1954

Technical Contact: (918) 495-5933
Medical Emergency: (918) 495-4700
CHEMTREC Emergency: (800) 424-9300

MATERIAL HAZARD EVALUATION

Health Precautions: Protect exposed skin from repeated or prolonged exposure.

Safety Precautions: Do not store material in open or unmarked containers.

HMIS Rating[1] Health: 0 Flammability: 1 Reactivity: 0

[1] Hazard Rating: least-0, slight-1, moderate-2, high-3, extreme-4.
CITGO assigned these values based upon an evaluation conducted pursuant to NPCA guidelines.

NA-Not Applicable ND-No Data NE-Not Established

1.0 GENERIC COMPOSITION / COMPONENTS

Components	CAS #	%	Hazard Data	
Refined Petroleum Oil(s)	Refer to Section 11	> 70	Oral LD50 (rat): Dermal & Eye:	> 5 g/kg Mild irritant.
Anti-oxidant, Dispersant (May include Zinc Dialkyldithiophosphate)	Mixture	< 20	Dermal Irritation: Eye Irritation:	Mild irritant Irritant
VI Improver	Mixture	< 15	Dermal & Eye:	Mild irritant.
Pour Point Depressant	Mixture	< 1	Dermal & Eye:	Mild irritant.
Antifoam	Mixture	<.0.1	Dermal & Eye:	Mild irritant.

2.0 PHYSICAL DATA

PHYSICAL HAZARD CLASSIFICATION (Per 29 CFR Part 1910.1200)

Combustible	No	Flammable	No	Pyrophoric	No
Compressed Gas	No	Organic Peroxide	No	Reactivity	No
Explosive	No	Oxidizer	No	Stable	Yes

Boiling Point, 760 mmHg, °C (°F):	~361 - 466 (~ 682 - 870)
Specific Gravity (60//60 °F) (H_2O = 1):	~ 0.87 - 0.89
Vapor Density (Air = 1):	> 1
% Volatiles by Volume:	Negligible
Melting Point, °C (°F):	NA
Vapor Pressure, mmHg (25°C):	$< 1 \times 10^{-5}$ to ~ 4×10^{5}
Solubility in H_2O:	Negligible
Evaporation Rate (Butyl Acetate = 1):	< 1
pH of Undiluted Product:	NA
Appearance and Odor:	Light to dark amber liquid, slight petroleum odor.

3.0 FIRE AND EXPLOSION DATA

Flash Point, OC, °C(°F)	213 - 286 (415 - 547)
Flash Point, CC, °C (°F)	170 - 232 (338 - 450)
Fire Point, OC °C(°F)	238 - 314 (460 - 597)
NFPA Rating[2]	Health: 0 Flammability: 1 Reactivity: 0
Flammable Limits (% by volume in air)	Lower: ND Upper: ND
Extinguishing Media	CO_2, dry chemical, foam, water fog
Special Fire Fighting Procedure	None.
Unusual Fire or Explosion Hazard	Water may cause frothing

Use of an asterisk (*) indicates that the material may present chronic health effects.
[2]Hazard Rating: least-0; slight-1; moderate-2; high-3; extreme-4.
CITGO assigned these values based upon an evaluation conducted pursuant to NFPA guidelines.

4.0 REACTIVITY DATA

Stability:	Stable.
Conditions Contributing to Instability:	Excessive heat.
Incompatibility:	Strong oxidants, strong acids, caustics
Hazardous Decomposition Products:	CO_2, (CO under incomplete combustion)
(thermal, unless otherwise specified):	Trace oxides of phosphorus, sulfur and zinc
Conditions Contributing to Hazardous Polymerization:	Hazardous polymerization is not expected to occur.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Procedure if Material is Spilled:

- Remove all ignition sources.
- Isolate the area of the spill and restrict access to persons wearing protective clothing.
- Ventilate area of release, as necessary, to disperse vapors and mists.
- **Small Spills:** Absorb released material with non-combustible absorbent. Place into containers for later disposal. (See Waste Disposal section below.)
- **Large Spills:** Evacuate area in the event of significant spills. Evaluate exposure potential. Potential exposure may require the use of positive pressure self-contained breathing apparatus. Use protective clothing. Contain spill in temporary dikes to avoid product migration and to assist in recovery. Do not allow material to escape into sewers, ground water, drainage ditches or surface waters.
- Administer appropriate first aid.
- Report releases as required to the appropriate Federal, State and local authorities.

Waste Disposal:

- It is the responsibility of the user to determine if the material is a hazardous waste at the time of disposal.
- Determine compliance status with all applicable requirements prior to disposal.
- Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues.

Protective Measures During Repair and Maintenance of Contaminated Equipment:

- Refer to Section 7.0 - Special Protection Information.
- Drain and purge equipment, as necessary, to remove material residues.
- Use impervious gloves constructed of nitrile rubber and protective work clothing if direct contact is anticipated.
- Eliminate heat and ignition sources.
- Wash exposed skin thoroughly with soap and water.
- Remove contaminated clothing. Launder before reuse.
- Keep unnecessary persons from hazard area.

6.0 HEALTH HAZARD DATA

Health Hazard Classification (Per 29 CFR Part 1910.1200)

Carcinogen	No	Corrosive	No
Animal Carcinogen	No	Irritant	No
Suspect Carcinogen	No	Sensitizer	No
Mutagen	No	Teratogen	No
Highly Toxic	No	Target Organ	No
Toxic	No		

Carcinogen or Potential Carcinogen:

Product/Component	CAS No.	Conc. (%)	NTP	IARC	OSHA	Other
CITGO Gas Engine Oils, SUS 450-2000	Mixture	100	No	No	No	No

Toxicity Summary: The approximate lethal oral dose of this material for a 150 lb. human adult is one quart.

