GW - 80

PERMITS, RENEWALS, & MODS Application

ENERGY TRANSFER PARTNERS

Transwestern Pipeline Company

June 14, 2011

Mr. Leonard Lowe
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87504

Re: Submittal of Discharge Plan Renewal Application, Transwestern Pipeline Company, Thoreau Compressor Station, McKinley County New Mexico, Discharge Plan GW-080

Dear Mr. Lowe:

By this letter, Transwestern Pipeline Company is submitting the attached discharge renewal application for the Thoreau Compressor Station.

Should you require any additional information concerning this renewal, contact the undersigned at our Roswell Technical Operations office at (575) 625-8022.

Sincerely,

Larry Campbell

Larry Campbell
Sr. Environmental Specialist

xc: envisions file no. 205.1.20
Laguna Team
file

6381 N. Main
Roswell, NM 88201

Transwestern Pipeline Company
Thoreau Compressor Station (GW-080)
Discharge Plan Renewal Application

1. Type of Operation

The facility is a mainline natural gas pipeline compressor station with the following site rated horsepower: three (3) 4500 hp Cooper Bessemer internal combustion engines and one (1) 333 hp Ingersoll Rand generator.

2. Name of Operator

The facility owner and operator is Transwestern Pipeline Company, 6381 North Main Street, Roswell, New Mexico, 88201. Facility contact is Larry Campbell. Contact phone number is (575) 625-8022.

3. Location of the Discharge Plan Facility

The facility is located in the SE /4 of section 20, T.14N, R.13W in McKinley County. GPS coordinates are N35 25 31 and W108 14 09. A USGS 7.5 minute map showing the location of the facility accompanies this submittal in **Attachment A**. The facility plot plan is presented in **Attachment B**.

4. Landowner

Refer to item no. 2 above.

5. Facility Description

A facility map and plot plan accompanies this submittal.

6. Materials Stored or Used at the Facility

The following chemicals and volumes represent the bulk storage capacities of the tanks at the facility. This may or may not represent the actual volume of liquids stored at the facilty.

Chemical	Solid/liquid	Container type	Volume	Location
Lubrication oil	Liquid	Tank	13,443 gal.	central area of yard
Ethylene glycol	Liquid	Tanks	2,705 gal	central area of yard
Condensate	Liquid	Tanks	23,762 gal	east area of yard
Oily wastewater	Liquid	Tank	19,530 gal	west area of yard

Degreasers/solvents	Liquid	Drum	15 gal	drum storage area
Used oil	Liquid	Tank	200 gal	south area of yard
Soap	Liquid	Drum	110 gal	drum storage area
Methanol	Liquid			

7A.Sources and Quantities of Effluent and Waste Solids Generated at the Facility

Source	**Mo. Generation Rate**	**Material**
WASTES		
Scrubbers/mist extractor	5 gal	Pipeline condensate
Used oil filters	50 lb	Used filters
Pipeline sludge	1 lb	Waste sludge
Oily wastewater	50 gal	Oily wastewater
Sewage wastes	N/A	Onsite septic system
Office and domestic wastes	100 lb	domestic solid waste
CHEMICALS		
Ethylene glycol	5 gal	Ethylene glycol
Solvent/degreasers	5 gal	Spent degreaser
Soap	2 gal	Spent soap
Lubrication oil	5 gal	Used oil

7B.(1-2) Quality Characteristics

Presented in **Attachment C** are the analytical reports for the waste streams which are at the facility. Due to the infrequent operation of this facility, the analytical reports may be historic in nature. In **Attachment D** find the MSDS for the above listed chemicals.

(3). Due to the infrequent operation of this facility, this compressor station generates extremely small quantities of the above listed used or spent materials. In addition, all chemicals and or waste materials are stored in segregated containers (drums and or tanks) with concrete secondary containments.

(4). Transwestern does not use chemicals that are defined as toxic or will generate a hazardous waste after use. In the Transwestern pipeline system, the pipeline liquids and pipeline sludge materials removed from the pipeline, may have the potential to contain very small concentrations of PCBs, arsenic, benzene and flashpoint. The concentrations and generation rates of these contaminants are very low (less than 20 ppm) and approximate less than 100 gallons per year,

respectively. Analytical testing of this waste stream is conducted each time these materials are removed from the pipeline and are managed and disposed based upon the analytical testing.

(5). Because Transwestern collects all waste materials in dedicated drums and or tanks, grab samples are the collection methodology Transwestern employs to characterize and dispose of the liquids and solids that are generated.

(6). Transwestern employs the grab method of sample collection, and assumes and understands that the normal variation of this sample methodology can be expected.

7C. All waste streams at this facility are segregated and contents are stored in dedicated drums and tanks.

8A.Description of Current Liquid and solid Waste Collection /Storage/Disposal Procedures

(B1). All new and used liquid chemicals and wastes are directed through underground piping and stored in dedicated above ground tanks. Pipeline liquids generated at pigging locations are collected in below grade sumps and transferred via underground piping to a dedicated above ground tank. All solid wastes are stored in above ground dedicated drums or containers. The transfer of liquids in the underground lines are completed via pressurized natural gas or air.

(B2). All drum and tanks at the facility which store chemicals or wastes are contained in impermeable concrete secondary containment.

(B3). For the current discharge plan issued in January 2007, testing of underground process and drainlines at the facility will be completed in 2011. The drainline testing methodology to be employed will be submitted to the OCD prior to completion of this testing requirement. Transwestern will employ two separate and different testing methodologies to test the low pressure and the high pressure drainlines. The methodologies to be employed for this testing have been approved by the OCD at other Transwestern facilities which are covered under OCD Discharge plans.

Transwestern has developed a schematic/plan presenting all underground drainlines and process lines to be tested as required by GW-080. In addition, an annual sump inspection is completed at the facility to determine sump integrity.

(C)1. Transwestern does not dispose of any industrial wastes onsite into a surface impoundment, leachfield, injection well, drying bed, pit or landfarm.

(C)2. Transwestern Pipeline Company incorporates the service of Gandy Corporation in Lovington, NM for all offsite non hazardous waste recycling and

disposal activities. All waste materials are transported via truck to the disposal/recycling facility in Lovington. The facility address is:

Gandy Corporation
P.O. Box 2140
Lovington, NM 88260

The Gandy Corporation disposal landfill and landfarm has all current permits and approvals required by the NMOCD to accept oil and gas wastes generated at the Thoreau Compressor Station.

9.(A-B). Non applicable.

10. Inspection, Maintenance and Reporting

10(A-B). Not applicable. Transwestern does not discharge industrial wastes into any surface impoundments or units that have leak detection systems or ground water monitoring. Domestic sewage wastes are directed to an onsite leachfield. There are two concrete impermeable evaporation ponds located southeast of the facility leachfield which are used to collect any sewage overflow from the leach field in the event the leach field capacity is exceeded. There has not been effluent received into the evaporation ponds in several years.

10(C). The direction of flow of surface water at the facility is south. The process equipment areas and tank and drum storage areas are located and positioned over the facility property. All bulk storage tanks are in concrete secondary containment. Concrete curbing, berms and asphalt driveways have been constructed at the facility to direct and contain surface runoff from precipitation events. During these events, water flows to the west and is intersected by the asphalt roads and curbs and prevented from traveling offsite. This storm water is then allowed to evaporate.

11. Spill/Leak Prevention and Reporting Procedures (Contingency Plans)

An SPCC (Spill Prevention Control and Countermeasure Plan) has been prepared for the Thoreau Compressor Station as the facility stores more than 1320 gallons of oil or liquid hydrocarbons. The plan has been activated and annual employee training is completed as required by this Plan. The Plan addresses notification, spill response and contingency's to be employed in the event a spill or release has occurred. The facility has spill cleanup kits at various locations around the facility to immediately respond to a spill or release of a hydrocarbons or chemical substances.

11.(A). In addition to compliance with the SPCC plan, Transwestern is also committed to the requirements of OCD Rule 116 and WQCC 1203 for notification reporting and mitigation of spills and releases. Refer to **Attachment E** for Transwestern's approach to compliance with Rule 116 and WQCC 120.

11(B). Transwestern has no below grade tanks at this facility. As an internal requirement, Transwestern conducts monthly visual tank and containment inspections for all tanks and containments that are storing chemical or hydrocarbon liquids at the facility. This applies to tanks other than domestic water. Should a leak or release occur to the area outside of the containment (failure of the SPCC plan), immediate measures are taken to stop the release and implement cleanup and rememdiation of the impacted soils. Liquids released into the containment area are transferred back into the original tank or transferred into a waste tank and properly disposed.

For the integrity of the underground piping, Transwestern conducts the five (5) year drainline testing program for all underground process and drain lines as required by the NMOCD in GW-080.

In the event chemical or hydrocarbon liquids contact the soil, Transwestern immediately excavates the contaminated soil and performs the appropriate analytical testing to determine disposition. The contamination soil is excavated and confirmation sampling/excavation is continued until the contamination in the soil has been removed. Transwestern employs the 1993 NMOCD document entitled "GUIDLEINES FOR REMEDIATION OF LEAKS, SPILLS AND RELEASES" (**Attachment E**) for sampling and cleanup guidelines of all chemical and hydrocarbon spills and releases which have occurred on Transwestern property. The contaminated soil is then taken to the Gandy Corporation commercial landfill in Tatum, NM for proper disposition.

11(C). Not applicable. Transwestern does not use an injection well for onsite effluent disposal.

12. Site characteristics

12(A)(1). There are no naturally occurring or intermittent small arroyos or drainage systems that occur on the facility. Several small and minor naturally occurring channels dissect area adjacent to the site which carry intermittent surface water events seasonally from the facility. Three (3) domestic wells are located onsite at the facility and provide domestic water to the facility and to the local residents. Current (5/2011) groundwater depth in these water wells is at approximately 310 feet.

According to a 1989 well inventory survey, 86 water wells exist within an approximate ten (10) miles radius of the facility and are screened in the Sonsela Aquifer including the three (3) water wells on the Transwestern property (see below for Regional groundwater description).

12(A)(2). The groundwater aquifer depth occurs at approximately 375 feet. Chemical characteristics of this groundwater is 21 mg/l chlorides and 380 mg/l

TDS. The facility receives its drinking water from 3 onsite water wells. Refer to **Attachment F** for the last analytical report from the water wells.

The regional groundwater flow direction is to the south. The principal water bearing aquifers are the Sonsela Sanstone, the Upper Chinle formation (650 ft) and the San Andres-Glorieta Aquifer (1200 ft). The deeper San Andres is the principal water bearing aquifer of the region supplying water for irrigation, industrial and domestic use.

A shallow perched water table is present at approximately 50 ft which flows in a southwesterly direction. Transwestern is currently performing a remediation and groundwater sampling program in this shallow aquifer to remove contaminants which have entered this aquifer from historic activities at the facility. This remediation program has been approved by the NMOCD.

12(A)(3). The soil types in and around the immediate vicinity of the facility are classified as fine loamy Aridic Haplastalfs of which shale and sandstone are the primary parent materials. These soils are deep (greater than 60 inches) and rated as having moderately high water holding capacities and moderately slow infiltration rates.

12(A)(4). There is no record of flooding on the 40 acres of this property. Flood protection is achieved by the use of curbs and berms at the facility and the natural dip in gradient to the south. There is approximately 40 feet of relief from the north property line to the south. There are no bodies of water located within the vicinity of the facility.

13. Other Compliance Information

The Thoreau Compressor Station uses the documents presented in **Attachments D through F** and the Corporate Environmental Policy and Guidelines to demonstrate and ensure compliance with all applicable rules administrated by the NMOCD. The Thoreau Compressor Station is committed to complying with NMOCD Rule 116 and WQCC Section 1203 for reporting and remediating any spills, leaks and releases which might occur at the facility.

Upon facility closure, Rule 116 and WQCC Section 1203 will be employed to ensure that the abandonment and closure of the facility will not violate WQCC standards of Section 3103. Financial assurance is maintained by the construction bond Transwestern submitted to the State of New Mexico prior to facility construction in 1959. This bond money is designed to be used as needed for post closure activities related to site restoration which includes soil contamination sampling and excavation and post closure maintenance and monitoring.

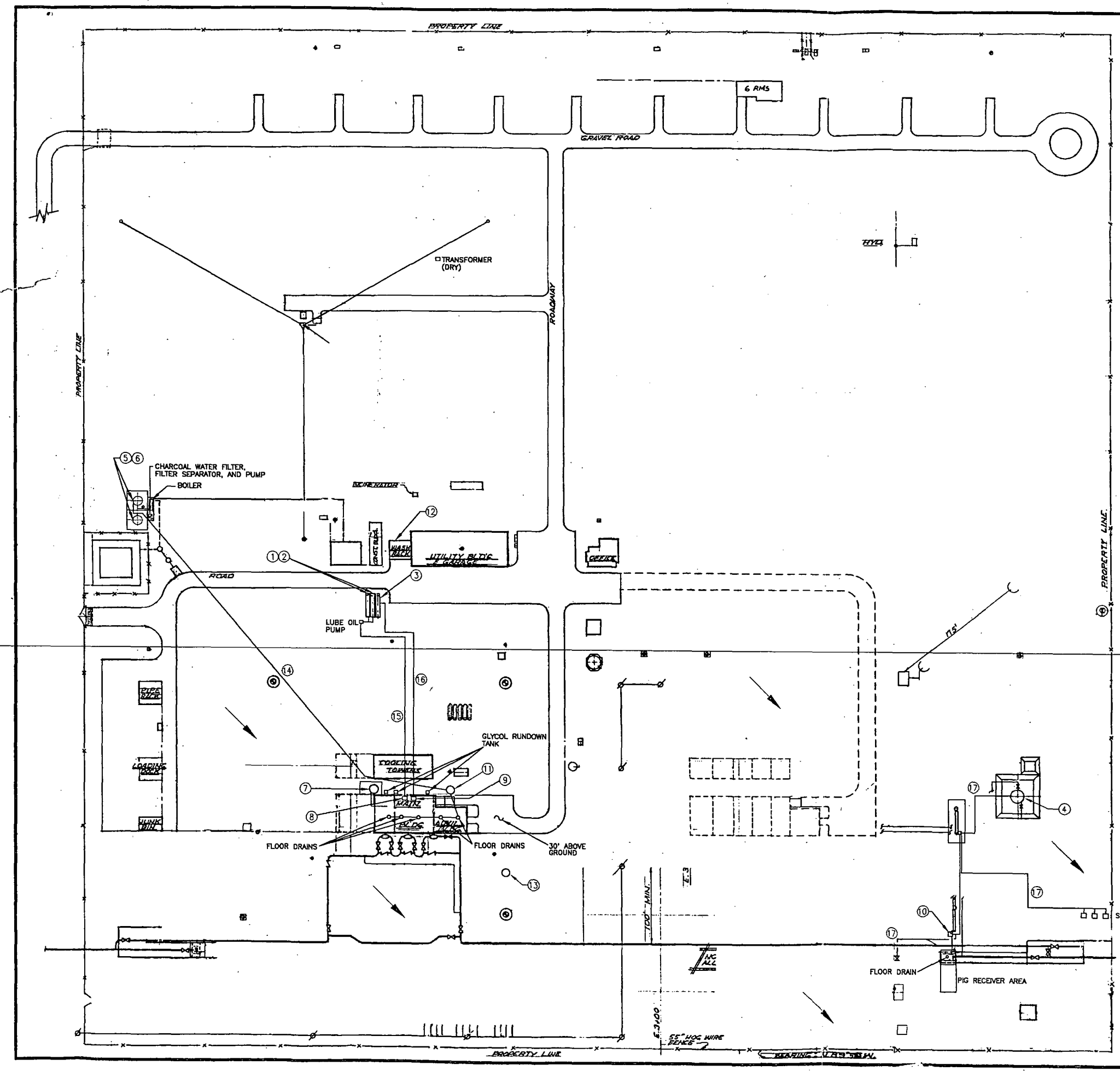
Because it is impossible to predict and develop a future plan which will address all contingencies and requirements related to site closure at a future date, at such time

that the facility ceases operation, Transwestern will present to the NMOCD a post closure plan which addresses site abandonment and soil cleanup activities. This plan will include maintenance and monitoring of the site to ensure that all Rule 116 and Section 1203 standards have been achieved or that all future Rules and Sections to be implemented will be adhered to and followed.

ATTACHMENT A
(7.5 Minute USGS Map of Facility)

Thoreau, NM,FC. Scale: 1" = 0.379MI 610MT 2,000FT, 1 MI = 2.640" , 1 cm = 240MM

ATTACHMENT B
(Plot Plan of Facility)



BULK STORAGE CONTAINERS

1. LUBE OIL TANK NO. 1
2. LUBE OIL TANK NO. 2
3. GEAR OIL/GLYCOL TANK
4. PIPELINE LIQUIDS TANK
5. OILY WASTE WATER TANK (NORTH)
6. OILY WASTE WATER TANK (SOUTH)
7. USED OIL TANK
8. ENGINE OIL DAY TANK
9. GEAR OIL DAY TANK
10. RECEIVER SUMP
11. ENGINE ROOM SUMP
12. DRUM STORAGE AREA

OIL-FILLED EQUIPMENT

13. TRANSFORMER

OIL PIPING

14. OILY WATER TANK
15. LUBE OIL
16. GEAR OIL
17. CONDENSATE

DRAINAGE

TRANSWESTERN PIPELINE COMPANY

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC)

STATION # 5 THOREAU

SCALE 1" = 60'	DATE		
DRAWN Ken Kimmons	8-6-79	JOB NO.	DRAWING NO.
CHECKED DBS	8-10-79		5-85-000
APPROVED			
APPROVED ENG.			

ATTACHMENT C

(Analytical Reports of Waste Streams at Facility)

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

Wednesday, May 21, 2008

Charlie Allen
Transwestern Pipeline Co.
P.O. Box 1019
Thoreau, NM 87323

TEL: (505) 862-7443
FAX (505) 862-7826

RE: STA 5 Mist Extractor

Order No.: 0804362

Dear Charlie Allen:

Hall Environmental Analysis Laboratory, Inc. received 1 sample(s) on 4/30/2008 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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

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

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

NM Lab # NM9425
AZ license # AZ0682
ORELAP Lab # NM100001

ACCREDITED IN ACCORDANCE WITH nelac

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory, Inc.

Date: *21-May-08*

CLIENT:	Transwestern Pipeline Co.	**Client Sample ID:**	STA. 5 Mist Extractor
Lab Order:	0804362	**Collection Date:**	4/30/2008 8:00:00 AM
Project:	STA 5 Mist Extractor	**Date Received:**	4/30/2008
Lab ID:	0804362-01	**Matrix:**	OIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8082: PCB'S						Analyst: **JMP**
Aroclor 1016	ND	9.9		mg/Kg	1	5/13/2008 12:55:20 PM
Aroclor 1221	ND	9.9		mg/Kg	1	5/13/2008 12:55:20 PM
Aroclor 1232	ND	9.9		mg/Kg	1	5/13/2008 12:55:20 PM
Aroclor 1242	19	9.9		mg/Kg	1	5/13/2008 12:55:20 PM
Aroclor 1248	ND	9.9		mg/Kg	1	5/13/2008 12:55:20 PM
Aroclor 1254	ND	9.9		mg/Kg	1	5/13/2008 12:55:20 PM
Aroclor 1260	ND	9.9		mg/Kg	1	5/13/2008 12:55:20 PM
Surr: Decachlorobiphenyl	44.0	33.5-104		%REC	1	5/13/2008 12:55:20 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	2300	57		mg/Kg	50	5/1/2008 2:00:45 PM
Surr: 4-Bromofluorobenzene	96.3	80-120		%REC	50	5/1/2008 2:00:45 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

LABORATORY ANALYTICAL REPORT

Client: Hall Environmental
Project: 0804362
Lab ID: C08050089-001
Client Sample ID: STA. 5 Mist Extractor

Report Date: 05/20/08
Collection Date: 04/30/08
DateReceived: 05/02/08
Matrix: Oil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Flash Point (Ignitability)	<41	°F		60	140	SW1010	05/07/08 12:41 / cjs
- Flashpoint has been corrected for barometric pressure.							
METALS - TOTAL							
Arsenic	4.8	mg/kg	D	1.3		SW6010B	05/14/08 23:56 / cp
Lead	24.6	mg/kg	D	0.6		SW6010B	05/14/08 23:56 / cp

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

QA/QC Summary Report

Client: Hall Environmental
Project: 0804362

Report Date: 05/20/08
Work Order: C08050089

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW1010									Batch: 080507A-FLSHPNT-LIQ
Sample ID: MBLK1_080507A	Method Blank				Run: PM_FLASHPOINT B_080507				05/07/08 15:10
Flash Point (Ignitability)	ND	°F							
- Flashpoint has been corrected for barometric pressure.									
Sample ID: LCS1_080507A	Laboratory Control Sample				Run: PM_FLASHPOINT B_080507				05/07/08 08:24
Flash Point (Ignitability)	90.0	°F	60	100	96	104			
- Flashpoint has been corrected for barometric pressure.									
Method: SW6010B									Batch: 18552
Sample ID: MB-18552	Method Blank				Run: ICP2-C_080514A				05/14/08 23:28
Arsenic	ND	mg/kg	0.02						
Lead	ND	mg/kg	0.007						
Sample ID: LCS-18552	Laboratory Control Sample				Run: ICP2-C_080514A				05/14/08 23:32
Arsenic	0.50	mg/kg	5.0	100	85	115			
Lead	0.56	mg/kg	2.5	112	85	115			
Sample ID: C08050022-002B MS	Sample Matrix Spike				Run: ICP2-C_080514A				05/14/08 23:48
Arsenic	19	mg/kg	5.0	78	75	125			
Lead	24	mg/kg	2.5	92	75	125			
Sample ID: C08050022-002B MSD	Sample Matrix Spike Duplicate				Run: ICP2-C_080514A				05/14/08 23:52
Arsenic	23	mg/kg	5.0	92	75	125	16	20	
Lead	27	mg/kg	2.5	104	75	125	12	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC SUMMARY REPORT

Client: Transwestern Pipeline Co.
Project: STA 5 Mist Extractor **Work Order:** 0804362

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8021B: Volatiles									
Sample ID: MB-15805		*MBLK*			Batch ID:	**15805**	Analysis Date:	5/1/2008 3:31:07 PM	
Benzene	ND	mg/Kg	1.2						
Sample ID: LCS-15805		*LCS*			Batch ID:	**15805**	Analysis Date:	5/1/2008 3:01:03 PM	
Benzene	51.22	mg/Kg	1.2	102	77	122			
Method: EPA Method 8082: PCB's									
Sample ID: MB-15930		*MBLK*			Batch ID:	**15930**	Analysis Date:	5/13/2008 11:16:22 AM	
Aroclor 1016	ND	mg/Kg	10						
Aroclor 1221	ND	mg/Kg	10						
Aroclor 1232	ND	mg/Kg	10						
Aroclor 1242	ND	mg/Kg	10						
Aroclor 1248	ND	mg/Kg	10						
Aroclor 1254	ND	mg/Kg	10						
Aroclor 1260	ND	mg/Kg	10						
Sample ID: LCS-15930		*LCS*			Batch ID:	**15930**	Analysis Date:	5/13/2008 12:05:23 PM	
Aroclor 1016	49.50	mg/Kg	10	99.0	73.3	147			
Aroclor 1260	49.42	mg/Kg	10	98.8	78.1	142			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name TWP THOR STA 5 Date Received: 4/30/2008

Work Order Number 0804362 Received by: AMF

Checklist completed by: _____ 4/30/08 Sample ID labels checked by: AT

Signature Date Initials

Matrix: Carrier name Client drop-off

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☐	Not Shipped ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	N/A ☑	
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Water - VOA vials have zero headspace?	No VOA vials submitted ☑	Yes ☐	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☐	No ☐	N/A ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑	
Container/Temp Blank temperature?	**16°**	*<6° C Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

_____

_____

_____

_____

Corrective Action _____

_____

_____

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

Client: Transwestern Pipeline
Address: P.O. Box 1019
Thoreau N.M. 87321
Phone #: 505-870-9432
Fax #: 505-862-7826

Project Name: STA. 5 Mist Extractor
Project #: STA. 5 Thoreau.
Project Manager: Charlie Allen
Sampler: Charlie Allen
Sample Temperature: 8 16

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No.
4/30/08	08:00	Gas	STA. 5 Mist Extractor	1				0804362 -1

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides (PCB's (8082))	8260B (VOA)	8270 (Semi-VOA)	Total Arsenic	Total Lead	Total Benzene	Flash Point	Air Bubbles or Headspace (Y or N)
									X			X	X	X	X	

Send Invoice To
Attn: George Friend
Transwestern Pipeline Company
Summit Office Building, Suite 250
4001 Indian School Road, NE
Albuquerque, NM 87110

Date	Time	Relinquished By: (Signature)	Received By: (Signature)	
4/30/08	10:38			4/30/08 10:30
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)	

Remarks: Send Copy of Analysis Report To Charlie Allen at Charlie.Allen@energytransfer.com.

ATTACHMENT D
(MSDS of Bulk Chemicals at Facility)

Mobil

MOBIL OIL CORPORATION MATERIAL SAFETY DATA BULLETIN

REVISED: 12/08/89

********** I. PRODUCT IDENTIFICATION **********

MOBIL DTE 26

SUPPLIER:
MOBIL OIL CORP.

CHEMICAL NAMES AND SYNONYMS:
PET. HYDROCARBONS AND ADDITIVES

USE OR DESCRIPTION:
HYDRAULIC OIL

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 4.0 LIQUID ODOR: MILD PH: NA
VISCOSITY AT 100 F, SUS: 353.1 AT 40 C, CS: 68.0
VISCOSITY AT 210 F, SUS: 55.0 AT 100 C, CS: 8.5
FLASH POINT F(C): > 400(204) (ASTM D-92)
MELTING POINT F(C): NA POUR POINT F(C): -10(-23)
BOILING POINT F(C): > 600(316)
RELATIVE DENSITY, 15/4 C: 0.89 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: NOT EXPECTED TO BE A PROBLEM.

********** 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: 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. 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.
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 **********

NO SPECIAL PRECAUTIONS REQUIRED.

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

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): LD50: > 5 G/KG 0/10 RATS DIED AT THIS DOSAGE LEVEL. SLIGHTLY TOXIC(ESTIMATED) ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

DERMAL TOXICITY (RABBITS): LD50: > 2 G/KG 0/10 RABBITS DIED AT THIS DOSAGE LEVEL. 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): 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. 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 AND EINECS.

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
ZINC (ELEMENTAL ANALYSIS) (0.06%)	7440-66-6	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: RL1250C*020) MCN: , MHC: 1* 1* NA 0* 0*, MPPEC: A, PPEC: A, US88-710 APPROVE 04/14/89

Mobil

MOBIL OIL CORPORATION MATERIAL SAFETY DATA BULLETIN

REVISED: 12/08/89

********** I. PRODUCT IDENTIFICATION **********

MOBIL PEGASUS 490

SUPPLIER:
MOBIL OIL CORP.

CHEMICAL NAMES AND SYNONYMS:
PET. HYDROCARBONS AND ADDITIVES

USE OR DESCRIPTION:
GAS ENGINE OIL

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 4.0 LIQUID ODOR: MILD PH: NA
VISCOSITY AT 100 F, SUS: 694.0 AT 40 C, CS: 132.0
VISCOSITY AT 210 F, SUS: 72.0 AT 100 C, CS: 13.0
FLASH POINT F(C): > 425(218) (ASTM D-92)
MELTING POINT F(C): NA POUR POINT F(C): 5(-15)
BOILING POINT F(C): > 600(316)
RELATIVE DENSITY, 15/4 C: 0.886 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	>90			
ADDITIVES AND/OR OTHER INGREDS.	<10			

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: NOT EXPECTED TO BE A PROBLEM.

********** 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.

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

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): LD50: > 5 G/KG 0/10 RATS DIED AT THIS DOSAGE LEVEL. SLIGHTLY TOXIC(ESTIMATED) ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

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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. EYE IRRITATION SCORES: 0 AT 24 HOURS, 0 AT 48 HOURS, 0 AT 72 HOURS--- 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)---

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

FLASH POINT F(C): > 425(218) (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.

********** 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
ZINC (ELEMENTAL ANALYSIS) (0.023%)	7440-66-6	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

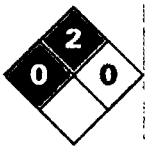
********** APPENDIX **********

FOR MOBIL USE ONLY: (FILL NO: RN612D1340) MCN: , MHC: 1* 1* NA 0* 0*, MPPEC: A, PPEC: A, US89-323 APPROVE 08/07/89

MATERIAL SAFETY DATA SHEET

Diesel Fuel (All Types) **MSDS No. 9909**

EMERGENCY OVERVIEW
CAUTION!
OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT
EFFECTS CENTRAL NERVOUS SYSTEM
HARMFUL OR FATAL IF SWALLOWED
Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer.
If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).



NFPA 704 (Section 16)

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000
MSDS INTERNET WEBSITE: www.hess.com (See Environment, Health, Safety & Social Responsibility)

SYNONYMS: Ultra Low Sulfur Diesel (ULSD); Low Sulfur Diesel; Motor Vehicle Diesel Fuel; Diesel Fuel #2; Dyed Diesel Fuel; Non-Road, Locomotive and Marine Diesel Fuel; Tax-exempt Diesel Fuel

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and CHEMICAL INFORMATION ON INGREDIENTS

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel (68476-34-6)	100
Naphthalene (91-20-3)	Typically < 0.01

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher. Diesel fuel may be dyed (red) for tax purposes. May contain a multifunctional additive.

3. HAZARDS IDENTIFICATION

EYES
Contact with liquid or vapor may cause mild irritation.

SKIN
May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 125 °F (> 52 °C) minimum PMCC
AUTOIGNITION POINT:	494 °F (257 °C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE)
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Diesel fuel, and in particular low and ultra low sulfur diesel fuel, has the capability of accumulating a static electrical charge of sufficient energy to cause a fire/explosion in the presence of lower flashpoint products such as gasoline. The accumulation of such a static charge occurs as the diesel flows through pipelines, filters, nozzles and various work tasks such as tank/container filling, splash loading, tank cleaning; product sampling; tank gauging; cleaning, mixing, vacuum truck operations, switch loading, and product agitation. There is a greater potential for static charge accumulation in cold temperature, low humidity conditions.

Documents such as 29 CFR OSHA 1910.106 "Flammable and Combustible Liquids, NFPA 77 Recommended Practice on Static Electricity, API 2003 "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents and ASTM D4865 "Standard Guide for Generation and Dissipation of Static

Electricity in Petroleum Fuel Systems" address special precautions and design requirements involving loading rates, grounding, bonding, filter installation, conductivity additives and especially the hazards associated with "switch loading." ["Switch Loading" is when a higher flash point product (such as diesel) is loaded into tanks previously containing a low flash point product (such as gasoline) and the electrical charge generated during loading of the diesel results in a static ignition of the vapor from the previous cargo (gasoline).]

Note: When conductivity additives are used or are necessary the product should achieve 25 picosiemens/meter or greater at the handling temperature.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Components (CAS No.)	Source	Exposure Limits TWA/STEL	Note
Diesel Fuel: (68476-34-6)	OSHA	5 mg/m, as mineral oil mist	
	ACGIH	100 mg/m^3 (as totally hydrocarbon vapor) TWA	A3, skin
Naphthalene (91-20-3)	OSHA	10 ppm TWA	
	ACGIH	10 ppm TWA / 15 ppm STEL	A4, Skin

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION
A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE
Clear, straw-yellow liquid. Dyed fuel oil will be red or reddish-colored.

