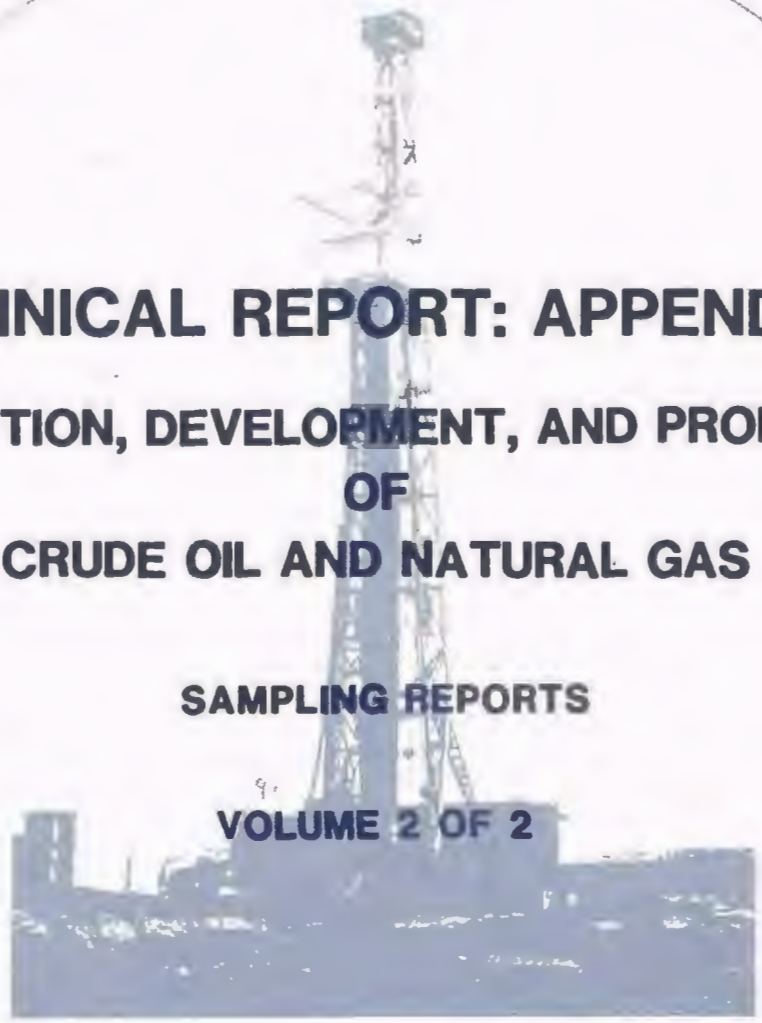
United States Environmental Protection Agency

Office of Water Regulations and Standards (WH-552) Washington, D.C. 20460

Office of Solid Waste and Emergency Response Washington, D.C. 20460

EPA 530-SW-87-005

EPA



TECHNICAL REPORT: APPENDIX C

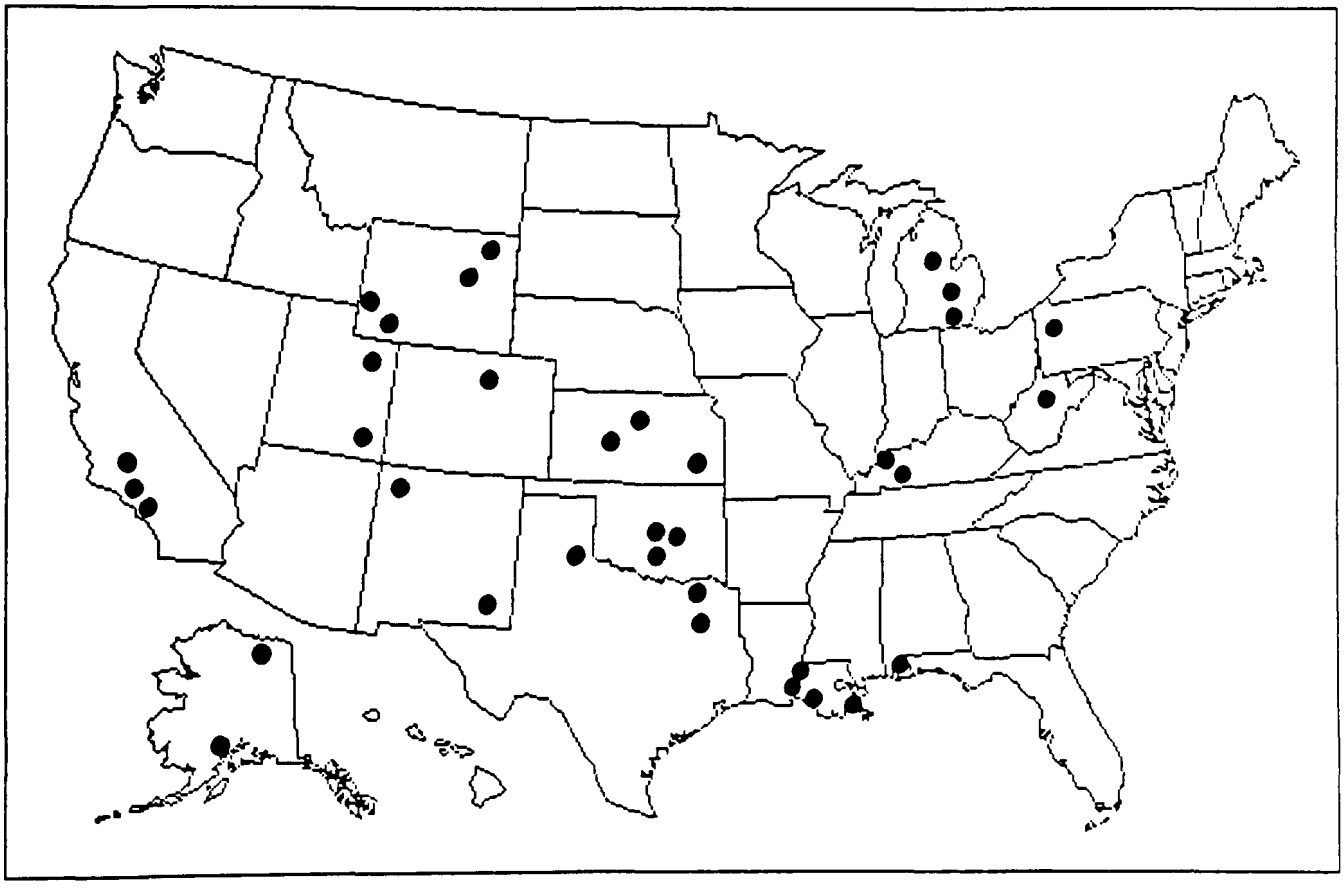
EXPLORATION, DEVELOPMENT, AND PRODUCTION OF CRUDE OIL AND NATURAL GAS

SAMPLING REPORTS

VOLUME 2 OF 2

APPENDIX C
SAMPLING REPORTS

VOLUME 2



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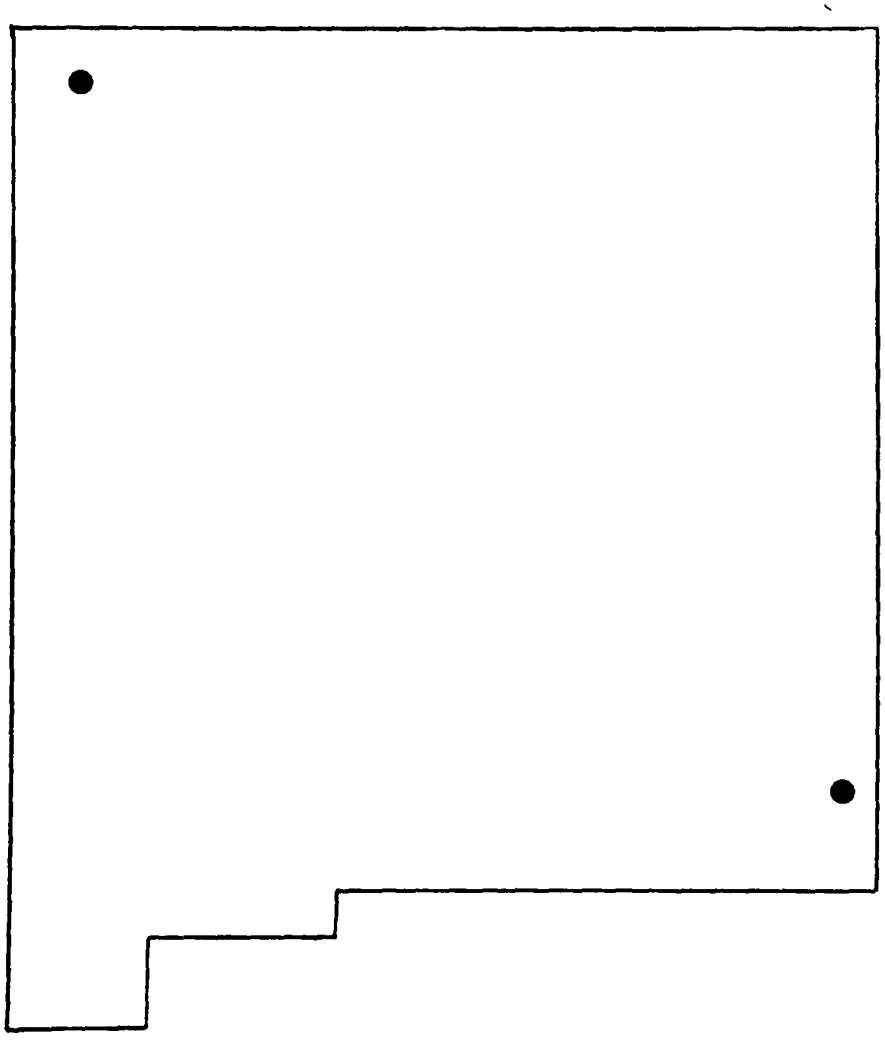


Sampling Report
Investigation of Basin Disposal Inc.
Bloomfield, New Mexico
June 25, 1986

SITE INFORMATION

Site Selection

EPA specifically selected the Basin Disposal facility to obtain technical information and analytical data regarding the regional practice of using centralized pits for disposal of wastes from multiple oil and/or gas sources. More detailed information about the rationale for selection of centralized disposal pits is contained in Appendix B of the EPA Technical Report (EPA 530-SW-87-005).

EPA worked cooperatively with the New Mexico Oil Conservation Division to identify and select the Basin Disposal facility. No problems were encountered arranging for sampling to be conducted on June 25, 1986.

Site Location

Basin Disposal Inc. is located 3 miles north of Bloomfield, NM on the west side of NM Highway 44. Figure 1 is a map indicating the disposal site.

The site is operated by Basin Disposal Incorporated, whose mailing address and telephone number are:

PO Box 100
Aztec, NM 87410
505-334-3013
Contact Name: Sally Sandel

Attendees

Sampling of Basin Disposal Inc. was performed by CENTEC Corporation personnel on June 25, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Andy Procko, Engineering Manager, Acting Technician
EPA Representative:	Susan de Nagy, Office of Water, Project Officer
State Representative:	Dave Boyer, Environmental Bureau Chief, NM Oil Conservation Division

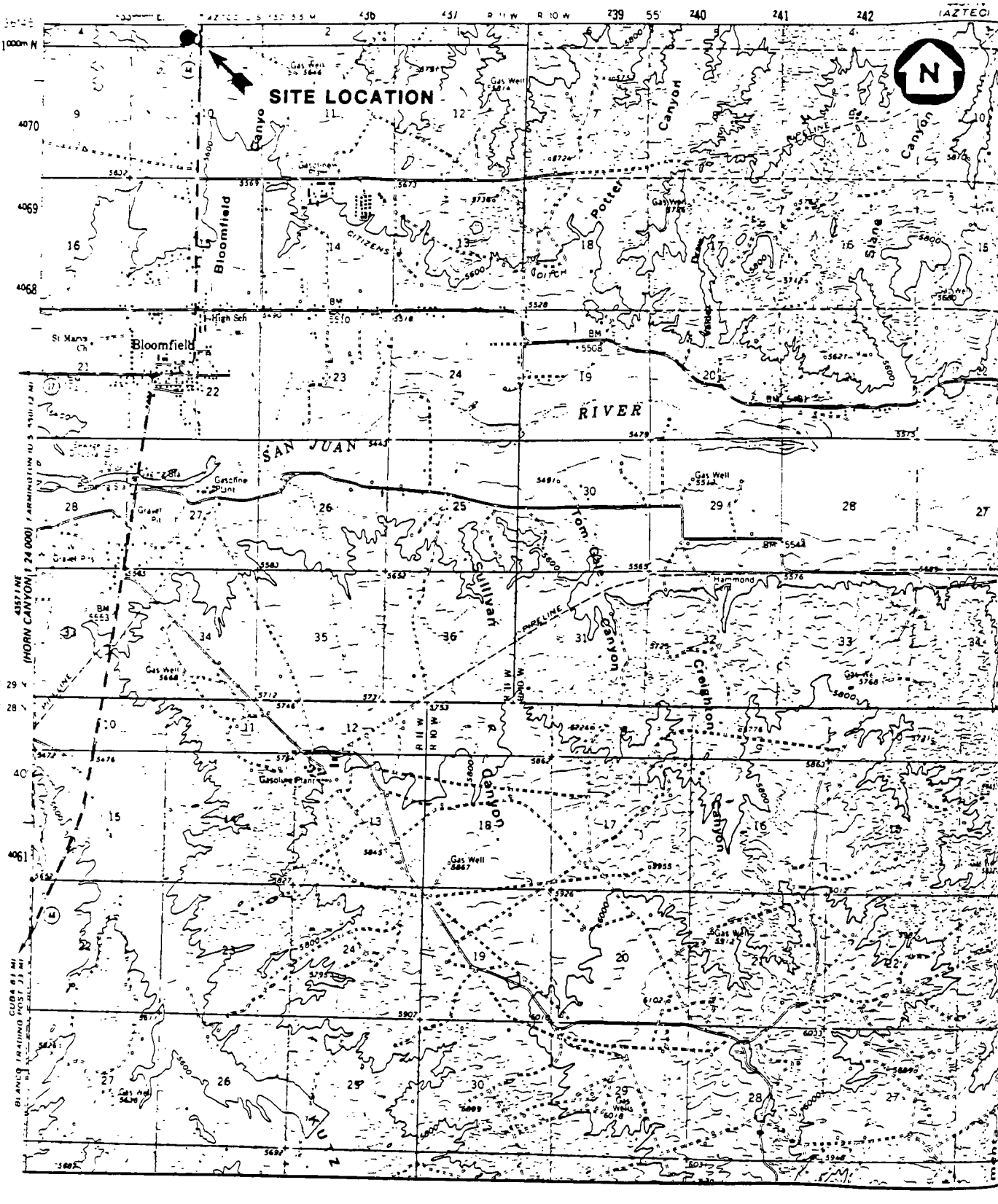


Figure 1. Location of Basin Disposal Inc., Bloomfield, New Mexico

Operator Representatives:	A. R. Bryan David Turner, Company Part-Owner
American Petroleum Institute Representative:	Bill Freeman, Observer

Site Description

Basin Disposal Inc. is located in the San Juan Basin in rural mesa; the depth to groundwater is over 250 feet and the nearest surface water is over 2 miles away. There are no drinking water wells within a 1-mile radius of the site. The soil in this area is sandy clay. The climate at this site is net evaporation.

This site is a commercial central pit facility for mud and brine. Annual operation hours are 4056. Proximity of clientele ranges within a 50-100 mile radius from the facility. The facility charges $50 per load for produced water and $75 per load for drilling mud. A load is approximately 80 bbl. The facility sells approximately 200 bbl reclaimed oil per month.

Figure 2 is a schematic diagram of the disposal site. Three separate pits were constructed for the site: two drilling mud pits and one brine pit. Each mud pit measured 150 feet by 70 feet. The brine pit measured 285 feet by 185 feet. All pits were constructed above grade. The mud pits were unlined. The brine pit had a double plastic liner with thickness of 20 ml and 40 ml. There was a sand layer between the liners. Leak detection monitoring was required. There was a source to catch leachate if the first liner leaks. The brine pit had a sprinkler system to enhance fluid evaporation. The pits are filled every day as material is trucked in from outside locations. On the day of sampling, the depth of the brine pit was 13-15 feet, and the depths of the mud pits were 4-6 feet. The pits were fenced. The total site construction costs were $450,000. Monthly operational costs at this facility include full-time salary for one employee and electricity costs for the trailer unit and the pumps for the heated separation unit.

Additional information is available in the following Attachments:

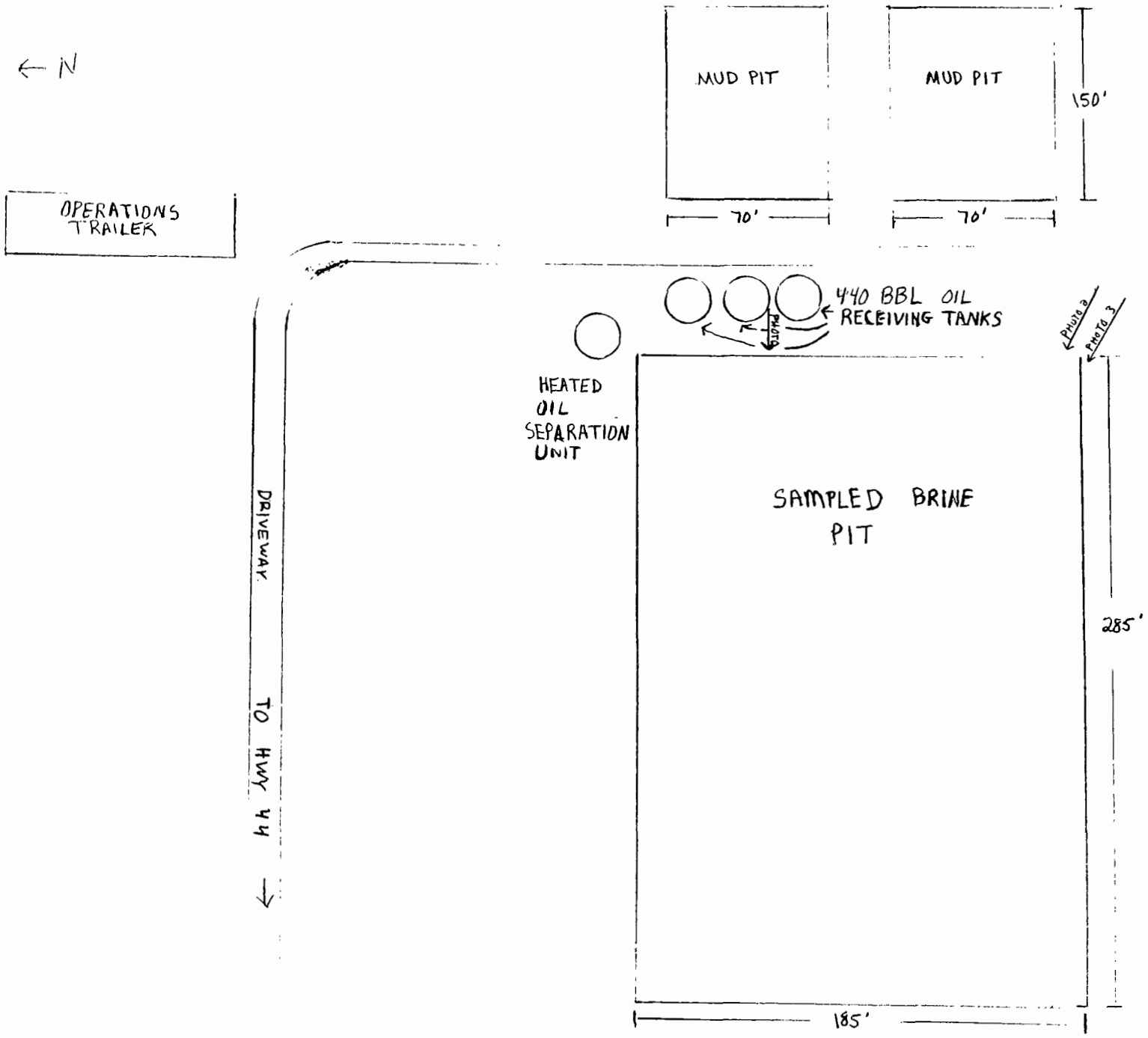
Attachment C: Design and Engineering Reports, Basin Disposal Inc.