Major Route of Entry: Inhalation of incidental mists or vapors and dermal contact with liquid.

Acute Exposure Symptoms:

Inhalation: Over exposure to mists or fumes at elevated temperatures cause drowsiness, dizziness, headache, nausea, lung irritation or chemical pneumonitis.

Dermal Contact: Mild irritant.

Eye Contact: Mild to moderate irritant.

Ingestion: The Saybolt viscosity of this material is 450 to 2000 SUS at 100°F. There is slight risk of aspiration of vomitus into the lungs. Ingestion of large quantities may result in gastrointestinal discomfort, diarrhea, and headache. Small doses may produce irritation and diarrhea.

Injection: Subcutaneous or intramuscular injection may cause irritation, erythema, edema.

Chronic Exposure Symptoms:

Prolonged and/or frequent contact may cause drying, cracking (dermatitis) or folliculitis.

Other Special Effects:

None expected.

HAULING / DISPOSAL CONTRACTORS
SID RICHARDSON GASOLINE CO.
JAL # 4 COMPRESSION FACILITY

Company Name	***Service***
Industrial Services Corporation 2112 E. 48 th. PO Box 2812 Lubbock, TX, 79408 (806) 747-6219	Engine waste oil recycle
Chaparral Services, Inc. PO Drawer 1769 West Texas Avenue Eunice, NM 88231 (505) 397-3044	Brine water
X-L Transportation 113 N. 3 rd. Jal, NM 88252 (505) 395-2010	Field liquids
Sundance Services, Inc. East of Eunice Eunice, NM 88231 (505) 394-2511	Facility washdown water

El Paso
Natural Gas Company

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-541-2600

June 5, 1990

Sid Richardson Carbon & Gasoline Co.
Attn: Mr. E. F. Gunn
201 Main St.
Ft. Worth, TX 76102

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Re: Discharge Plan for the Jal No. 4 Plant.

Dear Mr. Gunn:

Attached please find the drawings referenced in my correspondence dated May 25, 1990. The drawings were inadvertently left out of the mailing package.

Please feel free to call me at 915/541-2323 if you have any questions concerning this matter.

Sincerely,

Philip L. Baca, P.E.
Sr. Compliance Engineer

PLB:dac

c: Mr. William J. LeMay
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504-2088

El Paso
Natural Gas Company

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-541-2600

May 25, 1990

Sid Richardson Carbon & Gasoline Co.
Attn: Mr. E. F. Gunn
201 Main St.
Ft. Worth, TX 76102

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Re: Discharge Plan for the Jal No. 4 Plant.

Dear Mr. Gunn:

The New Mexico Oil Conservation Division (OCD) administers through delegation, all New Mexico Water Quality Control Commission (WQCC) regulations pertaining to surface and groundwater at natural gas processing plants.

Section 3-111 of the WQCC regulations states that with respect to the transfer of a discharge plan, "... the transferor shall notify the transferee in writing of the existence of the discharge plan, and shall deliver or send by certified mail to the director a copy of such written notification, together with a certification or other proof that such notification has in fact been received by the transferee. Upon receipt of such notification, the transferee shall have the duty to inquire into all of the provisions and requirements contained in such discharge plan, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in the divisions's file or files concerning such discharge plan."

Please consider this letter to be written notification of the existence of a discharge plan for the Jal No. 4 Plant. Because only a portion of the plant has been sold to Sid Richardson Carbon & Gasoline Company (see attached illustration and aerial photograph), Sid Richardson Carbon and Gasoline Company will only be responsible for compliance with those areas that apply to the company's ownership. A copy of the discharge plan will be sent to you under separate cover. If you have any questions concerning this matter, please feel free to contact me at 915/541-2323.

Sincerely,

Philip L. Baca, P.E.
Sr. Compliance Engineer

c: Mr. William J. LeMay
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504-2088

PLB:dac

bc: K. E. Beasley
J. C. Bridges
L. J. Meyer
J. Midkiff
D. R. Payne
J. R. Weaver
File: 5004 (W/W)

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☐ Telephone ☒ Personal | Time 11:30AM | Date 4/10/90

Originating Party	Other Parties
Don Payne EPNG compliance Elton F. "Dick" Gunn - Sid Richardson Co.	Dave Boyer OCD (817) 390-8630

Subject: TRANSFER of Jal 3 & 4

Discussion: Met with Payne & Gunn to discuss transfer. SRC will assume ownership of Jal 3 & ~~[illegible]~~ portions of Jal 4 after FERC approval. Operational transfer occurred in March. EPNG will relay ownership of the brine ponds*, storage wells and gasoline plant. I told both to follow the transfer requirements of 3-111 of WQCC Regs. and send plat plan showing ~~[illegible]~~ new ownership boundaries. SRC is unsure of operational plans for Jal 4 - Jal 3 to continue as is.

Conclusions or Agreements: Regarding DP renewal in Dec 1990, both comp. would be sent letters. However, want early submittal of DP modification so can be reviewed & approved prior to changes for operation of Jal 4 by either party.

Distribution:
EPNG Jal 4
Roger Anderson.

Signed: W. F. Boyer

* EPNG may sell brine operation to another party later.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☐ Telephone ☒ Personal | Time 1:30PM | Date 8/15/89

Originating Party	Other Parties
John Bridger, EPNG Don Payne, EPNG	DAVID Boyer, OCD

Subject: Jal #4 Gas Plant - Subsurface investigations

Discussion: EPNG investigated soil and groundwater as part of the plant sale (which did not occur). The soil analyses showed some hydrocarbons (methylnaphthalene) while 2 of 3 monitor wells showed very high chlorides (8500-9700 ppm). El Paso is going to put in more wells to study further (Total of 6 with new ones). OCD suggested ground water be sampled for BTEX, Chlorinated solvents, Cation/Anion + Br, ICAP + AA for Cr, Pb, As, Se, Hg and RCRA pesticides.