ODOR
Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	320 to 690 oF (160 to 366 °C)
VAPOR PRESSURE:	0.009 psia @ 70 °F (21 °C)
VAPOR DENSITY (air = 1):	> 1.0
SPECIFIC GRAVITY (H_2O = 1):	0.83 to 0.88 @ 60 °F (16 °C)
PERCENT VOLATILES:	100 %
EVAPORATION RATE:	Slow; varies with conditions
SOLUBILITY (H_2O):	Negligible

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ®; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute dermal LD50 (rabbits): > 5 ml/kg
Acute oral LD50 (rats): 9 ml/kg
Primary dermal irritation: extremely irritating (rabbits)
Draize eye irritation: non-irritating (rabbits)
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: A3

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

MUTAGENICITY (genetic effects)
This material has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Diesel Fuel	Placard (International Only):
HAZARD CLASS and PACKING GROUP:	3, PG III	
DOT IDENTIFICATION NUMBER:	NA 1993 (Domestic) UN 1202 (International)	
DOT SHIPPING LABEL:	None	

Use Combustible Placard if shipping in bulk domestically

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

CALIFORNIA PROPOSITON 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Diesel Engine Exhaust (no CAS Number listed)	10/01/1990

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING

HEALTH:	0
FIRE:	2
REACTIVITY:	0

Refer to NFPA 704 "Identification of the Fire Hazards of Materials" for further information

HMIS® HAZARD RATING

HEALTH:	1 *	* Chronic
FIRE:	2	
PHYSICAL:	0	

SUPERSEDES MSDS DATED: 02/28/2001

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute (212) 642-4900
API	American Petroleum Institute (202) 682-8000
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation [General info: (800) 467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Canadian Workplace Hazardous Materials Information System

Material Safety Data Sheet: **Crystal Simple Green® Industrial Cleaner/Degreaser**
Simple Green® Safety Towels

Version No. 19128-11A Date of Issue: January 2011 *ANSI-Z400.1-2003 Format*

Section 1: PRODUCT & COMPANY IDENTIFICATION

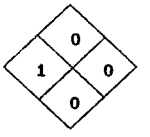
Product Name: Crystal Simple Green® Industrial Cleaner and Degreaser
Additional Names: Simple Green® Safety Towels (fluid only)

Manufacturer's Part Number: *Please refer to page 4*

Company: Sunshine Makers, Inc.
15922 Pacific Coast Highway
Huntington Beach, CA 92649 USA
Telephone: 800-228-0709 • 562-795-6000 Fax: 562-592-3830
Emergency Phone: Chem-Tel 24-Hour Emergency Service: 800-255-3924

Section 2: HAZARDS IDENTIFICATION

Emergency Overview: **CAUTION. Irritant. This is a clear colored liquid with a chemical/detergent odor. Safety towels are infused with a diluted version of mixture.**



NFPA/HMIS Rating:
Health = 1 = slight
Fire, Reactivity, and Special = 0 = minimal

Potential Health Effects

Eye Contact: Mildly irritating.
Skin Contact: No adverse effects expected under typical use conditions. Prolonged exposure may cause dryness. Chemically sensitive individuals may experience mild irritation.
Ingestion: May cause stomach or intestinal irritation if swallowed.
Inhalation: No adverse effects expected under typical use conditions. Adequate ventilation should be present for prolonged usage in small enclosed areas.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	Percent Range
Water	7732-18-5	≥ 78%
2-butoxyethanol	111-76-2	≤ 6%
Ethoxylated Alcohol Mixture	Proprietary	≤ 5%
Tetrapotassium Pyrophosphate	7320-34-5	≤ 5%
Sodium Citrate	68-04-2	≤ 5%
Fragrance	Proprietary	≤ 1%

Section 4: FIRST AID MEASURES

If Inhaled: If adverse effect occurs, move to fresh air.
If on skin: If adverse effect occurs, rinse skin with water.
If in eyes: Flush with plenty of water. After 5 minutes of flushing, remove contact lenses, if present. Continue flushing for at least 10 more minutes. If irritation persists seek medical attention.
If ingested: Drink plenty of water to dilute.

Section 5: FIRE FIGHTING MEASURES

This formula is stable, non-flammable, and will not burn. No special procedures necessary

Flammability: Non-flammable
Flash Point: Non-flammable

Suitable Extinguishing Media: Use Dry chemical, CO2, water spray or "alcohol" foam.
Extinguishing Media to Avoid High volume jet water.
Special Exposure Hazards: In event of fire created carbon oxides, oxides of phosphorus may be formed.
Special Protective Equipment: Wear positive pressure self-contained breathing apparatus; Wear full protective clothing.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: See section 8 – personal protection.

Environmental Precautions: Do not allow into open waterways and ground water systems.

Method for Clean Up: Dilute with water and rinse into sanitary sewer system or soak up with inert absorbent material.

Section 7: HANDLING AND STORAGE

Handling: Keep container tightly closed. Ensure adequate ventilation. Keep out of reach of children.

Storage: Keep in cool dry area.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limit Values:	OSHA PEL	ACGIH TLV
2-butoxyethanol	TWA 50 ppm (240 mg/m^3)	20 ppm (97 mg/m^3)
Tetrapotassium Pyrophosphate		5 mg/m^3

Exposure Controls:
Eye Contact: Use protective glasses if splashing or spray-back is likely.
Respiratory: Use in well ventilated areas.
Skin Contact: Prolonged exposure or dermal sensitive individuals should use protective gloves.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear Liquid	**Vapor Pressure:**		18 mmHg @20°C; 23.5 mmHg @26°C	
Odor:	No added odor; chemical/detergent	**Density:**		8.5 lb/gal;	
Specific Gravity:	1.020 ± 0.010	**Water Solubility:**		100%	
pH:	9.0 – 9.9 (Crystal)	**VOC composite Partial Pressure:**		TBD	
	8.0 – 8.9 (Safety Towel)	**VOC:**	CARB Method 310	5.8%*	
Boiling Point:	~212°F (100.6 °C)		SCAQMD Method 313	6.6%*	
Freezing Point:	~ 16°F (-9 °C)		** product must be diluted to meet air quality regulations*		
Nutrient Content:	Phosphorous: 0.28% Chloride: ~110 ppm	Sulfur: ~180 ppm Fluorine: ~90 ppm			

Section 10: STABILITY AND REACTIVITY

Stability: Stable
Materials to Avoid: None known
Hazardous Decomposition Products: Normal products of combustion - CO, CO2; Oxides of Phosphorous may occur.

Section 11: TOXICOLOGICAL INFORMATION

Acute Toxicity: Oral LD_{50} (rat) > 5 g/kg body weight
Dermal LD_{50} (rabbit) > 5 g/kg body weight
Toxicity calculated from ingredients using OECD SERIES ON TESTING AND ASSESSMENT Number 33

Carcinogens: No ingredients are listed by OSHA, IARC, or NTP as known or suspected carcinogens.

Section 12: ECOLOGICAL INFORMATION

Hazard to wild mammals: Low, based on toxicology profile

Hazard to avian species: Low, based on toxicology profile

Hazard to aquatic organisms: Low, based on toxicology profile

Chemical Fate Information: Readily Biodegradable based on biodegradability profile of ingredients

Section 13: DISPOSAL CONSIDERATIONS

Appropriate Method for Disposal:

Unused Product: *Dilute with water to use concentration and dispose by sanitary sewer.

Used Product: *This product can enter into clarifiers and oil/water separators. Used product may be hazardous depending on the cleaning application and resulting contaminants.

Empty Containers: *Triple-rinse with water and offer for recycling if available in your area. Otherwise, dispose as non-hazardous waste.

*Dispose of used or unused product, and empty containers in accordance with the local, State, Provincial, and Federal regulations for your location. Never dispose of used degreasing rinsates into lakes, streams, and open bodies of water or storm drains.

Section 14: TRANSPORT INFORMATION

U.S. Department of Transportation (DOT) / Canadian TDG:	Not Regulated		
IMO / IDMG:	Not classified as Dangerous		
ICAO/ IATA:	Not classified as Dangerous		
ADR/RID:	Not classified as Dangerous		
U.N. Number	Not Required	Proper Shipping Name:	Detergent Solution
Hazard Class:	Non-Hazardous	Marine Pollutant:	No

Section 15: REGULATORY INFORMATION

All components are listed on: EINECS, TSCA, DSL and AICS Inventory.
No components listed under: Clean Air Act Section 112; Clean Water Act 307 & 311

SARA Title III: 2-butoxyethanol is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 as Category N230 – Certain Glycol Ethers.

RCRA Status: Not a hazardous waste CERCLA Status : No components listed

State Right To Know Lists

2-butoxyethanol Illinois, Massachusetts, New Jersey, Pennsylvania, Rhode Island

WHMIS Classification – Category D, subcategory 2B, eye irritant

Name	Toxic Substances List – Schedule 1 – CEPA (Canadian Environmental Protection Act)	NPRI Inventory
2-butoxyethanol	Yes	No

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by Canada's Controlled Products Regulation.

Section 16: OTHER INFORMATION

Questions about the information found on this MSDS should be directed to:
SUNSHINE MAKERS, INC. – TECHNICAL DEPARTMENT
15922 Pacific Coast Hwy. Huntington Beach, CA 92649
Phone: 800/228-0709 [8am-5pm Pacific time, Mon-Fri] *Fax:* 562/592-3830 *Email:* infoweb@simplegreen.com.

National Stock Numbers & Industrial Numbers:

Crystal

Part Number	NSN	Size
19024	7930-01-418-1151	24 oz. spray (12/cs)
19128	7930-01-418-1152	1 Gal. (6/cs)
19005	7930-01-418-1153	5 Gal.
19055	7930-01-418-1155	55 Gal.

Safety Towels

Part Number	Size
13353	5 count pouch (50/cs)
13351	75-count canister (6/cs)

****International Part Numbers May Differ.**

DISCLAIMER: The information provided with this MSDS is furnished in good faith and without warranty of any kind. Personnel handling this material must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of this material and the safety and health of employees and customers. Sunshine Makers, Inc. assumes no additional liability or responsibility resulting from the use of, or reliance on this information.

CLEAN ACROSS AMERICA AND THROUGHOUT THE WORLD™

ZEP MANUFACTURING COMPANY
P.O. BOX 2015
ATLANTA, GEORGIA 30301
1-877-I-BUY-ZEP (1-877-428-9937)

MATERIAL SAFETY DATA SHEET
AND SAFE HANDLING AND DISPOSAL INFORMATION

ISSUE DATE: 07/21/98
SUPERSEDES: 06/20/94 Date printed: 06/02/00

ZEP BIG ORANGE
Product No: 0415 Industrial Solvent Degreaser

SECTION I -EMERGENCY CONTACTS

TELEPHONE:
(404) 352-1680 *BETWEEN 8:00 AM - 5:00 PM (EST)*
MEDICAL EMERGENCY:
(770) 439-4200 *NON OFFICE HOURS, WEEKENDS*
(770) 432-2873 *AND HOLIDAYS, PLEASE CALL YOUR*
(770) 455-8160 LOCAL POISON CONTROL
(770) 552-8836
(770) 424-2048
(770) 424-4789
TRANSPORTATION EMERGENCY:
(770) 922-0923
CHEMTREC:
(800) 424-9300 TOLL FREE - ALL CALLS RECORDED
DISTRICT OF COLUMBIA:
(202) 483-7616 ALL CALLS RECORDED

SECTION II - HAZARDOUS INGREDIENTS

DESIGNATIONS	(PPM)	EFFECTS (SEE NOTICE)	% IN PROD.
** D-LIMONENE ** orange distillate; citrus terpene; cyclohexene, 1-methyl-4-(1-methylethenyl)-, (R)-; CAS# 5989-27-5; RTECS# GW6360000; OSHA PEL N/D	N/D	CBL SEN	> 90

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:
This product can be an eye irritant. Inflammation of eye tissue is characterized by redness, watering, and/or itching.
One of the ingredients in this product has caused sensitization reactions in a small percentage of the general population.

CHRONIC EFFECTS OF OVEREXPOSURE:
Contact, especially if prolonged of repeated, may cause redness, itching, or irritation of the skin.
None of the hazardous ingredients are listed as carcinogens by IARC, NTP, & OSHA
EST'D PEL/TLV: Not established PRIMARY ROUTES OF ENTRY: N/A

HMIS CODES: HEALTH 1; FLAM. 2; REACT. 0; PERS. PROTECT. B ; CHRONIC HAZ. NO

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. If irritation develops, consult a physician.
INHALE: Move exposed person to fresh air. If irritation persists, get medical attention promptly.
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 nitrile 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: No special measures are required.
VENTILATION: Ventilation should be equivalent to outdoors. Use exhaust fans and open windows in enclosed spaces.

SECTION V - PHYSICAL DATA

BOILING POINT (F):	338-375	SPECIFIC GRAVITY:	0.85
VAPOR PRESSURE(mmHg):	N/A	EVAPORATION RATE (CCL4=1):	~33
VAPOR DENSITY(AIR=1):	N/A	pH(CONCENTRATE):	N/A
SOLUBILITY IN WATER:	EMULSIFIES	pH(USE DILUTION OF 1:20):	7.6
VOC CONTENT (CONCENTRATE):	92.7% 6.58 lb/gl		

APPEARANCE AND ODOR: ORANGE LIQUID WITH A CITRUS ODOR

(Continued on Page: 2)

Product No: 0415 **SECTION VI - FIRE AND EXPLOSION DATA**

FLASH POINT(F) (METHOD USED): 121 (TCC)
FLAMMABLE LIMITS: LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: Carbon dioxide, dry chemical and foam.
SPECIAL FIRE FIGHTING: Fire exposed drums should be cooled with stream of water.
UNUSUAL FIRE HAZARDS: None

SECTION VII - REACTIVITY DATA

STABILITY: Stable
INCOMPATIBLILITY(AVOID): Heat, flame, spark, strong acids and/or oxidizers.
POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION: Carbon dioxide, carbon monoxide, and other unidentified organic compounds.

SECTION VIII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Immediately eliminate all flame, ignition and high-heat sources. Absorb spill on inert absorbent material (e.g. Zep-0-Zorb). Pick up and place residue in a clean, D.O.T. specification container for disposal. Wash area thoroughly with a detergent solution and rinse well with water.
WASTE DISPOSAL METHOD:
Liquids cannot be sent to landfills unless solidified. Unusable product and collected, spent material may require disposal as a hazardous waste at a permitted treatment/storage/disposal facility. Solvent wastes may require treatment to meet the appropriate standards before disposal in a chemical or industrial waste landfill. Consult local, state, and federal agencies for proper disposal method in your area.
RCRA HAZ. WASTE NOS.: D001

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN WHEN HANDLING AND STORING:
Combustible! Store and use away from heat, sparks, open flame, or any source of ignition.
Post "No Smoking" signs according to local regulations for combustible liquids.
Keep product away from skin and eyes.
Store tightly closed container in a dry area at temps. between 40-120 degrees F.
Keep out of the reach of children.

SECTION X - REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: INDUSTRIAL CLEANERS NOI LIQUID KEEP FROM FREEZING
NOTE: DOT information applies to larger package sizes of affected products. For some products, DOT may require alternate names and labeling in accordance with packaging group requirements.
DOT HAZARD CLASS: NA DOT PACKING GROUP:
DOT I.D. NUMBER: DOT LABEL/PLACARD:
EPA TSCA CHEMICAL INVENTORY - ALL INGREDIENTS ARE LISTED
EPA CWA 40CFR PART 117 SUBSTANCE(RQ IN A SINGLE CONTAINER): N/A

(Continued On Page 3)

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 LISTED ALPHABETICALLY BY SECTION

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 100F and 200F 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 which reduces the activity of the brain and spinal cord.
COR: Corrosive - Causes irreversible injury to 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 TLVs, and OSHA PELs (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 100F, 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 based on the criteria established in the OSHA Hazard Communication Standard - 29 CFR 1910.1200
HTX: Highly toxic - the probable lethal dose for a 70kg (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 to make 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 Amendment 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.

(rev. 1/98)

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. The presence of a chronic hazard is indicated 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: 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)
VOC CONTENT: The percentage or amount in pounds per gallon of the product that is regulated as a Volatile Organic Compound under the Clean Air Act of 1990 and various state jurisdictions.
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 by extreme heat or fire.
INCOMPATIBILITY: Material contact by extreme heat and the conditions to avoid to prevent hazardous reactions.
POLYMERIZATION: Indicates the tendency of the product's molecules to combine with themselves 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- Federal Law which regulates chemical releases to bodies of water.
RQ: Reportable Quantity - The amount of the specific ingredient that, when spilled to the ground and can enter a storm sewer or natural watershed, 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 out 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 products label and Material Safety Data Sheet.

Material Safety Data Sheet
Instant FAME/Instant Anaerobe Methods
Methanol

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS Name: Methanol
MSDS Preparation Date: 06/19/2009
Synonyms or Generic ID for Methanol: Carbinol; Methyl alcohol; Methyl hydroxide; Monohydroxymethane; Wood alcohol; Wood naptha; Wood spirits; Columbian spirits; Methanol.
Chemical Family: Methanol Family
Formula: CH_3OH
Molecular Weight: N/A
PIN (UN#/ NA#): UN1230
Company Identification:

Microbial ID.
125 Sandy Drive
Newark, DE 19713

For Information, call: (800)276-8068, (302)737-4297
For Domestic CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

SECTION 2 – COMPOSITION, INFORMATION ON INGREDIENTS

67-56-1	Methanol	<99%	200-659-6	Irritant, Flammable

NFPA Rating: (estimated) Health: 1; Flammability: 3; Instability: 0

State: Liquid	Appearance: colorless	Odor: Alcohol-like, weak odor
Boiling Point: 64.7°C@760mmHg	pH: Not available	Specific Gravity: 7910g/cm3@20°C
Vapor Pressure (mm Hg): 128mmHg @20°C	Vapor Density (AIR=1): 1.11	
Flash Point: 12°C	Solubility in Water: miscible	

SECTION 3 – HAZARDS IDENTIFICATION

Appearance: Colorless liquid, Flash Point: 12°C, 53.6°F.

Danger! Poison! May be fatal or cause blindness if swallowed. Vapor harmful. **Flammable liquid and vapor.** Harmful if swallowed, inhaled, or absorbed through the skin. Causes eye, skin, and respiratory tract irritation. May cause central nervous system depression. Cannot be made non-poisonous.
Target Organs: Eyes, nervous system, optic nerve.

Potential Health Effects
Eye: May cause painful sensitization to light. Methanol is a mild to moderate eye irritant. Inhalation, ingestion or skin absorption of methanol can cause significant disturbance in vision, including blindness.
Skin: Causes moderate skin irritation. May be absorbed through the skin in harmful amounts. Prolonged and or repeated contact may cause defatting of skin and dermatitis. Methanol can be absorbed through the skin, producing systemic effects that include visual disturbances.
Ingestion: May be fatal or cause blindness if swallowed. Aspiration hazard. Cannot be made non-poisonous. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause systematic toxicity with acidosis. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma, and possible death due to failed respiratory failure. May cause cardiopulmonary system effects.

Inhalation: Methanol is toxic and can very readily form extremely high vapor concentrations at room temperature. Inhalation is the most common route of occupational exposure. At first, methanol causes CNS depression with nausea, headache, vomiting, dizziness and incoordination. A time period with no obvious symptoms follows (typically 8-24 hrs). This latent period is followed by metabolic acidosis and severe visual effects which may include reduced reactivity and/or increased sensitivity to light, blurred, doubl and/or snowy vision, and blindness. Depending on the severity of exposure and the promptness of treatment, survivors may recover completely or may have permanent blindness, vision disturbances and/or nervous system effects.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Chronic exposure may cause effects similar to those of acute exposure. Methanol is only very slowly eliminated from the body. Because of this slow elimination, methanol should be regarded as a cumulative poison. Though a single exposure may cause no effect, daily exposures may result in the accumulation of a harmful amount. Methanol has produced fetotoxicity in rats and teratogenicity in mice exposed by inhalation to high concentrations that did not produce significant maternal toxicity.

SECTION 4 – FIRST AID MEASURES

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.
Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Effects may be delayed.
Antidote: Ethanol may inhibit methanol metabolism.

SECTION 5 – FIRE FIGHTING MEASURES

General Information: Ethanol may inhibit methanol metabolism. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Water may be ineffective. For large fires, use water spray, fog or alcohol-resistant foam. Do NOT use straight streams of water.
Flash Point: 12 deg C (53.60 deg F)
Autoignition Temperature: 455 deg C (851.00 deg F)
Explosion Limits, Lower:6.0 vol %
Upper: 31.00 vol %
NFPA Rating: (estimated) Health: 1; Flammability: 3; Instability: 0

SECTION 6 – ACCIDENTAL RELEASE MEASURES

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Use water spray to disperse the gas/vapor. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

SECTION 7-HANDLING AND STORAGE

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid use in confined spaces.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Keep containers tightly closed.

SECTION 8 – EXPOSURE CONTROL/ PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Chemical Name	ACGIH	NIOSH	OSHA – Final PELs
Methanol	200 ppm TWA; 250 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous route	200 ppm TWA; 260 mg/m3 TWA 6000 ppm IDLH	200 ppm TWA; 260 mg/m3 TWA

OSHA Vacated PELs: Methanol: 200 ppm TWA; 260 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear butyl rubber gloves, apron, and/or clothing.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Clear liquid
Appearance: clear, colorless - APHA: 10 max
Odor: alcohol-like - weak odor
pH: Not available.
Vapor Pressure: 128 mm Hg @ 20 deg C
Vapor Density: 1.11 (Air=1)
Evaporation Rate:5.2 (Ether=1)
Viscosity: 0.55 cP 20 deg C
Boiling Point: 64.7 deg C @ 760 mmHg
Freezing/Melting Point:-98 deg C
Decomposition Temperature: Not available.
Solubility: miscible
Specific Gravity/Density:.7910 g/cm3 @ 20°C
Molecular Formula:CH4O
Molecular Weight:32.04

SECTON 10 – STABILITY AND REACTIVITY

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, ignition sources, confined spaces.
Incompatibilities with Other Materials: Oxidizing agents, reducing agents, acids, alkali metals, potassium, sodium, metals as powders (e.g. hafnium, raney nickel), acid anhydrides, acid chlorides, powdered aluminum, powdered magnesium.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, formaldehyde.
Hazardous Polymerization: Will not occur.

SECTION 11 – TOXICOLOGICAL INFORMATION

RTECS#:
CAS# 67-56-1: PC1400000
LD50/LC50:
CAS# 67-56-1:
Draize test, rabbit, eye: 40 mg Moderate;
Draize test, rabbit, eye: 100 mg/24H Moderate;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Inhalation, rabbit: LC50 = 81000 mg/m3/14H;
Inhalation, rat: LC50 = 64000 ppm/4H;
Oral, mouse: LD50 = 7300 mg/kg;
Oral, rabbit: LD50 = 14200 mg/kg;
Oral, rat: LD50 = 5600 mg/kg;
Skin, rabbit: LD50 = 15800 mg/kg;

Human LDLo Oral: 143 mg/kg; Human LDLo Oral: 428 mg/kg; Human TCLo Inhalation: 300 ppm caused visual field changes & headache; Monkey LDLo Skin: 393 mg/kg. Methanol is significantly less toxic to most experimental animals than humans, because most animal species metabolize methanol differently. Non-primate species do not ordinarily show symptoms of metabolic acidosis or the visual effects which have been observed in primates and humans.
Carcinogenicity:
CAS# 67-56-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: There is no human information available. Methanol is considered to be a potential developmental hazard based on animal data. In animal experiments, methanol has caused fetotoxic or teratogenic effects without maternal toxicity.
Reproductive Effects: See actual entry in RTECS for complete information.
Mutagenicity: See actual entry in RTECS for complete information.
Neurotoxicity: ACGIH cites neuropathy, vision and CNS under TLV basis.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity: Fish: Fathead Minnow: 29.4 g/L; 96 Hr; LC50 (unspecified)Fish: Goldfish: 250 ppm; 11 Hr; resulted in deathFish: Rainbow trout: 8000 mg/L; 48 Hr; LC50 (unspecified)Fish: Rainbow trout: LC50 = 13-68 mg/L; 96 Hr.; 12 degrees CFish: Fathead Minnow: LC50 = 29400 mg/L; 96 Hr.; 25 degrees C, pH 7.63Fish: Rainbow trout: LC50 = 8000 mg/L; 48 Hr.; UnspecifiedBacteria: Phytobacterium phosphoreum: EC50 = 51,000-320,000 mg/L; 30 minutes; Microtox test No data available.
Environmental: Dangerous to aquatic life in high concentrations. Aquatic toxicity rating: TLm 96>1000 ppm. May be dangerous if it enters water intakes. Methyl alcohol is expected to biodegrade in soil and water very rapidly. This product will show high soil mobility and will be degraded from the ambient atmosphere by the reaction with photochemically produced hyroxyl radicals with an estimated half-life of 17.8 days. Bioconcentration factor for fish (golden ide) < 10. Based on a log Kow of -0.77, the BCF value for methanol can be estimated to be 0.2.
Physical: No information available.
Other: No information available.

SECTION 13 – DISPOSAL CONSIDERATIONS

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series:

CAS# 67-56-1: waste number U154 (Ignitable waste).

SECTION 14 – TRANSPORT INFORMATION

	US DOT	CANADA TDG
Shipping Name:	Methanol	Methanol
Hazard Class:	3	3
UN Number:	UN1230	UN1230
Packing Group:	II	II
Additional Information		Flash Point 12°C

SECTION 15 – REGULATORY INFORMATION

US FEDERAL

TSCA

CAS# 67-56-1 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 67-56-1: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 67-56-1: immediate, fire.

Section 313

This material contains Methanol (CAS# 67-56-1, > 99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 67-56-1 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 67-56-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
T F
Risk Phrases:
R 11 Highly flammable.
R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.
R 39/23/24/25 Toxic : danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

Safety Phrases:
S 16 Keep away from sources of ignition - No smoking.
S 36/37 Wear suitable protective clothing and gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 7 Keep container tightly closed.

WGK (Water Danger/Protection)
CAS# 67-56-1: 1
Canada - DSL/NDSL
CAS# 67-56-1 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of B2, D1B, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 67-56-1 is listed on the Canadian Ingredient Disclosure List.

SECTION 16 – Other Information

This Material Safety Data Sheet has been prepared in accordance with 29 CFR 1910.1200 and contains information believed to be accurate and complete at the date of preparation. The statements contained herein are offered for informational purposes only and are based upon technical data. MIDI Inc. believes them to be accurate but does not purport to be all-inclusive. The above-stated product is intended for use only by persons having the necessary technical skills and facilities for handling the product at their discretion and risk. Since conditions and manner of use are outside our control, we (MIDI Inc.) make no warranty of merchantability or any such warranty, express or implied with respect to information and we assume no liability resulting from the above product or its use. Users should make their own investigations to determine suitability of information and product for their particular purposes.

MSDS Number: **E5125** * * * * * *Effective Date:* ***09/16/09*** * * * * * *Supercedes:* ***07/30/07***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ETHYLENE GLYCOL

1. Product Identification

Synonyms: 1,2-Ethanediol; glycol; 1,2-Dihydroxyethane; Ethylene Alcohol; Ethulene Dihydrate
CAS No.: 107-21-1
Molecular Weight: 62.07
Chemical Formula: CH2OHCH2OH
Product Codes:
J.T. Baker: 5387, 5845, 9140, 9298, 9300, 9346, 9356, L715
Mallinckrodt: 5001, 5037

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethylene Glycol	107-21-1	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Vapor inhalation is generally not a problem unless heated or misted. Exposure to vapors over an extended time period has caused throat irritation and headache. May cause nausea, vomiting, dizziness and drowsiness. Pulmonary edema and central nervous system depression may also develop. When heated or misted, has produced rapid, involuntary eye movement and coma.
Ingestion:
Initial symptoms in massive dosage parallel alcohol intoxication, progressing to CNS depression, vomiting, headache, rapid respiratory and heart rate, lowered blood pressure, stupor, collapse, and unconsciousness with convulsions. Death from respiratory arrest or cardiovascular collapse may follow. Lethal dose in humans: 100 ml (3-4 ounces).
Skin Contact:
Minor skin irritation and penetration may occur.
Eye Contact:
Splashes may cause irritation, pain, eye damage.
Chronic Exposure:
Repeated small exposures by any route can cause severe kidney problems. Brain damage may also occur. Skin allergy can develop. May damage the developing fetus.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye problems, or impaired liver, kidney, or respiratory function may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Give sodium bicarbonate intravenously to treat acidosis. Urinalysis may show low specific gravity, proteinuria, pyuria, cylindruria, hematuria, calcium oxide, and hippuric acid crystals. Ethanol can be used in antidotal treatment but monitor blood glucose when administering ethanol because it can cause hypoglycemia. Consider infusion of a diuretic such as mannitol to help prevent or control brain edema and hemodialysis to remove ethylene glycol from circulation.

5. Fire Fighting Measures

Fire:
Flash point: 111C (232F) CC
Autoignition temperature: 398C (748F)
Flammable limits in air % by volume:
lel: 3.2; uel: 15.3
Slight to moderate fire hazard when exposed to heat or flame.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Containers may explode when involved in a fire.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water or foam may cause frothing. Water spray may be used to extinguish surrounding fire and cool exposed containers. Water spray will also reduce fume and irritant gases.
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. Toxic gases and vapors may be released if involved in a fire.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from acids and oxidizing materials. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Ethylene Glycol [107-21-1]:

-ACGIH Short-Term Exposure Limit (STEL):
100 mg/m3 Ceiling (aerosol only)
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 exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear oily liquid.
Odor:
Odorless.
Solubility:
Miscible in water.
Specific Gravity:
1.1 @20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
197.6C (388F)
Melting Point:
-13C (9F)
Vapor Density (Air=1):
2.14
Vapor Pressure (mm Hg):
0.06 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition. May produce acrid smoke and irritating fumes when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents. Reacts violently with chlorosulfonic acid, oleum, sulfuric acid, perchloric acid. Causes ignition at room temperature with chromium trioxide, potassium permanganate and sodium peroxide; causes ignition at 212F(100C) with ammonium dichromate, silver chlorate, sodium chloride and uranyl nitrate.
Conditions to Avoid:
Heat, flames, ignition sources, water (absorbs readily) and incompatibles.

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11. Toxicological Information

Toxicological Data:
Oral rat LD50: 4700 mg/kg; skin rabbit LD50: 9530 mg/kg.
Irritation - skin rabbit: 555 mg(open), mild; eye rabbit: 500mg/24H, mild.
Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown teratogenic effects in laboratory animals.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Ethylene Glycol (107-21-1)	No	No	None

---

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is not expected to evaporate significantly. When released into water, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. When released into water, this material is not expected to evaporate significantly. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
The LC50/96-hour values for fish are over 100 mg/l.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Ethylene Glycol (107-21-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Ethylene Glycol (107-21-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Ethylene Glycol (107-21-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Ethylene Glycol (107-21-1)	5000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.
Label Precautions:
Do not breathe vapor or mist.
Use only with adequate ventilation.
Keep container closed.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Label First Aid:
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. Call a physician if irritation develops or persists. If swallowed, give water or milk to drink and induce vomiting. Never give anything by mouth to an unconscious person. In all cases call a physician.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****
Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **P6928** * * * * * *Effective Date:* ***07/09/08*** * * * * * *Supercedes:* ***05/19/08***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

PROPYLENE GLYCOL

1. Product Identification

Synonyms: 1,2-propanediol; 1,2-dihdroxypropane; methyl glycol; methylethylene glycol
CAS No.: 57-55-6
Molecular Weight: 76.09
Chemical Formula: CH3CHOHCH2OH
Product Codes:
J.T. Baker: 9402, 9403, U510
Mallinckrodt: 1925, 6263

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Propylene Glycol	57-55-6	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY CAUSE IRRITATION TO SKIN AND EYES.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
No adverse health effects via inhalation.
Ingestion:
Relatively non-toxic. Ingestion of sizable amount (over 100ml) may cause some gastrointestinal upset and temporary central nervous system depression. Effects appear more severe in individuals with kidney problems.
Skin Contact:
Mild irritant and defatting agent, especially on prolonged contact.
Eye Contact:
May cause transitory stinging and tearing.
Chronic Exposure:
Lactic acidosis, stupor and seizures have been reported following chronic ingestion.
Aggravation of Pre-existing Conditions:
Kidney disorders.