Attachment D: Evaporation Pit Geological Report

Attachment E: Bill of Lading Used by Basin Disposal Inc.

Permits

A copy of the facility permit was not available at the time of sampling.


← N
MUD PIT
MUD PIT
150'
70'
70'
OPERATIONS TRAILER
440 BBL OIL RECEIVING TANKS
PHOTO 3
PHOTO 3
PHOTO 3
HEATED OIL SEPARATION UNIT
SAMPLED BRINE PIT
285'
185'
DRIVEWAY
TO HWY 44

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The sample collected at Basin Disposal Inc. consisted of one supernatant sample from the brine pit. Figure 3 shows the sampling locations within the brine pit. Sample points were accessed by boat. Thus, there was no discrepancy between the actual and measured sample points caused by the inaccessibility of the measured point.

Sampling Methods and Equipment

To collect samples, the brine pit was measured in order to identify four quadrants and locate the center of each quadrant. Sampling was conducted with the liquid thief from the boat. Photos 1-3 (Attachment A) show the sample collection from the brine pit. At the direction of the EPA Project Officer, a sludge sample from the brine pit was cancelled since there was concern that the liner might be punctured by the sludge sampling equipment. Neither of the drilling waste pits was sampled.

The pit supernatant was tested onsite for pH after the completion of sampling. The results of the test gave the water a pH of 8. Due to time constraints, the samples were held in refrigeration overnight before shipment to the laboratories.

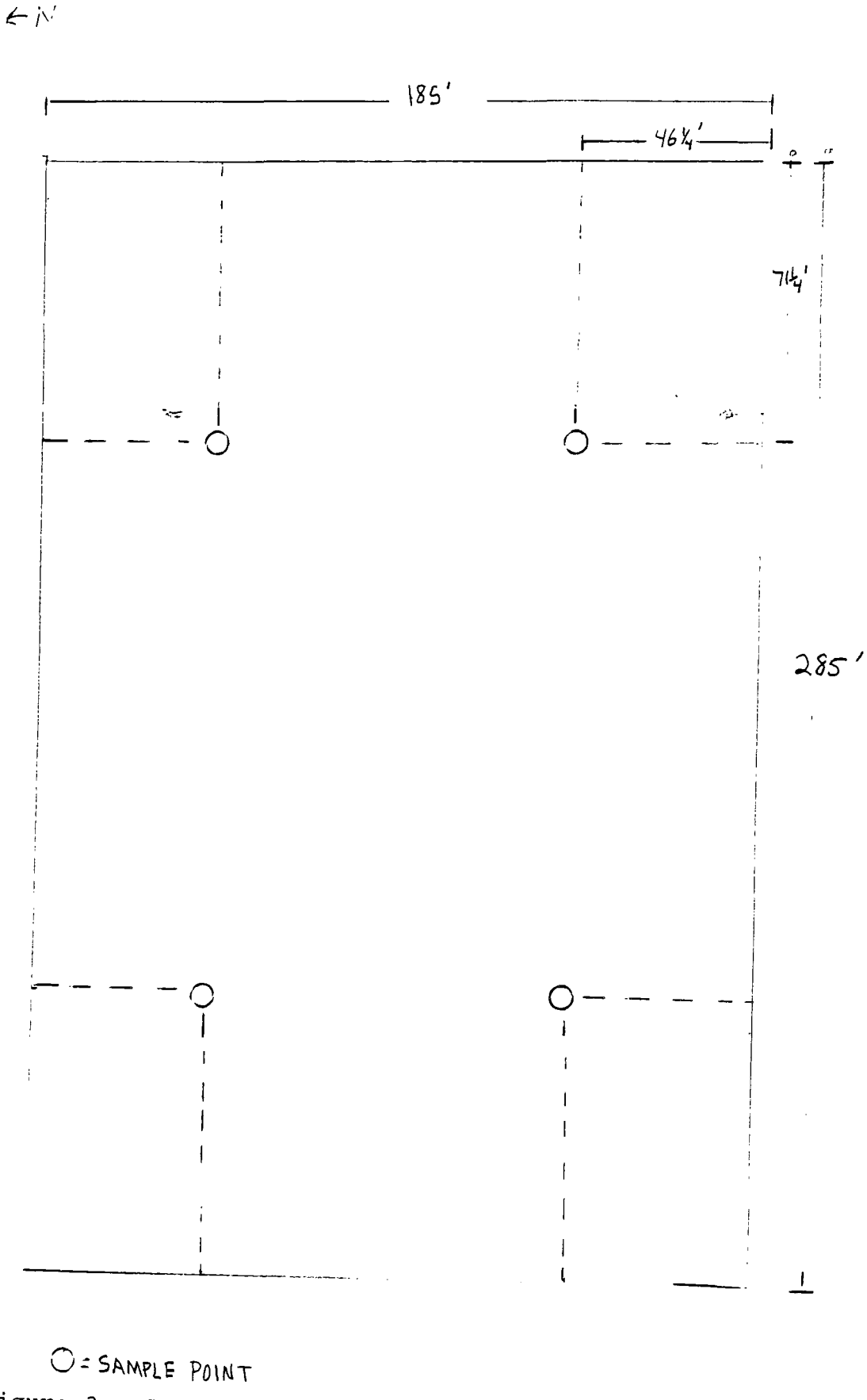


Figure 3. Sampling Locations in Basin Disposal Brine Pit

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

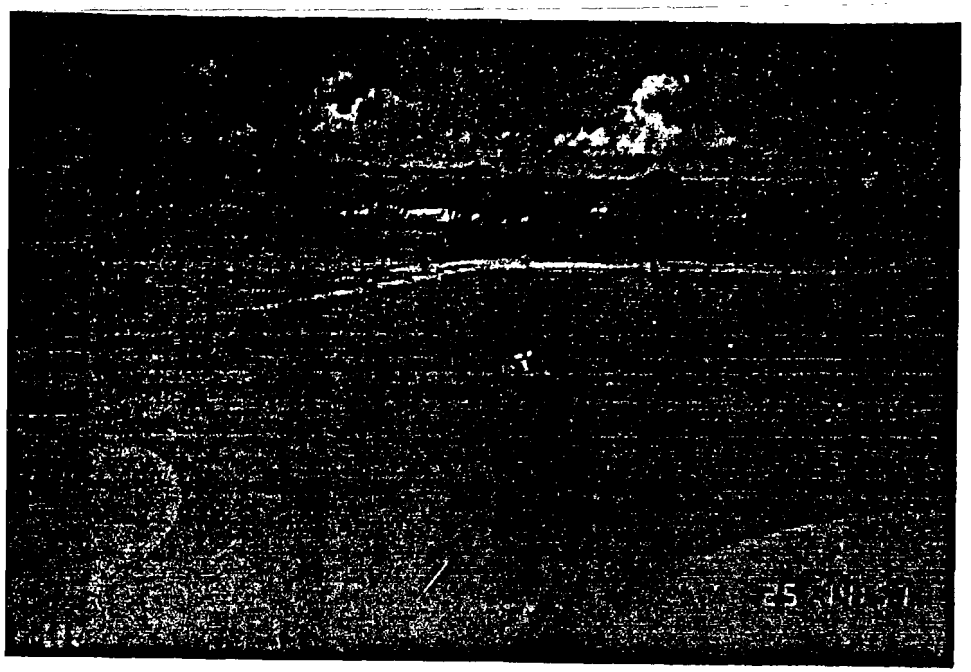


Photo 1. Sample collection from brine pit

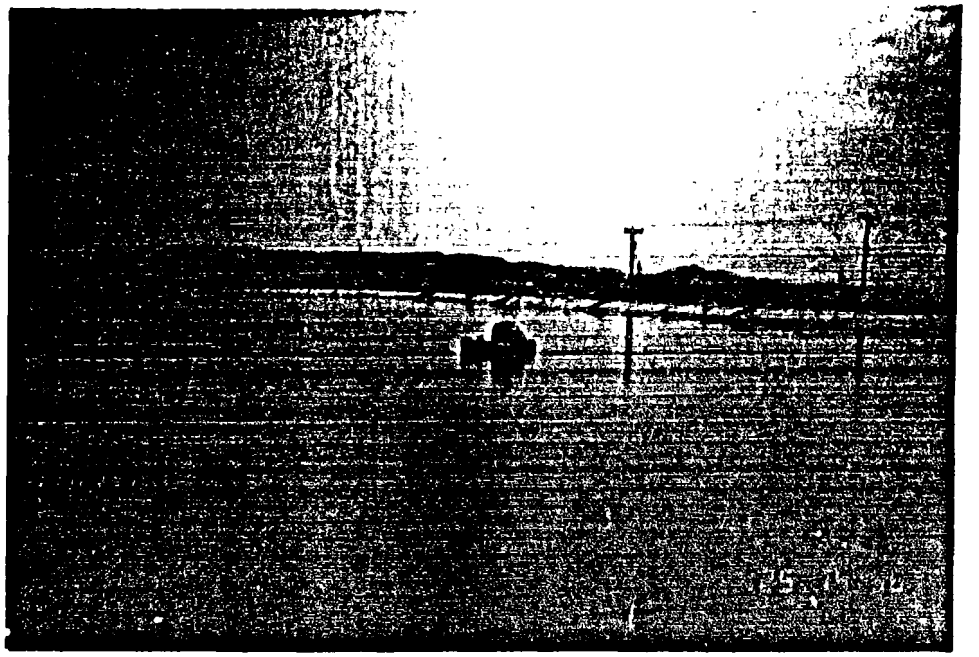
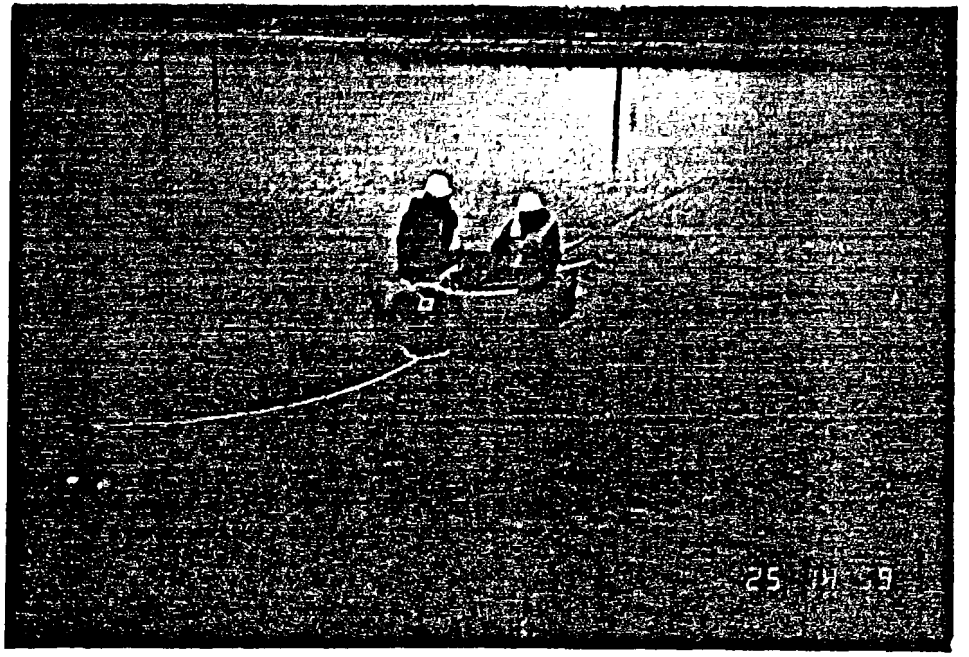


Photo 2. Sample collection from brine pit



ATTACHMENT B: PERMITS

No permit specific to the operation
of this site is available.

ATTACHMENT C:
DESIGN AND ENGINEERING REPORTS,
BASIN DISPOSAL, INC.

WALSH ENGINEERING & PRODUCTION CORP.

Petroleum Engineering Consulting
Lease Management
Contract Pumping

3001 Northridge Drive
P.O. Drawer 419
Farmington, New Mexico 87401
(505) 327-4892

BASIN DISPOSAL, INC.
PROPOSED
PRODUCED WATER
EVAPORATION PIT
SAN JUAN COUNTY, NEW MEXICO

August 14, 1985

OIL CONSERVATION DIVISION

AUG 15 1985

RECEIVED

Ewell N. Walsh, P.E.
State of New Mexico
Registration No. 4324

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FIGURES

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Skimmer Tanks	15

PREFACE

The purpose of the disposal pit is to provide a means of oil and gas producers to dispose of produced water in an approved disposal pit. The disposal pit will also be made available to industries or persons that have to dispose of water.

LOCATION

It is proposed to construct a disposal water pit in an area of Units E and F, Section 3-T29N-R11W, San Juan County, New Mexico.

The area is located adjacent to State Highway 44 approximately three miles north of Bloomfield, New Mexico.

DESIGN AND CONSTRUCTION

1. Anticipated Disposal Volume:

   The estimated amount of water that will be made available is unknown. However, it is proposed to install a spray evaporative system, if necessary, to increase the amount of evaporation of the water to prevent the pit from becoming to full for normal and safe operations. The water volumes anticipated are as indicated in calculations.

2. Pit will be of rectangular configuration, (Figure No. 1), and berm or levees constructed as indicated in Figures No. 2 through Figure No. 9.

3. Freeboard allowance will be 2.5 feet. Maximum water elevation 5719.5 feet with berm or levee elevation 5722 feet. Wave action was calculated to have a crest of elevation 5720.02 feet and a trough of elevation 5719.22 feet. See calculations.

4. The berm or levees will be constructed with an inside slope of 3:1 and outside slope of 3:1.

5. Top of levee is to be 12 feet wide.

6. The pit will incorporate a double liner system with leak detection system installed between primary (top) and secondary (bottom) liner. See Figures No. 12 through 14.

MATERIALS

It is proposed to utilize a flexible membrane for the primary and secondary liners.

Primary Liner:

Shelter-Rite XR5 8130 geomembrane. Resistant to deterioration from exposure to sunlight and also resistant to hydrocarbons. Thickness - 36 mils.

Secondary Liner:

Polyvinyl Chloride (PVC) geomembrane. Thickness - 20 mils.

LEAK DETECTION SYSTEM

The leak detection system will be a drainage and sump system. See Figures No. 12 through 14.

INSTALLATION OF FLEXIBLE MEMBRANE LINERS

1. The Aztec, New Mexico OCD District Office will be notified a minimum of 24 hours in advance of installation of secondary line.

2. Pit liner will be installed and joints sealed according to manufacturers specifications and with approval of Division representative.

3. Liner will install on top of berm or levee as indicated in Figure No. 10.

4. Vents, 16 to 20, will be installed for venting of air or gas that may accumulate beneath liner Geotextile padding (Grade 200, thickness - 60 mils) will be put on slopes, between liners. See Figure No. 11.

SKIMMER TANKS

Two 400 barrel skimmer tanks will be installed on West end of pond. See Figure No. 15 for skimmer tank design.

The tanks will be installed above ground with elevation sufficient to allow gravity flow of water into the pond.

The tanks, and also the slop oil tank, will have berms around tanks to contain spill or leakage of tank.

FENCE AND SIGN

1. A fence will be contructed around all facilities, outside of berm or levee area, to prevent livestock from entering the facility area.

2. A sign, 12" x 24", will be installed at the facility for identification as to Operator and legal locations.

MAINTENANCE

1. Leak detection sump will be inspected at least once a week.

2. The outside walls of the levee will be maintained in such a manner to prevent erosion and will be inspected after heavy rainfall.

CONTINGENCY PLAN

1. If fluid is found in detection sump a sample will be obtain and analyzed to determine if the fluid is the same fluid that is in the disposal pit.

2. If fluid is determined to be the same as in the disposal pit

   a. No additional water will be put in disposal pit.

   b. The spray evaporative system will be utilized to evaporate water as fast as possible.

   c. If spray evaporative system is not removing fluid at a sufficient rate, frac water storage tanks will be utilized as storage for removal of water from pit.

   d. When water has been removed the pit and liner will be inspected and any repairs will be made as per liner manufacturer recommendations.

BASDISP
A1..I336
& A337..N44

COMPANY: BASIN DISPOSAL, INC. DATE 08-13-85
LOCATION: UNIT: E & F SECTION: 3 TOWNSHIP: 29N RANGE: 11W
COUNTY: SAN JUAN STATE: NEW MEXICO
WELL NAME: NONE

SIZE: DEPTH-FT: TOT. (AV)- 13.5 CUT- 7 TO 12 BERM- 3 TO 11

MID-POINT-FEET: WIDTH- 136 LENGTH- 307 FETCH- 336

AREA: 41752 FT^2

VOLUME: AVERAGE FLUID HT. 10.5 FT.: FT^3- 438396 Bbls- 78076

DISPOSAL RATE, Bbls/D

ANNUAL--- 750.00 START MONTH NO.- 10

JAN------		APR------		JUL------		OCT------	250.00
FEB------		MAY------		AUG------		NOV------	400.00
MAR------		JUN------		SEP------		DEC------	600.00

SPRAY EVAPORATION (ESTIMATED % EVAPORATION)

								PUMP GPM
JAN------	0.5	APR------	2.0	JUL------	3.0	OCT------	2.0	-------
FEB------	1.0	MAY------	2.0	AUG------	3.0	NOV------	0.5	2000
MAR------	1.0	JUN------	3.0	SEP------	2.0	DEC------	0.5	

YEAR 1 MONTH	DAYS/MO	PRECIP-ITATION IN/MO	LAKE EVAP. IN/MO	DISPOSAL WATER BBLS/DA	DEPTH FEET	CUM. DEPTH FEET	SPRAY LOSS FEET	EVAP. CUM. DPTH FEET
CUM.						0.00		0.00
JAN	31	0.52	0.96	0.00	0.00	0.00	0.00	0.00
FEB	28	0.55	1.56	0.00	0.00	0.00	0.00	0.00
MAR	31	0.61	3.79	0.00	0.00	0.00	0.00	0.00
APR	30	0.58	6.34	0.00	0.00	0.00	0.00	0.00
MAY	31	0.46	8.01	0.00	0.00	0.00	0.00	0.00
JUN	30	0.40	8.83	0.00	0.00	0.00	0.00	0.00
JUL	31	0.91	8.73	0.00	0.00	0.00	0.00	0.00
AUG	31	1.01	7.38	0.00	0.00	0.00	0.00	0.00
SEP	30	0.96	5.71	0.00	0.00	0.00	0.00	0.00
OCT	31	0.99	3.79	250.00	0.81	0.81	0.00	0.81
NOV	30	0.45	2.03	400.00	1.48	2.29	0.00	2.29
DEC	31	0.63	0.99	600.00	2.47	4.76	0.00	4.76
TOTAL	365	8.07	58.12					

PAGE NO. 1 OF 8

YEAR 2 MONTH	DAYS/MO	PRECIP-ITATION IN/MO	LAKE EVAP. IN/MO	DISPOSAL WATER BBLS/DA	DEPTH FEET	CUM. DEPTH FEET	SPRAY LOSS FEET	EVAP. CUM. DP FEET
CUM.						4.76		4.7
JAN	31	0.52	0.96	750.00	3.09	7.85	0.00	7.8
FEB	28	0.55	1.56	750.00	2.74	10.59	0.00	10.5
MAR	31	0.61	3.79	750.00	2.86	-	-2.86	10.6
APR	30	0.58	6.34	750.00	2.55	-	-5.53	7.6
MAY	31	0.46	8.01	750.00	2.50	-	-5.72	4.3
JUN	30	0.40	8.83	750.00	2.32	-	-8.30	0.6
JUL	31	0.91	8.73	750.00	2.48	-	-8.58	0.4
AUG	31	1.01	7.38	750.00	2.60	-	-8.58	0.
SEP	30	0.96	5.71	750.00	2.63	-	-5.53	0.
OCT	31	0.99	3.79	750.00	2.89	-	-8.58	0.
NOV	30	0.45	2.03	750.00	2.89	-	-1.38	1.
DEC	31	0.63	0.99	750.00	3.10	-	-1.43	3.
TOTAL	365	8.07	58.12					

NOTE: Commence spray evaporation February or March.