Conclusions or Agreements: OCD will send letter on brine pond repair. At present, investigation is being done strictly as a survey by EPNG with OCD being kept informed. As far as we do not see a problem with cuttings being buried onsite, and water injected in approved Class II well onsite.

Distribution: Jal #4 file

Signed: David F Boyer

PLANT JAL 4 Person Taking Sample Steve Winterbottom - Ray Russell

DATE	SAMPLE ID	SAMPLE DESCRIPTION (Soil, Water, Sludge, etc	TEST PARAMETERS	Field Notes ~~SAMPLE LOCATION~~
6/89	4-11.9-15.7-22 4-11.9-15.7-66	Sludge, Pond # 1 - W. end	EP Tox Metals Total " pH BTX TPH PCB phenols	20.5-30' black dry sludge 30'-35' light grey, fine grain, dry sludge(?) 35'-38' black, dry sludge 38'-~~68~~ native soil - Unable to use split spoon below 38'
"	4-11.9-17.5-29 4-11.9-17.5-5[illegible]	pond # 1 east end " "	"	22'-35' dry black sludge 35'-52' native soil
"	4-12.5-14.5-23 4-12.5-19.5-2	pond #19 - native soil " " dry sludge	"	Jerry White, EPA 6, said pond # 19 was only a low spot not pit or pond. 0"-8" soil 8"-12" sludge
"	4-12.4-20.6-12 4-12.4-20.6-52	Pond #2 ~~#3~~	"	11'-16' light yellow-gray with slight sulfur odor 16'-32' Native soil
"	4-10.4-20.7-20	Pond # 3	"	11'-40' dark, dry sludge - hydrocarbon odor 40'-54' grey-black fine grain with hydrocarbon odor & heavily discolored native soil caused by leaching
"	Same as Boring above continued			54'-57' very hard, very black material 58'-64' grey, very hard material, hard rock 64'-67' soft material, dark color, hydrocarbon odor 67'-104' gray+TAN, ~~soft~~ SAND
"	Continued 4-10.4-20.7-118			104-120' ~~black~~ fine grain sand, heavy hydrocarbon odor Stopped at 120' due to hole sanding in.

FIELD NOTES:

According to Jerry White pond # 17+18 were just low spots

From MAP read coordinates right then down.

SAMPLE ID: First number represents plant number. Second two numbers are grid coordinates. Third number is depth.

A: 6/14/89 split spoon # 4-10.4-20.7-118 showed oil stained hard @ 99.6'. Could not determine bottom of hole. Oil was light with distinct

PLANT JAL 4 Person Taking Sample Ray Russell + Steve Winterbottom

DATE	SAMPLE ID	SAMPLE DESCRIPTION (Soil, Water, Sludge, etc	TEST PARAMETERS	Field Notes ~~SAMPLE LOCATION~~
5/3/89	4-8.6-21.1-13	Sludge, Pond #3	EP Tox Metals Total " #4 BTX TPH PCB Phenols	0-8', backfill 8-28' black, wet sludge 28'-60' grey-black dry material (native soil?) lighter grey & finer texture w/depth
	Continued 4-8.6-21.1-100 ☆	"	"	60'-65' hard rock + ~~grey~~, hydrocarbon smell 65'-100' grey & red-brown grey uniform, fine grain sand like material heavy hydrocarbon odor
			"	
5/3	4-9.8-23.2-20 4-9.8-23.2-40 4-9.8-23.2-55	Pond #8	"	0'-20' various tan & red tan soils, phenolic? odor at 20' 20'-~~55~~, same as above ~~55~~-56' hard tan rock + sand (sample taken from drill cuttings at top of hole) phenolic or amine like odor.
5/3	4-9.3-24.2-6	Pond #8	"	0'-4' native or backfill 4-~~20~~ 20' light colored sludge w/ phenolic or amine odor? or native soil
5/3	4-8.9-27.6-20 4-8.9-27.6-40	Pond #7	"	0'-2' native 2'-40' native w/ phenolic or amine like odor
5/3	4-6.7-21.5-11 4-6.7-21.5-39	Pond #4	"	0-~~10~~ fine texture native - slight sulfur odor 10'-17' black, dry, hydrocarbon odor 17'-29' tan, native, phenol or amine like odor fine sand 29'-38' lighter, caliche 38-40' very fine gray-tan sand - very slight odor

FIELD NOTES: ☆ 5/4/89 Hole # 4-8.6-21.1-100 showed about 6" of water at bottom, residue on tape had distinct odor and oily to touch.

Southwest Laboratory of Oklahoma

1700 W. Albany, Suite C / Broken Arrow, OK 74012 / (918) 251-2858

June 16, 1989

John C. Bridges
EL PASO NATURAL GAS COMPANY
Post Office Box 1492
El Paso, Texas 79978

Dear Mr. Bridges:

Enclosed are the analytical results for your sample received in our laboratory on May 12, 1989.

It is SOUTHWEST LABORATORY OF OKLAHOMA's policy to try and insure the accuracy of all data generated by this lab. Due to a discrepancy between the split sample results of this data, it was withheld until the problem was resolved. A copy of our letter to TEXACO is included for your review. We hope this delay has not been too much of an inconvenience.

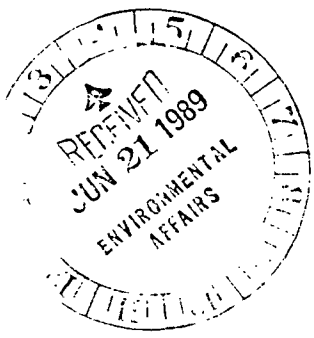
If, in your review, you should have any questions or require additional information, please call.