4. First Aid Measures

Inhalation:
Remove to fresh air. Not expected to require first aid measures.
Ingestion:
Not expected to require first aid measures. Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.
Skin Contact:
Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Eye Contact:
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Call a physician if irritation persists.

Note to Physician:
In case of ingestion, monitor for acidosis and central nervous system changes. Exposed persons with previous kidney dysfunction may require special treatment.

5. Fire Fighting Measures

Fire:
Flash point: 99C (210F) CC
Autoignition temperature: 371C (700F)
Flammable limits in air % by volume:
lel: 2.6; uel: 12.5
Material can support combustion.
Explosion:
Containers may explode in heat or fire.
Fire Extinguishing Media:
Dry chemical, foam, water 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. Move exposed containers from fire area, if it can be done without risk. Use water to keep fire-exposed containers cool.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. Handling and Storage

Protect container from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture, and incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
AIHA Workplace Environmental Exposure Level (WEEL): TWA = 10mg/m3.
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 exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear oily liquid.
Odor:
Odorless.
Solubility:
Miscible in water.
Specific Gravity:
1.0361 @ 20C/4C

pH:
No information found.
% Volatiles by volume @ 21C (70F):
No information found.
Boiling Point:
188.2C (370F)
Melting Point:
-59C (-74F)
Vapor Density (Air=1):
2.6
Vapor Pressure (mm Hg):
0.129 @ 25C (77F)
Evaporation Rate (BuAc=1):
0.01

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition. Aldehydes or lactic, pyruvic or acetic acids may also be formed.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 20g/kg. Skin rabbit LD50: 20.8g/kg.
Irritation: Eye rabbit/Draize, 500 mg/24H mild.
Investigated as a mutagen and reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Propylene Glycol (57-55-6)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into water, this material is expected to readily biodegrade. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Propylene Glycol (57-55-6)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Propylene Glycol (57-55-6)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ.	-----SARA 313------ List	Chemical Catg.
Propylene Glycol (57-55-6)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Propylene Glycol (57-55-6)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **0** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY CAUSE IRRITATION TO SKIN AND EYES.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician if irritation develops or persists.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8.
Disclaimer:
****
Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

E

ATTACHMENT

(OCD Guidelines for Remediation of Leaks, spills and Releases)

GUIDELINES

FOR

REMEDIATION

OF

LEAKS, SPILLS AND RELEASES

(AUGUST 13, 1993)

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

TABLE OF CONTENTS

INTRODUCTION

The following document is to be used as a **guide** on all federal, state and fee lands when remediating contaminants resulting from leaks, spills and releases of oilfield wastes or products. The New Mexico Oil Conservation Division (OCD) requires that corrective actions be taken for leaks, spills or releases of any material which has a reasonable probability to injure or be detrimental to public health, fresh waters, animal or plant life, or property or unreasonably interfere with the public welfare or use of the property. These guidelines are intended to provide direction for remediation of soils and fresh waters contaminated as a result of leaks, spills or releases of oilfield wastes and products in a manner that assures protection of fresh waters, public health and the environment.

Fresh waters (to be protected) includes the water in lakes, playas, surface waters of all streams regardless of the quality of the water within any given reach, and all underground waters containing 10,000 milligrams per liter (mg/l) or less of total dissolved solids (TDS) except for which, after notice and hearing, it is found that there is no present or reasonably foreseeable beneficial use which would be impaired by contamination of such waters. The water in lakes and playas shall be protected from contamination even though it may contain more than 10,000 mg/l of TDS unless it can be shown that hydrologically connected fresh ground water will not be adversely affected.

Procedures may deviate from the following guidelines if it can be shown that the proposed procedure will either remediate, remove, isolate or control contaminants in such a manner that fresh waters, public health and the environment will not be impacted. Specific constituents and/or requirements for soil and ground water analysis and/or remediation may vary depending on site specific conditions. Deviations from approved plans will require OCD notification and approval.

****** Note:** **Notification to OCD of leaks, spills and releases does not relieve an operator of responsibility for compliance with any other federal, state or local law and/or regulation regarding the incident. Other agencies (ie. BLM, Indian Tribes, etc) may also have guidelines or requirements for remediation of leaks spills and releases.**

I. NOTIFICATION OF LEAK, SPILL OR RELEASE

Leaks, spills and releases of any wastes or products from oilfield operations are required to be reported to the OCD pursuant to OCD Rule 116 (Appendix A) or New Mexico Water Quality Control Commission (WQCC) Regulation 1-203 (Appendix B). Appendix C contains the phone numbers and addresses for reporting incidents to the OCD district and Santa Fe offices. Notification will include all information required under the respective rule or regulation. Below is a description of some of the information required:

A. RESPONSIBLE PARTY AND LOCAL CONTACT

The name, address and telephone number of the person/persons in charge of the facility/operation as well as the owner and/or operator of the facility/operation and a local contact.

B. FACILITY

The name and address of the facility or operation where the incident took place and the legal location listed by quarter-quarter, section, township and range, and by distance and direction from the nearest town or prominent landmark so that the exact site location can be readily located on the ground.

C. TIME OF INCIDENT

The date, time and duration of the incident.

D. DISCHARGE EVENT

A description of the source and cause of the incident.

E. TYPE OF DISCHARGE

A description of the nature or type of discharge. If the material leaked, spilled or released is anything other than crude oil, condensate or produced water include its chemical composition and physical characteristics.

F. QUANTITY

The known or estimated volume of the discharge.

G. SITE CHARACTERISTICS

The relevant general conditions prevailing at the site including precipitation, wind conditions, temperature, soil type, distance to nearest residence and population centers and proximity of fresh water wells or watercourse (ie. any river, lake, stream, playa, arroyo, draw, wash, gully or natural or man-made channel through which water flows or has flowed).

H. IMMEDIATE CORRECTIVE ACTIONS

Any initial response actions taken to mitigate immediate threats to fresh waters, public health and the environment.

II. INITIAL RESPONSE ACTIONS

Upon learning of a leak, spill or release of any material which has a reasonable probability to injure or be detrimental to public health, fresh waters, animal or plant life, or property or unreasonably interfere with the public welfare or use of the property, the responsible party (RP) should take the following immediate actions unless the actions could create a safety hazard which would result in a threat to personal or public injury:

A. SOURCE ELIMINATION AND SITE SECURITY

The RP should take the appropriate measures to stop the source of the leak, spill or release and limit access to the site as necessary to reduce the possibility of public exposure.

B. CONTAINMENT

Once the site is secure, the RP should take steps to contain the materials leaked, spilled or released by construction of berms or dikes, the use of absorbent pads or other containment actions to limit the area impacted by the event and prevent potential fresh water contaminants from migrating to watercourses or areas which could pose a threat to public health and safety.

C. SITE STABILIZATION

After containment, the RP should recover any products or wastes which can be physically removed from the surface within the containment area. The disposition of all wastes or products removed from the site must be approved by the OCD.

III. SITE ASSESSMENT

Prior to final closure (Section VIII), soils into which nonrecoverable products or wastes have infiltrated and which have a reasonable probability to injure or be detrimental to public health, fresh waters, animal or plant life, or property or unreasonably interfere with the public welfare or use of the property should be assessed for their potential environmental impacts and remediated according to the procedures contained in the following sections. Assessment results form the basis of any required remediation. Sites will be assessed for severity of contamination and potential environmental and public health threats using a risk based ranking system.

The following characteristics should be determined in order to evaluate a sites potential risks, the need for remedial action and, if necessary, the level of cleanup required at the site:

A. GENERAL SITE CHARACTERISTICS

1. Depth To Ground Water

The operator should determine the depth to ground water at each site. The depth to ground water is defined as

the vertical distance from the lowermost contaminants to the seasonal high water elevation of the ground water. If the exact depth to ground water is unknown, the ground water depth can be estimated using either local water well information, published regional ground water information, data on file with the New Mexico State Engineer Office or the vertical distance from adjacent ground water or surface water.

2. Wellhead Protection Area

The operator should determine the horizontal distance from all water sources including private and domestic water sources. Water sources are defined as wells, springs or other sources of fresh water extraction. Private and domestic water sources are those water sources used by less than five households for domestic or stock purposes.

3. Distance To Nearest Surface Water Body

The operator should determine the horizontal distance to all downgradient surface water bodies. Surface water bodies are defined as perennial rivers, streams, creeks, irrigation canals and ditches, lakes, ponds and playas.

B. SOIL/WASTE CHARACTERISTICS

Soils/wastes within and beneath the area of the leak, spill or release should be evaluated to determine the type and extent of contamination at the site. In order to assess the level of contamination, observations should be made of the soils at the surface and samples of the impacted soils should be taken in the leak, spill or release area. Observations should note whether previous leaks, spills or releases have occurred at the site. Additional samples may be required to completely define the lateral and vertical extent of contamination. Soil samples should be obtained according to the sampling procedures in Sections V.A. and V.B. This may be accomplished using a backhoe, drill rig, hand auger, shovel or other means.

Initial assessment of soil contaminant levels is not required if an operator proposes to determine the final soil contaminant concentrations after a soil removal or remediation pursuant to section VI.A.

Varying degrees of contamination described below may co-exist at an individual site. The following sections describe the degrees of contamination that should be documented during the assessment of the level of soil contamination:

1. Highly Contaminated/Saturated Soils

Highly contaminated/saturated soils are defined as those soils which contain a free liquid phase or exhibit gross staining.

2. Unsaturated Contaminated Soils

Unsaturated contaminated soils are defined as soils which are not highly contaminated/saturated, as described above, but contain benzene, toluene, ethylbenzene and xylenes (BTEX) and total petroleum hydrocarbons (TPH) or other potential fresh water contaminants unique to the leak, spill or release. Action levels and sampling and analytical methods for determining contaminant concentrations are described in detail in Sections IV. and V.

**** **(NOTE: Soils contaminated as a result of spills, leaks or releases of non-exempt wastes must be evaluated for all RCRA Subtitle C hazardous waste characteristics. The above definitions apply only to oilfield contaminated soils which are exempt from federal RCRA Subtitle C hazardous waste provisions and nonexempt oilfield contaminated soils which are characteristically nonhazardous according to RCRA Subtitle C regulations. Any nonexempt contaminated soils which are determined to be characteristically hazardous cannot be remediated using this guidance document and will be referred to the New Mexico Environment Department Hazardous Waste Program.)**

C. GROUND WATER QUALITY

If ground water is encountered during the soil/waste characterization of the impacted soils, a sample should be obtained to assess the incidents potential impact on ground water quality. Ground water samples should be obtained using the sampling procedures in Section V.C. Monitor wells may be required to assess potential impacts on ground water and the extent of ground water contamination, if there is a reasonable probability of ground water contamination based upon the extent and magnitude of soil contamination defined during remedial activities.

IV. SOIL AND WATER REMEDIATION ACTION LEVELS

A. SOILS

The sections below describe the OCD's recommended remediation action levels for soils contaminated with petroleum hydrocarbons. Soils contaminated with substances other than petroleum hydrocarbons may be required to be remediated based upon the nature of the contaminant and it's potential to impact fresh waters, public health and the environment.

1. Highly Contaminated/Saturated Soils

All highly contaminated/saturated soils should be remediated insitu or excavated to the maximum extent practicable. These soils should be remediated using techniques described in Section VI.A to the contaminant specific level listed in Section IV.A.2.b.

2. Unsaturated Contaminated Soils

The general site characteristics obtained during the site assessment (Section III.A.) will be used to determine the appropriate soil remediation action levels using a risk based approach. Soils which are contaminated by petroleum constituents will be scored according to the ranking criteria below to determine their relative threat to public health, fresh waters and the environment.

a. Ranking Criteria

Depth To Ground Water	Ranking Score
<50 feet	20
50 - 99	10
>100	0

Wellhead Protection Area

<1000 feet from a water source,or; <200 feet from private domestic water source	
Yes	20
No	0

Distance To Surface Water Body

<200 horizontal feet	20
200 - 1000 horizontal feet	10
>1000 horizontal feet	0

b. Recommended Remediation Action Level

The total ranking score determines the degree of remediation that may be required at any given site. The total ranking score is the sum of all four individual ranking criteria listed in Section IV.A.2.a. The table below lists the remediation action level that may be required for the appropriate total ranking score.

(NOTE: The OCD retains the right to require remediation to more stringent levels than those proposed below if warranted by site specific conditions (ie. native soil type, location relative to population centers and future use of the site or other appropriate site specific conditions.)

	Total Ranking Score		
	>19	10 - 19	0 - 9
Benzene(ppm)*	10	10	10
BTEX(ppm)*	50	50	50
TPH(ppm)**	100	1000	5000

* A field soil vapor headspace measurement (Section V.B.1) of 100 ppm may be substituted for a laboratory analysis of the Benzene and BTEX concentration limits.

** The contaminant concentration for TPH is the concentration above background levels.

B. GROUND WATER

Contaminated ground water is defined as ground water of a present or foreseeable beneficial use which contains free phase products, dissolved phase volatile organic constituents or other dissolved constituents in excess of the natural background water quality. Ground water contaminated in excess of the WQCC ground water standards or natural background water quality will require remediation.

V. SOIL AND WATER SAMPLING PROCEDURES

Below are the sampling procedures for soil and ground water contaminant investigations of leaks, spills or releases of RCRA Subtitle C exempt oil field petroleum hydrocarbon wastes. Leaks, spills or releases of non-exempt RCRA wastes must be tested to demonstrate that the wastes are not characteristically hazardous according to RCRA regulations. Sampling for additional

constituents may be required based upon the nature of the contaminant which was leaked, spilled or released.

A. HIGHLY CONTAMINATED OR SATURATED SOILS

The following method is used to determine if soils are highly contaminated or saturated:

1. Physical Observations

Study a representative sample of the soil for observable free petroleum hydrocarbons or immiscible phases and gross staining. The immiscible phase may range from a free hydrocarbon to a sheen on any associated aqueous phase. A soil exhibiting any of these characteristics is considered highly contaminated or saturated.

B. UNSATURATED CONTAMINATED SOILS

The following methods may be used for determining the magnitude of contamination in unsaturated soils:

1. Soil Sampling Procedures for Headspace Analysis

A headspace analysis may be used to determine the total volatile organic vapor concentrations in soils (ie. in lieu of a laboratory analysis for benzene and BTEX but not in lieu of a TPH analysis). Headspace analysis procedures should be conducted according to OCD approved industry standards or other OCD-approved procedures. Accepted OCD procedures are as follows:

a) Fill a 0.5 liter or larger jar half full of sample and seal the top tightly with aluminum foil or fill a one quart zip-lock bag one-half full of sample and seal the top of the bag leaving the remainder of the bag filled with air.

b) Ensure that the sample temperature is between 15 to 25 degrees Celsius (59-77 degrees Fahrenheit).

c) Allow aromatic hydrocarbon vapors to develop within the headspace of the sample jar or bag for 5 to 10 minutes. During this period, the sample jar should be shaken vigorously for 1 minute or the contents of the bag should be gently massaged to break up soil clods.

d) If using a jar, pierce the aluminum foil seal with the probe of either a PID or FID organic vapor meter (OVM), and then record the highest (peak) measurement. If using a bag, carefully open one end of the bag and insert the probe of the OVM into the bag and re-seal the bag around the probe as much as possible to prevent vapors from escaping. Record the peak measurement. The OVM must be calibrated to assume a benzene response factor.

2. Soil Sampling Procedures For Laboratory Analysis

a. Sampling Procedures

Soil sampling for laboratory analysis should be conducted according to OCD approved industry standards or other OCD-approved procedures. Accepted OCD soil sampling procedures and laboratory analytical methods are as follows:

i) Collect samples in clean, air-tight glass jars supplied by the laboratory which will conduct the analysis or from a reliable laboratory equipment supplier.

ii) Label the samples with a unique code for each sample.

iii) Cool and store samples with cold packs or on ice.

iv) Promptly ship sample to the lab for analysis following chain of custody procedures.

v) All samples must be analyzed within the holding times for the laboratory analytical method specified by EPA.

b. Analytical Methods

All soil samples must be analyzed using EPA methods, or by other OCD approved methods and must be analyzed within the holding time specified by the method. Below are laboratory analytical methods commonly accepted by OCD for analysis of soil samples analyzed for petroleum related constituents. Additional analyses may be required if the substance leaked, spilled or released has been anything other than petroleum based fluids or wastes.

i) Benzene, toluene, ethylbenzene and xylene

- EPA Method 602/8020

ii) Total Petroleum Hydrocarbons

- EPA Method 418.1, or;
- EPA Method Modified 8015

C. GROUND WATER SAMPLING

If an investigation of ground water quality is deemed necessary, it should be conducted according to OCD approved industry standards or other OCD-approved procedures. The following methods are standard OCD accepted methods which

should be used to sample and analyze ground water at RCRA Subtitle C exempt sites (Note: The installation of monitor wells may not be required if the OCD approves of an alternate ground water investigation or sampling technique):

1. Monitor Well Installation/Location

One monitor well should be installed adjacent to and hydrologically down-gradient from the area of the leak, spill or release to determine if protectable fresh water has been impacted by the disposal activities. Additional monitor wells, located up-gradient and down-gradient of the leak, spill or release, may be required to delineate the full extent of ground water contamination if ground water underlying the leak, spill or release has been found to be contaminated.

2. Monitor Well Construction

a) Monitor well construction materials should be:

i) selected according to industry standards;

ii) chemically resistant to the contaminants to be monitored; and

iii) installed without the use of glues/adhesives.

b) Monitor wells should be constructed according to OCD approved industry standards to prevent migration of contaminants along the well casing. Monitor wells should be constructed with a minimum of fifteen (15) feet of well screen. At least five (5) feet of the well screen should be above the water table to accommodate seasonal fluctuations in the static water table.

3. Monitor Well Development

When ground water is collected for analysis from monitoring wells, the wells should be developed prior to sampling. The objective of monitor well development is to repair damage done to the formation by the drilling operation so that the natural hydraulic properties of the formation are restored and to remove any fluids introduced into the formation that could compromise the integrity of the sample. Monitoring well development is accomplished by purging fluid from the well until the pH and specific conductivity have stabilized and turbidity has been reduced to the greatest extent possible.

4. Sampling Procedures

Ground water should be sampled according to OCD accepted standards or other OCD approved methods. Samples should be collected in clean containers supplied by the laboratory which will conduct the analysis or from a reliable laboratory equipment supplier. Samples for

different analyses require specific types of containers. The laboratory can provide information on the types of containers and preservatives required for sample collection. The following procedures are accepted by OCD as standard sampling procedures:

a) Monitor wells should be purged of a minimum of three well volumes of ground water using a clean bailer prior to sampling to ensure that the sample represents the quality of the ground water in the formation and not stagnant water in the well bore.

b) Collect samples in appropriate sample containers containing the appropriate preservative for the analysis required. No bubbles or headspace should remain in the sample container.

c) Label the sample containers with a unique code for each sample.

d) Cool and store samples with cold packs or on ice.

e) Promptly ship sample to the lab for analysis following chain of custody procedures.

f) All samples must be analyzed within the holding times for the laboratory analytical method specified by EPA.

5. Ground Water Laboratory Analysis

Samples should be analyzed for potential ground water contaminants contained in the waste stream, as defined by the WQCC Regulations. All ground water samples must be analyzed using EPA methods, or by other OCD approved methods and must be analyzed within the holding time specified by the method. Below are OCD accepted laboratory analytical methods for analysis of ground water samples analyzed for petroleum related constituents. Additional analyses may be required if the substance leaked, spilled or release has been anything other than a petroleum based fluid or waste.

a. <u>Analytical Methods</u>

i.) Benzene, Toluene, Ethylbenzene and Xylene

- EPA Method 602/8020

ii.) Major Cations and Anions

- Various EPA or standard methods

iii.) Heavy Metals

- EPA Method 6010, or;
- Various EPA 7000 series methods

iv.) Polynuclear Aromatic Hydrocarbons

- EPA Method 8100

VI. REMEDIATION

The following discussion summarizes recommended techniques for remediation of contaminated soil and ground water as defined in Section IV.A. and IV.B. OCD approval for remediation of an individual leak, spill or release site is not required if the company is operating under an OCD approved spill containment plan. All procedures which deviate from the companies spill containment plan must be approved by OCD.

A. SOIL REMEDIATION

When RCRA Subtitle C exempt or RCRA nonhazardous petroleum contaminated soil requires remediation, it should be remediated and managed according to the criteria described below or by other OCD approved procedures which will remove, treat, or isolate contaminants in order to protect fresh waters, public health and the environment.

In lieu of remediation, OCD may accept an assessment of risk which demonstrates that the remaining contaminants will not pose a threat to present or foreseeable beneficial use of fresh waters, public health and the environment.

1. Contaminated Soils

Highly contaminated/saturated soils and unsaturated contaminated soils exceeding the standards described in Section IV.A. should be either:

a) Excavated from the ground until a representative sample from the walls and bottom of the excavation is below the contaminant specific remediation level listed in Section IV.A.2.b or an alternate approved remediation level, or;

b) Excavated to the maximum depth and horizontal extent practicable. Upon reaching this limit a sample should be taken from the walls and bottom of the excavation to determine the remaining levels of soil contaminants, or;

c) Treated in place, as described in Section VI.A.2.b.ii. - Treatment of Soil in Place, until a representative sample is below the contaminant specific remediation level listed in Section IV.A.2.b, or an alternate approved remediation level, or;

d) Managed according to an approved alternate method.

2. Soil Management Options

All soil management options must be approved by OCD. The following is a list of options for either on-site treatment or off-site treatment and/or disposal of contaminated soils:

a. Disposal

Excavated soils may be disposed of at an off-site OCD approved or permitted facility.

b. Soil Treatment and Remediation Techniques

i. Landfarming

Onetime applications of contaminated soils may be landfarmed on location by spreading the soil in an approximately six inch lift within a bermed area. Only soils which do not contain free liquids can be landfarmed. The soils should be disced regularly to enhance biodegradation of the contaminants. If necessary, upon approval by OCD, moisture and nutrients may be added to the soil to enhance aerobic biodegradation.

In some high risk areas an impermeable liner may be required to prevent leaching of contaminants into the underlying soil.

Landfarming sites that will receive soils from more than one location are considered centralized sites and must be approved separately by the OCD prior to operation.

ii. Insitu Soil Treatment

Insitu treatment may be accomplished using vapor venting, bioremediation or other approved treatment systems.

iii. Alternate Methods

The OCD encourages alternate methods of soil remediation including, but not limited to, active soil aeration, composting, bioremediation, solidification, and thermal treatment.

B. GROUND WATER REMEDIATION

1. Remediation Requirements

Ground water remediation activities will be reviewed and approved by OCD on a case by case basis prior to commencement of remedial activities. When contaminated

ground water exceeds WQCC ground water standards, it should be remediated according to the criteria described below.

a. Free Phase Contamination

Free phase floating product should be removed from ground water through the use of skimming devices, total-fluid type pumps, or other OCD-approved methods.

b. Dissolved Phase Contamination

Ground water contaminated with dissolved phase constituents in excess of WQCC ground water standards can be remediated by either removing and treating the ground water, or treating the ground water in place. If treated waters are to be disposed of onto or below the ground surface, a discharge plan must be submitted and approved by OCD.

c. Alternate Methods

The OCD encourages other methods of ground water remediation including, but not limited to, air sparging and bioremediation. Use of alternate methods must be approved by OCD prior to implementation.

VII. TERMINATION OF REMEDIAL ACTION

Remedial action may be terminated when the criteria described below have been met:

A. SOIL

Contaminated soils requiring remediation should be remediated so that residual contaminant concentrations are below the recommended soil remediation action level for a particular site as specified in Section IV.A.2.b.

If soil action levels cannot practicably be attained, an evaluation of risk may be performed and provided to OCD for approval showing that the remaining contaminants will not pose a threat to present or foreseeable beneficial use of fresh water, public health and the environment.

B. GROUND WATER

A ground water remedial action may be terminated if all recoverable free phase product has been removed, and the concentration of the remaining dissolved phase contaminants in the ground water does not exceed New Mexico WQCC water quality standards or background levels. Termination of remedial action will be approved by OCD upon a demonstration of completion of remediation as described in above.

VIII. FINAL CLOSURE

Upon termination of any required remedial actions (Section VII.) the area of a leak, spill or release may be closed by backfilling any excavated areas, contouring to provide drainage away from the site, revegetating the area or other OCD approved methods.

IX. FINAL REPORT

Upon completion of remedial activities a final report summarizing all actions taken to mitigate environmental damage related to the leak, spill or release will be provided to OCD for approval.

APPENDIX A

A. The Division shall be notified of any fire, break, leak, spill, or blowout occurring at any injection or disposal facility or at any oil or gas drilling, producing, transporting, or processing facility in the State of New Mexico by the person operating or controlling such facility.

B. "Facility," for the purpose of this rule, shall include any oil or gas well, any injection or disposal well, and any drilling or workover well; any pipe line through which crude oil, condensate, casinghead or natural gas, or injection or disposal fluid (gaseous or liquid) is gathered, piped, or transported (including field flow-lines and lead-lines but not including natural gas distribution systems); any receiving tank, holding tank, or storage tank, or receiving and storing receptacle into which crude oil, condensate, injection or disposal fluid, or casinghead or natural gas is produced, received, or stored; any injection or disposal pumping or compression station including related equipment; any processing or refining plant in which crude oil, condensate, or casinghead or natural gas is processed or refined; and any tank or drilling pit or slush pit associated with oil or gas well or injection or disposal well drilling operations or any tank, storage pit, or pond associated with oil or gas production or processing operations or with injection or disposal operations and containing hydrocarbons or hydrocarbon waste or residue, salt water, strong caustics or strong acids, or other deleterious chemicals or harmful contaminants.

C. Notification of such fire, break, leak, spill, or blowout shall be in accordance with the provisions set forth below:

(1) Well Blowouts. Notification of well blowouts and/or fires shall be "immediate notification" described below. ("Well blowout" is defined as being loss of control over and subsequent eruption of any drilling or workover well, or the rupture of the casing, casinghead, or wellhead or any oil or gas well or injection or disposal well, whether active or inactive, accompanied by the sudden emission of fluids, gaseous or liquid, from the well.)

(2) "Major" Breaks, Spills, or Leaks. Notification of breaks, spills, or leaks of 25 or more barrels of crude oil or condensate, or 100 barrels or more of salt water, none of which reaches a watercourse or enters a stream or lake; breaks, spills, or leaks in which one or more barrels of crude oil or condensate or 25 barrels or more of salt water does reach a watercourse or enters a stream or lake; and breaks, spills, or leaks of hydrocarbons or hydrocarbon waste or residue, salt water, strong caustics or strong acids, gases, or other deleterious chemicals or harmful contaminants of any magnitude which may with reasonable probability endanger human health or result in substantial damage to property, shall be "immediate notification" described below.

(3) "Minor" Breaks, Spills, or Leaks. Notification of breaks, spills, or leaks of 5 barrels or more but less than 25 barrels of crude oil or condensate, or 25 barrels or more but less than 100 barrels of salt water, none of which reaches a watercourse or enters a stream or lake, shall be "subsequent notification" described below.

(4) "Gas Leaks and Gas Line Breaks. Notification of gas leaks from any source or of gas pipe line breaks in which natural or casinghead gas of any quantity has escaped or is escaping which may with reasonable probability endanger human health or result in substantial damage to property shall be "immediate notification" described below. Notification of gas pipe line breaks or leaks in which the loss is estimated to be 1000 or more MCF of natural or casinghead gas but in which there is no danger to human health nor of substantial damage to property shall be "subsequent notification" described below.

(5) Tank Fires. Notification of fires in tanks or other receptacles caused by lightning or any other cause, if the loss is, or it appears that the loss will be, 25 or more barrels of crude oil or condensate, or fires which may with reasonable probability endanger human health or result in substantial damage to property, shall be "immediate notification" as described below. If the loss is, or it appears that the loss will be at least 5 barrels but less than 25 barrels, notification shall be "subsequent notification" described below.

(6) Drilling Pits, Slush Pits, and Storage Pits and Ponds. Notification of breaks and spills from any drilling pit, slush pit, or storage pit or pond in which any hydrocarbon or hydrocarbon waste or residue, strong caustic or strong acid, or other deleterious chemical or harmful contaminant endangers human health or does substantial surface damage, or reaches a watercourse or enters a stream or lake in such quantity

APPENDIX B

1-203. NOTIFICATION OF DISCHARGE--REMOVAL.

A. With respect to any discharge from any facility of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, the following notifications and corrective actions are required:

1. As soon as possible after learning of such a discharge, but in no event more than twenty-four (24) hours thereafter, any person in charge of the facility shall orally notify the Chief, Ground Water Bureau, Environmental Improvement Division, or his counterpart in any constituent agency delegated responsibility for enforcement of these rules as to any facility subject to such delegation. To the best of that person's knowledge, the following items of information shall be provided:

a. the name, address, and telephone number of the person or persons in charge of the facility, as well as of the owner and/or operator of the facility;

b. the name and address of the facility;

c. the date, time, location, and duration of the discharge;

d. the source and cause of discharge;

e. a description of the discharge, including its chemical composition;

f. the estimated volume of the discharge; and

g. any actions taken to mitigate immediate damage from the discharge.

2. When in doubt as to which agency to notify, the person in charge of the facility shall notify the Chief, Ground Water Bureau,
Environmental Improvement Division. If that division does not have authority pursuant to Commission delegation, the division shall notify the appropriate constituent agency.

3. Within one week after the discharger has learned of the discharge, the facility owner and/or operator shall send written notification to the same division official, verifying the prior oral notification as to each of the foregoing items and providing any appropriate additions or corrections to the information contained in the prior oral notification.

4. The oral and written notification and reporting requirements contained in the three preceding paragraphs and the paragraphs below are not intended to be duplicative of discharge notification and reporting requirements promulgated by the Oil Conservation Commission (OCC) or by the Oil Conservation Division (OCD); therefore, any facility which is subject to OCC or OCD discharge notification and reporting requirements need not additionally comply with the nofification/and reporting requirements herein.

5. As soon as possible after learning of such a discharge, the owner/operator of the facility shall take such corrective actions as are necessary or appropriate to contain and remove or mitigate the damage caused by the discharge.

Attachment F
(Analytical Report from Facility Water Wells)

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

Wednesday, September 02, 2009

Charlie Allen
Transwestern Pipeline Co.
P.O. Box 1019
Thoreau, NM 87323

TEL: (505) 862-7443
FAX (505) 862-7826

RE: Sta. 5 Thoreau TWP Water SamplesNM3561817

Order No.: 0908415

Dear Charlie Allen:

Hall Environmental Analysis Laboratory, Inc. received 3 sample(s) on 8/24/2009 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

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

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

Sincerely,

For Andy Freeman, Laboratory Manager

NM Lab # NM9425
AZ license # AZ0682
ORELAP Lab # NM100001
Texas Lab# T104704424-08-TX

ARS ANALYTICAL, LLC

4301 Masthead NE | Albuquerque, New Mexico 87109 505.344.3777 | 505.345.8964

Explanation of codes	
B	Analyte Detected in Method Blank
E	Result Is Estimated
H	Analyzed Out of Hold Time
N	Tentatively Identified Compound
S	Subcontracted
1-9	See Footnote

TRANSWESTERN PIPELINE STA 5
attn ANDY FREEMAN
4901 HAWKINS NE, SUITE D
ALBUQUERQUE NM 87109-4372

STANDARD

ARS Analytical, LLC

Certificate of Analysis

All samples are reported on an "as received" basis, unless otherwise noted (i.e. - Dry Weight).