YEAR 3 MONTH	DAYS/MO	PRECIP-ITATION IN/MO	LAKE EVAP. IN/MO	DISPOSAL WATER BBLS/DA	DEPTH FEET	CUM. DEPTH FEET	SPRAY LOSS FEET	EVAP. CUM. D FEE
CUM.						-		3
JAN	31	0.52	0.96	750.00	3.09	-	-1.43	4
FEB	28	0.55	1.56	750.00	2.74	-	-2.58	5
MAR	31	0.61	3.79	750.00	2.86	-	-2.86	5
APR	30	0.58	6.34	750.00	2.55	-	-5.53	2
MAY	31	0.46	8.01	750.00	2.50	-	-5.72	0
JUN	30	0.40	8.83	750.00	2.32	-	-8.30	0
JUL	31	0.91	8.73	750.00	2.48	-	-8.58	0
AUG	31	1.01	7.38	750.00	2.60	-	-8.58	0
SEP	30	0.96	5.71	750.00	2.63	-	-5.53	0
OCT	31	0.99	3.79	750.00	2.89	-	-8.58	0
NOV	30	0.45	2.03	750.00	2.89	-	-1.38	1
DEC	31	0.63	0.99	750.00	3.10	-	-1.43	3
TOTAL	365	8.07	58.12					

PAGE NO. 2 OF 8

YEAR 4 MONTH	DAYS/MO	PRECIP-ITATION IN/MO	LAKE EVAP. IN/MO	DISPOSAL WATER BBLS/DA	DEPTH FEET	CUM. DEPTH FEET	SPRAY LOSS FEET	EVAP. CUM.DPTH. FEET
CUM.						-		3.18
JAN	31	0.52	0.96	750.00	3.09	-	-1.43	4.84
FEB	28	0.55	1.56	750.00	2.74	-	-2.58	5.00
MAR	31	0.61	3.79	750.00	2.86	-	-2.86	5.00
APR	30	0.58	6.34	750.00	2.55	-	-5.53	2.01
MAY	31	0.46	8.01	750.00	2.50	-	-5.72	0.00
JUN	30	0.40	8.83	750.00	2.32	-	-8.30	0.00
JUL	31	0.91	8.73	750.00	2.48	-	-8.58	0.00
AUG	31	1.01	7.38	750.00	2.60	-	-8.58	0.00
SEP	30	0.96	5.71	750.00	2.63	-	-5.53	0.00
OCT	31	0.99	3.79	750.00	2.89	-	-8.58	0.00
NOV	30	0.45	2.03	750.00	2.89	-	-1.38	1.51
DEC	31	0.63	0.99	750.00	3.10	-	-1.43	3.18
TOTAL	365	8.07	58.12					

YEAR 5 MONTH	DAYS/MO	PRECIP-ITATION IN/MO	LAKE EVAP. IN/MO	DISPOSAL WATER BBLS/DA	DEPTH FEET	CUM. DEPTH FEET	SPRAY LOSS FEET	EVAP. CUM.DPTH FEET
CUM.						-		3.18
JAN	31	0.52	0.96	750.00	3.09	-	-1.43	4.84
FEB	28	0.55	1.56	750.00	2.74	-	-2.58	5.00
MAR	31	0.61	3.79	750.00	2.86	-	-2.86	5.00
APR	30	0.58	6.34	750.00	2.55	-	-5.53	2.01
MAY	31	0.46	8.01	750.00	2.50	-	-5.72	0.00
JUN	30	0.40	8.83	750.00	2.32	-	-8.30	0.00
JUL	31	0.91	8.73	750.00	2.48	-	-8.58	0.00
AUG	31	1.01	7.38	750.00	2.60	-	-8.58	0.00
SEP	30	0.96	5.71	750.00	2.63	-	-5.53	0.00
OCT	31	0.99	3.79	750.00	2.89	-	-8.58	0.00
NOV	30	0.45	2.03	750.00	2.89	-	-1.38	1.51
DEC	31	0.63	0.99	750.00	3.10	-	-1.43	3.18
TOTAL	365	8.07	58.12					

WAVE CALCULATION
(ALL REFERENCES-SHORE PROTEDTION MANUAL)

WINDSPEED, Ua= 50 M.P.H. : FETCH, F= 336 FEET

DEPTH OF WATER, D = 11.00 FEET SLOPE OF SIDE =3:1

WAVE HEIGHT AND PERIOD.

FOR D = 0.1 TO 5.0 FT., Pg. 3-56, Fig. 3-27(UPPER)
FOR D = 5.1 TO 10.0 FT., Pg. 3-57, Fig. 3-29(UPPER)

WAVE HEIGHT, H= 0.40 FEET
PERIOD, T= 0.8 SECONDS

CALCULATE BREAKING WAVE HEIGHT, Hb (Pg. 7-7, Fig. 7-3)

$$\frac{H}{g \times T^2} = 0.0194 \qquad g = 32.2$$

$$\text{(Fig.7-3)} \quad \frac{Hb}{H} = 1.0$$ NOTE: UTILIZE (m = 0.1) FOR SLOPE OF SIDE = 10:1 OR LESS.

$$Hb = H \times \frac{Hb}{H} = 0.4$$

$$\frac{Hb}{g \times T^2} = 0.0194$$

Pg. 7-6, Fig. 7-2 (UTILIZING m = 0.10(1:10))

a= 1.6 a = alpha, upper limit
b= 1.05 b = beta, lower limit

BREAKING HEIGHT, ft, MAX. = a x Hb = 1.6 x 0.4 = 0.6

BREAKING HEIGHT, fT, MIN. = b x Hb = 1.05 x 0.4 = 0.4

COMMENTS:
D = 11.00 feet is average depth of water in pond.
(ELEVATION-5719.5')

PAGE NO. 4 OF 8

NON-BREAKING WAVE FORCE AND MOMENTS
(ASSUMING A VERTICAL WALL)
(ALL REFERENCES SHORE PROTECTION MANUAL)

Pg. 7-161

X = 1.0 (ASSUME SMOOTH WALL)
Hi = H = 0.4
d= 12.5 FEET
T= 0.80 SECONDS

$$\frac{Hi}{d} = \frac{0.4}{12.5} = 0.0320$$

$$\frac{Hi}{g \times T^2} = 0.0194 \qquad g = 32.2$$

Pg. 7-164, Fig. 7-90

$$\frac{Ho}{Hi} = 0.30$$

$$Ho = \frac{Ho}{Hi} \times Hi = 0.120 \text{ FEET}$$

Pg. 7-161, Equations 7-73 and 7-74 and
Pg. 7-162, Fig. 7-88

HEIGHT OF CREST ABOVE BOTTOM

$$Yc = d + Ho + \left(\frac{1 + X}{2}\right) \times Hi = 13.02 \text{ FEET}$$

(ELEV. - 5720.02')

d = 12.5
Ho = 0.12
X = 1.
Hi = 0.

HEIGHT OF TROUGH ABOVE BOTTOM

$$Yt = d + Ho - \left(\frac{1 + X}{2}\right) \times Hi = 12.22 \text{ FEET}$$

(ELEV. - 5719.22')

COMMENTS:
d = 12.50 feet is at the east end or deepest portion of the pond.(ELEVATION - 5719.5')

PAGE NO. 5 OF 8

(AT WAVE CREST)

Pg. 7-165, Fig. 7-91

$$\frac{Fc}{w \times d^2} = 0.001 \qquad \frac{Hi}{g \times T^2} = 0.0194 \qquad \frac{Ho}{Hi} = 0.30$$

Fc = 0.001 x w xd^2 = 10.44 lb./ft

w = 66.8 lbs./ft

d = 12.5 FEET

COMMENTS:

force is considered negligible.

PAGE NO.6 OF 8

BERM CALCULATIONS

MAXIMUM HEIGHT = 11 FEET INSIDE SLOPE = 3 :1 SOIL DENSITY = 80 Lbs/Ft.^3
TOP WIDTH = 12 FEET OUTSIDE SLOPE = 3 :1 FRICTION FACTOR = 0.4
MAX. WATER DEPTH = 9 FEET
(ON BERM)

STATIC PRESSURE - Lbs./Ft.^2

WATER DEPTH - FT. / DEPTH BELOW SURFACE - Ft.	1	2	3	4	5	6	7	8	9	10	11	12
1	67	67	67	67	67	67	67	67	67	0	0	0
2	0	134	134	134	134	134	134	134	134	0	0	0
3	0	0	200	200	200	200	200	200	200	0	0	0
4	0	0	0	267	267	267	267	267	267	0	0	0
5	0	0	0	0	334	334	334	334	334	0	0	0
6	0	0	0	0	0	401	401	401	401	0	0	0
7	0	0	0	0	0	0	468	468	468	0	0	0
8	0	0	0	0	0	0	0	534	534	0	0	0
9	0	0	0	0	0	0	0	0	601	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
STATIC PRESSURE PER LINEAR FOOT - Lbs./Ft. = Fh	67	201	401	668	1002	1403	1871	2405	3006	0	0	0

WEIGHT OF BERM PER LINEAR FOOT

DEPTH FROM TOP OF BERM Ft.	Lbs.
1	1200
2	2880
3	5040
4	7680
5	10800
6	14400
7	18480
8	23040
9	28080
10	33600
11	39600
12	0

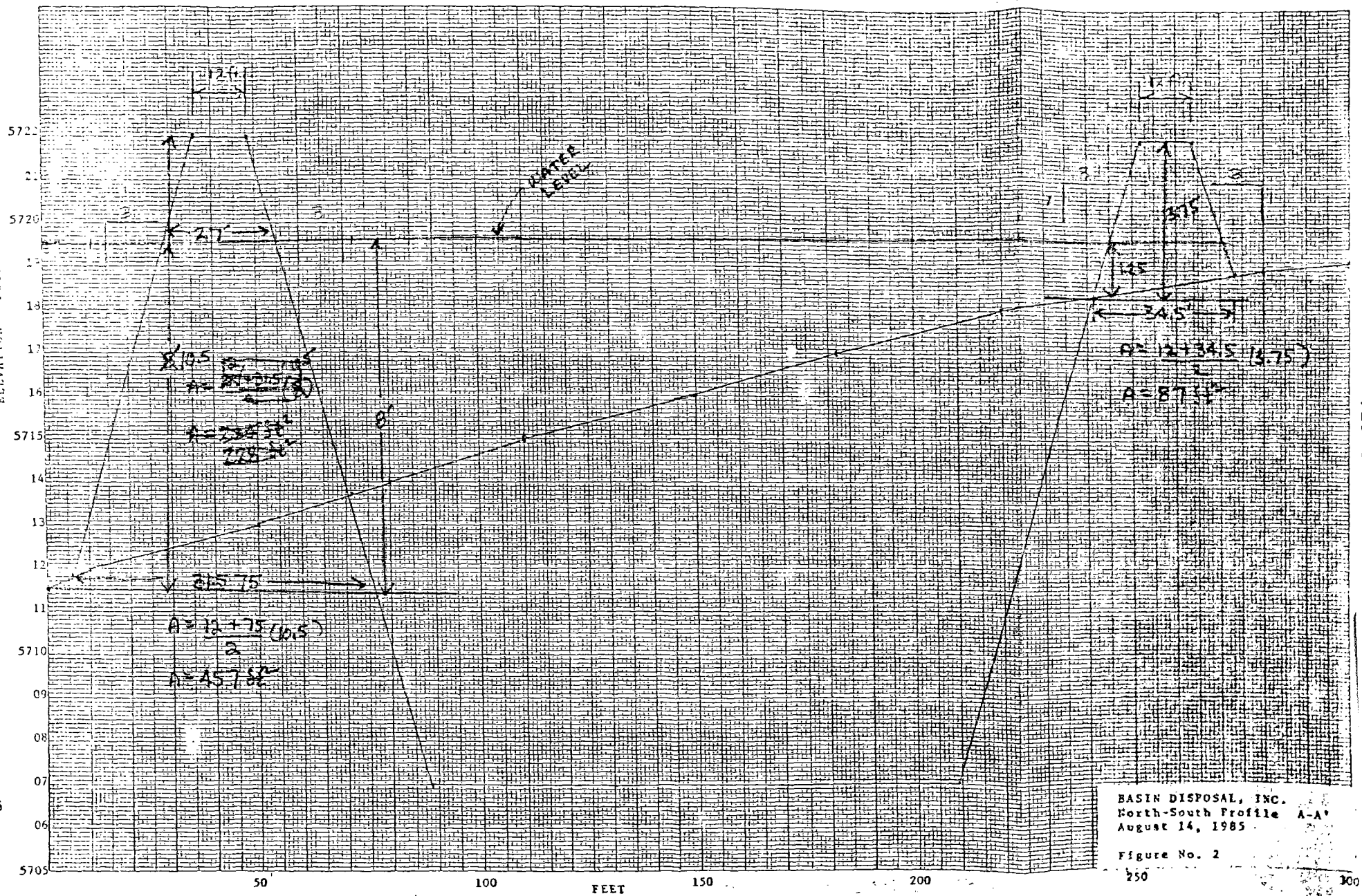
SHEARING FORCE, Fs

DEPTH FROM TOP OF BERM Ft.	Fs
1	480
2	1152
3	2016
4	3072
5	4320
6	5760
7	7392
8	9216
9	11232
10	13440
11	15840
12	0

SAFETY FACTORS - Fs/Fh

WATER DEPTH - FT. / BERM HEIGHT - Ft.	1	2	3	4	5	6	7	8	9	10	11	12
1	7.16											
2	17.19	5.73										
3	30.09	10.03	5.03									
4	45.85	15.28	7.66	4.60								
5	64.48	21.49	10.77	6.47	4.31							
6	85.97	28.66	14.36	8.62	5.75	4.11						
7	110.33	36.78	18.43	11.07	7.38	5.27	3.95					
8	137.55	45.85	22.98	13.80	9.20	6.57	4.93	3.83				
9	167.64	55.88	28.01	16.81	11.21	8.01	6.00	4.67	3.74			
10	200.60	66.87	33.52	20.12	13.41	9.58	7.18	5.59	4.47	0.00		
11	236.42	78.81	39.50	23.71	15.81	11.29	8.47	6.59	5.27	0.00	0.00	
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

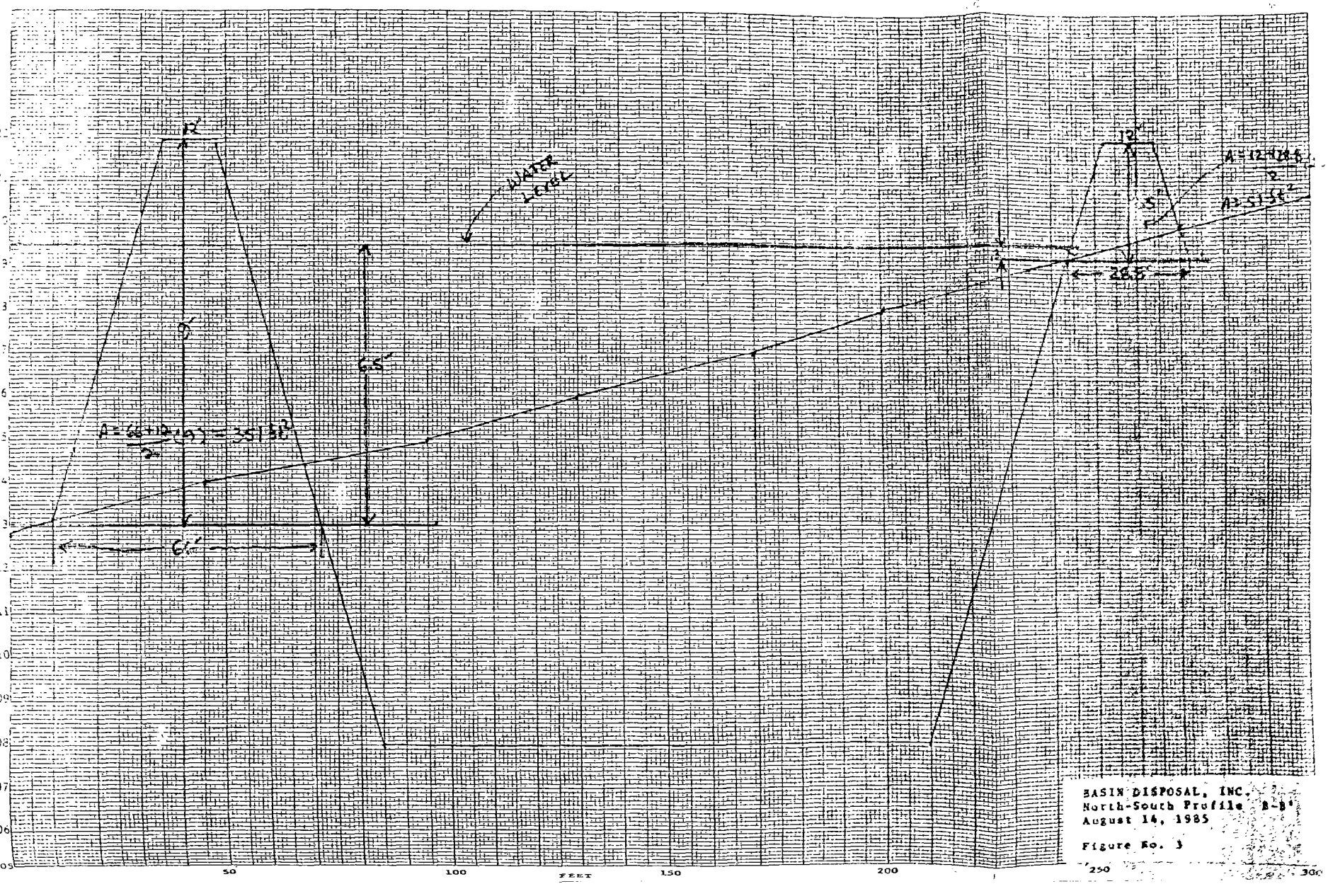
NOTE: TOP OF BERM - ELEVATION, 5722'.
MAXIMUM WATER LEVEL - ELEVATION, 5719.5.