Sincerely,

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Robert W. Harris

Robert W. Harris
Laboratory Manager



SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: EL PASO NATURAL GAS COMPANY
POST OFFICE BOX 1492
EL PASO, TEXAS 79978
ATTN: JOHN C. BRIDGES

REPORT: G1489

DATE: 05-31-89

SAMPLE MATRIX: SOIL
SWLO # 26429
DATE SUBMITTED: 05-12-89
SAMPLE ID: 4-10.4-20.7-118-B

PARAMETER	DET. LIMIT	UNIT	RESULTS	DATE ANALYZED	METHOD REFERENCE
TOTAL PETROLEUM HYDROCARBONS	5.0	mg/Kg	4,860	05-20-89	SM 503E
TOTAL PHENOLICS	1.0	mg/Kg	2.0	05-25-89	SM 510C
pH (@ 25° C)	NA	S.U.	10.4	05-15-89	SM 423
EP TOXICITY METALS					
ARSENIC	0.035	mg/L	ND	05-21-89	SW 6010
BARIUM	0.03	mg/L	0.15	05-21-89	SW 6010
CADMIUM	0.005	mg/L	ND	05-21-89	SW 6010
CHROMIUM	0.005	mg/L	ND	05-21-89	SW 6010
LEAD	0.02	mg/L	ND	05-21-89	SW 6010
MERCURY	0.05	mg/L	ND	05-21-89	SW 6010
SELENIUM	0.03	mg/L	ND	05-21-89	SW 6010
SILVER	0.01	mg/L	ND	05-21-89	SW 6010
TOTAL METALS					
ARSENIC	7.0	mg/Kg	ND	05-19-89	SW 6010
BARIUM	4.0	mg/Kg	8.0	05-19-89	SW 6010
CADMIUM	1.0	mg/Kg	ND	05-19-89	SW 6010
CHROMIUM	1.0	mg/Kg	1.5	05-19-89	SW 6010
LEAD	4.0	mg/Kg	ND	05-19-89	SW 6010
MERCURY	0.1	mg/Kg	ND	05-23-89	SW 7471
SELENIUM	6.0	mg/Kg	ND	05-19-89	SW 6010
SILVER	2.0	mg/Kg	ND	05-19-89	SW 6010

ND = NONE DETECTED
SM = STANDARD METHODS, 16TH EDITION
SW = EPA METHOD REFERENCES, "SW846"

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: EL PASO NATURAL GAS COMPANY
POST OFFICE BOX 1492
EL PASO, TEXAS 79978
ATTN: JOHN C. BRIDGES

REPORT: G1489.2

DATE: 05-31-89

SAMPLE MATRIX: SOIL
SWLO # 26429
DATE SUBMITTED: 05-12-89
DATE ANALYZED : 05-15-89
METHOD REFERENCE: SW846-8240, EPA METHODOLOGY
SAMPLE ID: 4-10.4-20.7-118-B

RESULTS REPORTED IN ug/Kg OR Parts Per Billion (PPB)

VOLATILES	DET. LIMIT	RESULTS	VOLATILES	DET. LIMIT	RESULTS
CHLOROMETHANE	10	ND	1,1,2,2-TETRACHLOROETHANE	5	ND
BROMOMETHANE	10	ND	1,2-DICHLOROPROPANE	5	ND
VINYL CHLORIDE	10	ND	TRANS-1,3-DICHLOROPROPENE	5	ND
CHLOROETHANE	10	ND	TRICHLOROETHENE	5	ND
METHYLENE CHLORIDE	5	21 B	DIBROMOCHLOROMETHANE	5	ND
ACETONE	10	50	1,1,2-TRICHLOROETHANE	5	ND
CARBON DISULFIDE	5	ND	BENZENE	5	ND
1,1-DICHLOROETHENE	5	ND	CIS-1,3-DICHLOROPROPENE	5	ND
1,1-DICHLOROETHANE	5	ND	2-CHLOROETHYLVINYLETHER	10	ND
TRANS-1,2-DICHLOROETHENE	5	ND	BROMOFORM	5	ND
CHLOROFORM	5	2 JB	2-HEXANONE	10	ND
1,2-DICHLOROETHANE	5	ND	4-METHYL-2-PENTANONE	10	ND
2-BUTANONE	10	ND	TETRACHLOROETHENE	5	ND
1,1,1-TRICHLOROETHANE	5	ND	TOLUENE	5	5
CARBON TETRACHLORIDE	5	ND	CHLOROBENZENE	5	ND
VINYL ACETATE	10	ND	ETHYLBENZENE	5	2 J
BROMODICHLOROMETHANE	5	ND	STYRENE	5	ND
			TOTAL XYLENES	5	8