Client: **TRANSWESTERN PIPELINE STA 5**
Project: **0908415**
Order: **09080628 HAL03** Receipt: **08-25-09**

Elvin J. Chavez: President of ARS Analytical, LLC

Sample: ***0908415-01A STA 5 E. WELL HEAD*** Collected: *08-24-09 11:15:00* By:
Matrix: ***AQUEOUS*** *SR7269*

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
09080628-001A		SM-9223B					By: FAS			
BT09297	BT.2009.518.1		E. coli, MMO/MUG	Absent	N/A	1	0		08-25-09	08-26-09
BT09297	BT.2009.518.1		Total Coliform, MMO/MUG	Absent	N/A	1	0		08-25-09	08-26-09

Sample: ***0908415-02A STA 5 CENTER*** Collected: *08-24-09 11:30:00* By:
Matrix: ***AQUEOUS*** *WELL HEAD/SR7270*

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
09080628-002A		SM-9223B					By: FAS			
BT09297	BT.2009.518.2		E. coli, MMO/MUG	Absent	N/A	1	0		08-25-09	08-26-09
BT09297	BT.2009.518.2		Total Coliform, MMO/MUG	Absent	N/A	1	0		08-25-09	08-26-09

Sample: ***0908415-03A STA 5 W. WELL HEAD*** Collected: *08-24-09 11:45:00* By:
Matrix: ***AQUEOUS*** *SR7271*

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
09080628-003A		SM-9223B					By: FAS			
BT09297	BT.2009.518.3		E. coli, MMO/MUG	Absent	N/A	1	0		08-25-09	08-26-09
BT09297	BT.2009.518.3		Total Coliform, MMO/MUG	Absent	N/A	1	0		08-25-09	08-26-09

Report Date: *8/27/2009 3:24:39 PM*

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name **TWP THOREAU** Date Received: **8/24/2009**

Work Order Number **0908415** Received by: **TLS**

Checklist completed by: Signature 8/24/09 Date Sample ID labels checked by: Initials

Matrix: Carrier name: Client drop-off

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☐	Not Shipped ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	N/A ☑	
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☐	No ☑		
All samples received within holding time?	Yes ☑	No ☐		Number of preserved bottles checked for pH:
Water - VOA vials have zero headspace?	No VOA vials submitted ☑	Yes ☐	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☐	No ☐	N/A ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑	*<2 >12 unless noted below.*
Container/Temp Blank temperature?	**10.8°**	*<6° C Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Transwestern Pipeline

Mailing Address: P.O. Box 1019
Thoreau NM 87323

Phone #: 505-870-9432

email or Fax#: 505-862-7826

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: STA. 5 Thoreau Transwestern Pipeline Water Samples.

Project #: STA. 5 Well Heads. E-Coli, Bact, Total C.I.F.

Project Manager: Charlie Allen

Sampler: Charlie Allen

On Ice: ☑ Yes ☐ No

Sample Temperature: 2°C 10.8

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 0908415	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	8310 (PNA or PAH)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	E-Coli	Bact mmot-mus	Total C.I.F.		Air Bubbles (Y or N)
8/24/09	11:15	Grab	STA.5 East well Head	Plastic		1												X	X	X		
8/24/09	11:30	Grab	STA.5 Center well Head	Plastic		2												X	X	X		
8/24/09	11:45	Grab	STA.5 West well Head	Plastic		3												X	X	X		

Please send analysis Report To State of NM for Transwestern.

STA. 5 Thoreau Water # 618-17

Send Invoice To
Attn: George Friend.
Transwestern Pipeline Company
Summit Office Building, Suite 250
4001 Indian School Road NE
Albuquerque, NM 87110

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/24/09	14:24			8/24/09	1424
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: Send analysis Report To:
Charlie allen@energytransfer.com.

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

New Source Permit Application

Thoreau Compressor Station
Transwestern Pipeline Company
McKinley County, New Mexico

Submitted to:

State of New Mexico Environment Department
Air Pollution Control Bureau

Prepared by:

George C. Robinson, P.E., Environmental Engineer
Cypress Engineering Services, Inc.
16300 Katy Freeway, Suite 105
Houston, Texas 77094-1609

&

Fenley "Ted" Ryther, Jr., P.E., Permits Group Manager
ENRON Operations Corp., Group Technical Services
Department of Environmental Affairs
P.O. Box 1188
Houston, Texas 77251-1188

March 31, 1994

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New Source Permit Application

Thoreau Compressor Station
Transwestern Pipeline Company
McKinley County, New Mexico

1.0 Introduction

Transwestern Pipeline Company (TPC) is filing an application for permit to install a soil vapor extraction system at TPC's Compressor Station No. 5 located near Thoreau, New Mexico (Figure 1). The soil vapor extraction system is to be installed as part of a proposed ground water remediation project at the site. The estimated emissions from the new source are below the levels required for a permit (AQCR 702) or a notice of intent (AQCR 703.1); however, the proposed new source is to be installed at a "grandfathered" facility. The soil vapor extraction system technically could be considered a modification to the existing facility which would require the submittal of an operating permit application for the entire facility. Therefore, representatives of TPC and the NMED Air Pollution Control Bureau met on February 10, 1994 to discuss this issue. As a result it was agreed that TPC would permit the soil vapor extraction system separate from the main facility with the understanding that an operating permit application would be submitted for the main facility in the near future as required by Title V of the 1990 Clean Air Act Amendments.

A completed permit application form is included in Appendix A. A completed permit application form checklist is included in Appendix B.

2.0 Description of Facility

2.1 Main Facility

The function of the main facility is to compress natural gas that is transported westward via TPC's 30" natural gas pipeline. The facility was constructed in 1958 on a 40 acre site that is owned by TPC (Figure 2). The SIC code for the existing facility is 4922. The primary air emission sources of the main facility are three 4500 Hp Cooper-Bess reciprocating engines that drive the compressors.

2.2 Proposed New Source Facility

The proposed soil vapor extraction system will be located in the southeast corner of the main facility as shown in Figure 2. The location of the proposed source is indicated by SVE-1 and SVE-2.

The proposed soil vapor extraction system will be implemented in three phases. A three phase approach was developed in order to limit the volatile organic compounds (VOC) emission rate from soil vapor extraction and to allow opportunities to optimize system components between

phases.

2.2.1 Phase I - Initial SVE System

The primary objective of the phase I system is to remove a limited volume of soil vapor to reduce the concentration of volatile organic compounds (VOC) from within the area to be remediated. This will be accomplished by extracting soil vapor from a single SVE well at a rate of 20-25 cfm (Figure 3). The purpose of the limited vapor extraction rate is to maintain the VOC emission rate below which emission control equipment is required. Typically, the VOC emissions from an SVE system are greatest at the start-up of the system and drop off rapidly to a much lower sustained rate. Therefore, rather than control VOC emissions with emission control equipment for such a short duration, the phase I system will maintain a low emission rate from a single SVE well for a longer duration. Once the concentration of VOCs have declined to lower levels, the phase II system will start-up without limitations imposed by VOC emission rates. The estimated duration of phase I is 30 days. After 30 days of operation, the phase II system is scheduled to start-up.

Monitor well 5-34B will be utilized as an extraction well during phase I. It was determined during an SVE pilot test that a sustainable extraction rate of approximately 21 cfm could be maintained from well 5-34B at a vacuum of 6"of H_2O. In the event the SVE equipment is not capable of limiting the vapor extraction rate from monitor well 5-34B to less than 25 cfm, then monitor well 5-35B will be used as the extraction well during phase I. It was determined during the SVE pilot test that a sustainable extraction rate of approximately 22 cfm could be maintained from well 5-35B at a vacuum of 27"of H_2O. The location of the emission source (SVE-1) during phase I will be adjacent to monitor well 5-34B as shown in Figure 3.

The surface equipment associated with the phase I vapor extraction system will consist of the following:

- 1 - Regenerative blower with 1/3 Hp TEFC motor (460V/15A/3ϕ; Class 1 Div 2 Group D);
- 1 - Vapor filter assembly;
- 1 - Water knockout assembly;
- 2 - Vacuum gauges
- 1 - Vapor flowmeter, 5-50 cfm range;
- 1 - Protective weather cover for blower; and
- 2 - Orifice plate flanges and multiple size orifice plates.

The purpose of the orifice plate is to limit the vapor extraction rate, and likewise the "potential emission rate", of the equipment to less than 25 cfm. The orifice plate, if necessary, will be located between the extraction well and the SVE blower. Due to the short duration of phase I, the equipment skid will be placed directly on the ground surface and located adjacent to the extraction well.

2.2.2 Phase II - Expanded SVE System

The purpose of the phase II system is to increase the soil vapor extraction rate to 88 cfm. The

estimated duration of phase II is six to twelve months. This time frame will allow sufficient time to evaluate the operation of the system and to make plans to optimize the system during installation of phase III if necessary.

Monitor wells 5-4B, 5-34B, and 5-35B will be utilized as extraction wells during phase II. In addition, a fourth extraction well will be drilled and completed just west of 5-34B to ensure containment of injected air (Figure 4). It is anticipated that a sustainable extraction rate of approximately 88 cfm will be maintained from the four wells with a vacuum of 20″of H_2O.

The surface equipment for the SVE system will be skid mounted and located in a storage shed just east of monitor well 5-2B as shown in Figure 4 (SVE-2). The blower discharge will be routed just outside the storage shed. The surface equipment associated with the vapor extraction system has been sized to accommodate the capacity requirements of both the phase II and phase III systems. This system will consist of the following:

- 1 - Regenerative blower with 5 Hp motor (460V/30A/3ϕ; Class 1 Div 2 Group D);
- 1 - Vapor filter assembly;
- 1 - Water knockout assembly and 30 gallon reservoir tank;
- 2 - Vacuum gauges;
- 1 - Butterfly valve; and
- 1 - Vapor flowmeter, 20-200 cfm range.

2.2.3 Phase III - Final SVE System

The purpose of the phase III addition to the phase II system is to increase the soil vapor extraction rate to 176 cfm. This will be accomplished by an expansion of the phase II system which, when complete, will extract soil vapor from five (5) SVE wells (Figure 5). The estimated duration of phase III is two to five years. This time frame should be sufficient to achieve the remediation objectives.

Monitor well 5-5B will be utilized as an extraction well in addition to the four wells utilized during phase II. It is anticipated that a sustainable extraction rate of approximately 132 - 176 cfm will be maintained from the five wells with a vacuum of 30-40″of H_2O. If necessary, a sixth extraction well will be drilled and completed. Information obtained during phase II will determine whether a sixth extraction well would be necessary.

Assuming that no optimization of the SVE equipment is necessary, there would be no modification of the phase II equipment.

3.0 Nature and Use of Surrounding Area

The Thoreau compressor station is located approximately 1.5 miles north-northwest of Thoreau, New Mexico in McKinley County, as shown on Figure 1. The property adjacent to the TPC station site is owned by the Navajo Nation and the Bureau of Land Management. Inhabitation of

the area in the immediate vicinity of the station site is sparse. The nearest residence to the proposed new source is located approximately 800 feet south of the south station boundary. The area immediately south of the station site is also used for livestock grazing.

The land surface at the station slopes gently to the south and is sparsely vegetated with native grasses, juniper, and piñon pine. The land surface elevation is about 7300 feet above mean sea level (fmsl). The station is located on the north side of a broad east-west trending valley just east of the continental divide. The Zuni Mountains to the south rise to about 9100 feet, and the prominent cliffs of the Owl Rock escarpment define the northern edge of the valley. No well defined surface drainages cross the station. A 7.5 minute topographic quadrangle map is included in Appendix F.

4.0 Emission Calculations

4.1 Phase I Emissions Estimate

An SVE pilot test was completed in November 1993 in order to gather information on potential emissions. The results of the pilot test is included in Appendix D. The estimated emission rates for phase I were calculated based on measurements and samples taken from monitor well 5-34B which exhibited the highest vapor concentrations of VOCs. The method for estimation of emissions is included in Appendix C. The various data and parameters used for each calculation and the results of each calculation are also included in Appendix C. The results for all regulated contaminants are also included in the permit application attached as Appendix A.

Based on the results of the SVE pilot test, the only regulated air contaminant that will approach either 10 pounds per hour or 10 tons per year is total non-methane hydrocarbons (NMHC). Total NMHC emissions is estimated to be 6.75 lb/hr at start-up of the system.

It is typical for emissions of VOCs from soil vapor extraction systems to drop off rapidly after start-up. Therefore, a conservative estimate of emissions during the first month of operation of the phase I system can be made by assuming an average emission rate of 75% of the initial emission rate. This assumption results in a total emission estimate for the first month of operation of 1.85 tons NMHC. The results of these calculations are also shown in the worksheet included in Appendix C.

4.2 Phase II Emissions Estimate

An estimate of the emission rates during phase II has been prepared by assuming an average extraction rate of 88 cfm for the duration of phase II and the VOC concentrations measured during the pilot test at the monitor well 5-4B location. The total emissions during operation of the phase II system was estimated assuming an average emission rate of 75% of the phase II initial emission rate. The results of these calculations are also included in Appendix C.

4.3 Phase III Emissions Estimate

In a similar manner, an estimate for the emission rates during phase III has been prepared by assuming an average extraction rate of 176 cfm for the duration of phase III and the VOC concentrations measured during the pilot test at the monitor well 5-4B location. The total emissions during operation of the phase III system was estimated assuming an average emission rate of 50% of the phase III initial emission rate. The results of these calculations are also included in Appendix C.

4.4 Total Annual Emissions Estimate

An estimate of maximum emissions anticipated during the first year of operation can be calculated assuming phase I operates for a period of one month, phase II operates for a period of six months, and phase III operates for the remaining five months. These assumptions result in an emission estimate of 4.33 tons NMHC during the first year of operation.

A conservative estimate of total emissions anticipated during the second year of operation can be calculated assuming phase III operates for a period of twelve months and an average emission rate of 50% of the phase III initial emission rate. These assumptions result in an emission estimate of 3.13 tons NMHC during the second year of operation.

5.0 Required Notices

Public notice has been made as required by AQCR 702 and in accordance with the NMED "Guidelines for Public Notification Regarding Permit Application" dated June 1990. Specific details of the public notices are as follows:

1. A notice of permit application was sent by certified mail to adjacent landowners and nearby county officials. Adjacent landowners are the Navajo Nation and the Bureau of Land Management. County officials in McKinley and Cibola counties were notified. There are no known municipal officials to notify in the town of Thoreau, New Mexico. A copy of the letters and the returned receipts are included in Appendix E.

2. A notice of permit application was posted on March 10, 1994 in four "publicly accessible and conspicuous places". A copy is included in Appendix E. The posted locations were:
   1. Compressor station main gate,
   2. Thoreau Shopping Center,
   3. Thoreau post office,
   4. Gasoline service station next to the Thoreau Shopping Center, and
   5. St. Bonaventure Mission.

3. A notice of permit application was published in a newspaper of general circulation, The Gallup Independent. A copy of the affidavit of publication is included in Appendix E.

4. A notice of permit application was provided in a public service announcement by KXTC Radio in Gallup, New Mexico. A copy of the affidavit of announcement is included in Appendix E.

Figures

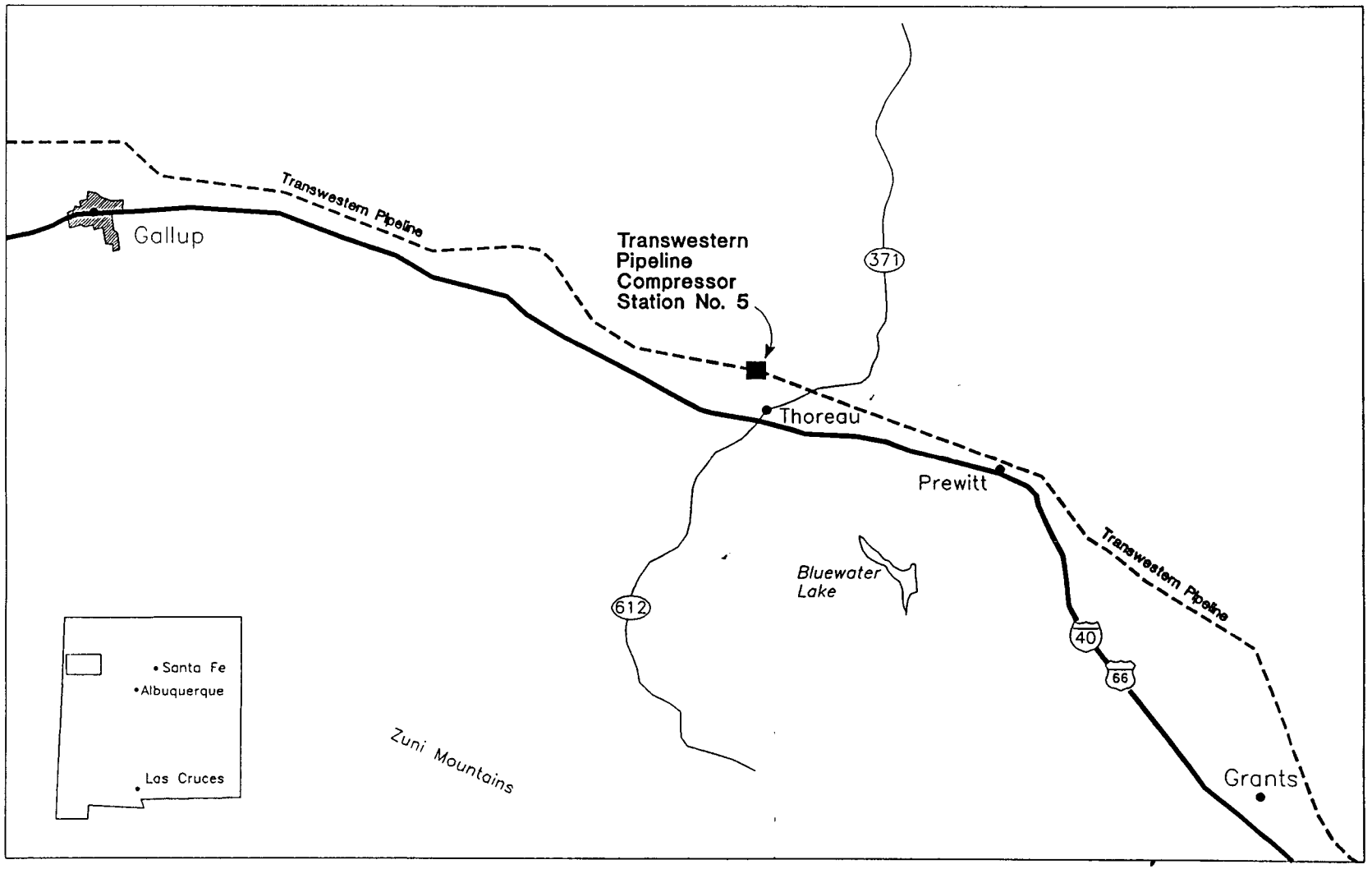
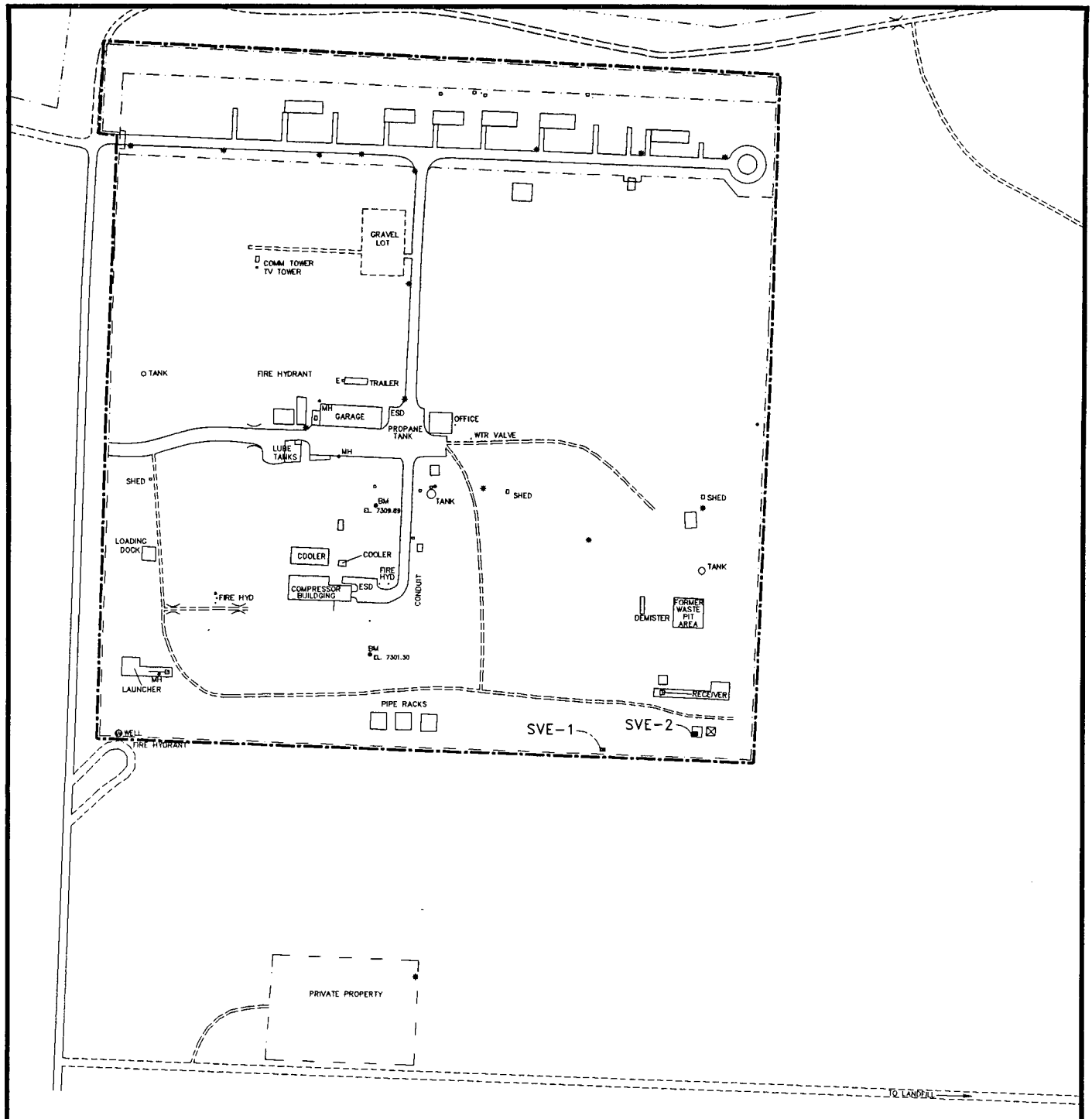


Figure 1

THOREAU COMPRESSOR STATION
Regional Location Map

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94 JN 2105



N

0 400'

Explanation

- Manhole
- Chainlink Fence
- Compressor Station Boundary
- Gravel Road
- Light

Figure 2

Site Map
Thoreau Compressor Station

TRANSWESTERN PIPE LINE COMPANY
2-94

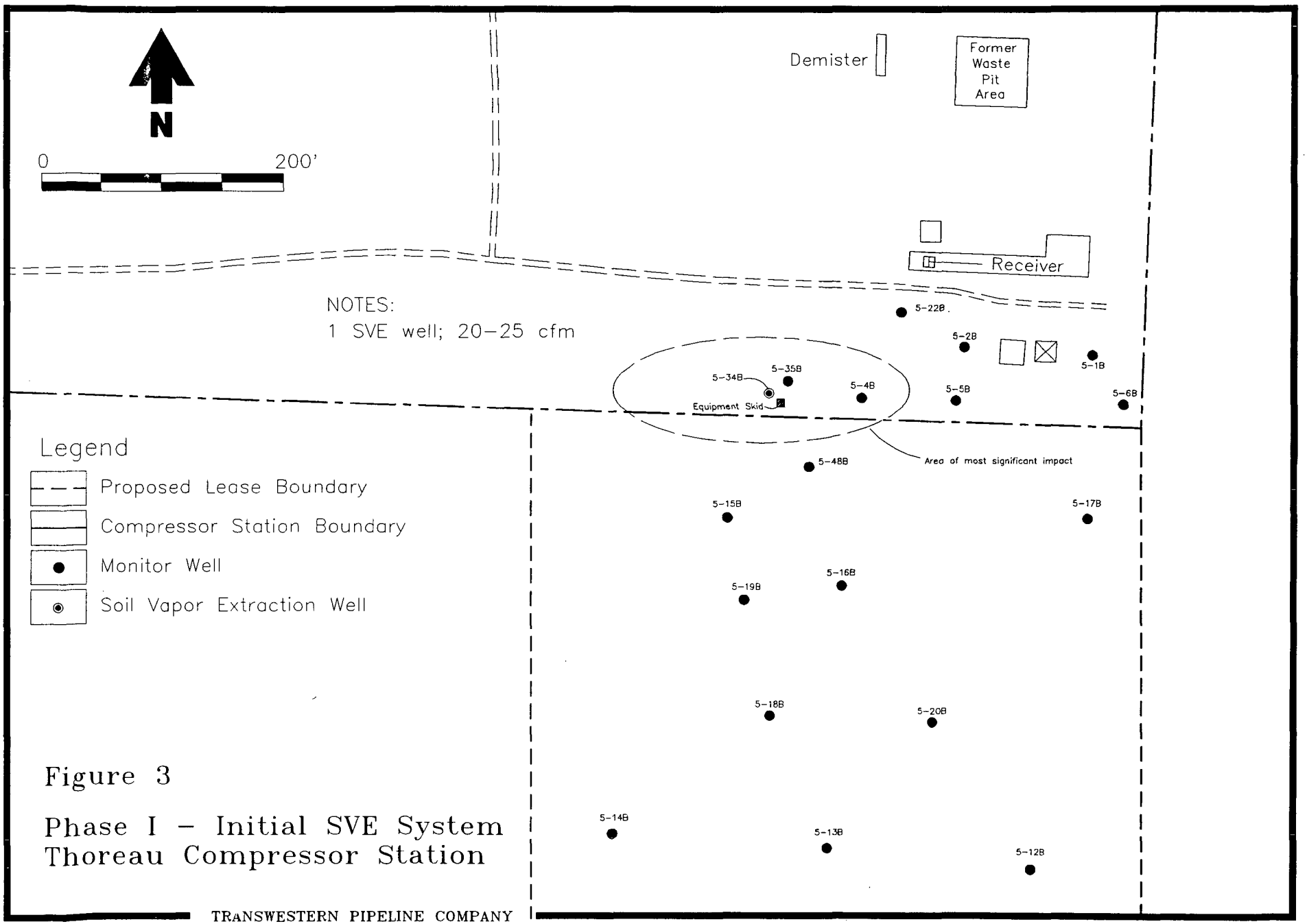


Figure 3

Phase I – Initial SVE System
Thoreau Compressor Station

TRANSWESTERN PIPELINE COMPANY

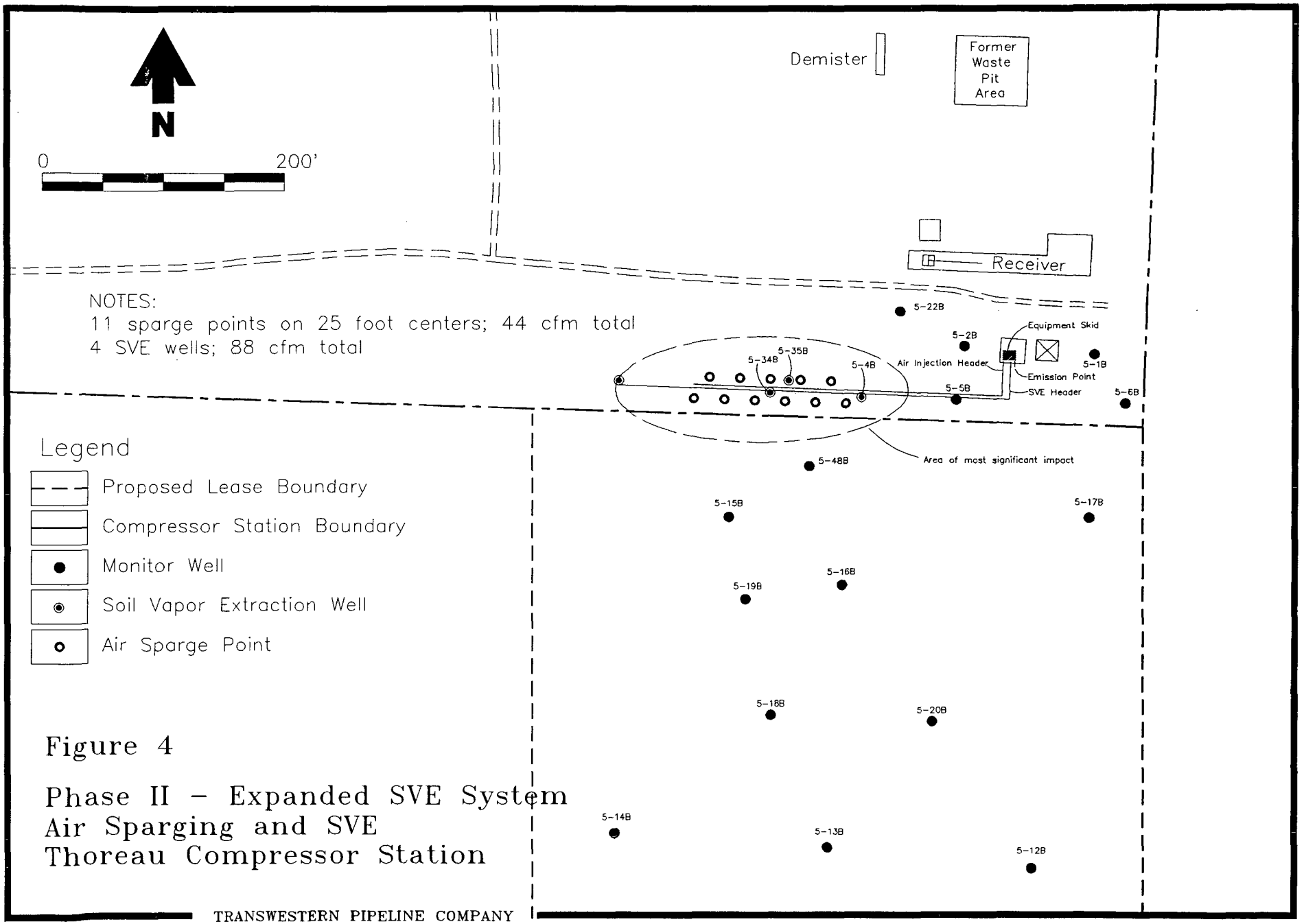


Figure 4

Phase II – Expanded SVE System
Air Sparging and SVE
Thoreau Compressor Station

TRANSWESTERN PIPELINE COMPANY

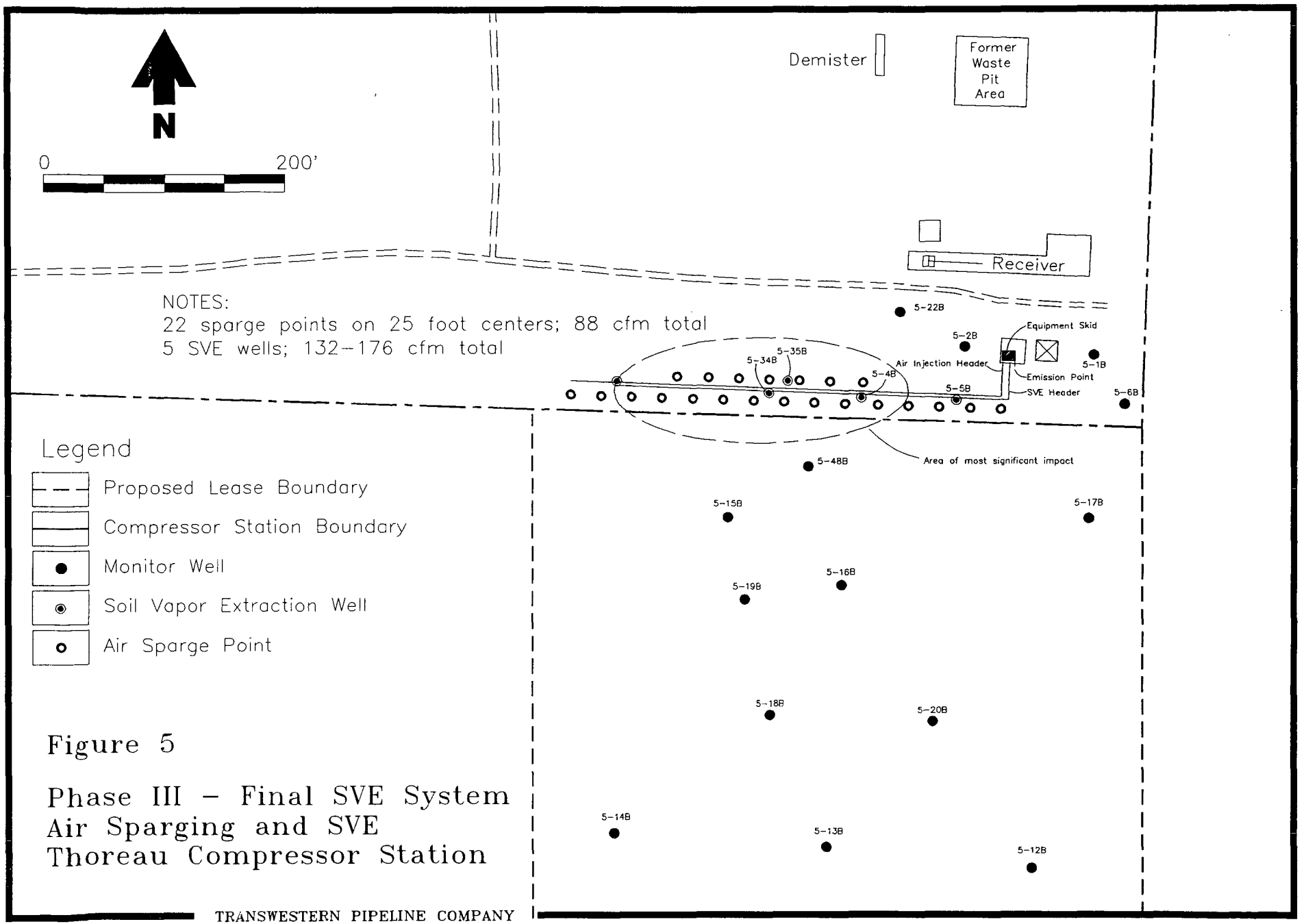


Figure 5

Phase III - Final SVE System
Air Sparging and SVE
Thoreau Compressor Station

TRANSWESTERN PIPELINE COMPANY

Appendix A

Permit Application Form

NMED - AIR QUALITY BUREAU
P.O. BOX 26110
SANTA FE, NEW MEXICO 87502
TELEPHONE: (505) 827-0070

GENERAL AIR QUALITY PERMIT APPLICATION AND NOTICE OF INTENT FOR THE STATE OF NEW MEXICO

Revised: November 4, 1992

Please answer all questions applicable to your specific business, operation and products.
Use the abbreviation "N.A." for "not applicable" wherever appropriate.