BASIN DISPOSAL, INC.
North-South Profile A-A'
August 14, 1985

Figure No. 2

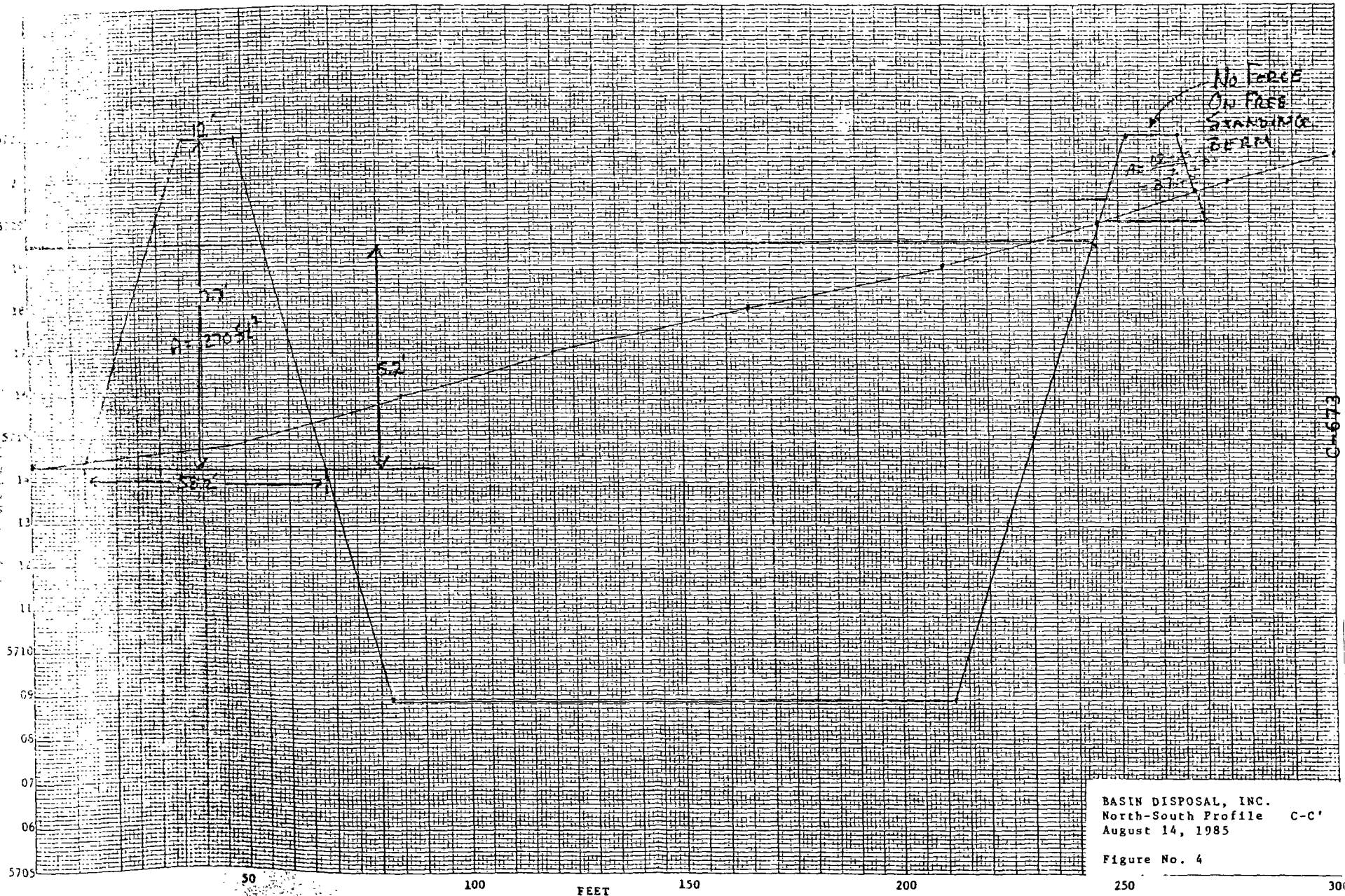
C-671



BASIN DISPOSAL, INC.
North-South Profile B-B'
August 14, 1985

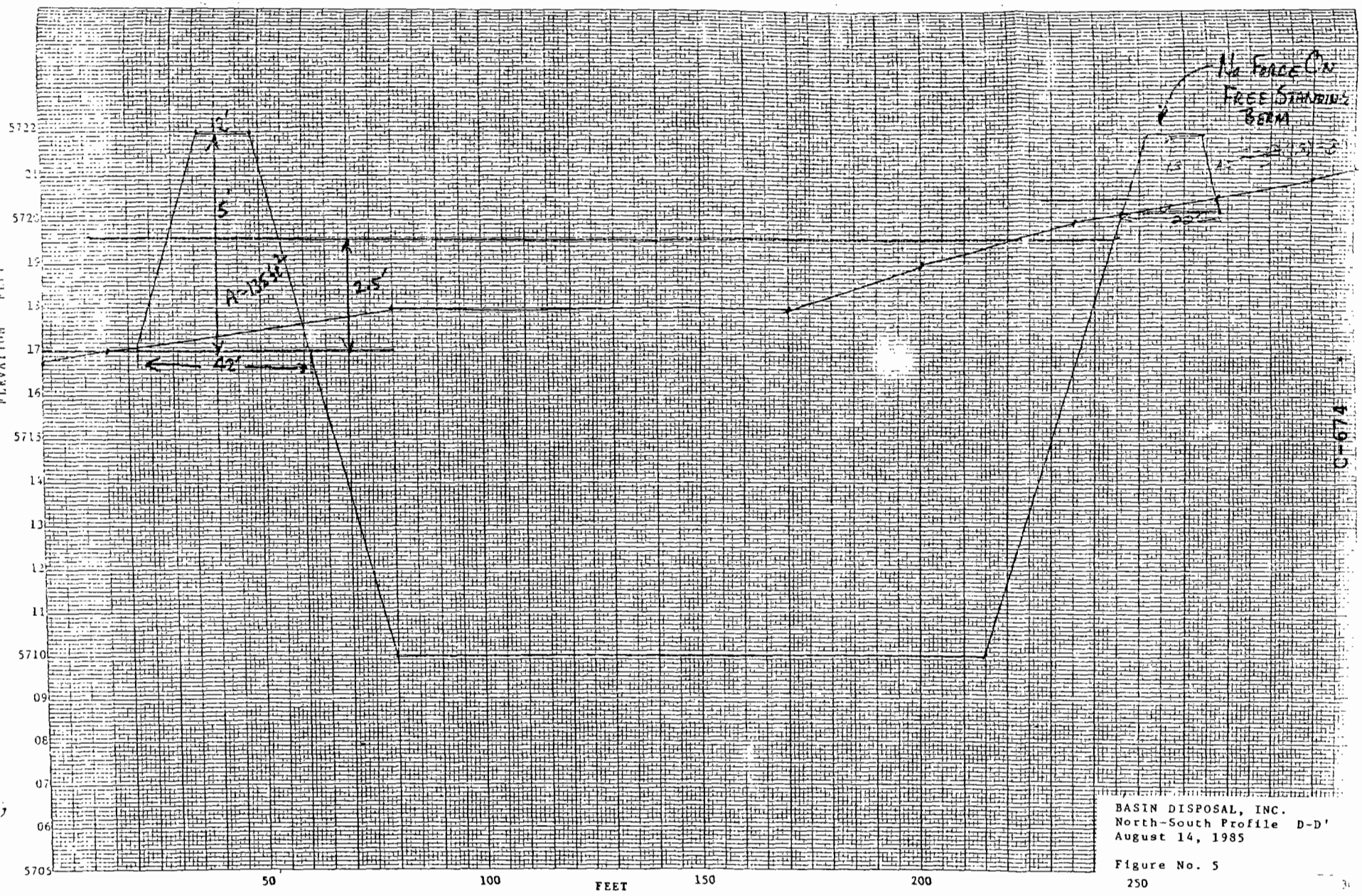
Figure No. 3

C-672
K+E 10 X 10 TO 1/2 INCH • 10 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1323



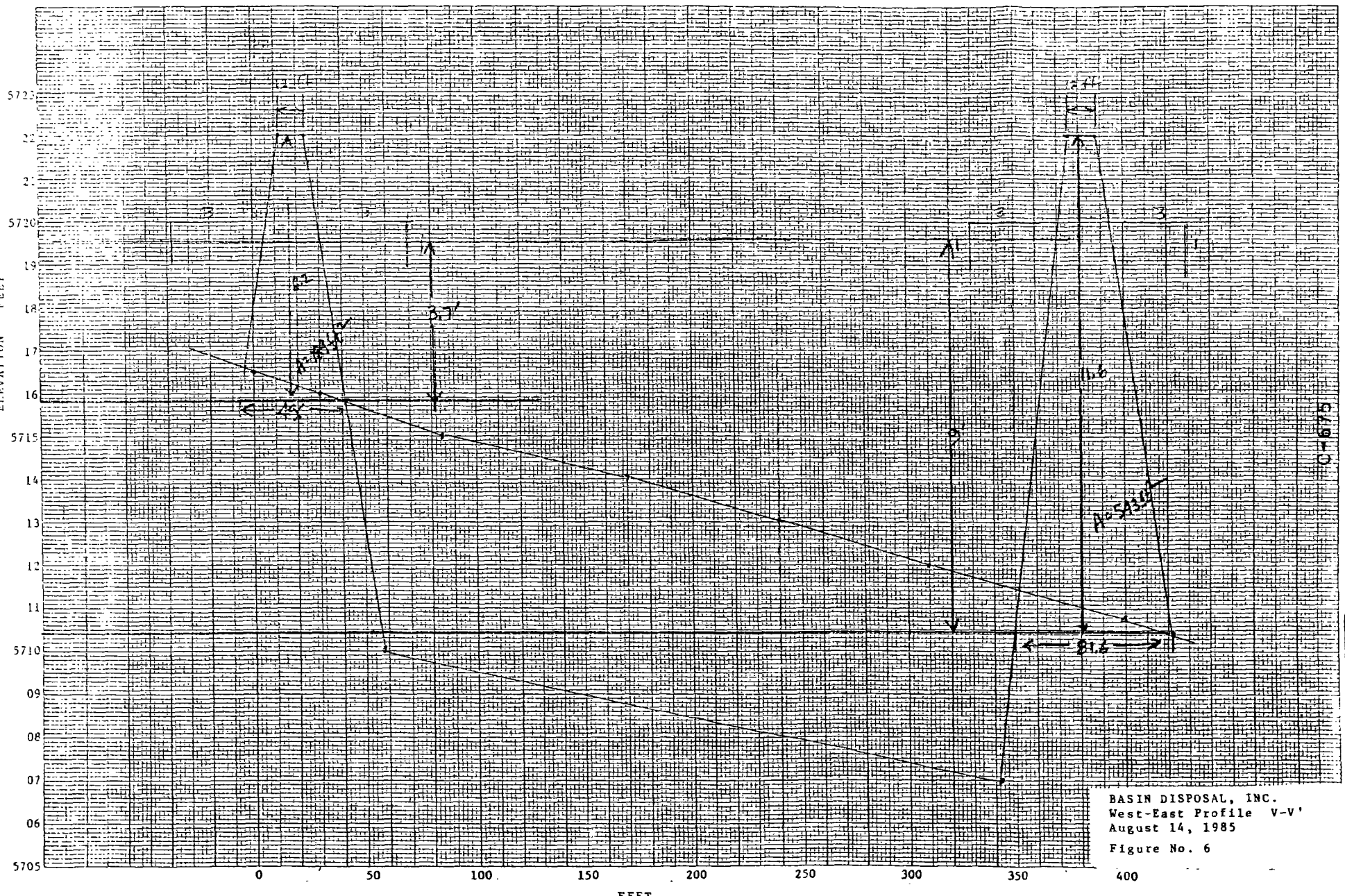
BASIN DISPOSAL, INC.
North-South Profile C-C'
August 14, 1985