QA/QC SURROGATE RECOVERIES

TOLUENE-d8 (81-117) 109% BROMOFLUOROBENZENE (74-121) 83% 1,2-DICHLOROETHANE (70-121) 102%

ND = NONE DETECTED
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

EL PASO NATURAL GAS COMPANY
POST OFFICE BOX 1492
EL PASO, TEXAS 79978
ATTN: JOHN C. BRIDGES

REPORT: G1489.3

DATE: 05-31-89

SAMPLE MATRIX: SOIL
SWLO # 26429
METHOD REF.: SW846-8270, EPA METHODOLOGY
SAMPLE ID: 4-10.4-20.7-118-B

DATE SUBMITTED: 05-12-89
DATE EXTRACTED: 05-12-89
DATE ANALYZED : 05-18-89

SEMIVOLATILES	DET. LIMIT	RESULTS (ug/Kg)		SEMIVOLATILES	DET. LIMIT	RESULTS (ug/Kg)	
N-NITROSODIMETHYLAMINE	3300	ND		ACENAPHTHENE	3300	ND	
PHENOL	3300	ND		2,4-DINITROPHENOL	16000	ND	
ANILINE	3300	ND		4-NITROPHENOL	16000	ND	
BIS(2-CHLOROETHYL)ETHER	3300	ND		DIBENZOFURAN	3300	930	J
2-CHLOROPHENOL	3300	ND		2,4-DINITROTOLUENE	3300	ND	
1,3-DICHLOROBENZENE	3300	ND		2,6-DINITROTOLUENE	3300	ND	
1,4-DICHLOROBENZENE	3300	ND		DIETHYLPHTHALATE	3300	ND	
BENZYL ALCOHOL	3300	ND		4-CHLOROPHENYL-PHENYLETHER	3300	ND	
1,2-DICHLOROBENZENE	3300	ND		FLUORENE	3300	ND	
2-METHYLPHENOL	3300	ND		4-NITROANILINE	16000	ND	
BIS(2-CHLOROISOPROPYL)ETHER	3300	ND		4,6-DINITRO 2-METHYLPHENOL	16000	ND	
4-METHYLPHENOL	3300	ND		N-NITROSODIPHENYLAMINE(1)	3300	ND	
N-NITROSO-DI-n-PROPYLAMINE	3300	ND		4-BROMOPHENYL-PHENYLETHER	3300	ND	
HEXACHLOROETHANE	3300	ND		HEXACHLOROBENZENE	3300	ND	
NITROBENZENE	3300	ND		PENTACHLOROPHENOL	3300	ND	
ISOPHORONE	3300	ND		PHENANTHRENE	3300	ND	
2-NITROPHENOL	3300	ND		ANTHRACENE	3300	ND	
2,4-DIMETHYLPHENOL	3300	ND		DI-N-BUTYLPHTHALATE	3300	ND	
BENZOIC ACID	16000	ND		FLUORANTHENE	3300	ND	
BIS(2-CHLOROETHOXY)METHANE	3300	ND		BENZIDINE	26000	ND	
2,4-DICHLOROPHENOL	3300	ND		PYRENE	3300	ND	
1,2,4-TRICHLOROBENZENE	3300	ND		BUTYLBENZYLPHTHALATE	3300	ND	
NAPHTHALENE	3300	ND		3,3-DICHLOROBENZIDINE	6600	ND	
4-CHLOROANILINE	3300	ND		BENZO(A)ANTHRACENE	3300	ND	
HEXACHLOROBUTADIENE	3300	ND		BIS(2-ETHYLHEXYL)PHTHALATE	3300	ND	
4-CHLORO-3-METHYLPHENOL	3300	ND		CHRYSENE	3300	ND	
2-METHYLNAPHTHALENE	3300	2178	J	DI-N-OCTYL PHTHALATE	3300	ND	
HEXACHLOROCYCLOPENTADIENE	3300	ND		BENZO(B)FLUORANTHENE	3300	ND	
2,4,6-TRICHLOROPHENOL	3300	ND		BENZO(K)FLUORANTHENE	3300	ND	
2,4,5-TRICHLOROPHENOL	16000	ND		BENZO(A)PYRENE	3300	ND	
2-CHLORONAPHTHALENE	3300	ND		INDENO(1,2,3-CD)PYRENE	3300	ND	
2-NITROANILINE	16000	ND		DIBENZ(A,H)ANTHRACENE	3300	ND	
DIMETHYLPHTHALATE	3300	ND		BENZO(G,H,I)PERYLENE	3300	ND	
ACENAPHTHYLENE	3300	ND					
3-NITROANILINE	16000	ND					

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5	(23-120)	53%	2-FLUOROBIPHENYL	(30-115)	97%	TERPHENYL-d14	(18-137) 102%
PHENOL-d5	(24-113)	37%	2-FLUOROPHENOL	(25-121)	72%	2,4,6-TRIBROMOPHENOL	(19-122) 82%

ND Analyte was not detected
J Estimated quantitation: Concentration below limit of quantitation
B Analyte detected in blank as well as sample
* Surrogate recovery outside of QC limits

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: EL PASO NATURAL GAS COMPANY
POST OFFICE BOX 1492
EL PASO, TEXAS 79978
ATTN: JOHN C. BRIDGES

REPORT: G1489.4

DATE: 05-31-89

SAMPLE MATRIX: SOIL
SWLO # 26429
DATE SUBMITTED: 05-12-89
DATE EXTRACTED: 05-12-89
DATE ANALYZED : 05-18-89
METHOD REFERENCE: SW846-8080, EPA METHODOLOGY
SAMPLE ID: 4-10.4-20.7-118-B

RESULTS REPORTED IN ug/Kg OR Parts Per Billion (PPB)

PCB'S	DETECTION LIMIT	RESULTS
AROCHLOR 1016	800	ND
AROCHLOR 1221	800	ND
AROCHLOR 1232	800	ND
AROCHLOR 1242	800	ND
AROCHLOR 1248	800	ND
AROCHLOR 1254	1600	ND
AROCHLOR 1260	1600	ND

QA/QC SURROGATE RECOVERY

DIBUTYLCHLORENDATE 103% (ADVISORY QC LIMITS: 24%-150%)