SECTION 1 - GENERAL DATA

1. Company Name: Transwestern Pipeline Company 2. Application Date: 3-31-94

3. Company Mailing Address: P.O. Box 1188, Houston, Texas 77251 Phone: _____

Person to Contact (1): Fenley "Ted" Ryther, Jr., P.E. Title: Manager, Permits Group Envr. Aff. Phone: (713) 646-7318

4. a. Name and Address of new plant or modification: Name: SVE Vent; Address: Compressor Station #5, P.O. Box 1019, Thoreau, New Mexico 87323 Is U.S.G.S. quadrangular map or equivalent attached? (2) Yes

b. Location of Plant: County: McKinley Range: 13W Township: 14N Section: 20

UTM Zone: 12 UTMH: 751.4 km UTMV: 3,923.4 km Plant Elevation 7300 ft above mean sea level.

c. Approximate location (direction and distance from nearest town): 2.4 miles NNW of Thoreau, New Mexico

5. a. Describe briefly type of plant and nature of construction (or modification) and products: (3) Installation of a vapor blower for the removal of subsurface vapors potentially containing volatile organic compounds (VOCs). Products: None

b. Is this a modification to an existing plant? Yes ___ No X If yes, give the date of original construction: _____

c. Date of anticipated start of construction: 7/1/94 Date of anticipated Start of Operation: 7/1/94

6. Maximum Design Plant capacity (specify units) (4): 176 CFM (Cubic Feet per minute)

7. Class of land at plant site (private, State, Federal, Indian, etc.): Private

8. Is this site permanent? Yes If not, how long is it expected to be occupied? NA Date of anticipated startup: 7/1/94

9. Normal operating schedule: 24 hours per day, 7 days per week, 4 weeks per month, 12 months per year.

10. Specify maximum operational periods: Continuous

11. Specify percent annual production by quarters: Dec. - Feb. 25, Mar. - May 25, June - Aug. 25, Sep. - Nov. 25

12. Capital Costs (Reconstruction) : (To include all depreciable components only) (5)
Capital cost to build entirely new facility, including modification: $ NA.
Capital cost of modification : NA.

13. Are cooling towers used at this facility? NO Is water conditioner containing Chromium used in the water of the cooling tower? NA

SECTION 2 - FUEL USAGE {1}

(Use additional sheets if necessary)

Unit No. {2}	Type of Equipment {3}	Equipment Manufacturer	Rated Capacity {4}	FUEL DATA {5}, {6}				
				Fuel Type {7}	Amount Per Year {8}	Heating Value (State Units) {9}	Percent Sulfur {10}	Percent Ash {10}
SVE-1	Vacuum Blower			Electric				
SVE-2	Vacumm Blower			Electric				

SECTION 3 - MATERIALS PROCESSED AND PRODUCED

A. RAW MATERIALS PROCESSED (Use additional sheets if necessary)

Unit No. {1}	Type	Composition {2}	Condition {3}	Quantity {4} Specify Units
SVE-1	Soil Vapor	Attached	NA	25 cfm (cubic ft per min)
SVE-2	Soil Vapor	Attached	NA	176 cfm (cubic ft.per min)
	B. MATERIALS PRODUCED (DO NOT INCLUDE EMISSIONS AND PRODUCTS LISTED IN SECTIONS 6, 7, 8 & 11)			

SECTION 4A - LIQUID STORAGE TANKS - MATERIAL DATA – NA

(Use additional sheets if necessary)

Tank No. {1}	Material Name	Composition {2}	Liquid Density (lb/gal)	Vapor Molecular Weight (lb/lb-mol)	Avg. Stor. Temp., Ta (°F)	True Vapor Pressure @ Ta (psia)	Max. Stor. Temp., Tm (°F)	True Vapor Pressure @ Tm (psia)

SECTION 4B - LIQUID STORAGE TANKS - TANK DATA- NA

(Use additional sheets if necessary)

Tank No. {1}	Date Installed /modif {2}	Material(s) Stored	Roof Type {3}	Seal Type {4}	Capacity (bbl)	Diameter (ft)	Vapor Space H (ft) {5}	Roof/ Shell Color {6}	Paint Cond. {7}	Annual Throughput (gal/yr) {8}	Turnovers per Year {9}

SECTION 5A - SOLIDS MATERIAL STORAGE - MATERIAL DATA – NA

(Use additional sheets if necessary)

Unit No. {1}	Material Name	Process Served {2}	Storage Type {3}	Composition {4}	Date Installed or Modified

SECTION 5B - MATERIAL STORAGE - STORAGE TYPE – NA

(Use additional sheets if necessary)

Unit No. {1}	Transfer or Transport method {2}	Max. Hourly Throughput (units)	Annual Throughput	Dust Control (Storage or Transfer) {3}

SECTION 6 - HAZARDOUS, TOXIC AIR POLLUTANTS {1}, OTHER CHEMICALS, AND ODORS

(Use additional sheets if necessary)

Describe any hazardous air pollutants and toxic chemicals used or emitted in plant processes. See AQCR 702 Part Three list and 1990 CAAA Title III. You may need to expand the information and discussion with respect to compliance with AQCR 702 Part Three list and 1990 CAAA Title III compliance beyond this application form in the permit application package. {2}

Unit {3}	Description of Chemicals {4}	Quantity Emitted to Atmosphere {5}	How, Where Emitted {6}
SVE-1	Benzene	0.04 lb/hr * 0.01 ton/yr.	Not listed on AQCR 702 Part III
SVE-1	Ethyl Benzene	0.03 lb/hr* 0.01 ton.yr	Below AQRC 702 PartIII thresholds
SVE-1	Toluene	0.26 lb/hr* 0.07 ton/yr	Below AQRC 702 Part III Thresholds
SVE-1	Xylene (O-,m-,& p-)	0.17 lb/hr* 0.05 ton/yr	Below AQRC 702 Part III Thresholds
SVE-1	Hexanes	1.07 lb/hr* 0.29 ton/yr	Below AQRC 702 Part III Thresholds
SVE-1	Octanes	3.00 lb/hr* 0.82 ton/yr	Below AQRC 702 Part III Thresholds
SVE-1	Nonanes	0.46 lb/hr* 0.12 ton/yr	Below AQRC 702 Part III Thresholds
SVE-2	Benzene	0.002 lb/hr* 0.003 ton/yr	Not listed on AQCR 702 Part III
SVE-2	Ethyl Benzene	0.02 lb/hr * 0.02 ton/yr	Below AQRC 702 Part III Thresholds
SVE-2	Toluene	0.09 lb/hr* 0.10 ton/yr	Below AQRC 702 Part III Thresholds
SVE-2	Xylene (O-,m-&p-)	0.25 lb/hr* 0.29 ton/yr	Below AQRC 702 Part III Thresholds
SVE-2	Hexanes	0.00 lb/hr* 0.00 ton/yr	Below AQRC 702 Part III Thresholds
SVE-2	Octanes	1.07 lb/hr* 1.24 ton/yr	Below AQRC 702 Part III Thresholds
SVE-2	Nonanes	0.40 lb/hr* 0.46 ton/yr	Below AQRC 702 Part III Thresholds

* Maximum estimated emission rate

SECTION 7- UNIT EMISSIONS (PRIOR TO CONTROL OR ABATEMENT EQUIPMENT OR TO ATMOSPHERE IF UNCONTROLLED)

(Use additional sheets if necessary)

Unit No. {1}	Process or Operation {2}	Quantity of Gases Discharged to Control Equipment {3}	ESTIMATES OF PRE-CONTROL AIR POLLUTANTS						Estimation Method {7}
			Pollutant No. 1		Pollutant No. 2		Pollutant No. 3 {6}		
			Type {4}	Quantity {5}	Type {4}	Quantity {5}	Type {4}	Quantity {5}	
SVE-1	Vacuum Blower	25 cfm 70°F 11.2 psia	VOC_s	*6.75 lb/hr 1.85 tn/yr		lb/hr tn/yr		lb/hr tn/yr	Field Test
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr	
SVE-2	Vacuum Blower	176 CFM 70°F 11.2 psia	VOC_s	*2.15 lb/hr 0.48 tn/yr		lb/hr tn/yr		lb/hr tn/yr	Field Test
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr	
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr	
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr	
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				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr	
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr	

* Maximum estimated emission rate

SECTION 8 - AIR POLLUTION CONTROL EQUIPMENT, EMISSIONS TO ATMOSPHERE

(Use additional sheets if necessary)

Unit No. {1}	CONTROL EQUIPMENT		AIR POLLUTANTS EMITTED TO STACKS {3}						Control Efficiency	
			Pollutant No. 1		Pollutant No. 2		Pollutant No. 3 {6}			
	Type {2}	Manufacturer and Model No.	Type {4}	Quantity {5}	Type {4}	Quantity {5}	Type {4}	Quantity {5}	% by Weight	How Determined {7}
SVE-1	NONE		VOCs	*6.75 lb/hr 1.85 tn/yr		lb/hr tn/yr		lb/hr tn/yr	0	
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr		
SVE-2	NONE		VOCs	*2.15 lb/hr 2.48 tn/yr		lb/hr tn/yr		lb/hr tn/yr	0	
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr		
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr		
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr		
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr		
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr		
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				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr		
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/hr		
				lb/hr tn/yr		lb/hr tn/yr		lb/hr tn/yr		

*Maximum estimated emission rate

SECTION 9 - STACK DATA

(Use additional sheets if necessary)

Unit No. {1}	Stack Height ft {2}	Stack Inside Exit Diameter ft {3}	EXIT GAS CONDITIONS {4}			SAMPLING PORTS		
			Temperature °F	Velocity ft/sec	Moisture % by Volume	Number	Size	Location {5}
SVE-1	No Stack	NA	70°F	19.1	3.3% (est.)	NA	NA	NA
SVE-2	No Stack	NA	70°F	19.1	3.3% (est.)	NA	NA	NA

SECTION 10 - EMISSION MEASUREMENT EQUIPMENT – NA

(Use additional sheets if necessary)

Unit No.	Pollutant	Type of Instrument {1}	Manufacturer - Model No.	Range {2}	Sensitivity	Accuracy

SECTION 11 - WASTE PRODUCT DISPOSAL (SOLID AND LIQUID WASTES, AND AUXILIARY INCINERATION, AND OTHER EMISSIONS NOT COVERED IN SECTIONS 4 OR 5) - NA

A. Auxiliary Incineration Operation: AQCR 2000 or AQCR 2020 may apply. **INCINERATION OF HAZARDOUS MATERIALS IS NOT ALLOWED UNDER AQCR 702.**
Normal on-site combustion operating schedule: _____ hours per day _____ days per week _____ weeks per year
Seasonal or peak combustion operating periods (specify):_____

B. Waste Products or Emissions: (Use additional sheets if necessary)

Unit No. {1}	Waste Material		Method of Disposal {4}	Incinerator Capacity Specify Units	Auxillary Fuel Used {5}	Type and Efficiency of Air Cleaning Equipment {6}	ESTIMATES OF AIR POLLUTANTS, IF ANY	
	Type {2}	Amount {3}					Type {7}	Quantity Per Year {8}
		/hr						/hr
		/yr						/yr
		/hr						/hr
		/yr						/yr
		/hr						/hr
		/yr						/yr
		/hr						/hr
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SECTION 12 - CERTIFICATION

I, Fenley "Ted" Ryther, Jr.,P.E, hereby certify that the information and data submitted in this application are completely true and as accurate as possible, to the best of my personal knowledge and professional expertise and experience.

Signed this 31st day of March, 1994, upon my oath of affirmation, before a notary of the State of Texas

SIGNATURE (~~Authorized~~ Company Representative) DATE March 31, 1994

Fenley "Ted" Ryther, Jr., P.E. Title: Manager, Permits Group, ~~Envr.~~ Aff.
PRINTED NAME Enron Operations Corp.

Subscribed and sworn to before me on this 31st day of March, 1994.

My authorization as a Notary of the State of Texas expires on the 14th day of November, 1997.

Maria E. Acosta 3-31-94
NOTARY'S SIGNATURE DATE

Maria E. Acosta
NOTARY'S PRINTED NAME

MARIA E. ACOSTA
Notary Public, State of Texas
My Commission Expires
NOVEMBER 19, 1997

Appendix B

Permit Application Checklist

BRUCE KING
GOVERNOR

State of New Mexico
ENVIRONMENT DEPARTMENT
AIR QUALITY BUREAU
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-0070

JUDITH M. ESPINOSA
SECRETARY

RON CURRY
DEPUTY SECRETARY

Air Quality Notice of Intent and Permit Application Checklist

This checklist is designed to help applicants to include the required elements under AQCR 703.1, Notice of Intent, AQCR 702, Permits and AQCR 707, PSD. Each application submitted shall contain the required items listed below, depending on the regulation under which the application is being submitted, before the Air Quality Bureau will rule the application complete under AQCR 702 or make a determination that no permit is required under AQCR 703.1. If each item on the appropriate checklist can not be checked prior to submitting the application, the application will be ruled incomplete. Applications which are ruled incomplete because of missing information will delay any determination or the issuance of the permit. The Department reserves the right to request additional relevant information prior to ruling the application complete in accordance with AQCR 702, Part Two D.1.i.

If an application is being submitted for a determination that no permit is required, complete SECTION A. If an application is being submitted for a permit, complete SECTION A and B. If any application is being submitted for a PSD permit under AQCR 707, complete SECTION A, B and C.

A copy of this checklist shall accompany the application.

SECTION A: AQCR 702, Permits, 703.1, Notice of Intent, and 707, PSD

Applications under this section shall:

1. [✓] be made on a form provided by the Department. Additional text, tables, calculations or clarifying information may also be attached to the form.

2. [✓] contain the applicant's name, address, and the names and addresses of all other owners or operators of the emission sources.

3. [ ] contain the name, address, and phone number of a person to contact regarding questions about the facility.

4. [✓] contain the date of application.

5. [✓] contain the company name which identifies this particular site.

6. [✓] contain a written description of the facility and/or modification including all operations affecting air emissions.

7. [✓] contain the maximum and standard operating schedules for the source after completion of construction or modification in terms of hours per day, days per week, and weeks per year.

8. [✓] contain a map, such as a 7.5 minute USGS topographic quadrangle, showing the exact location of the source.

9. [✓] contain the Section, Range, Township.

10. [✓] contain the UTM zone and UTM coordinates.

11. [✓] include the four digit Standard Industrialized Code (SIC).

12. [✓] contain the types and **potential uncontrolled** amounts of any regulated air contaminants the new source or modification will emit. Complete appropriate sections of the application; attachments can be used to supplement the application, but not replace it.

    if the "potential emission rate" for any one criteria pollutant from a new facility is greater than 10 pounds per hour or 25 tons per year a permit is required - complete Section A and B. If as a result of a modification an existing facility's potential emission rate for any one pollutant is greater than 10 pounds per hour or 25 tons per year a permit is required - complete Section A and B. If the emission rate for a toxic pollutant exceeds the thresholds in AQCR 702 Part Three a permit is required - complete Section A and B.

    "Potential emission rate" under AQCR 702 means the uncontrolled emission rate at maximum capacity, prior to or in the absence of pollution control equipment, for one hour or one full year (8760 hours per year).

NA 13. [ ] contain the types and **controlled** amounts of any regulated air contaminants the new source or modification will emit. Complete appropriate sections of the application; attachments can be used to supplement the application, but not replace it.

if the "potential to emit" for any one criteria pollutant from a new facility exceeds 100 tons per year (major source) for one of the 28 sources listed in Table 1 of AQCR 707, or 250 tons per year (major source) for all other sources, a PSD permit is required - complete Section A, B, and C. If the source is an existing major source and a modification occurs which results in an actual increase above the threshold in Table 2 of AQCR 707 a PSD permit is required - complete Section A, B, and C.

"potential to emit" under AQCR 707 means the controlled emission rate at maximum capacity, after pollution control equipment, for one full year (8760 hours). "Actual increase" means the emission rate to the atmosphere after all offsets or reductions elsewhere at the plant have been considered.

14. [✓] contain the basis or source for each emission rate (include the manufacturer's specification sheets when used as the source)

15. [✓] contain all calculations used to estimate **potential uncontrolled** and **controlled** emissions.

NA 16. [ ] contain a description of any air pollution control device or control method to be utilized.

NA 17. [ ] contain the basis for the estimated control efficiencies and sufficient engineering data for verification of the control equipment operation, including if necessary, design drawings, test reports, and factors which affect the normal operation (e.g. limits to normal operation).

NA 18. [ ] contain fuel data for each existing and/or proposed piece of fuel burning equipment.

NA 19. [ ] contain the anticipated maximum production capacity of the entire facility after construction and/or modification or of the applicable emission or process unit. Identify any process bottlenecks that limit production.

NA 20. [ ] contain the stack and exhaust gas parameters for all existing and proposed emission stacks.

21. [✓] be signed under oath or affirmation by the operator, the owner, or an authorized representative, certifying to the best of his or her knowledge the truth of all information submitted,

SECTION B: AQCR 702, Permits and 707, PSD

Applications under this section shall:

22. [✓] contain all the elements in SECTION A of this checklist.

23. [✓] consist of five copies of this entire application package, including five copies of the dispersion modelling summary report in each application. Only one complete copy of the dispersion modelling study, including computer disks with all input/output files, should be submitted.

NA 24. [ ] contain a regulatory compliance discussion demonstrating compliance with each applicable regulation (state & federal) and ambient air quality standard, PSD increments (if baseline triggered), and provisions of air toxics, if applicable.

NA 25. [ ] contain the required air quality modeling analysis.

NA 26. [ ] the "Air Quality Modeling Checklist for Permit Applications" has been reviewed and the required information has been submitted with the application.

NA 27. [ ] contain a preliminary operational plan defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown.

NA 28. [ ] contain a process flow sheet, including a material balance, of all components of the facility which would be involved in routine operations and emissions.

NA 29. [ ] contain a full description, including all calculations and the basis for all control efficiencies presented, of the equipment to be used for air pollution control. This shall include a process flow sheet or, if the Department so requires, layout and assembly drawings, design plans, test reports and factors which affect the normal equipment operation, including control and/or process equipment operating bounds.

NA 30. [ ] contain a description of the equipment or methods proposed by the applicant to be used for emission measurement.

contain the following public notice announcement documentation in accordance with AQCR 702, Part Two D.2;

31. [✓] adjacent land owners have been notified of the proposed application,

32. [✓] municipalities and counties have been notified,

33. [✓] one classified or legal advertisement has been published in a local newspaper,

34. [✓] one other advertisement has been published in a local newspaper,

35. [✓] notice of the application has been posted in at least four publicly accessible and conspicuous places, including the proposed or existing facility entrance. (ie: post office, library, grocery store, etc.)

36. [✓] a public service announcement has been made on at least one radio or television station which serves the municipality or county in which the source proposes to locate.

The public notice shall contain the following;

37. [✓] the applicant's name, address and the names and addresses of all other owners or operators of the emission sources,

38. [✓] the date of application submittal,

39. [✓] a description of the plant or equipment process for which a permit is sought,

40. [✓] an estimate of the maximum controlled emission rate for the entire facility in pounds per hour and tons per year for each pollutant, or in the case of a modification to an existing facility, the maximum controlled emission rates for both the modification and the entire facility after the modification,

41. [✓] the maximum and standard operating schedules expected at the facility after completion of construction (hrs/day, days/wk, wks/yr),

42. [✓] the current address of the Department to which comments and inquiries may be directed,

New Mexico Environment Department
Air Quality Bureau - Technical Analysis & Permits Section
1190 St. Francis Dr., P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-0070

43. [✓] include the $100.00 filing fee in accordance with AQCR 700.

SECTION C: AQCR 707, PSD

NA An **applicant** for a PSD permit shall:

44. [ ] arrange a pretest meeting to be held in Santa Fe, which includes the federal land managers, to discuss BACT, modeling, and items of particular interest.

45. [ ] submit the BACT analysis for review prior to submittal of the application (no application will be ruled complete until the final determination regarding BACT is made and this determination can ultimately affect information provided in the application),

46. [ ] submit a modeling protocol prior to submitting the permit application.

47. [ ] submit the monitoring exemption analysis prior to submittal of the application.

NA An **application** for a PSD permit shall:

48. [ ] contain all the elements in SECTION A and B of this checklist.

49. [ ] contain an analysis on the impact on visibility.

50. [ ] contain an analysis on the impact on soils.

51. [ ] contain an analysis on the impact on vegetation, including state and federal threatened and endangered species.

52. [ ] contain documentation that the federal land manager of a Class I area within 100 km of the site has been notified and provided a copy of the application, including the BACT analysis and modeling results.

53. [ ] contain a completed EPA PSD checklist.

Appendix C

Method for Estimation of Emissions and Calculation Results

Method for Estimation of Uncontrolled Emissions from the SVE-1 & SVE-2 Proposed New Sources

Transwestern Pipeline Company
Compressor Station No. 5 Remediation

1. Vapor samples collected from monitor well 5-34B during an SVE pilot test were analyzed by two laboratories; Core Laboratories and Hall Environmental Analysis Laboratory (HEAL). The Core Lab results indicated higher Non-Methane Volatile Organic Compounds (NMVOC) concentrations than the HEAL results and were used for emission estimations. The concentrations of NMVOC reported by Core Lab are shown in Table 1.

Table 1. Estimated vapor concentrations and emission rates for NMVOC during phase I system operation.

Compound	Concentration ppmv	Concentration ug/L	Emission Rate lb/hr	Emissions tons
benzene	192	474	0.04	0.01
toluene	969	2821	0.26	0.07
ethybenzene	96	322	0.03	0.01
xylene (m-, p-, & o-)	552	1853	0.17	0.05
hexanes	4200	11445	1.07	0.29
heptanes	5500	17422	1.63	0.45
octanes	8900	32131	3.00	0.82
nonanes	1200	4867	0.46	0.12
decanes	200	900	0.08	0.02
undecanes	0	0	0.00	0.00
Total NMVOC	21809	72236	6.75	1.85

2. The following calculation was performed to convert concentrations from ppmv to ug/L:

$$C_{(ug/L)} = C_{(ppmv)} \times \frac{MW_x \times P}{R \times T}$$

where, $C_{(ppmv)}$ = concentration of compound "x" in parts per million by volume;
MW_x = molecular weight of compound "x" in grams/mole;
P = atmospheric pressure in atmospheres (1.0 atm = 14.7 psia at sea level); this was estimated to be 0.76 atm at an elevation of 7300 feet above mean sea level;
R = universal gas constant (0.08205 L-atm/°K-mole); and
T = temperature in degrees °K (assumed to be 293 °K or 68 °F).

3. The emission rates were calculated as follows:

$$M_x = C_x \times Q \times \frac{1\ kg}{1.0E09\ ug} \times \frac{2.203\ lb}{1\ kg} \times \frac{28.32\ L}{1\ ft^3} \times \frac{60\ min}{1\ hr}$$

where, M_x = emission rate of compound "x" in lb./hour;
C_x = concentration of compound "x" in ug/L; and
Q = vapor flow rate in cubic feet per minute; the design flow rate for phase I of 25.0 cfm was used in the following calculations.

4. The total emissions during the first month of operation of the phase I system were estimated as follows:

$$M_{x(\text{tons})} = M_{x(\text{lb./hr})} \times RF \times \frac{24\ \text{hr}}{1\ \text{day}} \times \frac{30\ \text{day}}{1\ \text{month}} \times \frac{1\ \text{ton}}{2000\ \text{lb}}$$

where, RF = an adjustment factor to account for a decline in vapor concentration with time; this was assumed to be 0.75 for the first month of operation of the phase I system.

5. A copy of a spreadsheet with the results of all calculations is attached. The calculations for the phase II and III systems were identical to the phase I calculations with the following exceptions:

- The initial vapor concentrations for the phase II and III systems assumed the concentrations measured during the pilot test in monitor well 5-4B;
- The vapor flow rate for the phase II and III systems was assumed to be the design flow rates of 88 cfm and 176 cfm, respectively;
- The adjustment factor used to account for the decline in vapor concentration with time for the phase II and III systems was 0.75 and 0.50, respectively.

Estimated Uncontrolled Emission Calculations
for the SVE-1 & SVE-2 Proposed New Sources
Transwestern Pipeline Company
Compressor Station No. 5 Remediation

Note: Compound concentrations based on Core Lab analysis of pilot test samples.

Phase I Emissions Estimate (SVE-1)

Compound	C(ppmv)	MW(gm/mole)	P(atm)	R(L-atm/K-mole)	T(K)	C(ug/L)	@ cfm 25.0000 M(lb/hr)	Factor	@ months 1.0000 M(tons)
benzene	192	78.1	0.76	0.08205	293	474.05	0.0443	0.7500	0.0121
toluene	969	92.1	0.76	0.08205	293	2821.31	0.2637	0.7500	0.0722
ethylbenzene	96	106.2	0.76	0.08205	293	322.30	0.0301	0.7500	0.0082
xylene(m-, p-, &o-)	552	106.2	0.76	0.08205	293	1853.24	0.1732	0.7500	0.0474
hexanes	4200	86.2	0.76	0.08205	293	11445.21	1.0699	0.7500	0.2929
heptanes	5500	100.2	0.76	0.08205	293	17421.99	1.6287	0.7500	0.4459
octanes	8900	114.2	0.76	0.08205	293	32130.94	3.0037	0.7500	0.8223
nonanes	1200	128.3	0.76	0.08205	293	4867.16	0.4550	0.7500	0.1246
decanes	200	142.3	0.76	0.08205	293	899.71	0.0841	0.7500	0.0230
undecanes	0	156.3	0.76	0.08205	293	0.00	0.0000	0.7500	0.0000
Total NMHC	21809	104.8	0.76	0.08205	293	72235.91	6.7529	0.7500	1.8486

Phase II Emissions Estimate (SVE-2)

Compound	C(ppmv)	MW(gm/mole)	P(atm)	R(L-atm/K-mole)	T(K)	C(ug/L)	@ cfm 88.0000 M(lb/hr)	Factor	@ months 6.0000 M(tons)
benzene	1	78.1	0.76	0.08205	293	2.47	0.0008	0.7500	0.0013
toluene	31	92.1	0.76	0.08205	293	90.26	0.0297	0.7500	0.0488
ethylbenzene	6	106.2	0.76	0.08205	293	20.14	0.0066	0.7500	0.0109
xylene(m-, p-, &o-)	76	106.2	0.76	0.08205	293	255.16	0.0840	0.7500	0.1379
hexanes	0	86.2	0.76	0.08205	293	0.00	0.0000	0.7500	0.0000
heptanes	100	100.2	0.76	0.08205	293	316.76	0.1042	0.7500	0.1712
octanes	300	114.2	0.76	0.08205	293	1083.07	0.3564	0.7500	0.5854
nonanes	100	128.3	0.76	0.08205	293	405.60	0.1335	0.7500	0.2192
decanes	0	142.3	0.76	0.08205	293	0.00	0.0000	0.7500	0.0000
undecanes	0	156.3	0.76	0.08205	293	0.00	0.0000	0.7500	0.0000
Total NMHC	614	112.0	0.76	0.08205	293	2173.45	0.7152	0.7500	1.1747

Phase III Emissions Estimate (SVE-2)

Compound	C(ppmv)	MW(gm/mole)	P(atm)	R(L-atm/K-mole)	T(K)	C(ug/L)	@ cfm 176.0000 M(lb/hr)	Factor	@ months 5.0000 M(tons)
benzene	1	78.1	0.76	0.08205	293	2.47	0.0016	0.5000	0.0015
toluene	31	92.1	0.76	0.08205	293	90.26	0.0594	0.5000	0.0542
ethylbenzene	6	106.2	0.76	0.08205	293	20.14	0.0133	0.5000	0.0121
xylene(m-, p-, &o-)	76	106.2	0.76	0.08205	293	255.16	0.1679	0.5000	0.1532
hexanes	0	86.2	0.76	0.08205	293	0.00	0.0000	0.5000	0.0000
heptanes	100	100.2	0.76	0.08205	293	316.76	0.2085	0.5000	0.1902
octanes	300	114.2	0.76	0.08205	293	1083.07	0.7128	0.5000	0.6504
nonanes	100	128.3	0.76	0.08205	293	405.60	0.2669	0.5000	0.2436
decanes	0	142.3	0.76	0.08205	293	0.00	0.0000	0.5000	0.0000
undecanes	0	156.3	0.76	0.08205	293	0.00	0.0000	0.5000	0.0000
Total NMHC	614	112.0	0.76	0.08205	293	2173.45	1.4304	0.5000	1.3053

Summation of Emissions Estimates

Compound	First Year Emissions tons	Second Year Emissions tons
benzene	0.0149	0.0036
toluene	0.1752	0.1301
ethylbenzene	0.0312	0.0290
xylene(m-, p-, &o-)	0.3386	0.3678
hexanes	0.2929	0.0000
heptanes	0.8073	0.4566
octanes	2.0581	1.5610
nonanes	0.5874	0.5846
decanes	0.0230	0.0000
undecanes	0.0000	0.0000
Total NMHC	**4.3286**	**3.1326**

Appendix D

SVE Pilot Test Information

AcuVac Remediation

9111 Katy Freeway
Suite 303
Houston, TX 77024
(713) 468-6688: TEL
(713) 468-6689: FAX
Manufacturers Distributor
RSI S.A.V.E. System

November 15, 1993

Ms JoAnn Hilton
Hydrogeologist and Manager
Daniel B. Stephens & Associates, Inc.
6020 Academy N.E. Ste 100
Albuquerque, NM 87109

Dear Ms Hilton:

Enclosed is the report on Pilot Testing performed on November 3rd, 4th, and 5th, 1993 at DBS&A Project No. 2105, Enron Corporation, Transwestern Compressor Station #5, Thoreau, NM. During the tests, AcuVac used the S.A.V.E. Remediation System with various instrumentation including the Horiba Analyzer. The report is divided into six separate tests that were conducted over a three day period.