Figure No. 4



BASIN DISPOSAL, INC.
North-South Profile D-D'
August 14, 1985

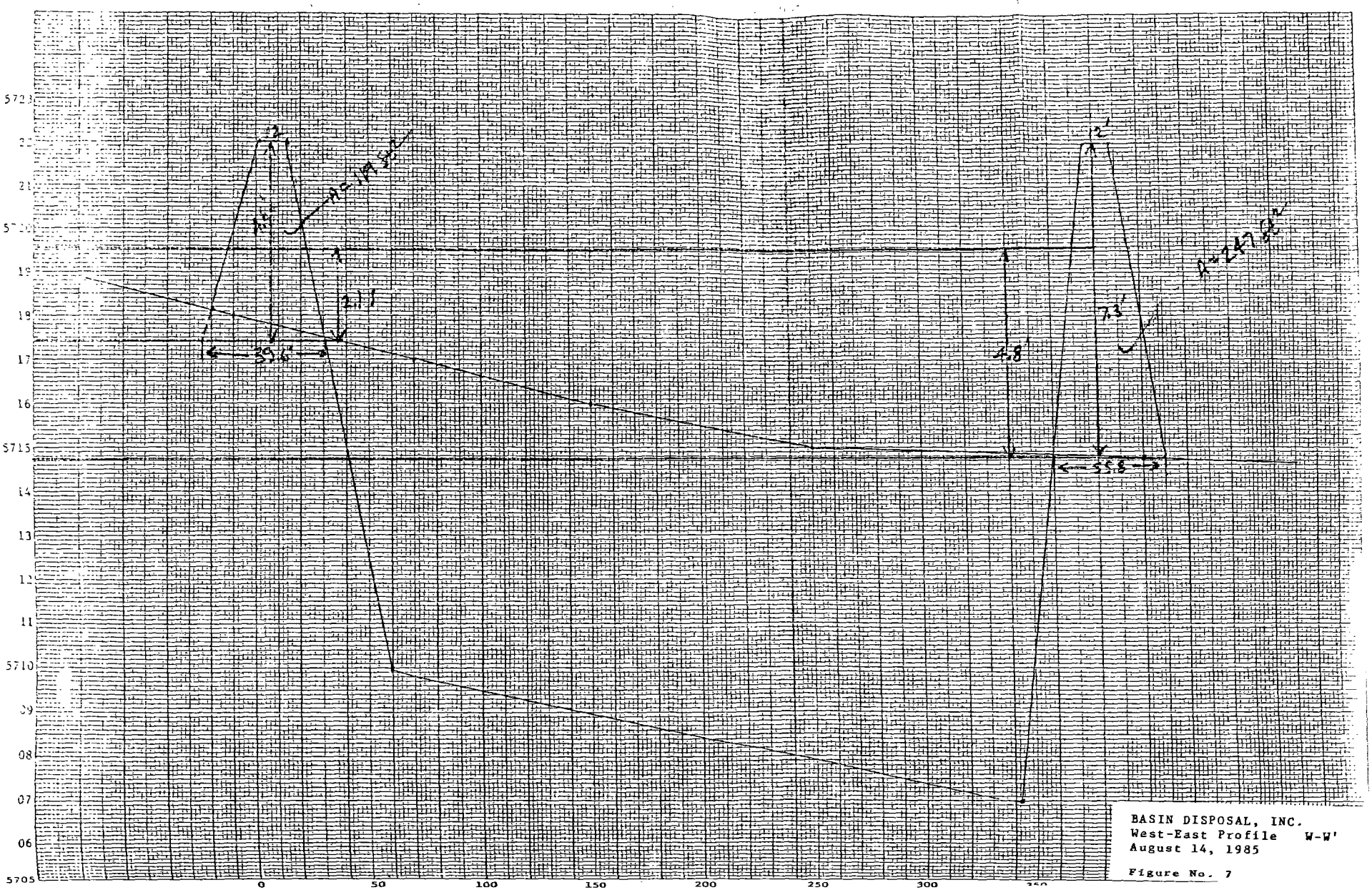
Figure No. 5



BASIN DISPOSAL, INC.
West-East Profile V-V'
August 14, 1985

Figure No. 6

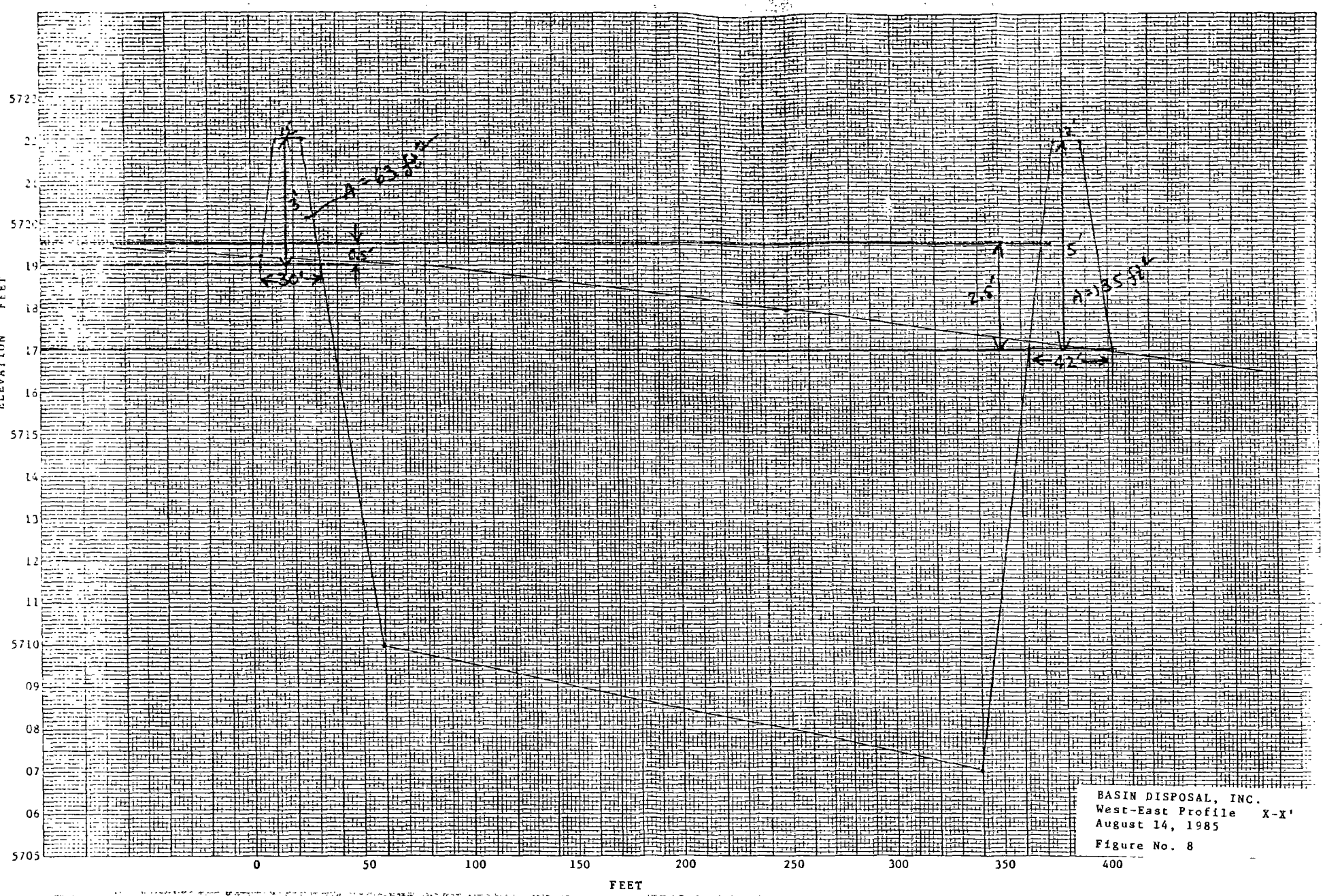
C-675



BASIN DISPOSAL, INC.
West-East Profile W-W'
August 14, 1985

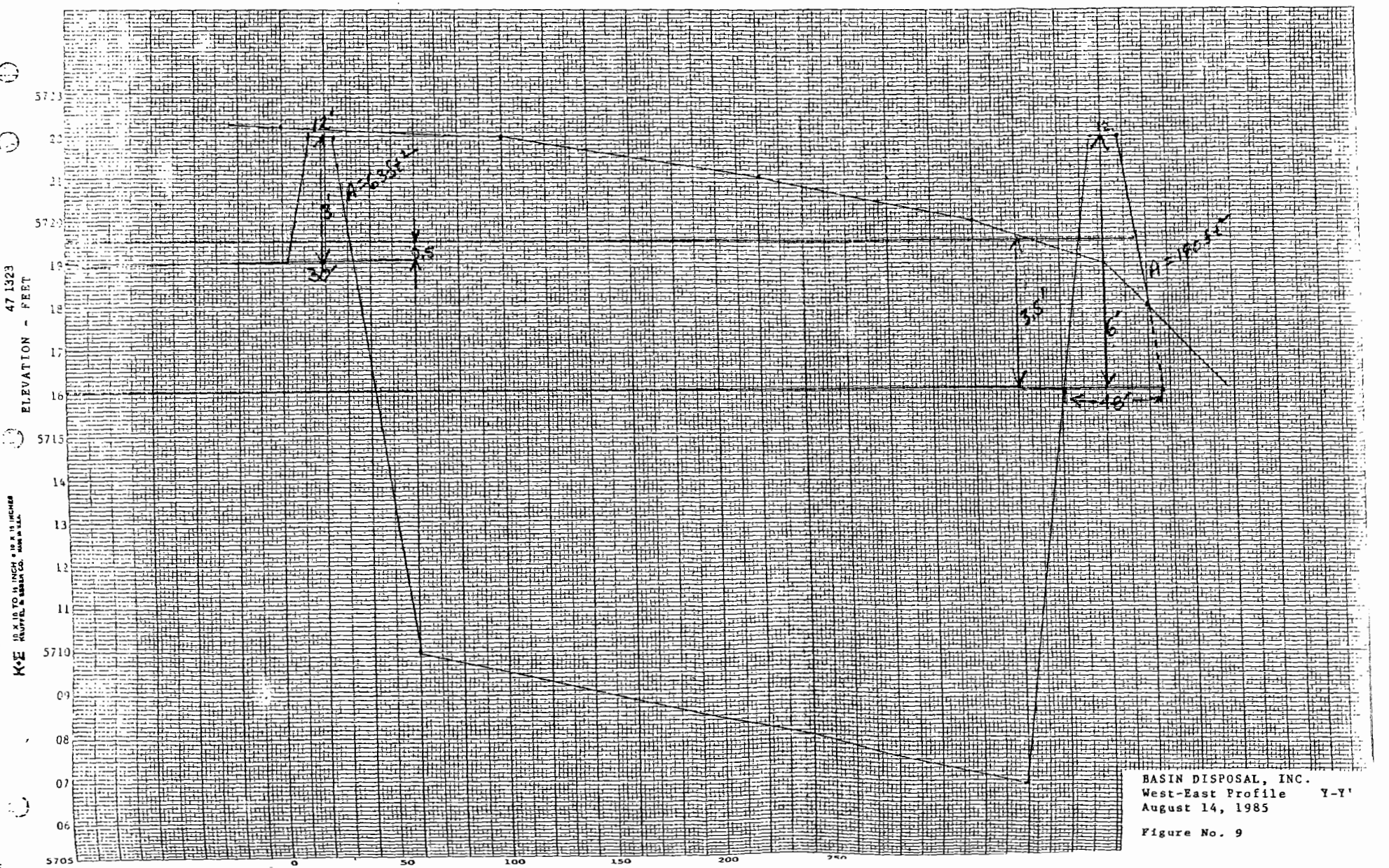
Figure No. 7

C-676



BASIN DISPOSAL, INC.
West-East Profile X-X'
August 14, 1985

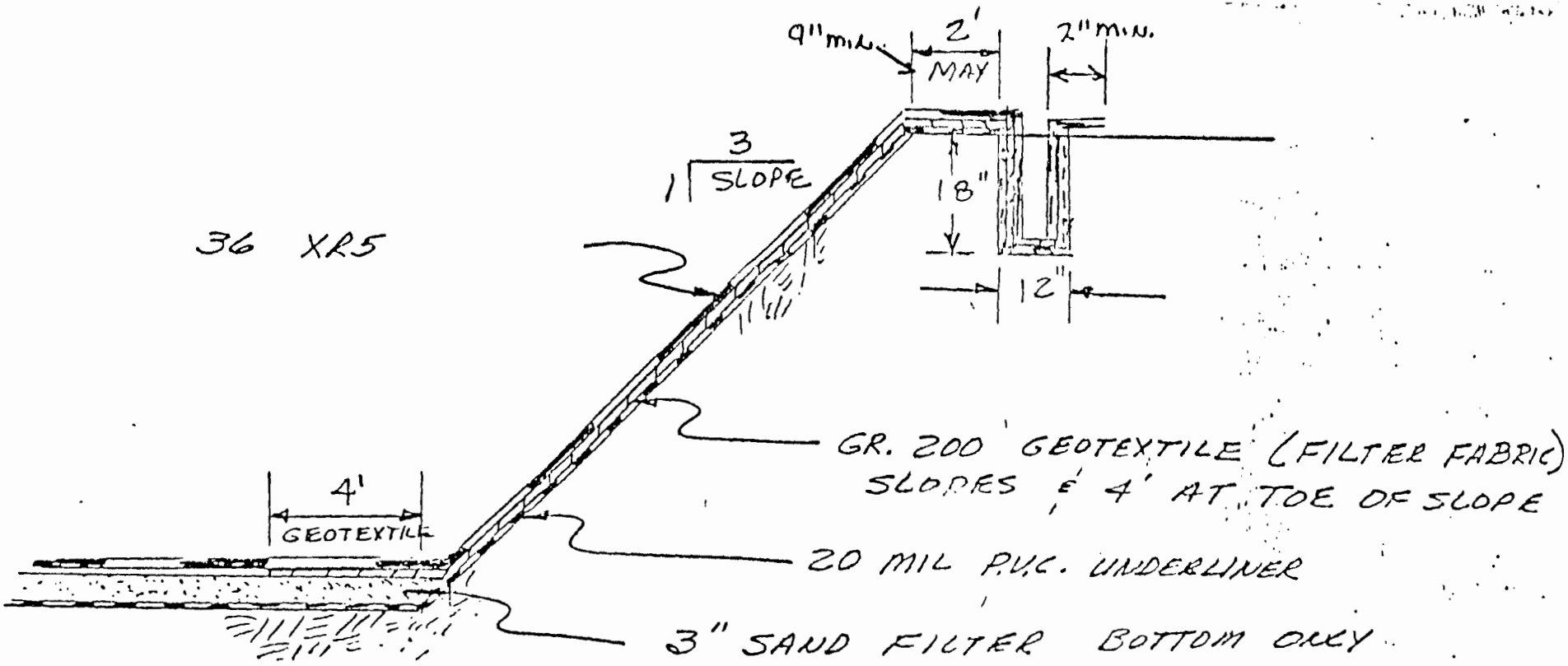
Figure No. 8



BASIN DISPOSAL, INC.
West-East Profile Y-Y'
August 14, 1985

Figure No. 9

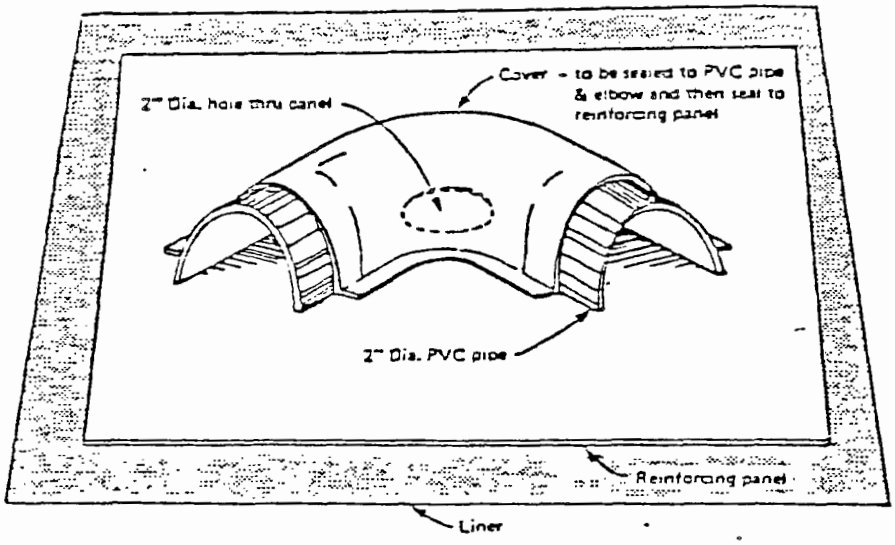
K+E 10 X 10 TO 1/2 INCH X 10 X 15 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1323
C-678



TYP. ANCHOR DETAIL DOUBLE LINER

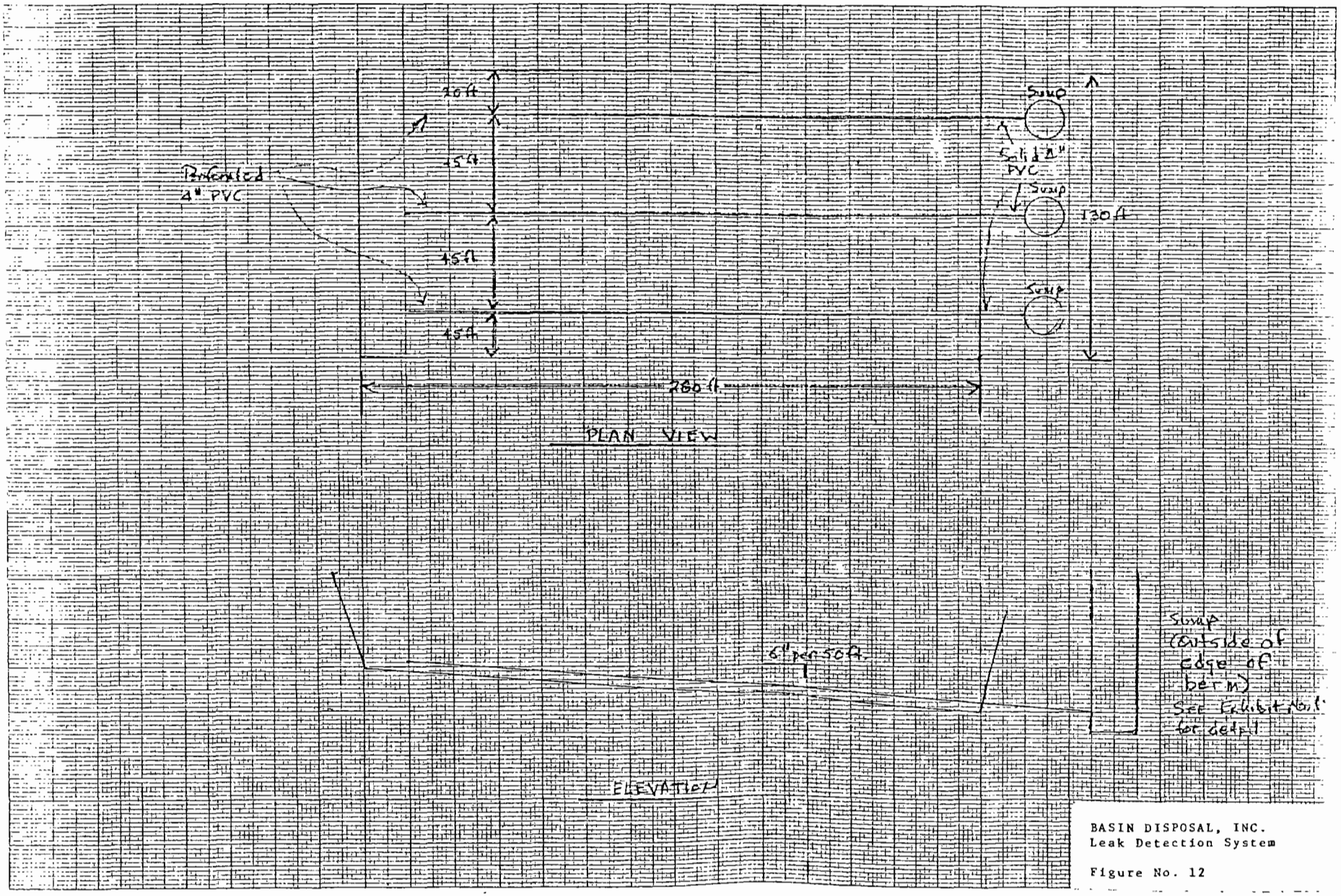
NO SCALE

BASIN DISPOSAL, INC.
Slope Protection and
Liner Anchor



BASIN DISPOSAL, INC.
Vents

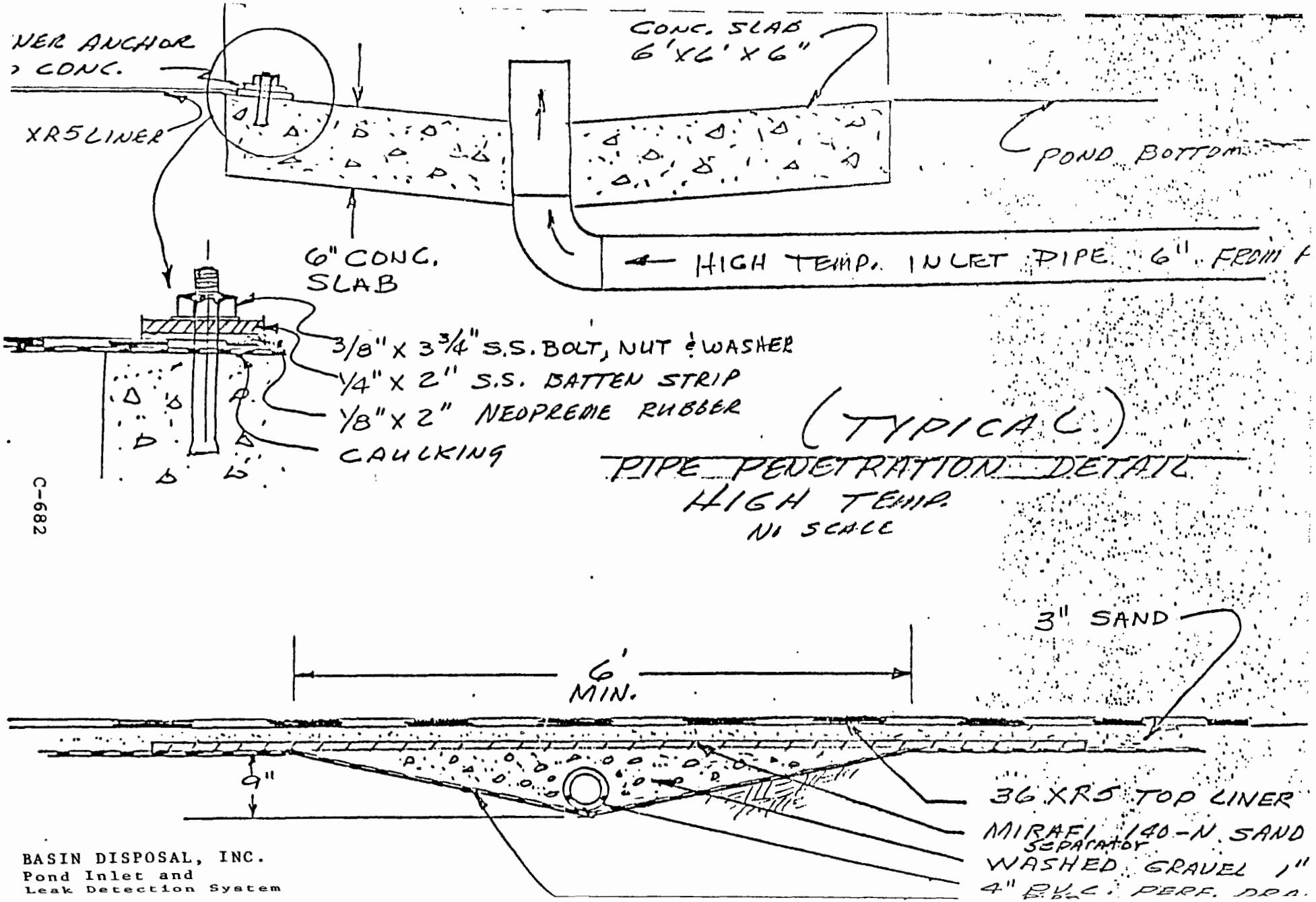
Figure No. 11



BASIN DISPOSAL, INC.
Leak Detection System

Figure No. 12

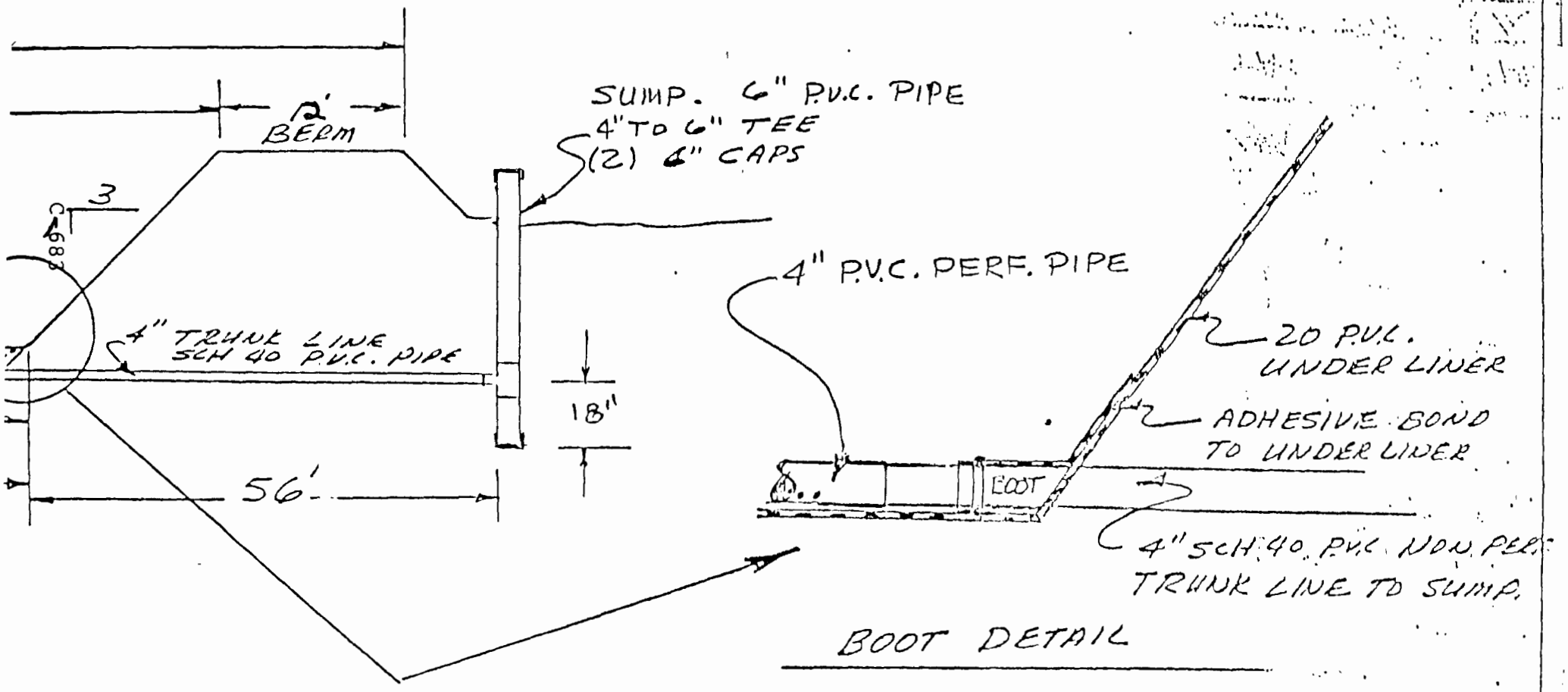
K+E 10 X 10 TO 1/2 INCH • 10 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1323

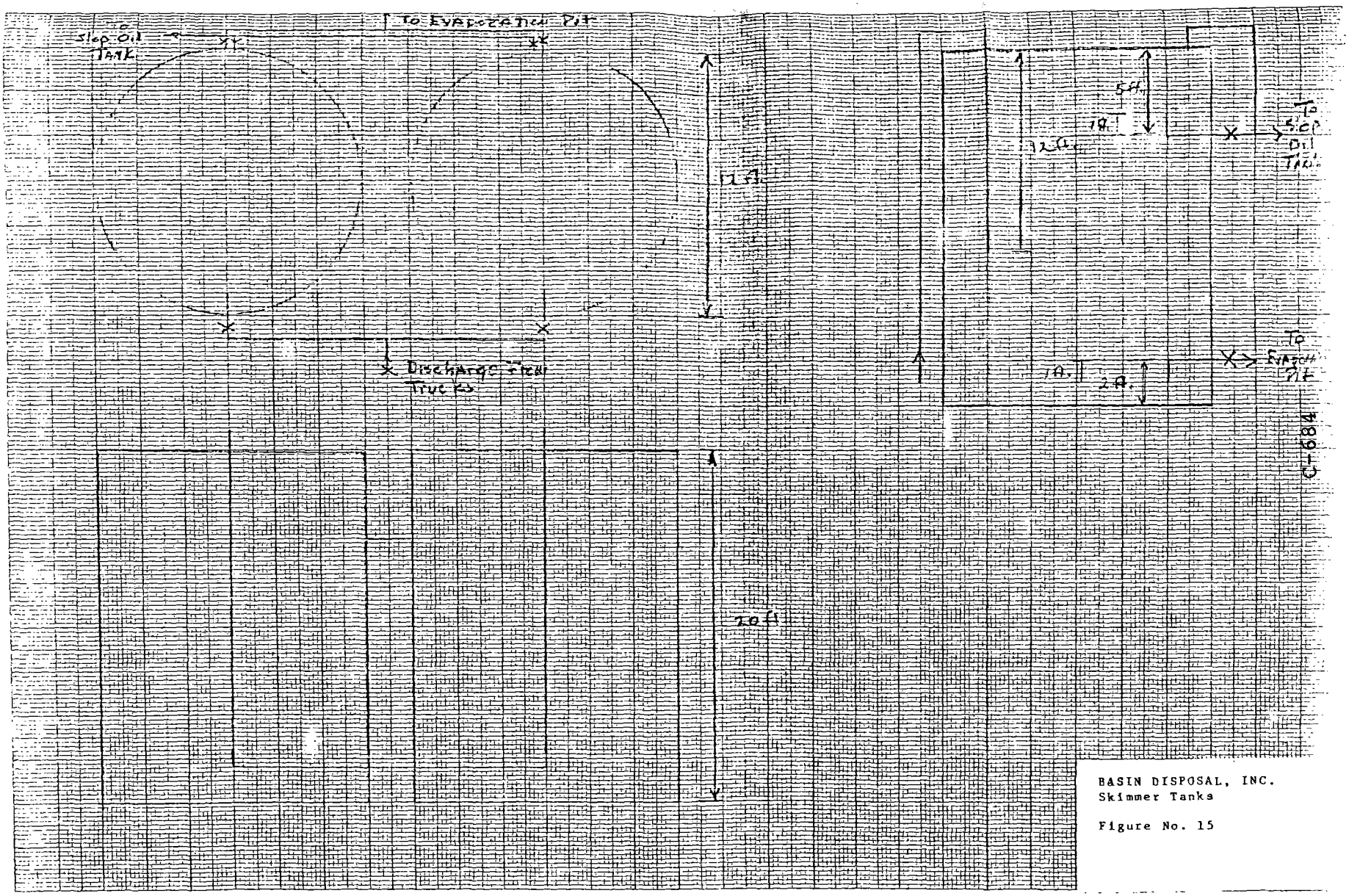


BASIN DISPOSAL, INC.
Pond Inlet and
Leak Detection System

BASIN DISPOSAL, INC.
Leak Detection System
Thru Berm and Sump

Figure No. 14





BASIN DISPOSAL, INC.
Skimmer Tanks

Figure No. 15

WALSH ENGINEERING & PRODUCTION CORP.