ND = NONE DETECTED
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

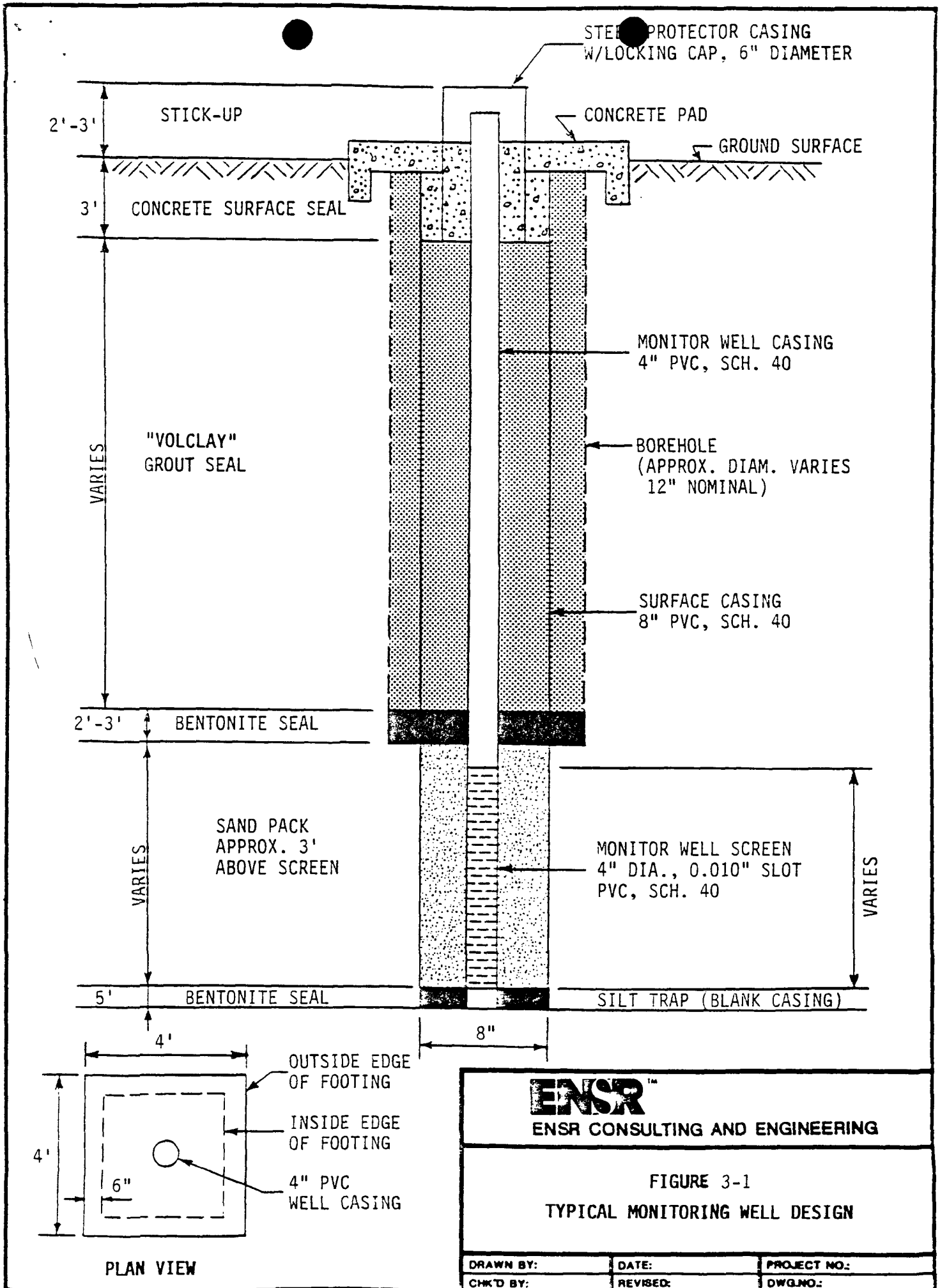


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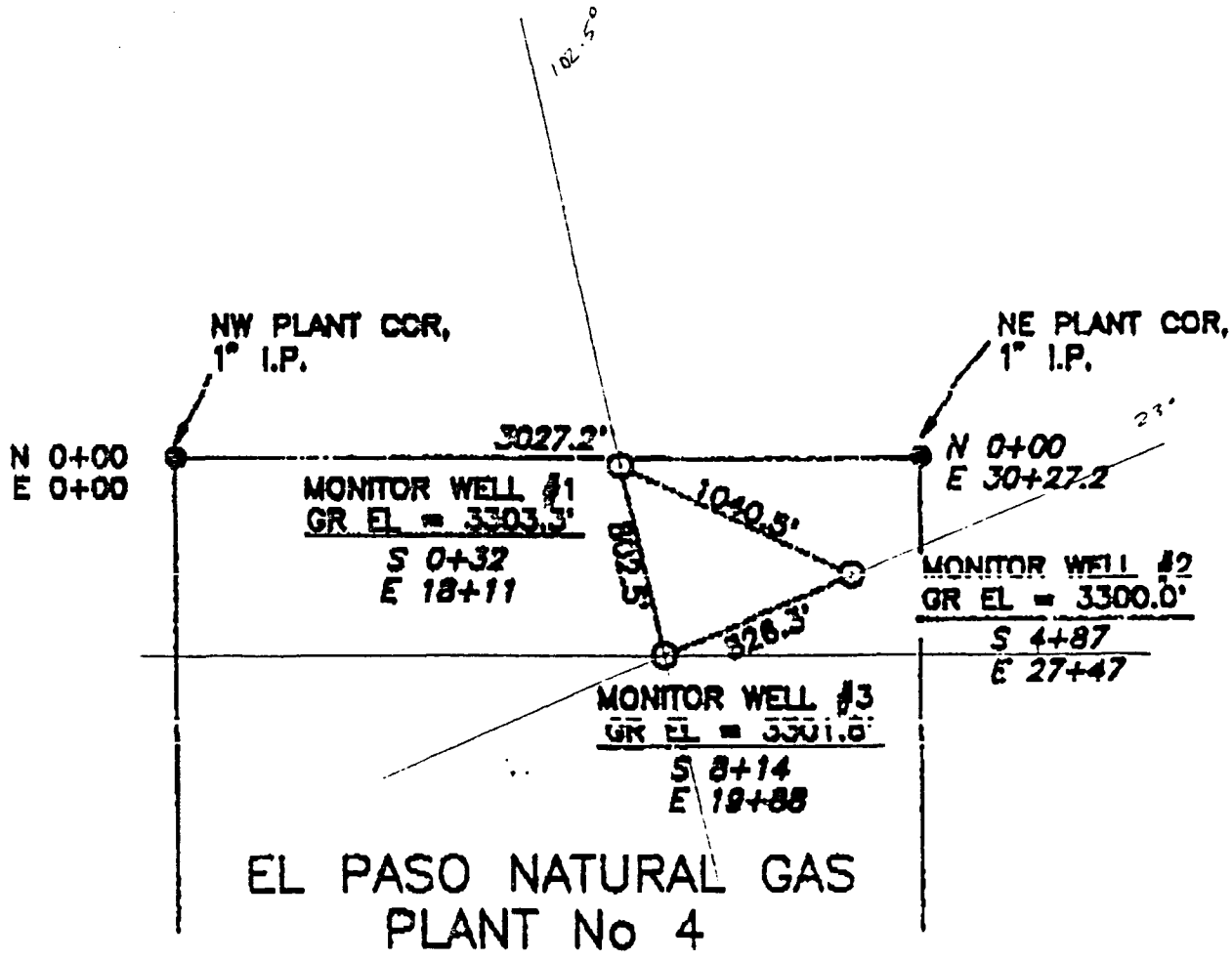
FIGURE 3-1
TYPICAL MONITORING WELL DESIGN