Project Scope:

Connect the S.A.V.E. System to observation wells B-35B, B-34B, B-4B, B-5B, B-2B and B-6B, and apply vacuum to these wells; record the vacuum and well flow and record all system data - including fuel flow (propane) - and estimate the fuel value from the well vapors. Install and observe the magnehelic gauges on the selected outer observation wells to determine vacuum radius of influence or if the selected recovery well is in vacuum communication with the outer observation wells. Take influent vapor samples to forward for laboratory analysis and provide on-site Horiba Analyzer data on HC ppmv, CO_2 and CO, % by volume. Operate the S.A.V.E. System in a manner that all well vapors are passed through the engine to destruct the contaminants and exhausted to meet air emission standards and comply with applicable State and Federal laws and safety standards.

Fuel Use Information:

When the S.A.V.E. System is running 100% on fuel from recovery well vapors at an altitude of 7,300 ft, the maximum contaminated fuel destruction or burn rate is approximately 9.3 lbs/hr or 1.4 gallons of gasoline per hour. Maximum propane flow at full load was 115 CFH at this altitude at ambient air temperatures from 30° to 50°F and engine speed at 2,700 RPM. Therefore, when the flow meter is on 60 CFH, the well vapors are contributing approximately 50% of the fuel value, or approximately 4.65 lbs/hr. Other percentages are calculated accordingly. Contaminant in the form of gasoline will produce approximately 125,000 BTU/hr. Therefore, the fuel requirement

for these tests are estimated to produce 175,000 BTU/hr. Propane requirements without fuel value from well flow is 1.81 gals/hr.

Summary of Data: 6 Tests See Exhibit A.

Discussion of Data:

There will be variations in well distances compared to an accurate survey. Some well distances were measured while others were estimated from the scale plotted on a location map.

Test #1 was a 24 hour SVE test conducted from recovery well (RW) 5-35B. This well is constructed from 4" PVC pipe and screened from 31.3 to 61.3 ft bgs with a depth of groundwater at test time of 50.03 bmp. Prior to beginning the test, magnehelic gauges were used to check the static vacuum or pressure existing in the selected observation wells. With the exception of well 5-37I, all selected observation wells indicated a pressure under static conditions. From my experience in observing SVE test data, this is not uncommon. Observation wells 5-36E and 5-37I are reported to be screened below the groundwater level and erratic data may occur during SVE testing. Later, we found out during SVE Test #5, that 5-2B was a dead well (no well flow) and the observed vacuums /pressures were probably not influenced by the RW vacuum with the exception of groundwater level changes.

Prior to starting the test, the recovery well PVC connecter and boot were modified to accept transducers for sensing groundwater level changes. All S.A.V.E.'s systems were checked and magnehelic gauges set at "0".

The 24 hour test provided good steady data from observation wells 5-34B, 5-4B, 5-22B and 5-5B. This is presented in the Summary of Data. From this data, 5-34B and 5-4B should be considered within the radius of influence and it is highly probable that 5-22B and 5-5B will effectively be within the influence over time (see Figure 1). The HC, CO_2 and CO concentrations from well vapors as provided by the HORIBA Analyzer were consistent throughout the test period. This is confirmed by the consistent propane flow.

Test #2 was a 3 hour SVE test conducted from recovery well (RW) 5-34B. This well is constructed from 4" PVC pipe and screened from 34 to 64 ft bgs with depth of groundwater at 47.68 ft at the time of the test. The interface probe indicated a PSH sheen on the groundwater. The test was a very typical SVE test in that the RW vacuum and flow was almost constant throughout the test time. The propane flow and the HORIBA analysis of well vapors were also consistent and the progress of vacuum in the

observation wells was steady. This is confirmed as shown in the Summary of Data and Figure 1.

Test #3 was a 2 hour SVE test conducted from recovery well (RW) 5-4B. This well is constructed from 2" PVC pipe and screened from 38.7 to 58.7 ft bgs with depth of groundwater at time of test of 46.12 ft. Prior to beginning the test, magnehelic gauges were used to check the static vacuum/pressure existing in the selected observations wells. With the exception of well 5-2B, all wells indicated a vacuum at 0730 hours on 11/05/93 as compared to a pressure at 1155 hours on 11/03/93. This occurred after 27.9 hours of SVE testing. The recorded data was consistent throughout the test as indicated in the Summary of Data and Figure 1.

Test #4 was a 2 hour SVE test from recovery well (RW) 5-5B. This well is constructed from 2" PVC pipe and screened from 39.5 to 58 ft bgs with depth of groundwater of 45.0 ft at time of test. The operating data was consistent throughout the test. The HORIBA analysis indicates the well vapors contained small amounts of hydrocarbon vapors. Observation wells 5-35B and 5-34B were too far from the RW to provide meaningful data. Two additional wells, 5-1B and 5-6B were added as observation wells. The data is presented in the Summary and Figure 1.

Test #5 was scheduled to be a 2 hour SVE test. However, after the initial vapor evacuation from the well, no flow was observed at a well vacuum of 283" H_2O. The test was aborted. The well should not be included as a SVE recovery well.

Test #6 was a 1.3 hour SVE test conducted from recovery well (RW) 5-6B. This well is constructed from 2" PVC pipe and reported screened from 38.7 to 58.7 ft bgs with the depth of groundwater at 42.0 ft at the time of test. All operating data was consistent throughout the test. Vacuum was held at near 90" H_20 to encourage well flow. Observation wells 5-1B and 5-5B responded to RW vacuum. HORIBA data indicates low hydrocarbon value from the well vapors. All other observation wells were dropped due to distances. The data was not included in the plot in Figure 1.

Figure 1 indicates the most conclusive data supporting a SVE system for this facility. As shown on the plot, a radius of influence from 40 to 60 ft could be incorporated in the design plan. An approximation of the radius of influence may be obtained by determining the point at which the measured vacuum is 0.3 to 0.5" H_20. It is assumed that beyond these points, the pressure gradient (driving force) is negligible to effectively transport vaporized contaminants to the extraction well. Under continuous operation, vacuum and radius of influence may continue to increase 1 to 10 days.

Additional Information (This should be read as vital part of the report):

- Summary of Operating Data
- Plot of observed Vacuum vs Distance at the Facility
- Field Operating Data and Notes
- Site Photographs

Conclusion:

The tests indicate that soil vacuum extraction (SVE) would be an effective method of remediation for this facility. Although the observed vacuum on the outer observation wells was relatively low, or in some cases pressure was recorded, the duration of the pilot tests #2 through #6 were short. However, the results give positive indication that the observed and reported wells were in vacuum communication with the selected SVE recovery wells. A properly installed SVE System should effectively remove contaminants from the soil.

The S.A.V.E. System performed as represented and should be considered a viable technology to use for the remediation of this location. We project it will take 1 to 5 days to establish a consistent vacuum and true radius of influence. The System is designed to consume heavy concentrations of vapors and meet air emission standards set by the NMED. The new S.A.V.E. II System which is presently being tested, can provide well flows of up to 250 cfm.

Once you have reviewed the report, please call me if you have any questions.

Sincerely,

James E. Sadler
Product Engineer

SCHEDULE A
ENRON CORPORATION/TRANSWESTERN COMPRESSOR STATION #5

DBS&A - Thoreau, NM Test #1

11/03/93	Initial Data Time 1230	Second Data Time 1315	Third Data Time 1330	Forth Data Time 1430	Fifth Data Time 1530	Sixth Data Time 1630	Seventh Data Time 1730
% Well Vapors As Fuel	13	22	17	22	22	22	22
Horiba-HC PPM	-	15,530	-	19,430	20,490	17,120	23,950
Recovery Well Vacuum "H_2O Well 5-35B	24	26	26	26	26	26	26
Recovery Well Flow-CFM Well 5-35B	19	20	19.5	19	20	21	21
Well 5-34B Vacuum "H_2O Dist. ft.	.25	.45	.48	.60	.64	.64	.70
Well 5-4B Vacuum "H_2O Dist. ft.	.17	.30	.35	.40	.52	.50	.48
Well 5-22B Vacuum "H_2O Dist. ft.	(.13)	0	.05	.05	.10	.10	.12
Well 5-2B Vacuum "H_2O Dist. ft.	(.41)	(1.00)	(1.00)	(.85)	(.70)	(.70)	(.54)
'l 5-5B .uum "H_2O Dist. ft.	(.10)	(.03)	(.01)	.03	.05	.04	.06

11/03/93 and 11/04/93	Eighth Data Time 1830	Ninth Data Time 1930	Tenth Data Time 2030	Eleventh Data Time 2130	Twelfth Data Time 2230	Thirteenth Data Time 2330	Fourteenth Data Time 0030
% Well Vapors As Fuel	26	17	17	17	17	17	17
Horiba-HC PPM	23,630	21,370	-	22,130	-	21,870	-
Recovery Well Vacuum "H_2O Well 5-35B	26	27	27	27	27	27	27
Recovery Well Flow-CFM Well 5-35B	20	21	21	21	21	21	22
Well 5-34B Vacuum "H_2O Dist. ft.	.70	.78	.80	.83	.85	.86	.88
Well 5-4B Vacuum "H_2O Dist. ft.	.52	.56	.60	.62	.60	.58	.60
Well 5-22B Vacuum "H_2O Dist. ft.	.15	.18	.18	.18	.18	.16	.14
.ell 5-2B Vacuum "H_2O Dist. ft.	(.48)	(.30)	(.28)	(.24)	(.30)	(.32)	(.38)
Well 5-5B Vacuum "H_2O Dist. ft.	.07	.13	.12	.12	.12	.14	.14

ENRON CORPORATION/TRANSWESTERN COMPRESSOR STATION #5

DBS&A - Thoreau, NM Test #1 - Continued

11/04/93	Fifteenth Data Time 0130	Sixteenth Data Time 0230	Seventeenth Data Time 0330	Eighteenth Data Time 0430	Nineteenth Data Time 0530	Twentieth Data Time 0630	Twenty-first Data Time 0730
% Well Vapors As Fuel	17	17	17	22	22	17	17
Horiba-HC PPM	-	23,110	-	22,570	-	21,960	21,200
Recovery Well Vacuum "H_2O Well 5-35B	27	27	27	27	27	27	28
Recovery Well Flow-CFM Well 5-35B	22	22	21	22	22	22	26
Well 5-34B Vacuum "H_2O Dist. 21.6 ft.	.90	.90	.90	.90	.92	.95	.98
Well 5-4B Vacuum "H_2O Dist. 38.2 ft.	.62	.60	.64	.66	.66	.67	.70
Well 5-22B Vacuum "H_2O Dist. 80.3 ft.	.15	.15	.15	.16	.18	.20	.27
Well 5-2B Vacuum "H_2O Dist. 116.9 ft.	(.38)	(.34)	(.32)	(.30)	(.24)	(.20)	(.14)
Well 5-5B Vacuum "H_2O Dist. 118.8 ft.	.15	.14	.12	.10	.12	.15	.15

11/04/93	Twenty-second Data Time 0830	Twenty-third Data Time 0930	Twenty-forth Data Time 1030	Twenty-fifth Data Time 1130	Twenty-sixth Data Time 1235	Average Data 24:05 Hrs.	Maximum Data
% Well Vapors As Fuel	17	17	17	17	17	18.54	26
Horiba-HC PPM	-	20,398	21,394	22,470	21,860	21,205	23,950
Recovery Well Vacuum "H_2O Well 5-35B	28	29	29	30	31	27.12	31
Recovery Well Flow-CFM Well 5-35B	27	29	29	30	30	22.64	30
Well 5-34B Vacuum "H_2O Dist. 21.6 ft.	.97	.98	1.00	1.00	1.10	.81	1.10
Well 5-4B Vacuum "H_2O Dist. 38.2 ft.	.74	.68	.65	.72	.76	.57	.76
Well 5-22B Vacuum "H_2O Dist. 80.3 ft.	.24	.17	.18	.24	.26	.15	.27
Well 5-2B Vacuum "H_2O Dist. 116.9 ft.	(.18)	(.22)	(.24)	(.30)	(.50)	(.42)	(.14)
Well 5-5B Vacuum "H_2O Dist. 118.8 ft.	.15	.08	.10	.14	.15	.09	.15

ENRON CORPORATION/TRANSWESTERN COMPRESSOR STATION #5

DBS&A - Thoreau, NM Test #2

11/04/93	Initial Data Time 1415	Second Data Time 1515	Third Data Time 1615	Average Data 2:12 Hrs.	Maximum Data
% Well Vapors As Fuel	35	30	35	33.3	35
Horiba-HC PPM	28,770	32,570	31,670	31,003	32,570
Recovery Well Vacuum "H_2O Well 5-34B	6.0	6.0	6.2	6.07	6.2
Recovery Well Flow-CFM Well 5-34B	20	21	22	21	22
Well 5-35B Vacuum "H_2O Dist. 21.6 ft.	.80	.80	.85	.82	.85
Well 5-4B Vacuum "H_2O Dist. 54.0 ft.	.46	.48	.52	.49	.52
Well 5-22B Vacuum "H_2O Dist. 102.0 ft.	.12	.16	.20	.16	.20
Well 5-2B Vacuum "H_2O Dist. 134.0 ft.	(.66)	(.50)	(.36)	.51	(.36)
Well 5-5B Vacuum "H_2O Dist. 133.5 ft.	.10	.14	.18	.14	.18

ENRON CORPORATION/TRANSWESTERN COMPRESSOR STATION #5

DBS&A - Thoreau, NM Test #3

11/05/93	Initial Data Time 0755	Second Data Time 0855	Third Data Time 1000	Average Data 2:05 Hrs.	Maximum Data
% Well Vapors As Fuel	0	0	0	0	0
Horiba-HC PPM	898	1,178	1,205	1,094	1,205
Recovery Well Vacuum "H_2O Well 5-4B	42	42	43	42.33	43
Recovery Well Flow-CFM Well 5-4B	20	22	23	21.67	23
Well 5-35B Vacuum "H_2O Dist. 38.2 ft.	.38	.46	.52	.45	.52
Well 5-34B Vacuum "H_2O Dist. 54.0 ft	.22	.28	.34	.28	.34
Well 5-22B Vacuum "H_2O Dist. 83.0 ft.	.14	.19	.24	.19	.24
Well 5-2B Vacuum "H_2O Dist. 88.5 ft.	(.06)	(.04)	(.02)	(.04)	(.02)
Well 5-5B Vacuum "H_2O Dist. 79.5 ft.	.04	.20	.26	.17	.26

ENRON CORPORATION/TRANSWESTERN COMPRESSOR STATION #5

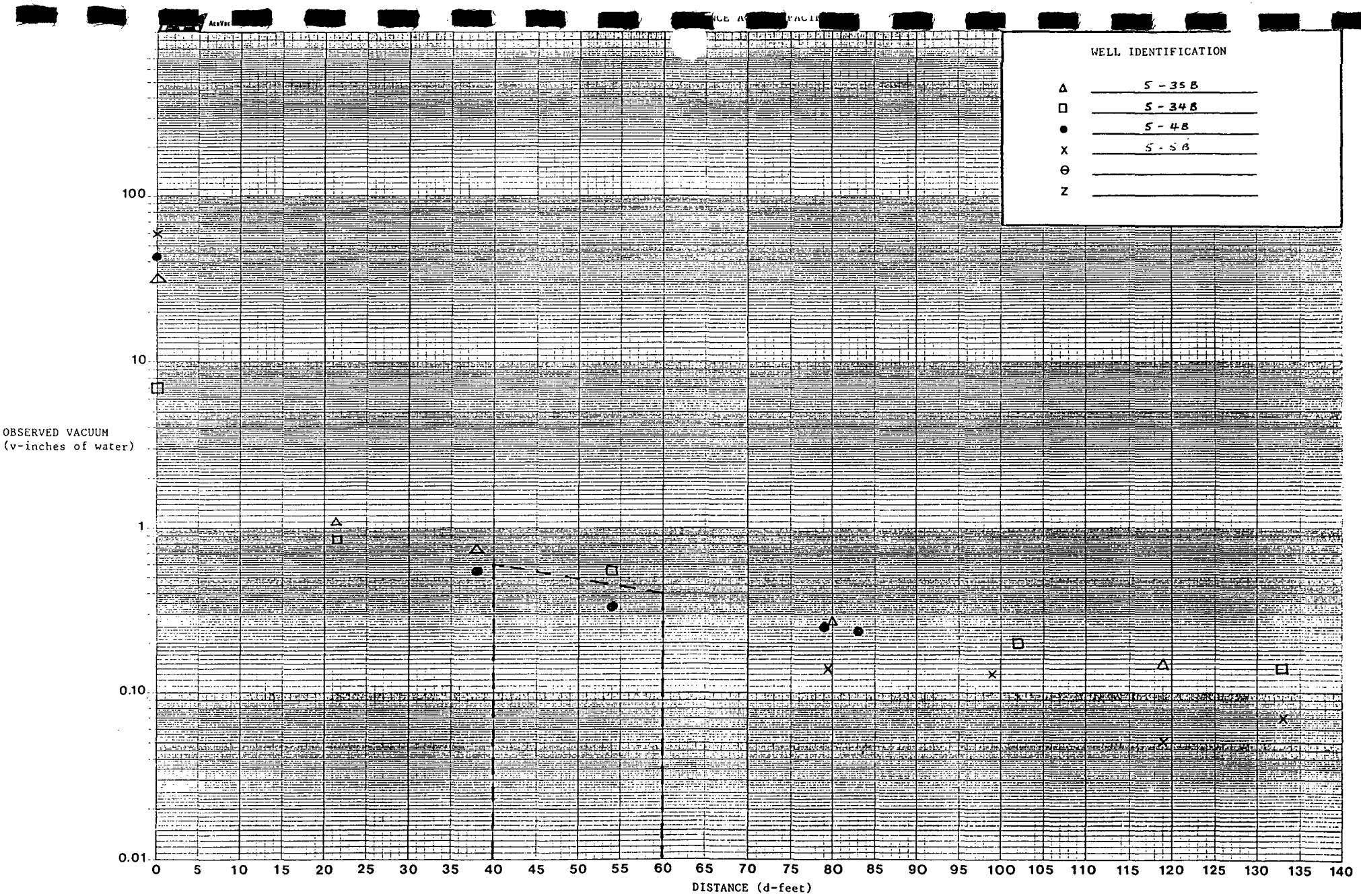
DBS&A - Thoreau, NM Test #4

11/05/93	Initial Data Time 1015	Second Data Time 1115	Third Data Time 1225	Average Data 2:10 Hrs.	Maximum Data
% Well Vapors As Fuel	0	0	0	0	0
Horiba-HC PPM	56	64	22	47.33	64
Recovery Well Vacuum "H_2O Well 5-5B	82	60	60	67.33	82
Recovery Well Flow-CFM Well 5-5B	20	18	18	.67	20
Well 5-35B Vacuum "H_2O Dist. 118.8 ft.	.05	.05	.05	.05	.05
Well 5-34B Vacuum "H_2O Dist. 133.5 ft	.07	.07	.05	.06	.07
Well 5-4B Vacuum "H_2O Dist. 79.5 ft.	.14	.16	.18	.16	.18
Well 5-22B Vacuum "H_2O Dist. 99.0 ft.	.14	.14	.16	.15	.16
l 5-2B .cuum "H_2O Dist. 46.0 ft.	(.02)	.05	.05	.03	.05
Well 5-1B Vacuum "H_2O Dist. 123.0 ft.	(.22)	(.04)	.05	(.07)	.05
Well 5-6B Vacuum "H_2O Dist. 142.5 ft.	(.10)	(.05)	.08	(.02)	.08

ENRON CORPORATION/TRANSWESTERN COMPRESSOR STATION #5

DBS&A - Thoreau, NM Test #6

11/05/93	Initial Data Time 1305	Second Data Time 1405	Third Data Time 1420	Average Data 1:15 Min	Maximum Data
% Well Vapors As Fuel	0	0	0	0	0
Horiba-HC PPM	20	108	-	64	108
Recovery Well Vacuum "H_2O Well 5-6B	92	95	96	94.33	96
Recovery Well Flow-CFM Well 5-6B	4	8	9	7.0	9
Well 5-1B Vacuum "H_2O Dist. 49.5 ft.	0	.18	.20	.13	.20
Well 5-5B Vacuum "H_2O Dist. 142.5 ft	.04	.15	.18	.12	.18


WELL IDENTIFICATION
Δ S-35B
□ S-34B
● S-4B
X S-5B
Θ
Z
OBSERVED VACUUM
(v-inches of water)
100
10
1
0.10
0.01
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140
DISTANCE (d-feet)

AcuVac Remediation

OPERATING DATA - TEST NO 1

S.A.V.E.™ SYSTEM

Page 1 Location ENRON CORPORATION TRANSWESTERN COMPRESSOR STA #5 THOREAU NM Project Engr. J. SADLER

	Parameter						
	Date	11/3/93					→
		Time START UP	Time WARM UP	Time START	Time	Time	Time
		1005	1155	1230	1315	1330	1430
		Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter
		535.0	536.0	536.5	537.2	537.5	538.6
ENGINE	R.P.M.	2000	2000	2600	2750	2700	2700
ENGINE	Oil Press P.S.I.	60	55	55	50	50	50
ENGINE	Water Temp °F	120	170	190	190	190	190
ENGINE	Volts	13.5	13.5	13.5	13.5	13.5	13.5
ENGINE	Intake Vac Hg	6	6	8	6	6	4
FUEL/AIR	Gas Flow Fuel/Propane cfh	60	60	100	90	95	90
FUEL/AIR	Air Flow cfm	20	18	24	28	28	30
FUEL/AIR	Well Flow 5-35B cfm	—	—	19	20	19.5	19
FUEL/AIR	Recovery Well Vac 5-35B "H_2O	—	—	24	26	26	26
	Air Temp °F	38	52	55	56	56	58
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-36E "H_2O	-	(.90)	.05	.11	.12	(.18)
MONITOR WELL VACUUM	5-37 I "H_2O	-	0	.40	.90	.90	.90
MONITOR WELL VACUUM	5-34 B "H_2O	-	(.06)	.25	.45	.48	.60
MONITOR WELL VACUUM	5-4 B "H_2O	-	(.10)	.17	.30	.35	.40
MONITOR WELL VACUUM	5-22B "H_2O	-	(.13)	(.13)	0	.05	.05
MONITOR WELL VACUUM	5-2B "H_2O	-	(.16)	(.41)	(1.00)	(1.00)	(.85)
MONITOR WELL VACUUM	5-5B "H_2O	-	(.10)	(.10)	(.03)	(.01)	.03
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O		STATIC WELL VACUUM / PRESSURE PRIOR TO WELL VACUUM OR FLOW	( ) INDICATES WELL PRESSURE			
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MANIFOLD	Vapor Wells On/Off	OFF	ON	ON	ON	ON	ON
MANIFOLD	Groundwater Wells On/Off	OFF	→	→	→	→	→
MANIFOLD	Discharge Flow Meter gals	OFF	→	→	→	→	→
	Samples				HORIBA Influent		HORIBA Influent

33107)

TEST	Instrument	HORIBA	HORIBA	HORIBA			
	Time	1310	1430	1545			
VAPOR INFLUENT	H-C ppmv	15,530	19,430				
	C-O %	.04	.04				
	CO_2 %	5.16	5.70				
SAVE EMISSIONS	H-C ppmv			18			
	C-O %			.05			
	CO_2 %			4.16			
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/3/93 TEST NO. 1

0905	Arrived at location - Met with Robert Morley, Daniel
	B. Stephens & Associates
0915	Positioned S.A.V.E. System near well 5-35B for recovery well (RW)
	and connected S.A.V.E to RW via flex hose and boot and PVC well
0945	extention. Connected air/water separator and installed
	individual well plugs for magnehelic gages - H_2O level 51.75'
1005	Started S.A.V.E. for warm-up and system check - Ran 9 hour
1100	Helped remove monitoring well pumps and installing transducers in RW
1155	Recorded static pressures on outer wells - Restart for warm-up
1215	DBS&A recorded initial groundwater levels and set readings on transducers
1230	START TEST - Initial well flow @ 18 cfm, well vacuum @ 22" H_2O
	Recorded Data - All outer wells responding to vacuum X 5-2B & 5-5B
1315	Recorded Operating and HORIBA Data - All system functions
	normal - Vac. increase on outer wells X 5-2B, with press. inc.
1330	Recorded Data - All normal - Slight increases on outer wells
1430	HORIBA Data - Recorded increase in HC value
1430	Recorded Data - Note that 5-36E changed from vacuum to press.
	Difficult to provide reason since well screened below H_2O level.

AcuVac Remediation

OPERATING DATA - TEST NO 1

S.A.V.E.™ SYSTEM

Page 2 Location ENRON CORPORATION TRANSWESTERN COMPRESSOR STA #5 THOREAU N.M Project Engr. J. SADLER

	Parameter						
	Date	11/2/93					→
		Time	Time	Time	Time	Time	Time
		1530	1630	1730	1830	1930	2030
		Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter
		539.6	540.6	541.6	542.6	543.6	544.6
ENGINE	R.P.M.	2700	2700	2700	2600	2700	2700
ENGINE	Oil Press P.S.I.	50	50	50	50	50	50
ENGINE	Water Temp °F	190	190	190	190	185	185
ENGINE	Volts	13.5	13.5	13.5	13.5	13.5	13.5
ENGINE	Intake Vac Hg	4	4	4	4	5	5
FUEL/AIR	Gas Flow Fuel/Propane cfh	90	90	90	85	95	95
FUEL/AIR	Air Flow cfm	30	32	32	32	35	35
FUEL/AIR	Well Flow 5-35B cfm	20	21	21	20	21	21
FUEL/AIR	Recovery Well Vac 5-35B "H_2O	26	26	26	26	27	27
	Air Temp °F	52	48	43	40	38	38
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-36E "H_2O	(.17)	(.12)	(.02)	.03	.15	.08
MONITOR WELL VACUUM	5-37I "H_2O	.90	.90	1.00	(1.2)	(.60)	(.60)
MONITOR WELL VACUUM	5-34B "H_2O	.64	.64	.70	.70	.78	.80
MONITOR WELL VACUUM	5-4B "H_2O	.52	.50	.48	.52	.56	.60
MONITOR WELL VACUUM	5-22B "H_2O	.10	.10	.12	.15	.18	.18
MONITOR WELL VACUUM	5-2B "H_2O	(.70)	(.70	(.54)	(.48)	(.30)	(.28)
MONITOR WELL VACUUM	5-5B "H_2O	.05	.04	.06	.07	.13	.12
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O			( ) INDICATES WELL PRESSURE			
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON	ON	ON	ON	ON
MANIFOLD	Groundwater Wells On/Off	OFF	→	→	→	→	→
MANIFOLD	Discharge Flow Meter gals	OFF	→	→	→	→	→
	Samples	HORIBA EMISSIONS		HORIBA INFLUENT & EMISSIONS	HORIBA INFLUENT	HORIBA INFLUENT	

(933107)

TEST	Instrument	HORIBA	HORIBA	HORIBA	HORIBA	HORIBA	
	Time	1600	1700	1730	1850	1995	
VAPOR INFLUENT	H-C ppmv	20,490	17,120	23,950	23,630	21,370	
	C-O %	.07	.06	.07	.07	.06	
	CO_2 %	6.24	5.20	5.95	5.81	5.60	
SAVE EMISSIONS	H-C ppmv		20				
	C-O %		.03				
	CO_2 %		3.22				
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/3/93 TEST NO. 1

1530	Recorded Data - All S.A.V.E functions normal - Outer wells
	indicating increased vacuum x 5-36B.
	NOTE: Observation wells 5-36E and 5-37I are
	reported to be screened below the groundwater level
	and erratic data may occur during SVE testing
1600	HORIBA Data: Note increase in volume % of CO_2.
1630	Recorded Data - All system functions normal
1645	Adjusted for slight increase in RW vacuum and flow
1730	Recorded Operating and HORIBA Data
1830	Recorded Data - System will not consume any higher
	RW vapors. Fresh air flow must remain 30-35 cfm to
	provide proper air/fuel ratio - System can consume much
	higher fuel concentrations, therefore well vapors probably have low O_2
	NOTE Well 5-37I has changed from .90" H_2O vac. to 1.2" H_2O pressure
1930	Recorded Operating & HORIBA Data - All outer wells
	indicating continued increased vacuum
1945	HORIBA Data - HC down slightly
2030	Recorded Data - SAVE System functions normal.