Petroleum Engineering Consulting
Lease Management
Contract Pumping

3001 Northridge Drive
P.O. Drawer 419
Farmington, New Mexico 87401
(505) 327-4892

August 19, 1985

Mr. Phil Bacca
Environmental Engineer
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

REF: Basin Disposal, Inc.
Proposed Disposal Pit
Unit E & F, Section 3-T29N-R11W
San Juan County, New Mexico

Dear Mr. Bacca:

The enclosed revised Figure No. 12, Leak Detection System, is being submitted for your approval as per our telephone conversation on this date.

I believe the revision, dated August 19, 1985, will meet the requirements as to 20 feet distance of leak detection system from any portion of bottom of pit.

Thank you for your consideration in this matter.

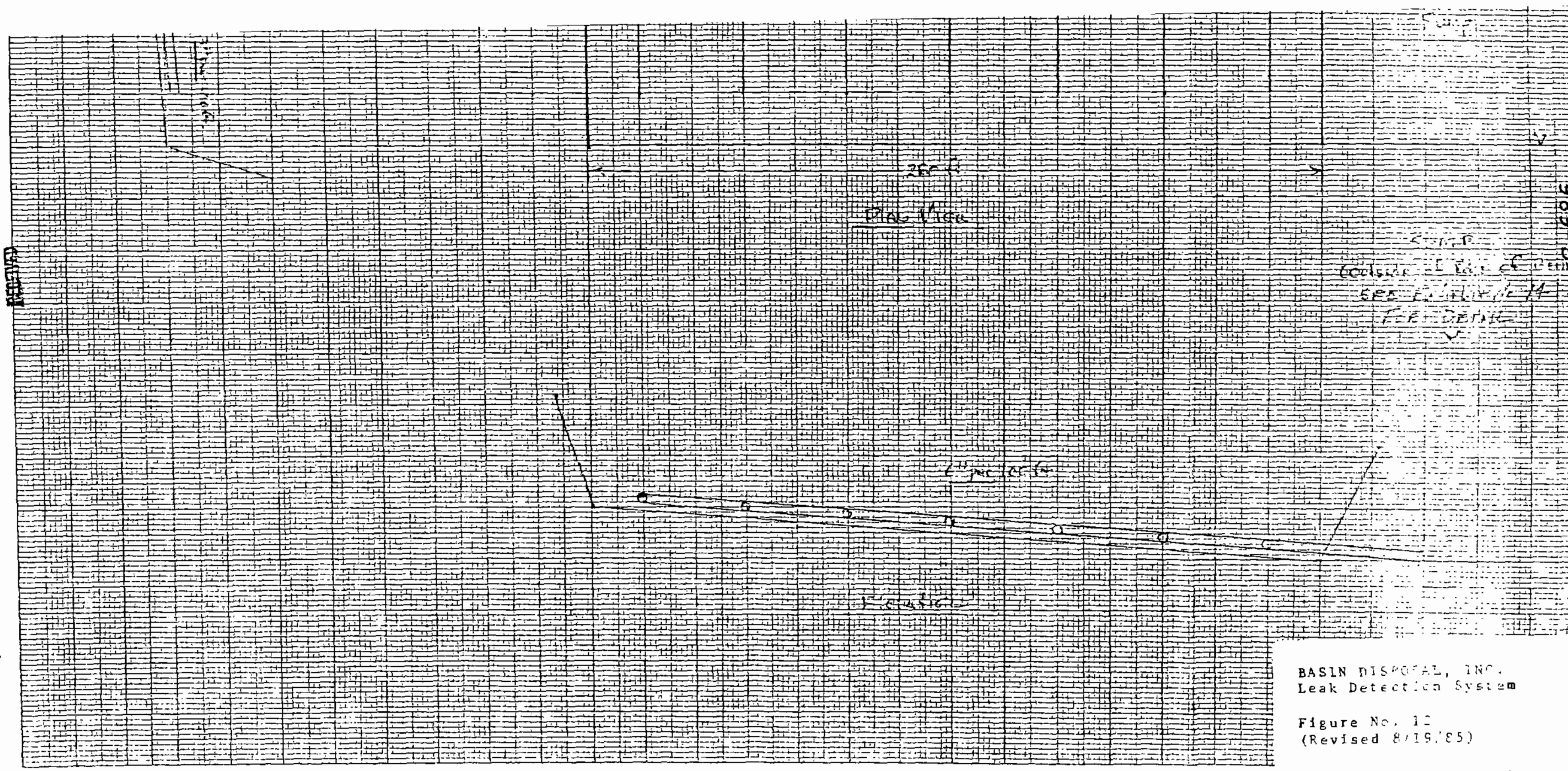
Very truly yours,

Ewell N. Walsh, P.E.
President

ENW:rr
cc: Frank Chavez, OCD, Aztec, N.M.
Basin Disposal, Inc.
Jerry Sandel, D. C. Turner and David Turner

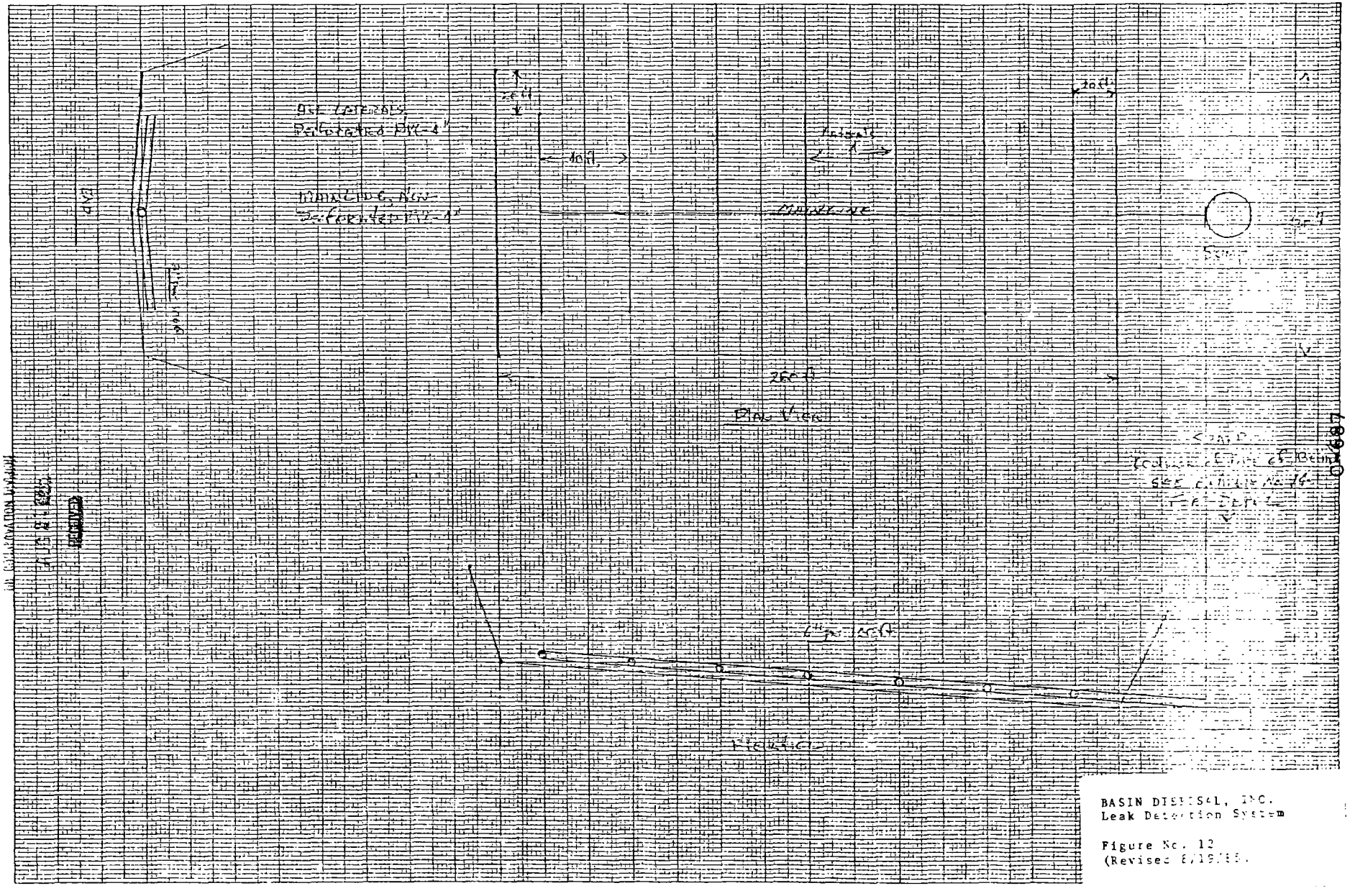
Enclosure

47 1323
K+E 10 X 10 TO 1/2 INCH • 10 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.
OIL CONSERVATION DIVISION
AUG 21 1985
RECEIVED



BASIN DISPOSAL, INC.
Leak Detection System

Figure No. 12
(Revised 8/19/85)



BASIN DISPOSAL, INC.
Leak Detection System

Figure No. 12
(Revised 6/19/85.

K+E 10 X 10 TO ½ INCH • 10 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1323

WALSH ENGINEERING & PRODUCTION CORP.

Petroleum Engineering Consulting
Lease Management
Contract Pumping

3001 Northridge Dr.
P.O. Drawer 419
Farmington, New Mex
(505) 327-4892

BASIN DISPOSAL, INC.
PRODUCED WATER EVAPORATION PIT
PROPOSED
WATER SPRAY SYSTEM
SAN JUAN COUNTY, NEW MEXICO

November 21, 1985

Ewell N. Walsh, P.E.
State of New Mexico
Registration No. 4324

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Location	3
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Motor and Pump	3
Motor and Pump Location	3
Spray System	3
Mainline	3
Spray System	3 and 4

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Schematic - Perimeter Spray System	1
Spray Array	2

	TABLE NO.
Evaporation Rate Vs. G.P.M. - 24 Hrs.	1
Evaporation Rate Vs. G.P.M. - 12 Hrs.	2

PREFACE

The purpose of installing a spray system at the disposal pit is to increase evaporation rate, into the air, and maintain a water level below approved maximum water level.

SUMMARY

Installation of the proposed spray system will prevent the water level from increasing to the approved water level for the pit.

Installation of the system in the top of the berm will not affect the stability of the berm to contain disposed water.

It is anticipated, depending upon temperature and relative humidity, to evaporate 500 to 2500 barrels per day.

LOCATION

The approved water disposal pit is located in an area of Units E and F, Section 3-T29N-R11W, San Juan County, New Mexico.

The area is located adjacent to State Highway 44, approximately three miles north of Bloomfield, New Mexico.

DESIGN AND CONSTRUCTION

1. Motor and Pump:
   A. Fifty (50) horsepower electric motor.
   B. Two stage centrifugal pump.
      Rated Capacity - 600 gallons per minute at 70 to 75 psi.
   C. Installed on concrete base.
   D. Enclosed for weather protection and heated to prevent freezing.

2. Motor and Pump Location:
   A. Installation is proposed on top of berm at northwest corner of disposal pit.

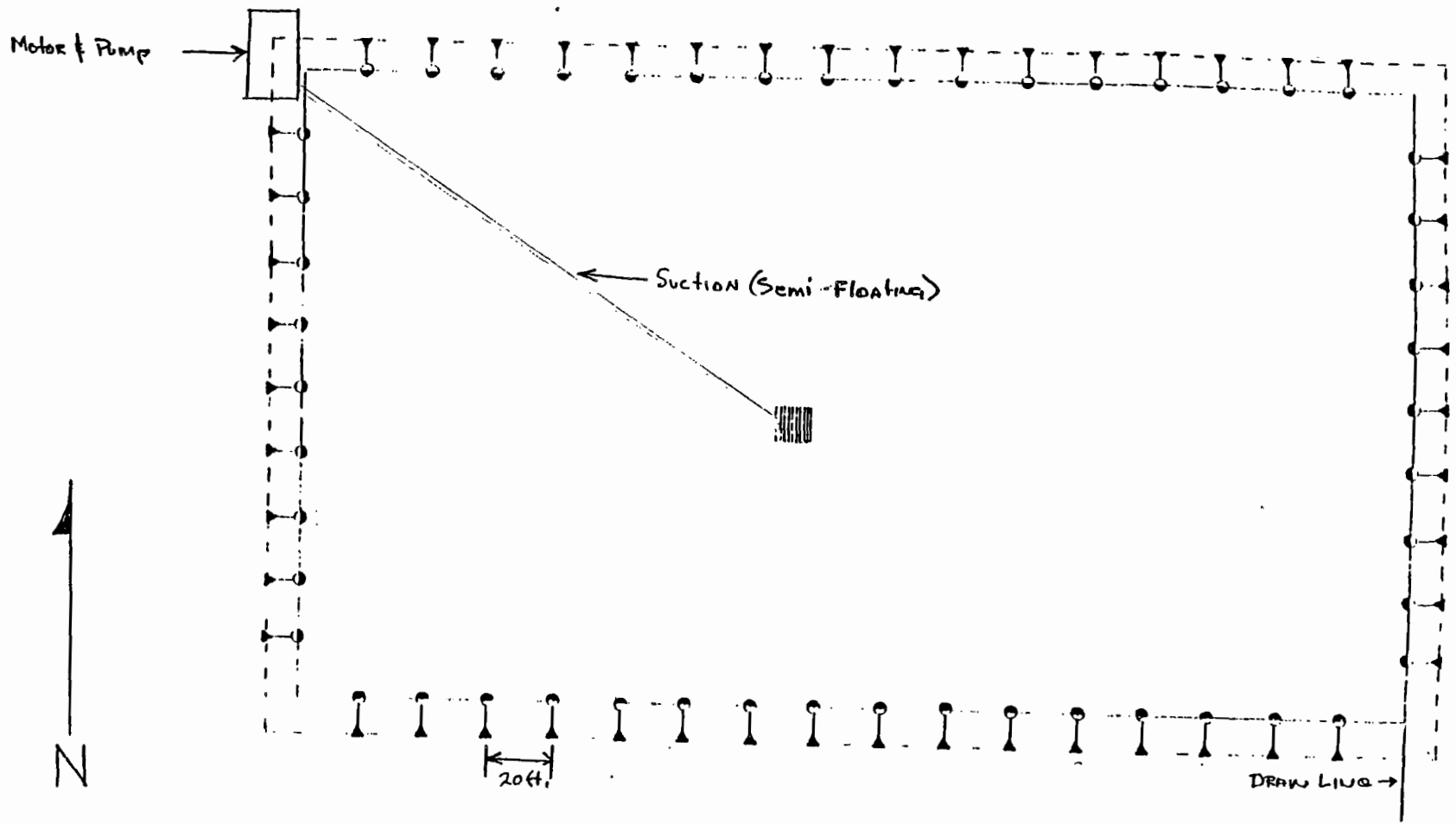
3. Spray System:
   A. Mainline:
      1. Mainline, 4", Class 200, P.V.C. pipe, to be installed on top of berm at 2 foot depth, for the full circumference of pit.
      2. Mainline drain will be installed at southwest corner of pit to drain system to prevent freezing of main line during shut down periods.
      3. Water drained from system, to be contained in above ground, plastic or similar material, tank or container.
      4. Mainline to be installed a minimum of 2 feet outside of trench containing pit lining anchor.

   B. Spray System:
      1. Fifty (50) individual spray arrays will be installed around top of disposal pit.
      2. Spacing between arrays will be 20 feet.
      3. Each array will connect to mainline with 3/4 inch diameter, schedule 80 P.V.C. or 3/4 inch galvanized pipe.
      4. Each array will have control valve for shut off if wind direction and velocity will have an effect on spray blowing outside of pit.

5. The spray array will consist of 15' six (6) half-circle spray heads to spray towards center of disposal pit. Each spray head is rated at 2 gallons per minute at 70 to 75 psi.

6. The spray array will be installed so that the array will be 5 to 6 feet, from the pit side of berm, inside the area of lined pit.