DRAWN BY:	DATE:	PROJECT NO.:
CHK'D BY:	REVISED:	DWG.NO.:

SECTION 31, TOWNSHIP 23 SOUTH, RANGE 37 EAS
LEA COUNTY,



SOURCE: JOHN WEST ENGINEERING

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FIGURE 3-2
MONITOR WELL ELEVATIONS

DRAWN BY:	DATE:	PROJECT NO.:
CHK'D BY:	REVISED:	DWG.NO.:

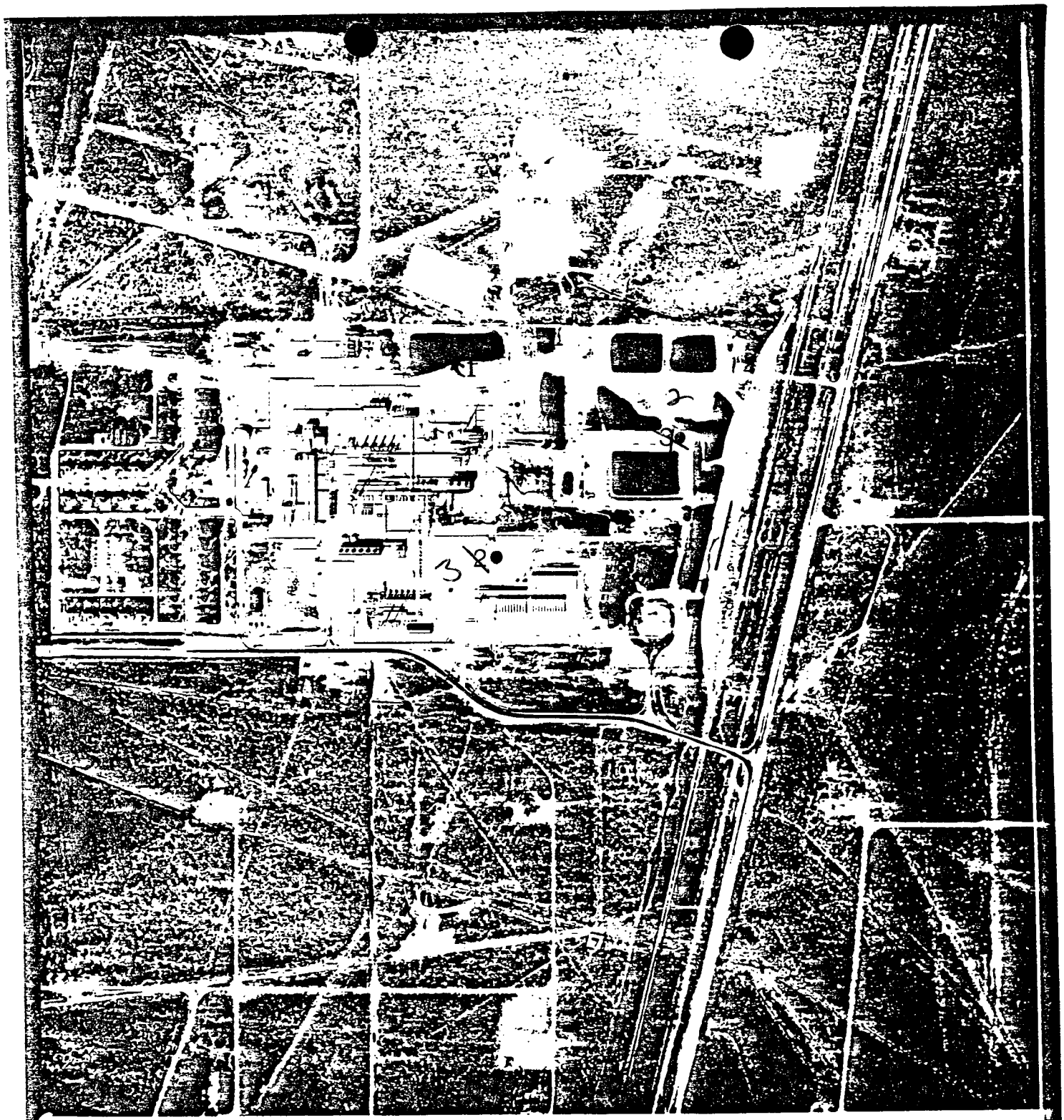

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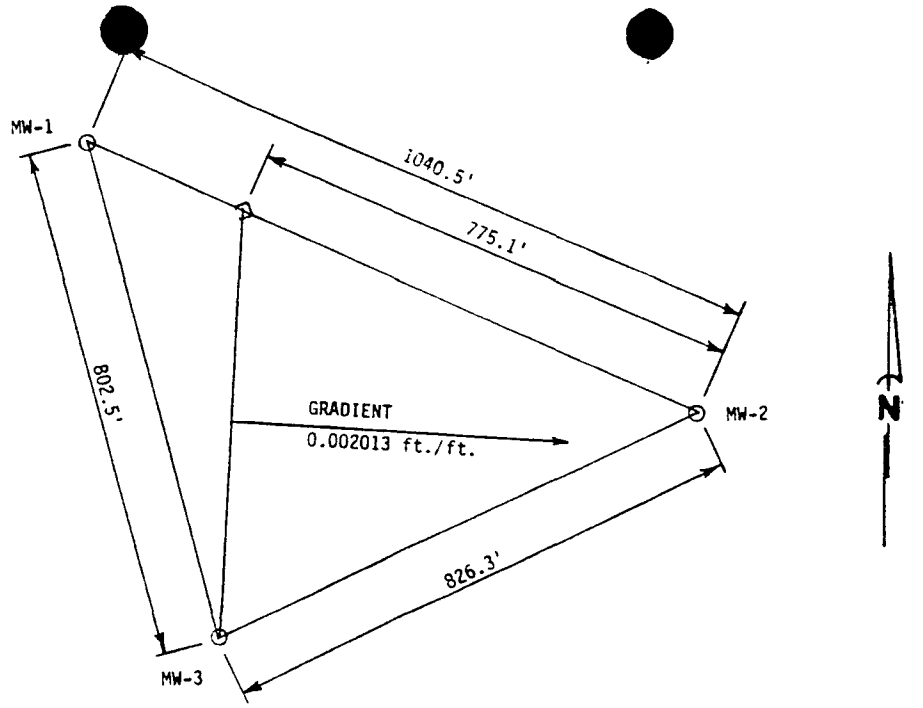
FIGURE 3-3

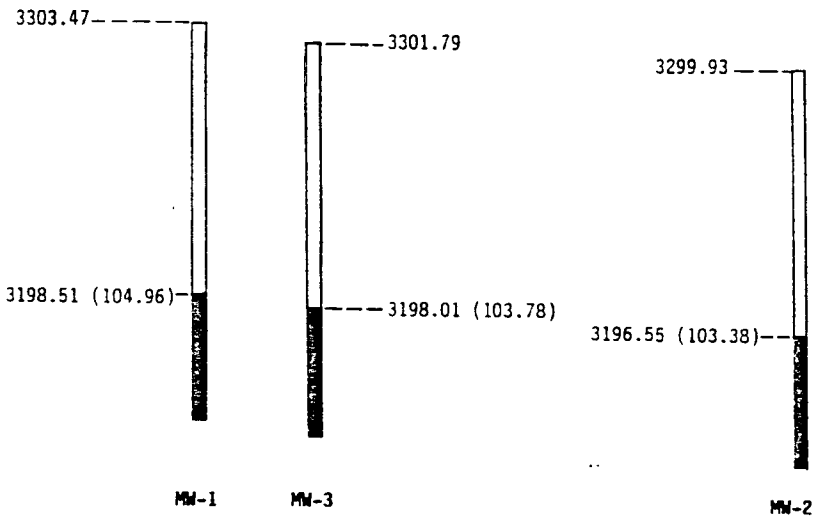
APPROXIMATE WELL LOCATIONS

DRAWN BY:	DATE:	PROJECT NO.:
CHK'D BY:	REVISED:	DWG.NO.:



PLAN

SCALE: 1' = 300'



ELEVATION

NOTE: Water Level Elevations Measured On 7/8/89.