AcuVac Remediation

OPERATING DATA - TEST NO 1

S.A.V.E.™ SYSTEM

Page 3 Location ENRON CORPORTION TRANSWESTERN COMPRESSOR STA #5 THOREAU NM, Project Engr. J. SADLER

	Parameter						
	Date	11/3/93	→	→	11/4/93	→	→
		Time	Time	Time	Time	Time	Time
		2130	2230	2330	0030	0130	0230
		Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter
		545.5	546.5	547.5	548.5	549.5	550.5
ENGINE	R.P.M.	2700	2700	2800	2700	2700	2700
ENGINE	Oil Press P.S.I.	50	50	50	50	50	50
ENGINE	Water Temp °F	185	185	185	185	185	185
ENGINE	Volts	13.5	13.5	13.5	13.5	13.5	13.5
ENGINE	Intake Vac Hg	5	5	5	5	5	5
FUEL/AIR	Gas Flow Fuel/Propane cfh	95	95	95	95	95	95
FUEL/AIR	Air Flow cfm	34	34	34	34	34	34
FUEL/AIR	Well Flow 5-35B cfm	21	21	21	22	22	22
FUEL/AIR	Recovery Well Vac 5-35B "H_2O	27	27	27	27	27	27
	Air Temp °F	37	37	36	36	36	35
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-36E "H_2O	.06	.08	.10	.12	.12	.10
MONITOR WELL VACUUM	5-37I "H_2O	(.70)	(.70)	(.75)	(.80	(.80)	(.60)
MONITOR WELL VACUUM	5-34B "H_2O	.83	.85	.86	.88	.90	.90
MONITOR WELL VACUUM	5-4B "H_2O	.62	.60	.58	.60	.62	.60
MONITOR WELL VACUUM	5-22B "H_2O	.18	.18	.16	.14	.15	.15
MONITOR WELL VACUUM	5-2B "H_2O	(.24)	(.30)	(.32)	(.38)	(.38)	(.34)
MONITOR WELL VACUUM	5-5B "H_2O	.12	.12	.14	.14	.15	.14
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O			( ) INDICATES WELL PRESSURE			
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON	ON	ON	ON	ON
MANIFOLD	Groundwater Wells On/Off	OFF	→	→	→	→	→
MANIFOLD	Discharge Flow Meter gals	OFF	→	→	→	→	→
	Samples	HORIBA INFLUENT		HORIBA INFLUENT			HORIBA INFLUENT

(33107)

TEST	Instrument	HORIBA	HORIBA	HORIBA			
	Time	2140	2345	0245			
VAPOR INFLUENT	H-C ppmv	22,130	21,870	23,110			
	C-O %	.06	.06	.07			
	CO_2 %	5.78	5.64	6.08			
SAVE EMISSIONS	H-C ppmv						
	C-O %						
	CO_2 %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/3-4/93 TEST NO. 1

2130	Recorded Data - All S.A.V.E. System functions normal - Outer well vacuum steady.
2140	HORIBA DATA - HC in 20,000 ppm range throughout test
2230	Recorded Data - All steady
2245	Increased well vacuum slightly, but well vapors at maximum flow, requiring high propane and fresh air flow to provide 120 to 140 thousand BTU/HR.
2330	Recorded Data - All systems normal - NOTE Very windy chill factor low - blowing sand.
2345	HORIBA Data - -
0030	THURSDAY 11/4/93 - Recorded Data - All systems normal Checked calibration of magnehelic gages - Minor adjustments for temperature.
0130	Recorded Data - All steady - Slight variance in outer wells vacuum
0230	Recorded Data - Outer wells vacuum off slightly All system functions normal - Switched to full propane tanks.

AR AcuVac Remediation

OPERATING DATA - TEST NO 1

S.A.V.E.™ SYSTEM

Page 4 Location ENRON CORPORATION TRANSWESTERN COMPRESSOR STA #5 THOREAU N.M. Project Engr. J. SADLER

	Parameter						
Date		11/4/93					→
		Time 0330	Time 0930	Time 0530	Time 0630	Time 0730	Time 0830
		Hr. Meter 551.5	Hr. Meter 552.5	Hr. Meter 553.5	Hr. Meter 554.5	Hr. Meter 555.5	Hr. Meter 556.5
ENGINE	R.P.M.	2700	2700	2700	2700	2700	2700
ENGINE	Oil Press P.S.I.	50	50	50	50	50	50
ENGINE	Water Temp °F	185	185	185	185	185	185
ENGINE	Volts	13.5	13.5	13.5	13.5	13.5	13.5
ENGINE	Intake Vac Hg	5	5	5	5	5	6
FUEL/AIR	Gas Flow Fuel/Propane cfh	95	90	90	95	95	95
FUEL/AIR	Air Flow cfm	34	32	33	34	32	32
FUEL/AIR	Well Flow 5-35B cfm	21	22	22	22	26	27
FUEL/AIR	Recovery Well Vac 5-35B "H_2O	27	27	27	27	28	28
	Air Temp °F	34	33	32	34	35	36
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-36E "H_2O	.07	.08	.10	.10	.12	.08
MONITOR WELL VACUUM	5-37I "H_2O	(.60)	(.50)	(.50)	(.50)	(.50)	(.60)
MONITOR WELL VACUUM	5-34B "H_2O	.90	.90	.92	.95	.98	.97
MONITOR WELL VACUUM	5-4B "H_2O	.64	.66	.66	.67	.70	.74
MONITOR WELL VACUUM	5-22B "H_2O	.15	.16	.18	.20	.27	.24
MONITOR WELL VACUUM	5-2B "H_2O	(.32)	(.30)	(.24)	(.20)	(.14)	(.18)
MONITOR WELL VACUUM	5-5B "H_2O	.12	.10	.12	.15	.15	.15
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O			( ) INDICATES WELL PRESSURE			
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON	ON	ON	ON	ON
MANIFOLD	Groundwater Wells On/Off	OFF	→	→	→	→	→
MANIFOLD	Discharge Flow Meter gals	OFF	→	→	→	→	→
	Samples		HORIBA INFLUENT		HORIBA INFLUENT	HORIBA INFLUENT	

(933107)

TEST	Instrument	HORIBA	HORIBA	HORIBA			
	Time	0450	0700	0745			
VAPOR INFLUENT	H-C ppmv	22,570	21,960	21,200			
	C-O %	.06	.06	.05			
	CO_2 %	5.94	6.02	6.84			
SAVE EMISSIONS	H-C ppmv						
	C-O %						
	CO_2 %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/4/93 TEST NO. 1

0330	Recorded Data - All systems normal - Outer wells steady
0430	Recorded Data - No major changes - HORIBA Data
0530	Recorded Data - All SAVE System functions normal
	Very windy and cold
0630	Recorded Data - All functions normal
0700	HORIBA DATA - CO_2 continuing to increase
0710	Increased well flow to 27 cfm and well vacuum to 28" H_2O
0730	Recordal Data - Outer wells responding to RW
	vacuum and flow increase.
0745	SAVE engine experiences roughness - HORIBA Data
	indicates CO_2 increased to 6.84% - Probable
	reason is that increased vacuum and flow opened
	new zones - Also, natural and induced bio-remediation
	produces CO_2.
0830	Recorded Data - All steady - Engine still little
	rough - Adjusted propane and air flow slightly

AcuVac Remediation

OPERATING DATA - TEST NO 1

S.A.V.E.™ SYSTEM

Page 5 Location ENRON CORPORATION TRANSWESTERN COMPRESSOR STA #5 THOREAU N.M. Project Engr. J. SADLER

	Parameter						
Date		11/4/93	→	→	→		
		Time 0930	Time 1030	Time 1130	Time STOP 1235	Time	Time
		Hr. Meter 557.5	Hr. Meter 558.5	Hr. Meter 559.5	Hr. Meter 560.6	Hr. Meter	Hr. Meter
ENGINE	R.P.M.	2800	2700	2700	2700		
	Oil Press P.S.I.	50	50	50	50		
	Water Temp °F	190	190	190	190		
	Volts	13.5	13.5	13.5	13.5		
	Intake Vac Hg	5	5	5	5		
FUEL/AIR	Gas Flow Fuel/Propane cfh	95	95	95	95		
	Air Flow cfm	33	34	34	34		
	Well Flow 5-35 B cfm	29	29	30	30		
	Recovery Well Vac 5-35 B "H_2O	29	29	30	31		
	Air Temp °F	39	44	48	54		
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-36 E "H_2O	.05	.05	.05	(.20)		
	5-37 I "H_2O	(.6)	(.65)	(.88)	(1.1)		
	5-34 B "H_2O	.98	1.00	1.00	1.10		
	5-4 B "H_2O	.68	.65	.72	.76		
	5-22 B "H_2O	.17	.18	.24	.26		
	5-2 B "H_2O	(.22)	(.24)	(.30)	(.50)		
	5-5 B "H_2O	.08	.10	.14	.15		
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O		( ) INDICATES	WELL PRESSURE			
	"H_2O						
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON	ON	ON		
	Groundwater Wells On/Off	OFF	→	→	→		
	Discharge Flow Meter gals	OFF	→	→	→		
	Samples	HORIBA INFLUENT	HORIBA INFLUENT AND EMISSIONS	HORIBA INFLUENT	HORIBA INFLUENT		

(933107)

TEST							
	Instrument	HORIBA	HORIBA	HORIBA	HORIBA	HORIBA	HORIBA
	Time	1340	1425	1435	1500	1540	1615
VAPOR INFLUENT	H-C ppmv	33,180	28,770		32,590	30,198	31,670
	C-O %	.07	.07		.06	.06	.07
	CO_2 %	6.51	5.82		6.43	5.80	6.12
SAVE EMISSIONS	H-C ppmv			46			
	C-O %			.04			
	CO_2 %			3.87			
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/4/93 TEST NO. 2

1250	Positioned SAVE System near well 5-34B for recovery well (RW-4)
	4" well screened from 34' to 64 ft bgs - H_2O @ 47.68
	Interface probe indicated PSit sheen on groundwater
1315	START TEST - Recorded Data - Initial RW vac. @ 5.6" H_2O and
	flow @ 20 cfm - Propane @ 90 cfh - Initial vac. reading - 3 wells
1340	HORIBA Data - with propane flow @ 75 to 80 cfh, HC
	level in ppmv expected to be 30,000 ppm +
1415	Recorded Data - All SAVE functions normal - Good vacuum
	response on outer wells & pressure wells.
	NOTE - Outer wells 5-36E & 5-37I are reported to be screened
	below groundwater level and erratic data may occur during SVE
1425	HORIBA INFLUENT Data - 1435 HORIBA Emissions Data
1500	HORIBA " Data - HC values steady within range
1515	Recorded Operating Data - System functions normal - Outer wells
	indicating good response to steady vacuum and flow
1540	HORIBA Influent Data
1615	Recorded Operating and HORIBA Data - RW vac & flow up
1627	STOP TEST - H_2O level 47.38 - Increase 0.30' - Good Test

AcuVac Remediation

OPERATING DATA - TEST NO 3

S.A.V.E.™ SYSTEM

Page 1 Location ENRON CORPORATION TRANSWESTERN COMPRESSOR STA #5 THOREAU NM Project Engr. J. SADLER

	Parameter						
	Date	11/5/93	→	→	→		
		Time Warm-up 0730	Time START 0755	Time 0855	Time STOP 1000	Time	Time
		Hr. Meter 564.0	Hr. Meter 564.5	Hr. Meter 565.5	Hr. Meter 566.6	Hr. Meter	Hr. Meter
ENGINE	R.P.M.	1500	2500	2750	2700		
ENGINE	Oil Press P.S.I.	60	55	50	50		
ENGINE	Water Temp °F	120	180	190	190		
ENGINE	Volts	13.5	13.5	13.5	13.5		
ENGINE	Intake Vac Hg	4	11	7	7		
FUEL/AIR	Gas Flow Fuel/Propane cfh	60	115	115	115		
FUEL/AIR	Air Flow cfm	20	27	23	24		
FUEL/AIR	Well Flow 5-4B cfm	OFF	20	22	23		
FUEL/AIR	Recovery Well Vac 5-4B "H_2O	OFF	42	42	43		
	Air Temp °F	33	34	36	39		
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-35B "H_2O	.05	.38	.46	.52		
MONITOR WELL VACUUM	5-36E "H_2O	.40	(.60)	(.60)	(.64)		
MONITOR WELL VACUUM	5-37I "H_2O	.40	(.40)	(.44)	(.40)		
MONITOR WELL VACUUM	5-34B "H_2O	.05	.22	.28	.34		
MONITOR WELL VACUUM	5-22B "H_2O	.10	.14	.19	.24		
MONITOR WELL VACUUM	5-2B "H_2O	(.2)	(.06)	(.04)	(.02)		
MONITOR WELL VACUUM	5-5B "H_2O	.07	.04	.20	.26		
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O	INITIAL OUTER WELL DATA PRIOR TO VACUUM & FLOW					
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O			( ) INDICATES WELL PRESSURE			
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MANIFOLD	Vapor Wells On/Off	OFF	ON	ON	ON		
MANIFOLD	Groundwater Wells On/Off	OFF	→	→	→		
MANIFOLD	Discharge Flow Meter gals	OFF	→	→	→		
	Samples		HORIBA INFLUENT	HORIBA INFLUENT/ EMISSIONS	HORIBA INFLUENT		

(33107)

TEST	Instrument	HORIBA	HORIBA	HORIBA	HORIBA		
	Time	0810	0905	0920	0955		
VAPOR INFLUENT	H-C ppmv	898	1178		1205		
	C-O %	.03	.02		.02		
	CO_2 %	3.94	3.44		3.50		
SAVE EMISSIONS	H-C ppmv			34			
	C-O %			00			
	CO_2 %			2.74			
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/5/93 TEST NO. 3

0700	Arrived at location - positioned SAVE near well 5-4B as
	recovery well (RW) - 2" well along fence line - Screened
	from 38.7 to 58.7 ft bgs and water depth @ 46.12'
0715	Set up SAVE System and plug outer wells for manchlic gages
0730	SAVE System warm up - All systems normal - Recorded static well data
	NOTE Outer wells 5-36E & 5-37I are reported to be screened
	below groundwater level and erratic data may occur during SVE tests
0755	START TEST - Recorded Initial Data - RW flow @ 20 cfm, vac @ 42" H_2O
	Good vacuum response on outer wells 5-35B and 5-34B
	Note: Wells 5-36E and 5-37I changed from vacuum to pressure
0810	HORIBA DATA - HC low - very little BTU value
0830	Increased RW flow to 22 cfm and vacuum to 43" H_2O
0855	Recorded Data - All systems normal - Good response on outer wells
0905	HORIBA Data - Little change in HC - 0920 HORIBA EMISSION DATA
0955	HORIBA Influent Data - HC low - Propane near max @ 1150 ppm
1000	Recorded Data - All systems normal - Continued good response
	on outer wells 5-35B, 5-34B & 5-5B
1005	TEST COMPLETED - H_2O @ 45.05 - Increase during test - 1.07'

AcuVac Remediation

OPERATING DATA - TEST NO 4

S.A.V.E.™ SYSTEM

ENRON CORPORATION — THOREAU

Page 1 Location TRANSWESTERN COMPRESSOR STA #5 N.M. Project Engr.

	Parameter						
	Date	11/5/93	→	→			
		Time START 1015	Time 1115	Time STOP 1225	Time	Time	Time
		Hr. Meter 566.9	Hr. Meter 567.9	Hr. Meter 569.0	Hr. Meter	Hr. Meter	Hr. Meter
ENGINE	R.P.M.	2500	2500	2500			
ENGINE	Oil Press P.S.I.	50	50	50			
ENGINE	Water Temp °F	190	190	190			
ENGINE	Volts	13.5	13.5	13.5			
ENGINE	Intake Vac Hg	11	11	11			
FUEL/AIR	Gas Flow Fuel/Propane cfh	115	115	115			
FUEL/AIR	Air Flow cfm	12	14	14			
FUEL/AIR	Well Flow 5-5B cfm	20	18	18			
FUEL/AIR	Recovery Well Vac 5-5B "H_2O	82	60	60			
	Air Temp °F	40	43	47			
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-35B "H_2O	.05	.05	.05			
MONITOR WELL VACUUM	5-34B "H_2O	.07	.07	.05			
MONITOR WELL VACUUM	5-4B "H_2O	.14	.16	.18			
MONITOR WELL VACUUM	5-22B "H_2O	.14	.14	.16			
MONITOR WELL VACUUM	5-2B "H_2O	(.02)	.05	.05			
MONITOR WELL VACUUM	5-1B "H_2O	(.22)	(.09)	.05			
MONITOR WELL VACUUM	5-6B "H_2O	(.10)	(.05)	.08			
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O			( ) INDICATES WELL PRESSURE			
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON	ON			
MANIFOLD	Groundwater Wells On/Off	OFF	→	→			
MANIFOLD	Discharge Flow Meter gals	OFF	→	→			
	Samples	HORIBA INFLUENT	HORIBA INFLUENT	HORIBA INFLUENT			

(933107)

TEST	Instrument	HORIBA	HORIBA	HORIBA			
	Time	1040	1120	1225			
VAPOR INFLUENT	H-C ppmv	56	64	22			
	C-O %	00	00	00			
	CO_2 %	2.16	1.96	2.12			
SAVE EMISSIONS	H-C ppmv						
	C-O %						
	CO_2 %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/5/93 TEST NO. 4

1010	Moved SAVE to well 5-5B as (RW) recovery well
	2" well screened from 39.5 to 58' bgs, H_2O @ 45.0'
1015	START TEST - Recorded Data - Initial vacuum @ 82" H_2O, flow
	@ 20 cfm - Held vacuum below 100" H_2O to encourage flow.
	Dropped wells 5-36E and 5-37I - Good initial vac. response
1030	RW vacuum @ 130" H_2O - Surging - Probably ground water
	rising above upper screened area.
1035	Reduced RW vacuum to 20" H_2O and increased to 60" H_2O @ 1040
1045	HORIBA Data - HC very low - No engine fuel value
1050	Vacuum increased to 90" H_2O - Reduced flow to 18 cfm and
	reset RW vacuum @ 60" H_2O - Propane @ max.
1115	Recorded Data - All systems normal - Not much vacuum
	response on outer wells - Well vac. holding @ 60" H_2O
1120	HORIBA Data - HC low
1225	Recorded Data - All systems normal - Limited response
	on outer wells
1227	HORIBA DATA - HC lower
1230	TEST COMPLETED - H_2O level @ 44.05 - H_2O level inc. 0.95'

AcuVac Remediation

OPERATING DATA - TEST NO 5

S.A.V.E.™ SYSTEM

Page 1 Location ENRON CORPORATION TRANSWESTERN COMPRESSOR STA #5 THOREAU N.M. Project Engr. J. SADLER

	Parameter						
	Date	11/5/93	→	→			
		Time START 1245	Time 1250	Time STOP 1255	Time	Time	Time
		Hr. Meter 569.3	Hr. Meter 569.4	Hr. Meter 569.5	Hr. Meter	Hr. Meter	Hr. Meter
ENGINE	R.P.M.	2600	2700	2700			
ENGINE	Oil Press P.S.I.	50	–	–			
ENGINE	Water Temp °F	190	–	–			
ENGINE	Volts	13.5	–	–			
ENGINE	Intake Vac Hg	16	–	–			
FUEL/AIR	Gas Flow Fuel/Propane cfh	115	115	115			
FUEL/AIR	Air Flow cfm	15	15	16			
FUEL/AIR	Well Flow 5-2B cfm	0	0	0			
FUEL/AIR	Recovery Well Vac 5-2B "H_2O	250	280	285			
	Air Temp °F	48	49	49			
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-35B "H_2O	NO WELL FLOW - NO TEST					
MONITOR WELL VACUUM	5-34B "H_2O						
MONITOR WELL VACUUM	5-9B "H_2O						
MONITOR WELL VACUUM	5-22B "H_2O						
MONITOR WELL VACUUM	5-5B "H_2O						
MONITOR WELL VACUUM	5-1B "H_2O						
MONITOR WELL VACUUM	5-6B "H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON	ON			
MANIFOLD	Groundwater Wells On/Off	OFF	→	→			
MANIFOLD	Discharge Flow Meter gals	OFF	→	→			
	Samples						

933107)

TEST	Instrument						
	Time						
VAPOR INFLUENT	H-C ppmv						
	C-O %						
	CO_2 %						
SAVE EMISSIONS	H-C ppmv						
	C-O %						
	CO_2 %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/5/93 TEST NO. 5

1235	Positional SAVE near well 5-2B as recovery well (RW)
	2" well - Screened from 37.5 to 52.5' bgs - H_2O @ 45.2'
1245	START TEST - RW vacuum immediately @ 250" H_2O
	Initial well flow was evacuation of vapors from
	RW, well flow then went to 0.
1250	RW vacuum @ 280" H_2O - No well flow.
1255	RW vacuum @ 285' H_2O - No well flow.
	Test was aborted - This well should not be
	used as a SVE recovery well

AcuVac Remediation

OPERATING DATA - TEST NO 6

S.A.V.E.™ SYSTEM

Page 1 Location ENRON CORPORATION TRANSWESTERN COMPRESSOR STA. #5 THOREAU N.M. Project Engr. J. SADLER

	Parameter						
	Date	11/5/93	→	→	→		
		Time START 1305	Time 1405	Time STOP 1420	Time SHUT ON 1425	Time	Time
		Hr. Meter 569.7	Hr. Meter 570.7	Hr. Meter 570.9	Hr. Meter 571.0	Hr. Meter	Hr. Meter
ENGINE	R.P.M.	2500	2600	2600			
ENGINE	Oil Press P.S.I.	50	50	50			
ENGINE	Water Temp °F	190	190	190			
ENGINE	Volts	13.5	13.5	13.5			
ENGINE	Intake Vac Hg	13	13	13			
FUEL/AIR	Gas Flow Fuel/Propane cfh	115	115	115			
FUEL/AIR	Air Flow cfm	18	18	20			
FUEL/AIR	Well Flow 5-6B cfm	4	8	9			
FUEL/AIR	Recovery Well Vac 5-6B "H_2O	92	95	96			
	Air Temp °F	49	49	50			
	Barometric Pressure "Hg						
MONITOR WELL VACUUM	5-1B "H_2O	0	.18	.20			
MONITOR WELL VACUUM	5-5B "H_2O	.04	.15	.18			
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MONITOR WELL VACUUM	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON	ON			
MANIFOLD	Groundwater Wells On/Off	OFF	→	→			
MANIFOLD	Discharge Flow Meter gals	OFF	→	→			
	Samples						

33107)

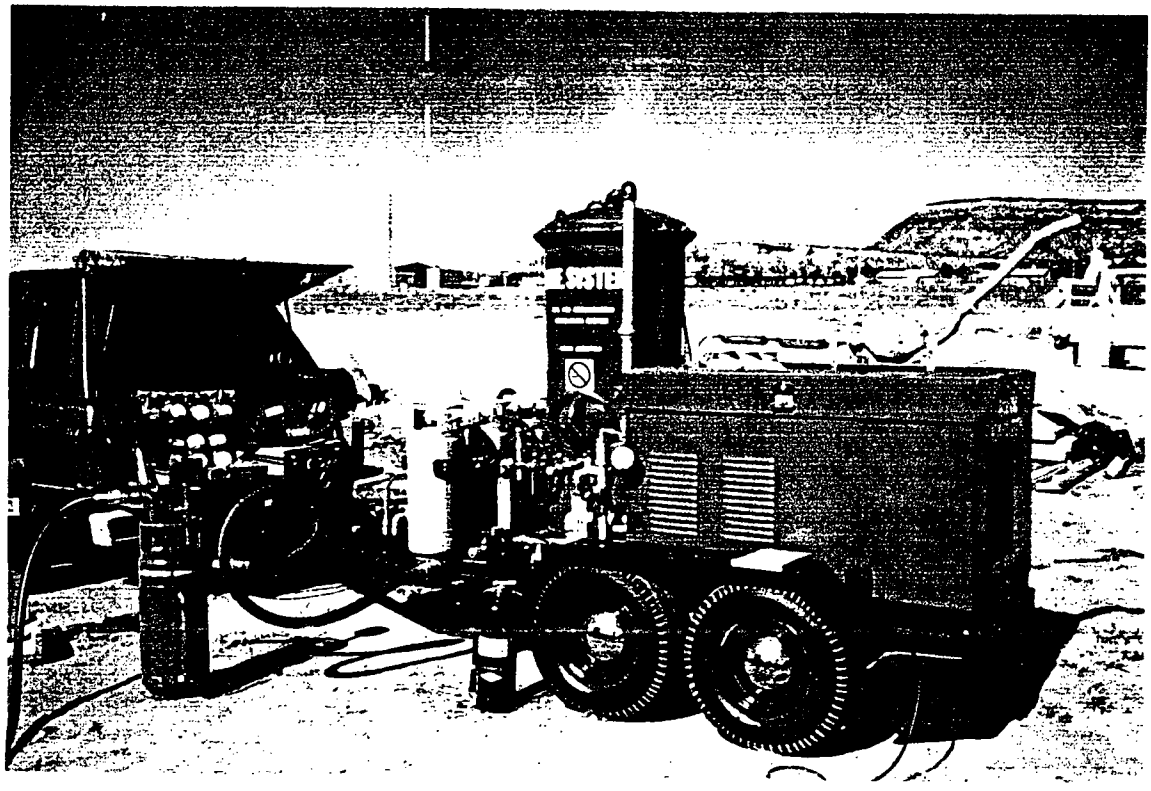
TEST	Instrument	HORIBA	HORIBA				
	Time	1320	1405				
VAPOR INFLUENT	H-C ppmv	20	108				
	C-O %	00	00				
	CO_2 %	.84	1.45				
SAVE EMISSIONS	H-C ppmv						
	C-O %						
	CO_2 %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/5/93 TEST NO. 6

1300	Moved SAVE near well 5-6B as recovery well (RW)
	2" well - Reported screened from 38.7 to 58.7 ft bgs
	Groundwater level @ 42.00'
1305	START TEST - Recorded Data - Initial RW flow @ 4 cfm
	and vacuum at 92" H_2O - Propane @ 115 cfh
1320	HORIBA Data - HC very low - well almost clean
1405	Recorded Data - All SAVE System functions normal
1410	HORIBA Data - HC slightly higher
1420	Recorded Data - Outer wells indicating vacuum response
	H_2O level @ 40.58 - Increase 1.42'
	TEST COMPLETED
1445	Cleaned and loaded all equipment -
1500	Reviewed test data
1545	Departed location

ENRON CORPORATION, TRANSWESTERN COMPRESSOR STATION #5



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A N A L Y T I C A L R E P O R T

Job Number: 935571
Prepared For:

HALL ENVIRONMENTAL ANALYTICAL
**SCOTT HALLENBECK*
2403 SAN MATEO N E
ALBUQUERQUE, NM 87110

Date: 11/19/93

Larry Scott AJW
Signature

11-19-93
Date:

Name: Larry Scott

CORE LABORATORIES
P O BOX 34766
HOUSTON, TX 77234-4282

Title: Laboratory Supervisor

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CORE LABORATORIES

LABORATORY TESTS RESULTS
11/19/93

JOB NUMBER: 935571 CUSTOMER: HALL ENVIRONMENTAL ANALYTICAL ATTN: **SCOTT HALLENBECK*

CLIENT I.D.....: 210522
DATE SAMPLED.....: 11/03/93
TIME SAMPLED.....: 14:40
WORK DESCRIPTION...: 5-35B

LABORATORY I.D...: 935571-0001
DATE RECEIVED....: 11/09/93
TIME RECEIVED....: 08:23
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			11/17/93	PKT
Benzene	30	1	ppm v/v			
Toluene	220	1	ppm v/v			
Ethyl Benzene	48	1	ppm v/v			
m+p-Xylenes	501	1	ppm v/v	GC		
ortho-Xylene	21	1	ppm v/v			
Refinery Gas Analysis, Extended		*1			11/17/93	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	2.95	0.01	Mol %	ASTM D-1945		
Nitrogen	84.29	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	11.55	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	<0.01	0.01	Mol %	ASTM D-1945		
Ethylene	<0.01	0.01	Mol %	ASTM D-1946		
Ethane	<0.01	0.01	Mol %	ASTM D-1945		
Propylene	<0.01	0.01	Mol %	ASTM D-2163		
Propane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutylene	<0.01	0.01	Mol %	ASTM D-2163		
1-Butene	<0.01	0.01	Mol %	ASTM D-2163		
n-Butane	<0.01	0.01	Mol %	ASTM D-1945		
trans-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
cis-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
Isopentane	<0.01	0.01	Mol %	ASTM D-2163		
n-Pentane	<0.01	0.01	Mol %	ASTM D-2163		
Hexanes	0.08	0.01	Mol %			
Heptanes	0.34	0.01	Mol %			
Octanes	0.33	0.01	Mol %			
Nonanes	0.06	0.01	Mol %			
Decanes	0.01	0.01	Mol %			
Undecanes	0	0	Mol %			
Dodecanes	0	0	Mol %			
Tridecanes	0	0	Mol %			
Tetradecanes Plus	0	0	Mol %			

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LABORATORY TESTS RESULTS
11/19/93

JOB NUMBER: 935571 CUSTOMER: HALL ENVIRONMENTAL ANALYTICAL ATTN: **SCOTT HALLENBECK*

CLIENT I.D.....: 210522
DATE SAMPLED.....: 11/04/93
TIME SAMPLED.....: 12:30
WORK DESCRIPTION...: 5-358

LABORATORY I.D...: 935571-0002
DATE RECEIVED....: 11/09/93
TIME RECEIVED....: 08:23
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			11/17/93	PKT
Benzene	38	1	ppm v/v			
Toluene	262	1	ppm v/v			
Ethyl Benzene	47	1	ppm v/v			
m+p-Xylenes	558	1	ppm v/v	GC		
ortho-Xylene	32	1	ppm v/v			
Refinery Gas Analysis, Extended		*1			11/17/93	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	3.69	0.01	Mol %	ASTM D-1945		
Nitrogen	85.31	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	9.85	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	<0.01	0.01	Mol %	ASTM D-1945		
Ethylene	<0.01	0.01	Mol %	ASTM D-1946		
Ethane	<0.01	0.01	Mol %	ASTM D-1945		
Propylene	<0.01	0.01	Mol %	ASTM D-2163		
Propane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutylene	<0.01	0.01	Mol %	ASTM D-2163		
1-Butene	<0.01	0.01	Mol %	ASTM D-2163		
n-Butane	<0.01	0.01	Mol %	ASTM D-1945		
trans-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
cis-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
Isopentane	<0.01	0.01	Mol %	ASTM D-2163		
n-Pentane	<0.01	0.01	Mol %	ASTM D-2163		
Hexanes	0.10	0.01	Mol %			
Heptanes	0.41	0.01	Mol %			
Octanes	0.38	0.01	Mol %			
Nonanes	0.07	0.01	Mol %			
Decanes	0.01	0.01	Mol %			
Undecanes	0.01	0	Mol %			
Dodecanes	0	0	Mol %			
Tridecanes	0	0	Mol %			
Tetradecanes Plus	0	0	Mol %			

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LABORATORY TESTS RESULTS
11/19/93

JOB NUMBER: 935571 CUSTOMER: HALL ENVIRONMENTAL ANALYTICAL ATTN: **SCOTT HALLENBECK*

CLIENT I.D.....: 210522
DATE SAMPLED.....: 11/04/93
TIME SAMPLED.....: 16:10
WORK DESCRIPTION...: 5-348

LABORATORY I.D...: 935571-0003
DATE RECEIVED....: 11/09/93
TIME RECEIVED....: 08:23
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			11/17/93	PKT
Benzene	192	1	ppm v/v			
Toluene	969	1	ppm v/v			
Ethyl Benzene	96	1	ppm v/v			
m+p-Xylenes	435	1	ppm v/v	GC		
ortho-Xylene	117	1	ppm v/v			
Refinery Gas Analysis, Extended		*1			11/17/93	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	1.56	0.01	Mol %	ASTM D-1945		
Nitrogen	81.39	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	14.44	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	<0.01	0.01	Mol %	ASTM D-1945		
Ethylene	<0.01	0.01	Mol %	ASTM D-1946		
Ethane	<0.01	0.01	Mol %	ASTM D-1945		
Propylene	<0.01	0.01	Mol %	ASTM D-2163		
Propane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutylene	<0.01	0.01	Mol %	ASTM D-2163		
1-Butene	<0.01	0.01	Mol %	ASTM D-2163		
n-Butane	<0.01	0.01	Mol %	ASTM D-1945		
trans-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
cis-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
Isopentane	<0.01	0.01	Mol %	ASTM D-2163		
n-Pentane	<0.01	0.01	Mol %	ASTM D-2163		
Hexanes	0.42	0.01	Mol %			
Heptanes	0.55	0.01	Mol %			
Octanes	0.89	0.01	Mol %			
Nonanes	0.12	0.01	Mol %			
Decanes	0.02	0.01	Mol %			
Undecanes	0	0	Mol %			
Dodecanes	0	0	Mol %			
Tridecanes	0	0	Mol %			
Tetradecanes Plus	0	0	Mol %			