7. The connecting line will either drain into the mainline and/or into the disposal pit when pump is shut off.



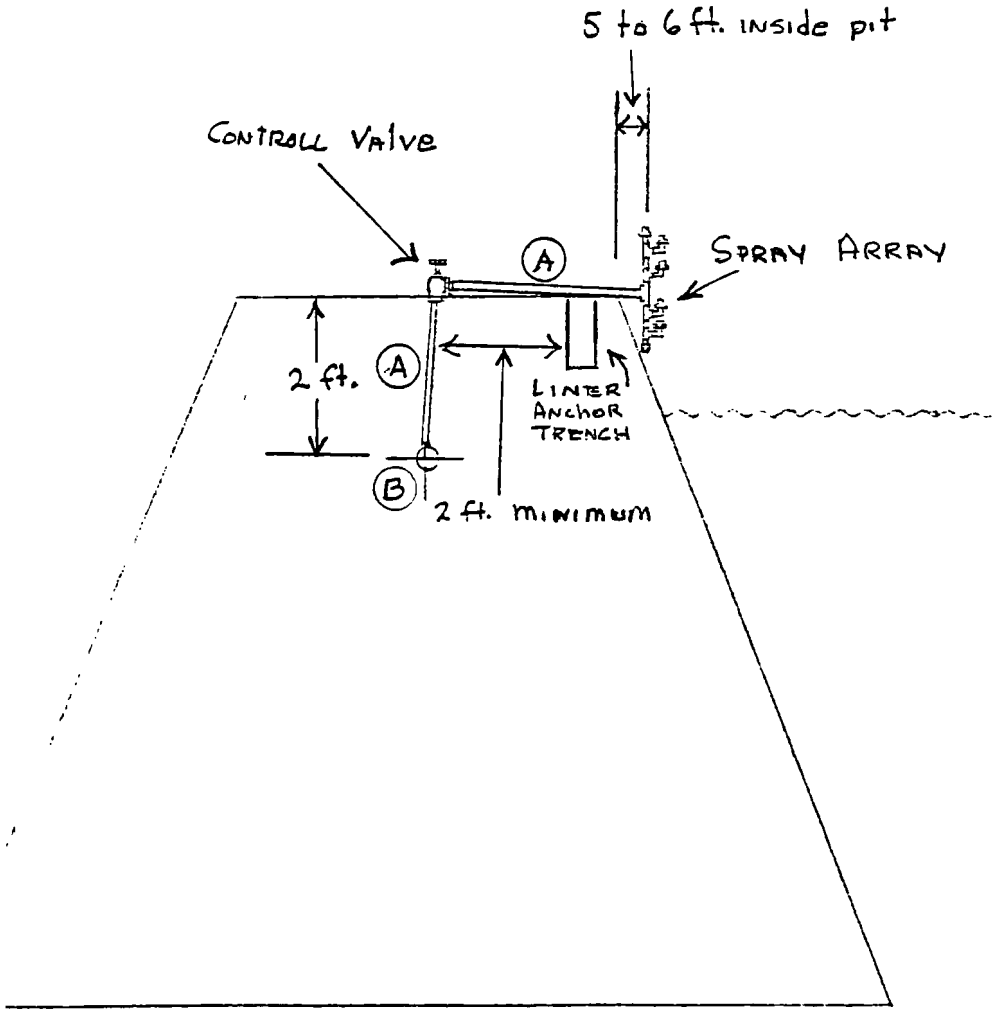
SCALE 1 = 10

LEGEND

- 3/4" MANUAL ANGLE VALVE
- 530 SERIES SPRINKLER HEAD ASSY.
- 4" CLASS 200 PVC MAINLINE PIPE

FIGURE NO. 1
Schematic
Perimeter Spray System

C-694



N. T. S.

(A) 3/4" Sched. 80 P.V.C or Galvanized Pipe,

(B) 4" Class 200 P.V.C.

FIGURE NO. 2
Spray Array

C-695

TABLE NO. 1

EVAPORATION RATE - BARRELS PER DAY(24 HRS.)

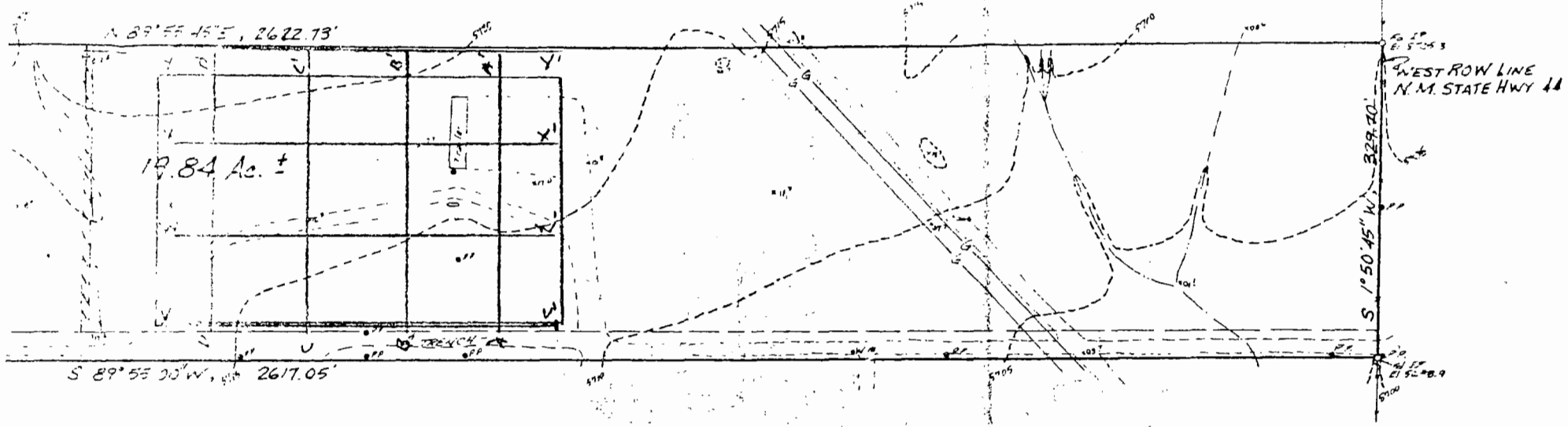
	EVAPORATION RATE - %						
GPM	5	10	15	20	25	30	35
100	171	343	514	686	857	1029	1200
200	343	686	1029	1371	1714	2057	2400
300	514	1029	1543	2057	2571	3086	3600
400	686	1371	2057	2743	3429	4114	4800
500	857	1714	2571	3429	4286	5143	6000
600	1029	2057	3086	4114	5143	6171	7200
700	1200	2400	3600	4800	6000	7200	8400
800	1371	2743	4114	5486	6857	8229	9600
900	1543	3086	4629	6171	7714	9257	10800
1000	1714	3429	5143	6857	8571	10286	12000
1100	1886	3771	5657	7543	9429	11314	13200
1200	2057	4114	6171	8229	10286	12343	14400
1300	2229	4457	6686	8914	11143	13371	15600
1400	2400	4800	7200	9600	12000	14400	16800
1500	2571	5143	7714	10286	12857	15429	18000
1600	2743	5486	8229	10971	13714	16457	19200
1700	2914	5829	8743	11657	14571	17486	20400
1800	3086	6171	9257	12343	15429	18514	21600
1900	3257	6514	9771	13029	16286	19543	22800
2000	3429	6857	10286	13714	17143	20571	24000

TABLE NO. 2

EVAPORATION RATE - BARRELS PER DAY(12 HRS.)

GPM	EVAPORATION RATE - %						
	5	10	15	20	25	30	35
100	86	171	257	343	429	514	600
200	171	343	514	686	857	1029	1200
300	257	514	771	1029	1286	1543	1800
400	343	686	1029	1371	1714	2057	2400
500	429	857	1286	1714	2143	2571	3000
600	514	1029	1543	2057	2571	3086	3600
700	600	1200	1800	2400	3000	3600	4200
800	686	1371	2057	2743	3429	4114	4800
900	771	1543	2314	3086	3857	4629	5400
1000	857	1714	2571	3429	4286	5143	6000
1100	943	1886	2829	3771	4714	5657	6600
1200	1029	2057	3086	4114	5143	6171	7200
1300	1114	2229	3343	4457	5571	6686	7800
1400	1200	2400	3600	4800	6000	7200	8400
1500	1286	2571	3857	5143	6429	7714	9000
1600	1371	2743	4114	5486	6857	8229	9600
1700	1457	2914	4371	5829	7286	8743	10200
1800	1543	3086	4629	6171	7714	9257	10800
1900	1629	3257	4886	6514	8143	9771	11400
2000	1714	3429	5143	6857	8571	10286	12000

Ditch & Berm
co [illegible]
drafting



Pit Outline
Profiles

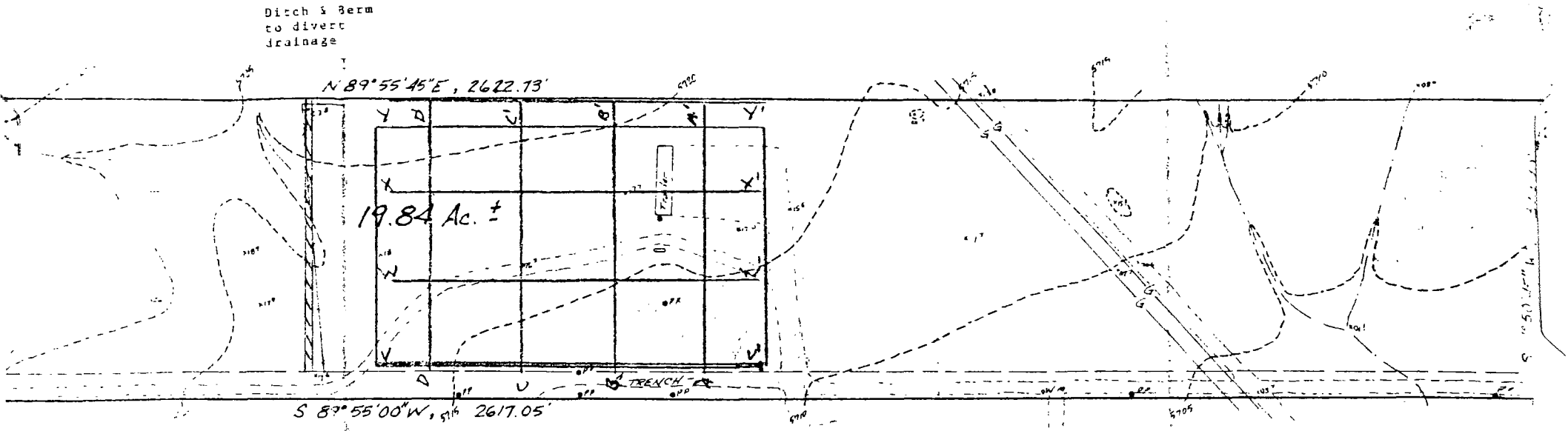
C-698

BASIN DISPOSAL, INC.
Plat of Acreage with
Topography, outline of
Pit and Profile Lines

August 1[illegible], 1985

being the South 330 feet of the Northwest Quarter of Section 3,
P.M., San Juan County, New Mexico, less and except any and all
[illegible]rations of record or in existance.

[illegible]ike II, do hereby certify that I am a Professional Land Surveyor
under the Laws of the State of New Mexico, and that I prepared
direction of the Owners from field notes of an actual survey.
[illegible]sentations hereon are true and [illegible] the best of my
[illegible]



Pit Outline

Profiles

BASIN DISPOSAL, INC.
Plat of Acreage with
Topography, outline of
Pit and Profile Lines

August 14, 1985

DESCRIPTION

A tract of land being the South 330 feet of the Northwest Quarter of Section 3, T29N, R11W, N.M.P.M., San Juan County, New Mexico, less and except any and all easements or reservations of record or in existance.

CERTIFICATION

I, William E. Mahnke II, do hereby certify that I am a Professional Land Surveyor duly Registered under the Laws of the State of New Mexico, and that I prepared this plat at the direction of the Owners from field notes of an actual survey, and that the representations hereon are true and correct to the best of my knowledge and belief.

William E. Mahnke II 8-7-85

William E. Mahnke II
N.M. R.L.S. No. 8465

Lou Ellen Weikert

Ditch & Berm
to divert
drainage

N 89°55'45

N 00°51'25"E, 330 1/2'

19.8

30' Easement

S 89°55'00"W

W 1/4 Cor Sec 3

Ev Lutheran Good Samaritan Society

200'

100'

C-700

BASIN DISPOSAL,
Plat of Acreage
Topography, outl
Pit and Profile

August 14, 1985

DESCRIPTION

A tract of land being the South 330 feet
T29N, R1W, W.M.P.M., San Juan County,
easements or reservations of record or

CERTIFICATE

WALSH ENGINEERING & PRODUCTION CORP.

Petroleum Engineering Consulting
Lease Management
Contract Pumping

3001 Northridge Drive
P.O. Drawer 419
Farmington, New Mexico 874
(505) 327-4892

August 16, 1985

Mr. Phil Bacca
Enviromental Engineer
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

REF: Basin Disposal, Inc.
Proposed Water Disposal Pit
Unit E & F, Section 3-T29N-R11W
San Juan County, New Mexico

Dear Mr. Bacca:

Enclosed you will find, as per your request during our meeting August 15, 1985, three copies (3) of revised Contingency Plan and drawing of Leak Detection System, Figure No. 12.

In addition, as discussed during our meeting, the following changes are requested to be approved:

1. Secondary liner to be 20 mil. thickness instead of 30 mil.

2. Slope of grade for Leak Detection System to be 6" per 100 feet instead of 6" per 50 feet. Note: 6" per 100 feet is approved by the Texas Railroad Commission for Leak Detection Systems.

Also you indicated that you would advise as to type or degree of water anaylsis you would require concerning the analysis of water detected in detection sump.

Thank you for your consideration and cooperation in these matters.

Very truly yours,

Ewell N. Walsh, P.E.
President

ENW:rr
cc: Frank Chavez, OCD, Aztec, N.M. w/encl.
Basin Disposal, Inc. w/encl
Jerry Sandel, D. C. Turner and David Turner

CONTINGENCY PLAN

1. If fluid is found in detection sump a sample will be obtained and analyzed to determine if the fluid is the same fluid that is in the disposal pit. The O.C.D. District Office, Aztec, New Mexico, will be immediately notified of the detection of fluid in the detection sump and will be furnished a copy of analysis of fluid.

2. If fluid is determined to be the same as in the disposal pit:

    a. No additional water will be put in disposal pit.

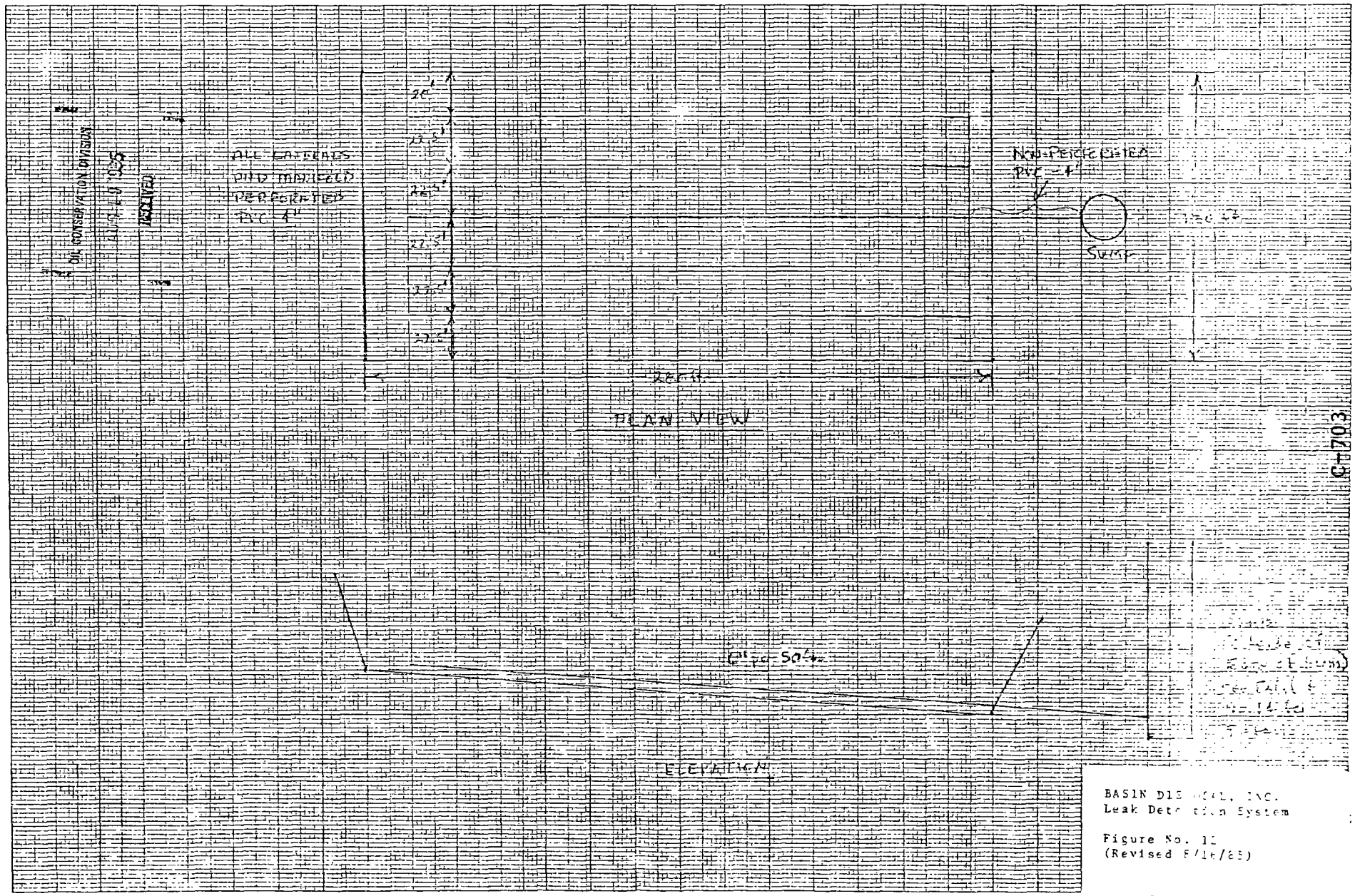
    b. The spray evaporative system will be utilized to evaporate water as fast as possible.

    c. If spray evaporative system is not removing fluid at a sufficient rate, frac water storage tanks will be utilized as storage for removal of water from pit.

    d. When water has been removed the pit and liner will be inspected and any repairs will be made as per liner manufacturer recommendations.

OIL CONSERVATION DIVISION
AUG 19 1985
RECEIVED

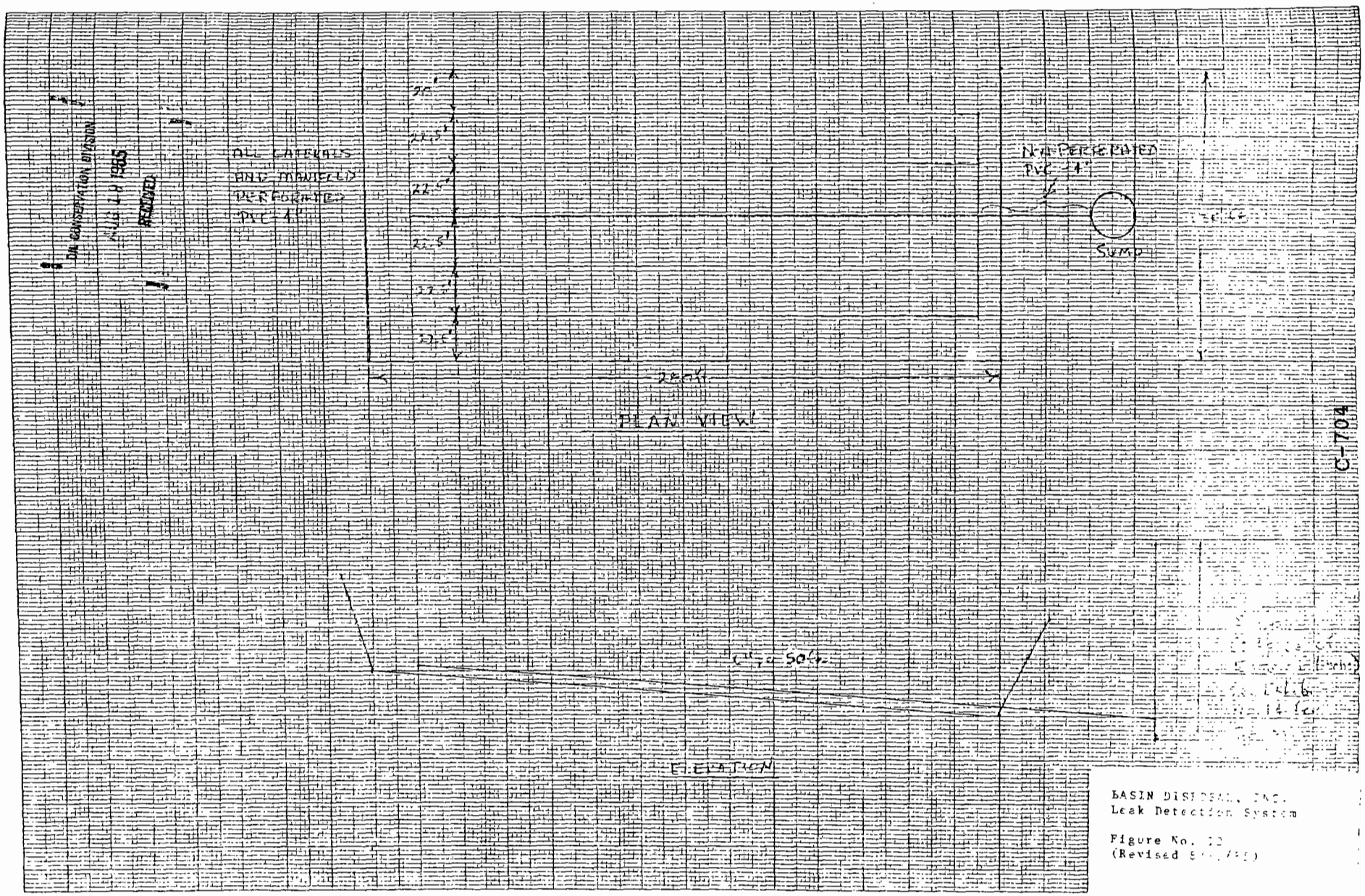
Revised 8/16/85



BASIN DISPOSAL, INC.
Leak Detection System

Figure No. 1[illegible]
(Revised 5/16/85)

K+E 10 X 10 TO 14 INCH • 10 X 18 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1323



BASIN DISPOSAL, INC.
Leak Detection System

Figure No. 22
(Revised 8/1/85)

ATTACHMENT D:
EVAPORATION PIT GEOLOGICAL REPORT

EVAPORATION PIT
GEOLOGICAL REPORT
SECTION 3-T29N-R11W
SAN JUAN COUNTY, NEW MEXICO
JULY 23, 1985

OIL CONSERVATION DIVISION
AUG 15 1985
RECEIVED

R. Tucker Attebery, Geologist
ATTEBERY GEOLOGICAL SERVICES, INC.
3005 Northridge Drive - Suite L
Farmington, New Mexico 87401
505-327-4039

EVAPORATION PIT GEOLOGICAL REPORT
for the south 330 feet of the northwest quarter of Section 3-T29N-R11W, San Juan County, New Mexico

The property is located two and one-half miles north of Bloomfield, New Mexico along the west flank of the valley bisected by Highway 44. Due to the gentle slope, surface drainage is primarily a sheetwash from an elevation of approximately 5740 feet to 5720 feet in a south-southwest direction.