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FIGURE 3-4
WELL CONFIGURATION
EPNG, JAL NUMBER 4

DRAWN BY:	DATE:	PROJECT NO.:
CHK'D BY:	REVISED:	DWG.NO.:

TABLE 3-1

EL PASO NATURAL GAS
JAL NO. 4
DATA ANALYSIS FROM MONITORING WELLS

SAMPLE #	EP-01-A	EP-02-A	REPLICATE EP-02-B	EP-03-A
CHLORIDES	9700PPM	8900PPM	8500PPM	285PPM
ACETONE	24	81	80	23
CARBON DISULFIDE	BDL	22	24	BDL
2-BUTANONE (MEK)	BDL	29	30	BDL
BIS (2 ETHYLHEXYL) PHTHALATES	BDL	BDL	BDL	22
DI-N-BUYTL PHTHALATES	BDL	BDL	5.9	BDL
2,4 DIMETHYL PHENOL	16	7.5J	9.5J	BDL
METHYL NAPHTHALENE	6.0J	BDL	BDL	BDL
PENTACHLOROPHENOL	BDL	BDL	7.6	BDL
PCB	ND	ND	ND	ND
TOC		5ppm		

ALL FIGURES IN UG/L OR PPB

J = ESTIMATES

BDL = BELOW DETECTION LIMITS