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A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/19/93

JOB NUMBER: 935571 CUSTOMER: HALL ENVIRONMENTAL ANALYTICAL ATTN: **SCOTT HALLENBECK*

CLIENT I.D.....: 210522
DATE SAMPLED.....: 11/05/93
TIME SAMPLED.....: 09:50
WORK DESCRIPTION...: 5-48

LABORATORY I.D...: 935571-0004
DATE RECEIVED....: 11/09/93
TIME RECEIVED....: 08:23
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			11/17/93	PKT
Benzene	<1	1	ppm v/v			
Toluene	31	1	ppm v/v			
Ethyl Benzene	6	1	ppm v/v			
m+p-Xylenes	67	1	ppm v/v	GC		
ortho-Xylene	9	1	ppm v/v			
Refinery Gas Analysis, Extended		*1			11/17/93	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	15.31	0.01	Mol %	ASTM D-1945		
Nitrogen	78.92	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	5.72	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	<0.01	0.01	Mol %	ASTM D-1945		
Ethylene	<0.01	0.01	Mol %	ASTM D-1946		
Ethane	<0.01	0.01	Mol %	ASTM D-1945		
Propylene	<0.01	0.01	Mol %	ASTM D-2163		
Propane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutylene	<0.01	0.01	Mol %	ASTM D-2163		
1-Butene	<0.01	0.01	Mol %	ASTM D-2163		
n-Butane	<0.01	0.01	Mol %	ASTM D-1945		
trans-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
cis-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
Isopentane	<0.01	0.01	Mol %	ASTM D-2163		
n-Pentane	<0.01	0.01	Mol %	ASTM D-2163		
Hexanes	<0.01	0.01	Mol %			
Heptanes	0.01	0.01	Mol %			
Octanes	0.03	0.01	Mol %			
Nonanes	0.01	0.01	Mol %			
Decanes	<0.01	0.01	Mol %			
Undecanes	0	0	Mol %			
Dodecanes	0	0	Mol %			
Tridecanes	0	0	Mol %			
Tetradecanes Plus	0	0	Mol %			

P O BOX 34766
HOUSTON, TX 77234-4282
(713) 943-9776

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
11/19/93

JOB NUMBER: 935571 CUSTOMER: HALL ENVIRONMENTAL ANALYTICAL ATTN: **SCOTT HALLENBECK*

CLIENT I.D.....: 210522
DATE SAMPLED.....: 11/05/93
TIME SAMPLED.....: 12:15
WORK DESCRIPTION...: 5-5B

LABORATORY I.D...: 935571-0005
DATE RECEIVED....: 11/09/93
TIME RECEIVED....: 08:23
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			11/17/93	PKT
Benzene	<1	1	ppm v/v			
Toluene	2	1	ppm v/v			
Ethyl Benzene	<1	1	ppm v/v			
m+p-Xylenes	6	1	ppm v/v	GC		
ortho-Xylene	<1	1	ppm v/v			
Refinery Gas Analysis, Extended		*1			11/17/93	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	12.70	0.01	Mol %	ASTM D-1945		
Nitrogen	82.47	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	4.83	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	<0.01	0.01	Mol %	ASTM D-1945		
Ethylene	<0.01	0.01	Mol %	ASTM D-1946		
Ethane	<0.01	0.01	Mol %	ASTM D-1945		
Propylene	<0.01	0.01	Mol %	ASTM D-2163		
Propane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutane	<0.01	0.01	Mol %	ASTM D-1945		
Isobutylene	<0.01	0.01	Mol %	ASTM D-2163		
1-Butene	<0.01	0.01	Mol %	ASTM D-2163		
n-Butane	<0.01	0.01	Mol %	ASTM D-1945		
trans-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
cis-2-Butene	<0.01	0.01	Mol %	ASTM D-2163		
Isopentane	<0.01	0.01	Mol %	ASTM D-2163		
n-Pentane	<0.01	0.01	Mol %	ASTM D-2163		
Hexanes	<0.01	0.01	Mol %			
Heptanes	<0.01	0.01	Mol %			
Octanes	<0.01	0.01	Mol %			
Nonanes	<0.01	0.01	Mol %			
Decanes	<0.01	0.01	Mol %			
Undecanes	0	0	Mol %			
Dodecanes	0	0	Mol %			
Tridecanes	0	0	Mol %			
Tetradecanes Plus	0	0	Mol %			

P O BOX 34766
HOUSTON, TX 77234-4282
(713) 943-9776

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: Daniel B. Stephens & Assoc.

Address: 6020 Academy NE Suite 100
Albuquerque, NM 87109

Phone #: 505 822 9400

Fax #: 505 822 8877

Project Name: Enron - Thoreau

Project #: 2105 2.2

Project Manager: Bob Marley

Sampler: Bob Marley

Samples Cold? ☐ Yes ☐ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HCl	Preservative: Other	HEAL No.
11/3/93	1440	Air	S-35B	1L / 1 60cc				
11/4/93	1230	Air	S-35B	1L				
11/4/93	1610	Air	S-34B	1L				
11/5/93	0950	Air	S-4B	1L				
11/5/93	1215	Air	S-5B	1L				

ANALYSIS REQUEST

BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + ~~MTBE~~ + TPH (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles	EDB (Method 504.1)	EDC	610 (PNA or PAH)	explanded refinery Gasses			Air Bubbles or Headspace (Y or N)
			X							X			Y
			X							X			
			X							X			
			X							X			
			X							X			

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
11/5/93	1745	Bob Marley	
11/5/93	1745		11-5-93 1030

Remarks:

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo N.E., Suite P-13
Albuquerque, N.M. 87110
(505) 880-1803

11/10/93

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley:

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

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

Sincerely,

Scott Hallenbeck 11/10/93

Scott Hallenbeck, Lab Manager

Project: Enron-Thoreau

Results for sample : 5-35B (See date collected)

Date collected: 11/4/93 Date received: 11/5/93
Date extracted: NA Date injected: 11/8/93
Client: Daniel B. Stephens and Associates, Inc.
Project Name: Enron-Thoreau HEAL #: 931119-2
Project Manager: Bob Marley Sampled by: B. Marley
Matrix: Air

Method: EPA 602

Compound	Amount	Units
Benzene	67	UG/L
Toluene	450	UG/L
Ethylbenzene	21	UG/L
Total-Xylene	190	UG/L

BFB (Surrogate) Recovery = 100 %

Dilution Factor = 100

Method: EPA 8015 Modified

Compound	Amount	Units
Gasoline	53,000	UG/L

BFB (Surrogate) Recovery = 108 %

Dilution Factor = 100

Results for sample : 5-4B

Date collected: 11/5/93 Date received: 11/5/93
Date extracted: NA Date injected: 11/8/93
Client: Daniel B. Stephens and Associates, Inc.
Project Name: Enron-Thoreau HEAL #: 931119-4
Project Manager: Bob Marley Sampled by: B. Marley
Matrix: Air

Method: EPA 602

Compound	Amount	Units
Benzene	4.8	UG/L
Toluene	44	UG/L
Ethylbenzene	6.2	UG/L
Total-Xylene	38	UG/L

BFB (Surrogate) Recovery = 102 %

Dilution Factor = 25

Method: EPA 8015 Modified

Compound	Amount	Units
Gasoline	6,800	UG/L

BFB (Surrogate) Recovery = 119 %

Dilution Factor = 25

Results for QC: Air Blank

Date extracted: NA Date injected: 11/8/93
Client: Daniel B. Stephens and Associates, Inc.
Project Name: Enron-Thoreau HEAL #: RB 11/8
Project Manager: Bob Marley
Matrix: Air

Method: EPA 602

Compound	Amount	Units
Benzene	<0.05	UG/L
Toluene	<0.05	UG/L
Ethylbenzene	<0.05	UG/L
Total-Xylene	<0.05	UG/L

BFB (Surrogate) Recovery = 99 %

Method: EPA 8015 Modified

Compound	Amount	Units
Gasoline	<10	UG/L

BFB (Surrogate) Recovery = 95 %

CHAIN-OF-CUSTODY RECORD

[redacted]

2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: Daniel B. Stephens & Assoc.

Project Name: Enron - Thoreau

Address: 6020 Academy NE Suite 100
Albuquerque, NM 87109

Project #: 2105 2.2

Project Manager: Bob Marley

Phone #: 505 822 9400

Sampler: Bob Marley

Fax #: 505 822 8877

Samples Cold? ☐ Yes ☐ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HCl	Preservative: Other	HEAL No.
11/3/93	1490	Air	5-35B	1L/1 600cc				931119-01
11/4/93	1230	Air	5-35B	1L/				-02
11/4/93	1610	Air	5-34B	1L/				-03
11/5/93	0950	Air	5-4B	1L/				-04
11/5/93	1215	Air	5-5B	1L/				-05

ANALYSIS REQUEST

BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + ~~MTBE~~ + TPH (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles	EDB (Method 504.1)	EDC	610 (PNA or PAH)	extended refinery Gasses			Air Bubbles or Headspace (Y or N)
			X							X			Y
			X							X			
			X							X			
			X							X			
			X							X			

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
11/5/93	1745	Bob Marley	
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

Appendix E

Verification of Notifications

ENRON
Transwestern Pipeline Company

P. O. Box 1188 Houston, Texas 77251-1188 (713) 853-6161

CERTIFIED MAIL -- RETURN RECEIPT REQUESTED

March 11, 1994

Ms. Sadie Hoskie
Director, Navajo EPA
P.O. Box 308
Window Rock, AZ 86515

Dear ~~Ms. Hoskie~~, Sr. Ad. Re

This is to let you know that Transwestern Pipeline Company (TPC) is preparing to apply to the New Mexico Environment Department, Air Pollution Control Bureau for a permit for construction of a soil vapor extraction system at its Compressor Station No. 5 facility. This notice is a requirement of the permitting process, under Air Quality Control Regulation 702 - Permits.

We expect to submit the permit application to the NMED Air Pollution Control Bureau on March 21, 1994. The TPC facility is located in Section 20 of Range 13W Township 14N, 2.4 miles NNW of Thoreau, New Mexico. The process for which we are seeking a permit is a soil vapor extraction system. The system is designed to extract subsurface soil vapor at a maximum rate of 176 cfm (cubic feet per minute). The estimated maximum emissions after construction is completed are listed in Table 1. The standard operating schedule of the new source after completion is 24 hours/day, 7 days/week, 52 weeks/year.

Table 1. Maximum estimated emission rates and annual emissions of regulated compounds.

Compound	Maximum Estimated Emission Rate lbs./hour	Maximum Estimated Annual Emissions tons/year
benzene	0.04	0.01
toluene	0.26	0.18
ethylbenzene	0.03	0.03
xylene (m-, p-, & o-)	0.17	0.34
hexanes	1.07	0.29
octanes	3.00	2.01
nonanes	0.46	0.59
Total NMHC	6.75	4.33

Note: Total NMHC (non-methane hydrocarbons) includes the previously listed compounds.

The owner and operator of the facility is Transwestern Pipeline Company, a subsidiary of ENRON Operations Corp., P.O. Box 1188, Houston, TX 77251-1188.

Comments and inquiries regarding this permit application or the permitting process may be directed to:

Program Manager, Technical Analysis and Permits Section
Environment Department
Air Pollution Control Bureau, S2100
1190 St. Francis Drive, Runnels Building
P.O. Box 26110
Santa Fe, New Mexico 87502

Sincerely,

Fenley "Ted" Ryther, Jr., P.E.
Manager, Permits Group

Address:
Environmental Affairs, Rm. 3AC3137
ENRON Operations Corp.
P.O. Box 1188
Houston, TX 77251-1188

ENRON
Transwestern Pipeline Company

P. O. Box 1188 Houston, Texas 77251-1188 (713) 853-6161

CERTIFIED MAIL -- RETURN RECEIPT REQUESTED

March 11, 1994

Area Manager, BLM
Rio Puerco Resource Area
435 Montano NE
Albuquerque, NM 87107

To whom it may concern:

This is to let you know that Transwestern Pipeline Company (TPC) is preparing to apply to the New Mexico Environment Department, Air Pollution Control Bureau for a permit for construction of a soil vapor extraction system at its Compressor Station No. 5 facility. This notice is a requirement of the permitting process, under Air Quality Control Regulation 702 - Permits.

We expect to submit the permit application to the NMED Air Pollution Control Bureau on March 21, 1994. The TPC facility is located in Section 20 of Range 13W Township 14N, 2.4 miles NNW of Thoreau, New Mexico. The process for which we are seeking a permit is a soil vapor extraction system. The system is designed to extract subsurface soil vapor at a maximum rate of 176 cfm (cubic feet per minute). The estimated maximum emissions after construction is completed are listed in Table 1. The standard operating schedule of the new source after completion is 24 hours/day, 7 days/week, 52 weeks/year.

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ethylbenzene	0.03	0.03
xylene (m-, p-, & o-)	0.17	0.34
hexanes	1.07	0.29
octanes	3.00	2.01
nonanes	0.46	0.59
Total NMHC	6.75	4.33

Note: Total NMHC (non-methane hydrocarbons) includes the previously listed compounds.

The owner and operator of the facility is Transwestern Pipeline Company, a subsidiary of ENRON Operations Corp., P.O. Box 1188, Houston, TX 77251-1188.

Comments and inquiries regarding this permit application or the permitting process may be directed to:

Program Manager, Technical Analysis and Permits Section
Environment Department
Air Pollution Control Bureau, S2100
1190 St. Francis Drive, Runnels Building
P.O. Box 26110
Santa Fe, New Mexico 87502

Sincerely,

Fenley "Ted" Ryther, Jr., P.E.
Manager, Permits Group

Address:
Environmental Affairs, Rm. 3AC3137
ENRON Operations Corp.
P.O. Box 1188
Houston, TX 77251-1188

ENRON
Transwestern Pipeline Company

P. O. Box 1188 Houston, Texas 77251-1188 (713) 853-6161

CERTIFIED MAIL -- RETURN RECEIPT REQUESTED

March 11, 1994

Mr. Milton Gabaldon
McKinley County Clerk
P.O. Box 1268
Gallup, NM 87305

Dear Mr. Gabaldon,

This is to let you know that Transwestern Pipeline Company (TPC) is preparing to apply to the New Mexico Environment Department, Air Pollution Control Bureau for a permit for construction of a soil vapor extraction system at its Compressor Station No. 5 facility. This notice is a requirement of the permitting process, under Air Quality Control Regulation 702 - Permits.

We expect to submit the permit application to the NMED Air Pollution Control Bureau on March 21, 1994. The TPC facility is located in Section 20 of Range 13W Township 14N, 2.4 miles NNW of Thoreau, New Mexico. The process for which we are seeking a permit is a soil vapor extraction system. The system is designed to extract subsurface soil vapor at a maximum rate of 176 cfm (cubic feet per minute). The estimated maximum emissions after construction is completed are listed in Table 1. The standard operating schedule of the new source after completion is 24 hours/day, 7 days/week, 52 weeks/year.

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toluene	0.26	0.18
ethylbenzene	0.03	0.03
xylene (m-, p-, & o-)	0.17	0.34
hexanes	1.07	0.29
octanes	3.00	2.01
nonanes	0.46	0.59
Total NMHC	6.75	4.33

Note: Total NMHC (non-methane hydrocarbons) includes the previously listed compounds.

The owner and operator of the facility is Transwestern Pipeline Company, a subsidiary of ENRON Operations Corp., P.O. Box 1188, Houston, TX 77251-1188.

Comments and inquiries regarding this permit application or the permitting process may be directed to:

Program Manager, Technical Analysis and Permits Section
Environment Department
Air Pollution Control Bureau, S2100
1190 St. Francis Drive, Runnels Building
P.O. Box 26110
Santa Fe, New Mexico 87502

Sincerely,

Fenley "Ted" Ryther, Jr., P.E.
Manager, Permits Group

Address:
Environmental Affairs, Rm. 3AC3137
ENRON Operations Corp.
P.O. Box 1188
Houston, TX 77251-1188

ENRON
Transwestern Pipeline Company

P. O. Box 1188 Houston, Texas 77251-1188 (713) 853-6161

CERTIFIED MAIL -- RETURN RECEIPT REQUESTED

March 11, 1994

Ms. Patricia A. Aragon
Cibola County Clerk
P.O. Box 190
Grants, NM 87020

Dear Ms. Aragon,

This is to let you know that Transwestern Pipeline Company (TPC) is preparing to apply to the New Mexico Environment Department, Air Pollution Control Bureau for a permit for construction of a soil vapor extraction system at its Compressor Station No. 5 facility. This notice is a requirement of the permitting process, under Air Quality Control Regulation 702 - Permits.

We expect to submit the permit application to the NMED Air Pollution Control Bureau on March 21, 1994. The TPC facility is located in Section 20 of Range 13W Township 14N, 2.4 miles NNW of Thoreau, New Mexico. The process for which we are seeking a permit is a soil vapor extraction system. The system is designed to extract subsurface soil vapor at a maximum rate of 176 cfm (cubic feet per minute). The estimated maximum emissions after construction is completed are listed in Table 1. The standard operating schedule of the new source after completion is 24 hours/day, 7 days/week, 52 weeks/year.

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toluene	0.26	0.18
ethylbenzene	0.03	0.03
xylene (m-, p-, & o-)	0.17	0.34
hexanes	1.07	0.29
octanes	3.00	2.01
nonanes	0.46	0.59
Total NMHC	6.75	4.33

Note: Total NMHC (non-methane hydrocarbons) includes the previously listed compounds.

The owner and operator of the facility is Transwestern Pipeline Company, a subsidiary of ENRON Operations Corp., P.O. Box 1188, Houston, TX 77251-1188.

Comments and inquiries regarding this permit application or the permitting process may be directed to:

Program Manager, Technical Analysis and Permits Section
Environment Department
Air Pollution Control Bureau, S2100
1190 St. Francis Drive, Runnels Building
P.O. Box 26110
Santa Fe, New Mexico 87502

Sincerely,

Fenley "Ted" Ryther, Jr., P.E.
Manager, Permits Group

Address:
Environmental Affairs, Rm. 3AC3137
ENRON Operations Corp.
P.O. Box 1188
Houston, TX 77251-1188

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Ms. Sadie Hoskie
Director, Navajo EPA
P.O. Box 308
Window Rock, AZ 86515

4a. Article Number
P 468 140 118

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☒ Return Receipt for Merchandise

7. Date of Delivery
3-21-94

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)
Lee Marks

PS Form **3811**, December 1991 ☆ U.S.G.P.O.: 1992-307-530 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Area Manager, BLM
Rio Puerco Resource Area
435 Montano NE
Albuquerque, NM 87107

4a. Article Number
P 468 149 120

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☒ Return Receipt for Merchandise

7. Date of Delivery
3-18-94

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)
K. Armendariz

PS Form **3811**, December 1991 ☆ U.S.G.P.O.: 1992-307-530 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Ms. Patricia A. Aragon
Cibola County Clerk
P.O. Box 190
Grants, NM 87020

4a. Article Number
P 468 140 121

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☒ Return Receipt for Merchandise

7. Date of Delivery
MAR 21 1994

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

PS Form **3811**, December 1991 ☆ U.S.G.P.O.: 1992-307-530 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
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I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr. Milton Gabaldon
McKinley County Clerk
P.O. Box 1268
Gallup, NM 87305

4a. Article Number
P 468 140 122

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☒ Return Receipt for Merchandise

7. Date of Delivery
3

5. Signature (Addressee)
Milton Gabaldon

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

PS Form **3811**, December 1991 ☆ U.S.G.P.O.: 1992-307-530 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

NOTICE OF PERMIT APPLICATION

Pursuant to the requirements of New Mexico Air Quality Control Regulation 702 - Permits, Transwestern Pipeline Company (TPC) of P.O. Box 1188, Houston, TX 77251, hereby announces an intent to apply to the New Mexico Environment Department, Air Pollution Control Bureau for a permit to construct a facility which will cause emissions of the following regulated air contaminants: benzene, toluene, ethylbenzene, xylene, hexanes, octanes, and nonanes. The expected date of application submittal to the NMED is March 15, 1994. The TPC facility is located in Section 20 of Range 13W Township 14N, 2.4 miles NNW of Thoreau, New Mexico. The process for which TPC is seeking a permit is a soil vapor extraction system. The system is designed to extract subsurface soil vapor at a maximum rate of 176 cfm (cubic feet per minute).

The estimated maximum emissions after construction is completed are listed in Table 1. The maximum and standard operating schedule of the new source after completion is 24 hours/day, 7 days/week, 52 weeks/year.

Table 1. Maximum estimated emission rates and annual emissions of regulated compounds.

Compound	Maximum Estimated Emission Rate lbs./hour	Maximum Estimated Annual Emissions tons/year
benzene	0.04	0.01
toluene	0.26	0.18
ethylbenzene	0.03	0.03
xylene (m-, p-, & o-)	0.17	0.34
hexanes	1.07	0.29
octanes	3.00	2.01
nonanes	0.46	0.59
Total NMHC	6.75	4.33

Note: Total NMHC (non-methane hydrocarbons) includes the previously listed compounds.

The owner and operator of the facility is Transwestern Pipeline Company, a subsidiary of ENRON Operations Corp., P.O. Box 1188, Houston, TX 77251-1188.

Comments and inquires regarding this permit application or the permitting process may be directed to:

Program Manager, Technical Analysis and Permits Section
Environment Department
Air Pollution Control Bureau, S2100
1190 St. Francis Drive, Runnels Building
P.O.Box 26110
Santa Fe, New Mexico 87502

Affidavit of Publication

STATE OF NEW MEXICO
) SS
UNTY OF McKINLEY

HUBBARD, FREIDA being duly sworn upon oath, deposes and says:

As Legal Clerk of The Independent, a newspaper published in and having a general circulation in McKinley County, New Mexico and in the City of Gallup, New Mexico and having a general circulation in Cibola County, New Mexico and in the City of Grants, New Mexico and having a general circulation in Apache County, Arizona and in the City of St. Johns and in the City of Window Rock, Arizona therein: that this affiant makes this affidavit based upon personal knowledge of the facts herein sworn to. That the publication, a copy of which is hereto attached was published in said newspaper during the period and time of publication and said notice was published in the newspaper proper, and not in a supplement thereof,

for one time, the first publication being on the 21st day of March, 19 94 the second publication being on the _____ day of _____, 19_____ the third publication on the _____ day of _____, 19_____.

and the last publication being on the _____ day of _____, 19_____.

That such newspaper, in which such notice or advertisement was published, is now and has been at all times material hereto, duly qualified for such purpose, and to publish legal notices and advertisements within the meaning of Chapter 12, of the statutes of the State of New Mexico, 1941 compilation.

Freida Hubbard
Affiant.

Sworn and subscribed to before me this 24th day of March, A.D., 19 94.

Linda Kay Pelton
Notary Public

My commission expires
August 29, 1997

2735 2M BUTLER'S Gallup

LEGAL NOTICE
Santa Fe County
New Mexico

NOTICE OF PERMIT APPLICATION

Pursuant to the requirements of New Mexico Air Quality Control Regulation 702 - Permits, Transwestern Pipeline Company (TPC) of P.O. Box 1188, Houston, TX 77251, hereby announces an intent to apply to the New Mexico Environment Department, Air Pollution Control Bureau for a permit to construct a facility which will cause emissions of the following regulated air contaminants: benzene, toluene, ethylbenzene, xylene, hexanes, octanes, and nonanes. The expected date of application submittal to the NMED is March 21, 1994. The TPC facility is located in Section 20 of Range 13W Township 14N, 2.4 miles NNW of Thoreau, New Mexico. The process for which TPC is seeking a permit is a soil vapor extraction system. The system is designed to extract subsurface soil vapor at a maximum rate of 176 cfm (cubic feet per minute).

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OCTANES	3.00	2.01
NONANES	0.46	0.59
TOTAL NMHC	6.75	4.33

Note: Total NMHC (non-methane hydrocarbons) includes the previously listed compounds.

The owner and operator of the facility is Transwestern Pipeline Company, a subsidiary of ENRON Operations Corp., P.O. Box 1188, Houston, TX 77251-1188.

Comments and inquires regarding this permit application of the permitting process may be directed to:

Program Manager, Technical Analysis and Permits Section
Environment Department
Air Pollution Control Bureau, S2100
1190 St. Francis Drive, Runnels Building
P.O. Box 26110
Santa Fe, New Mexico 87502

Legal No. 10492 Published in The Independent March 21, 1994.

NOTICE OF PERMIT APPLICATION

Pursuant to the requirements of New Mexico Air Quality Control Regulation 702-Permits, Transwestern Pipeline Company (TPC) of P.O. Box 1188, Houston, TX 77251, hereby announces an intent to apply to the New Mexico Environment Department, Air Pollution Control Bureau for a permit to construct a facility which will cause emissions of the following regulated air contaminants: benzene, toluene, ethylbenzene, xylene, hexanes, octanes, and nonanes. The expected date of application submittal to the NMED is March 21, 1994. The TPC facility is located in Section 20 of Range 13W Township 14N, 2.4 miles NNW of Thoreau, New Mexico. The process for which TPC is seeking a permit is a soil vapor extraction system. The system is designed to extract subsurface soil vapor at a maximum rate of 176 cfm (cubic feet per minute).

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Environment Department
Air Pollution Control Bureau, S2100
1190 St. Francis Drive, Runnels Building
P.O. Box 26110
Santa Fe, New Mexico 87502

FUN 100 KXTC
2495 East Aztec
Gallup, New Mexico
87301
(505) 722 - 4442

FM 100
KXTC

CONTINUITY

DATE: 3-31-94

ACCOUNT: ENRON CORP.

PREPARED BY: JENNIFER SAUCEDO

SPECIAL INSTRUCTIONS: -

TIME AND DATE SCHEDULE

3-19-94 10:20am

THIS ANNOUNCEMENT WAS BROADCAST 1 TIMES, AS BILLING TO THIS STATION'S CLIENTS, FOR THE PERIOD DATED 3-19-94 AT THE COST OF $ 19.60 EACH FOR 1MIN ANNOUNCEMENTS, FOR A TOTAL OF $ 19.60

LEE WINSLOW GENERAL MANAGER
OFFICIAL'S TITLE

Lee Winslow
OFFICIAL SIGNAUTURE

NOTARY

KXTC FM 100
STATION

FUN 100 KXTC
2495 East Aztec
Gallup, New Mexico
87301
(505) 722 - 4442

FM 100
KXTC

CONTINUITY

DATE: 3-31-94

ACCOUNT: ENRON OPERATIONS

PREPARED BY: JENNIFER SAUCEDO

SPECIAL INSTRUCTIONS:

NOTICE OF PERMIT APPLICATION

PURSUANT TO THE REQUIREMENTS OF NEW MEXICO AIR QUALITY CONTROL REGULATION 702 PERMITS, TRANWESTERN, PIPELINE COMPANY (TPC) OF P.O. BOX 1188, HOUSTON, TX 77251, HEREBY ANNOUNCES AN INTENT TO APPLY TO THE NEW MEXICO ENVIRONMENT DEPARTMENT, AIR POLLUTION CONTROL BUREAU FOR A PERMIT TO CONSTRUCT A FACILITY WHICH WILL CAUSE EMISSIONS OF THE FOLLOWING REGULATED AIR CONTAMINANTS: THE EXPECTED DATE OF APPLICATION SUBMITTAL TO THE NMED IS MARCH 21, 1994 THE TPC FACILITY IS LOCATED IN SECTION 20 OF RANGE 13W TOWNSHIP 14N, 2.4 MILES NNW OF THOREAU, NEW MEXICO THE PROCESS FOR WHICH TPC IS SEEKING A PERMIT IS A SOIL VAPOR EXTRACTION SYSTEM.

THE ESTIMATED MAXIMUM EMISSIONS AFTER CONSTRUCTION IS COMPLETED ARE LISTED IN TABLE 1. THE MAXIMUM AND STANDARD OPERATING SCHEDULE OF THE MEW SOURCE AFTER COMPLETION IS 24 HOURS/DAY, 7 DAYS/WEEK, 52 WEEKS/YEAR.

Table 1 Maximum estimated emission rates and annual emissions of regulated compounds

Compound	Maximum Estimated Emission Rate lbs/hour	Maximum Estimated Annual Emissions tons/year
benzene	0.04	0.01
toluene	0.26	0.18
ethylbenzene	0.03	0.03
xylene (m-, p-, & o-)	0.17	0.34
hexanes	1.07	0.29
octanes	3.30	2.01
nonanes	0.46	0.59
Total NMHC	6.75	4.33

Note. Total NMHC (non-methane hydrocarbons) includes the previously listed compounds

THIS ANNOUNCEMENT WAS BROADCAST 1 TIMES, AS BILLING TO THIS STATION'S CLIENTS, FOR THE PERIOD DATED 3-19-94 AT THE COST OF $ 19.60 EACH FOR 1min ANNOUNCEMENTS, FOR A TOTAL OF $ 19.60

Lee Winslow

OFFICIAL'S TITLE

Jennifer Saucedo

NOTARY

KXTC FM 100

STATION

LEE WINSLOW GENERAL MANAGER

OFFICIAL SIGNAUTURE

FUN 100 KXTC
2495 East Aztec
Gallup, New Mexico
87301
(505) 722 - 4442

FM 100
K X T C

CONTINUITY

DATE:

ACCOUNT:	PREPARED BY:

SPECIAL INSTRUCTIONS: -

- -

THE OWNER AND OPERATOR OF THE FACILITY IS TRANWESTERN PIPELINE COMPANY, A SUBSIDIARY OF ENRON OPERATIONS CORP., P.O. BOX 1188, HOUSTON, TX 77251-1188.
FOR THE ADDRESS TO MAIL COMMENTS AND INQUIRES PLEASE CALL KXTC AT (505)-722-4442 THIS ANNOUNCEMENT BROUGHT AND PAID FOR BY TRANSWESTERN PIPELINE COMPANY, A SUBSIDIARY OF ENRON OPERATIONS CORP,. P.O. BOX 1188 HOUSTON, TX 77251-1188

THIS ANNOUNCEMENT WAS BROADCAST _____ TIMES, AS BILLING TO THIS STATION'S CLIENTS, FOR THE PERIOD DATED _____ AT THE COST OF $ _____ EACH FOR _____ ANNOUNCEMENTS, FOR A TOTAL OF $ _____

_____
OFFICIAL'S TITLE

NOTARY _____ STATION _____ OFFICIAL SIGNAUTURE

Appendix F

USGS Topographic Quadrangle Map

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

THOREAU QUADRANGLE
NEW MEXICO - MC KINLEY CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Location of New Source

One Mile Radius

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1958. Field checked 1963

Polyconic projection. 1927 North American datum
10,000-foot grid based on New Mexico coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

To place on the predicted North American Datum 1983 move the projection lines 56 meters east as shown by dashed corner ticks

UTM GRID AND 1980 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Revision shown in purple compiled from aerial photographs taken 1978 and other source data. This information not field checked. Map edited 1980

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

Heavy duty ——— Light duty .....
Medium-duty — — — Unimproved dirt .....
( ) Interstate Route ( ) U.S. Route ( ) State Route

THOREAU, N. MEX.
N3535-W10807/7.5

1963
PHOTOREVISED 1980
DMA 4354 I NW-SERIES V881