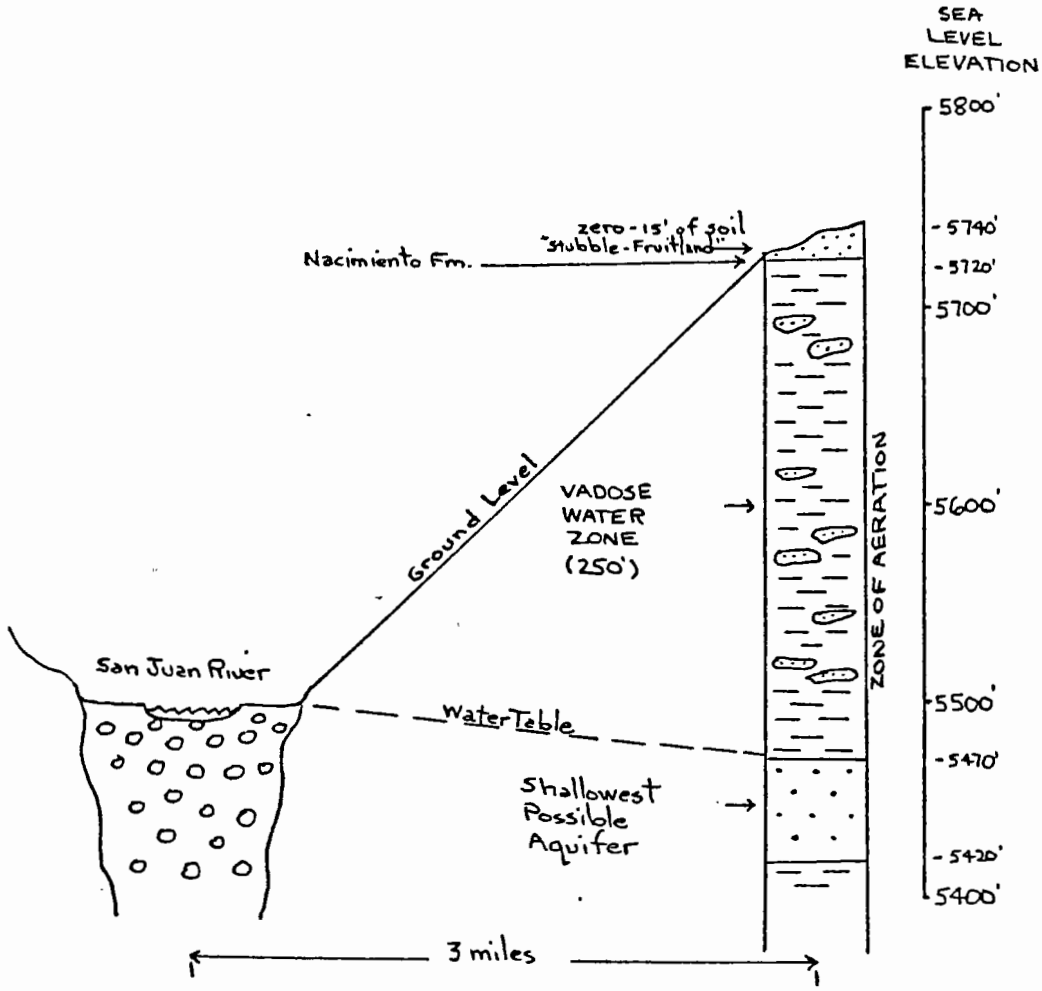
Three miles south, at an elevation of approximately 5500 feet, the San Juan River Valley represents the closest vulnerable ground-water system and floodplain. Drillers logs from the 1920's indicate reaching a water table below 250-290 feet in wells drilled just north of the property. This apparent aquifer or saturated zone probably coincides with the mean water level of the San Juan River.

No successful water wells have been drilled within a three mile radius according to the 1984 publication "Availability of Hydrologic Data in San Juan County, New Mexico". The area has been approved for septic systems and successful systems surround the property.

The soil cover is zero to 15 feet of well drained, sandy loam on gently sloping topography. This soil is classified as "Stubble-Fruitland" in the 1980 publication "Soil Survey of San Juan County, New Mexico". The soil cover is underlain by and seperated from the apparent water table by about 250 feet of gray, sandy, clayey shale containing thin, scattered, discontinuous, sand and silt lenses. It is the weathered and erosion thinned top of the Nacimiento Formation of Tertiary Age. The limited permeability of this unit provides a thick vadose water zone.

The vadose water zone is defined as a zone periodically containing suspended water in the zone of aeration, and is above the zone of saturation (water table). Because of it's thickness, in this case, any organic or inorganic contamination will be reduced in strength by a delay in movement and therefore are subject to dilution, mixing sorption, volatilization and microbiological degradation.

In our opinion, the property is acceptable for evaporation pit usage because of the surface stability and isolation from surface and subsurface waters. It is several miles from any area, considered by the state, to have vulnerable ground waters. The vadose zone isolates the shallowest possible aquifer and already is part of an approved septic system zone.



Schematic section from San Juan River floodplain to property

Vert. Scale 1" = 100' Horizontal Scale - none

oo Cobbles ⁘ Soil Sand lenses • • • Water sand — — Shale

ATTACHMENT E:
BILL OF LADING USED BY BASIN DISOSAL, INC.

BASIN DISPOSAL, INC.

P. O. BOX 100 • AZTEC, NEW MEXICO 87410 • PHONE: (505) 334-3013

LOCATED 3 MILES NORTH OF BLOOMFIELD ON WEST SIDE OF NM HWY 44

NO. 2286

DATE _____ CUSTOMER _____

WELL NAME & NUMBER _____

TRUCKING CO. _____ UNIT NO. _____

DRIVER _____

DEL. TICKET NO. _____

ORDERED BY _____

NO.	WATER	MUD	TIME	AM	PM	DRIVER'S SIGNATURE
1						
2						
3						
4						
5						
6						

TRUCK RATES
$ 42.50/HR.

_____ LOADS @ $50.00 = Produced H_2O

_____ LOADS @ $75.00 = Drilling Muds

TOTAL = _____

~~Drill~~ Oil - ≈ 200 BBLS.

ATTENDANT'S SIGNATURE _____

san juan repr Form 168-1

C-713

Sampling Report
Investigation of Amoco Production Company's
USG Section 18 Well No. 43
San Juan County, New Mexico
June 26, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of active San Juan Basin production sites developed by the New Mexico Oil Conservation Division at the request of EPA. The list was transmitted via telephone to the EPA contractor on June 10, 1986. Site selection from this list took place during the telephone conversation.

New Mexico state officials preferred to list the possible sample sites as shown below. The EPA contractor had no interest in the manner the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites. The list consisted of eight production sites in northwest New Mexico:

1. Pump Mesa
2. Cedar Hill
3. Hogback Unit
4. Cha Cha Gallop
5. Galletos Canyon
6. Totah Gallop Field
7. NW Cha Cha Unit
8. Mexico Federal

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. No. 8 on the above list (Mexico Federal) was selected as the primary sample site. No. 5 on the above list (Galletos Canyon) was selected as a back-up site.

Further inquiry indicated that both the primary and back-up sites were inappropriate for sampling. The particular wells at both proposed sample sites were not producing (shut in).

The EPA contractor randomly selected a second back-up site from the original list of sites and the random number table. The second back-up site was No. 3 on the above list (Hogback Unit).

Further inquiry indicated that this site was Amoco Production Company's USG Section 18 Well No. 43. Arrangements were made for this site to be sampled June 25, 1986. (See Sampling Information regarding actual sample date.)

The New Mexico Conservation Division conducted a reconnaissance visit to the site to confirm its appropriateness and availability prior to sampling. Sampling was conducted on June 26, 1986. No back-up site was required.

Site Location

USG Section 18 Well No. 43 is located 23 miles west of Farmington. Figure 1 is a map locating the production site.

The site is operated by Amoco Production Company, whose mailing address and telephone number are:

501 Airport Drive
Farmington, NM 87401
505-325-8841
Contact: Ed Alizadeh, Engineer

Attendees

Sampling of USG Section 18 Well No. 43 was performed by CENTEC Corporation personnel on June 26, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Andy Procko, Engineering Manager, Acting Technician
EPA Representative:	Susan de Nagy, Office of Water, Project Officer
State Representative:	Dave Boyer, NM Oil Conservation Division
Operator Representative:	Ed Alizadeh, Production Engineer
American Petroleum Institute Representative:	Bill Freeman, Contracted Observer

Site Description

USG Section 18 Well No. 43 is located within the San Juan Basin in an area characterized as a rural mesa. The depth to groundwater is over 100 feet, and the nearest surface water is less than 1/2-mile away. There are no drinking water wells within a 1-mile radius of this site. The soil in this area is

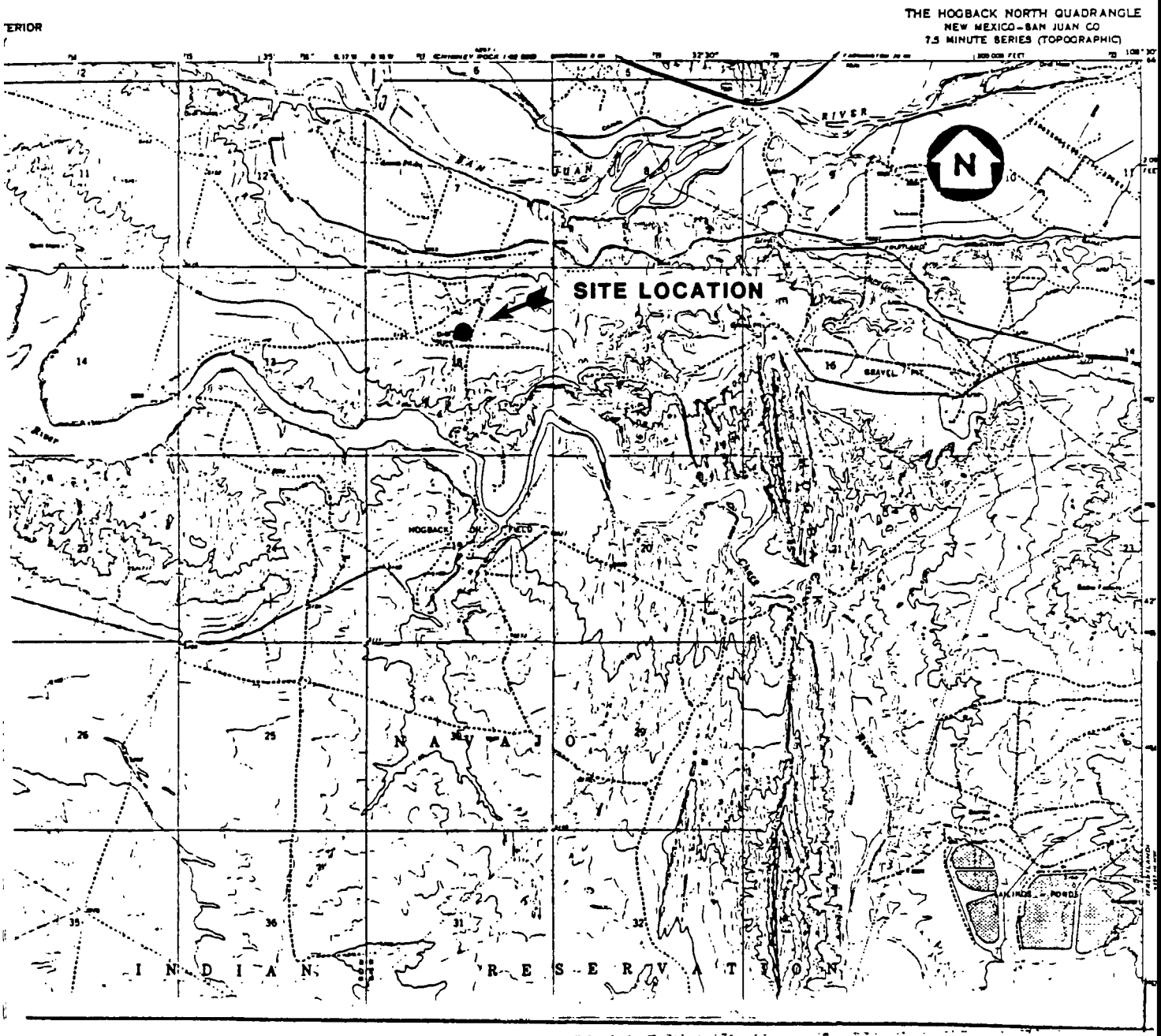


Figure 1. Location of USG Section 18, Well #43, San Juan County, New Mexico

mostly sandy rock. The climate at this site location is net evaporation.

This site consists of an actively producing oil well with a production of between 60 and 70 bbl/day. Daily production of produced water ranges from 70-80 bbl/day. Production at this site is sweet. The well depth is 7283 feet. The well produces using natural drive. The lease for this well contains a total of 12 wells, 4 of which were producing at the time of sampling.

Figure 2 is a schematic diagram of the production facility. The site consisted of a 400 bbl gun barrel tank (shown in Photos 1 and 2 in Attachment A), and two 400 gallon oil storage tanks.

Disposal Practices

As of the time of sampling, this site was approximately 1-year old, and their current system of produced water disposal was classified as temporary. The produced water was collected in the gun barrel tank prior to being trucked to a central pit or central treatment facility. The tanks at this site had never been cleaned.

Permits

The associated drilling and completion permits for the well are shown in Attachment B.

SAMPLING INFORMATION

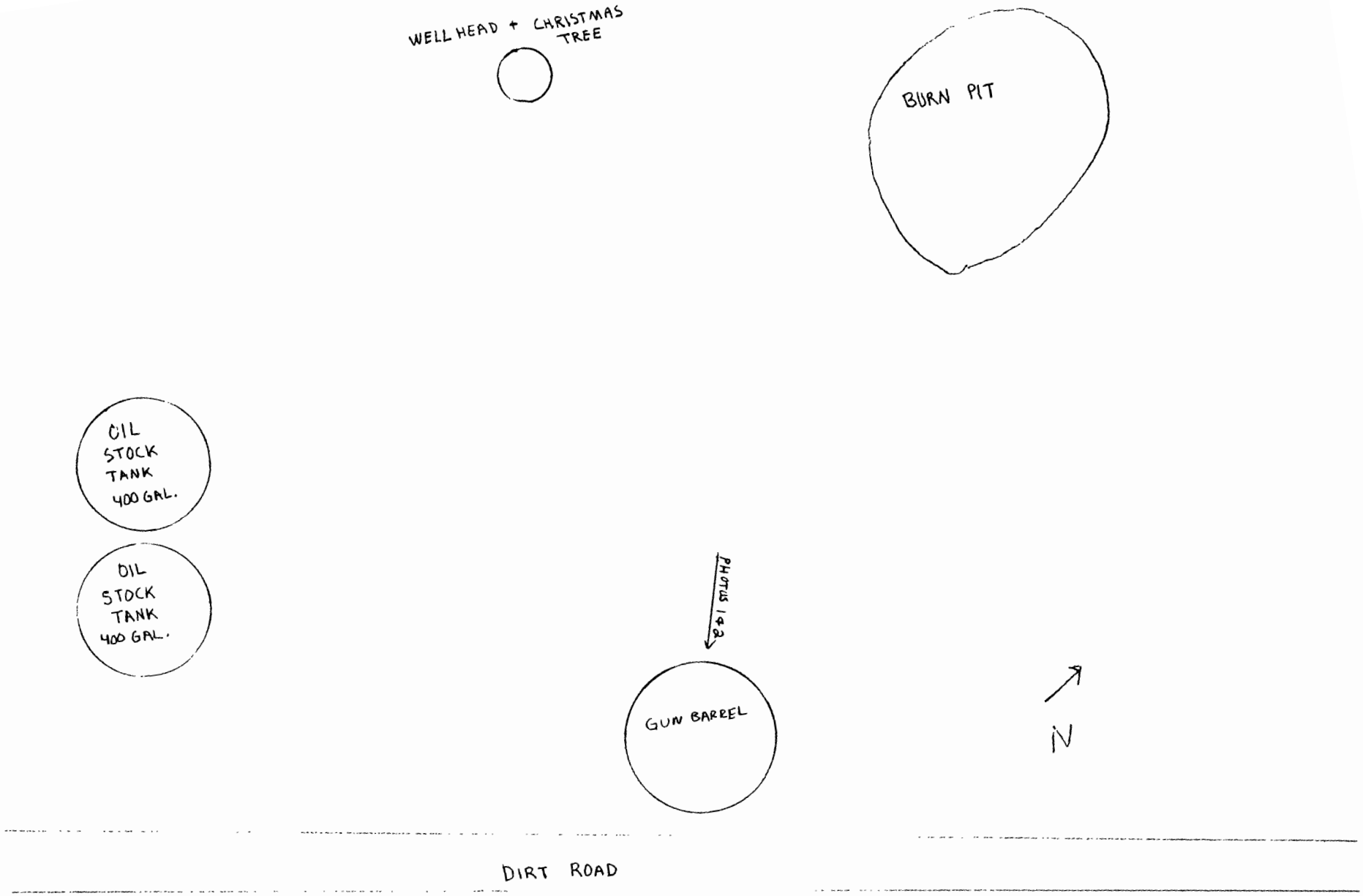
Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The sample collected at USG Section 18 Well No. 43 consisted of one liquid sample. The sample collection point was at the gun barrel tank.

Sampling Methods and Equipment

The liquid sample was collected at a valve at the bottom of the gun barrel tank. The liquid thief was not used, since there was only 5-10 feet of liquid height in the tank at the time of sampling. The sample bottles were filled directly from the valve. Originally, sampling was to have been conducted on June 25; however, the tank was emptied on June 24 because the well was temporarily shut down. The well was restarted on June 25.



...gram. USG Section 18, Well No. 43

An attempt was made to take a tank bottom sample from the top of the tank using a dredge. However, the tank had no bottoms to collect.

The pH of the produced water was tested onsite after the completion of sampling. The results gave a pH value of 6.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

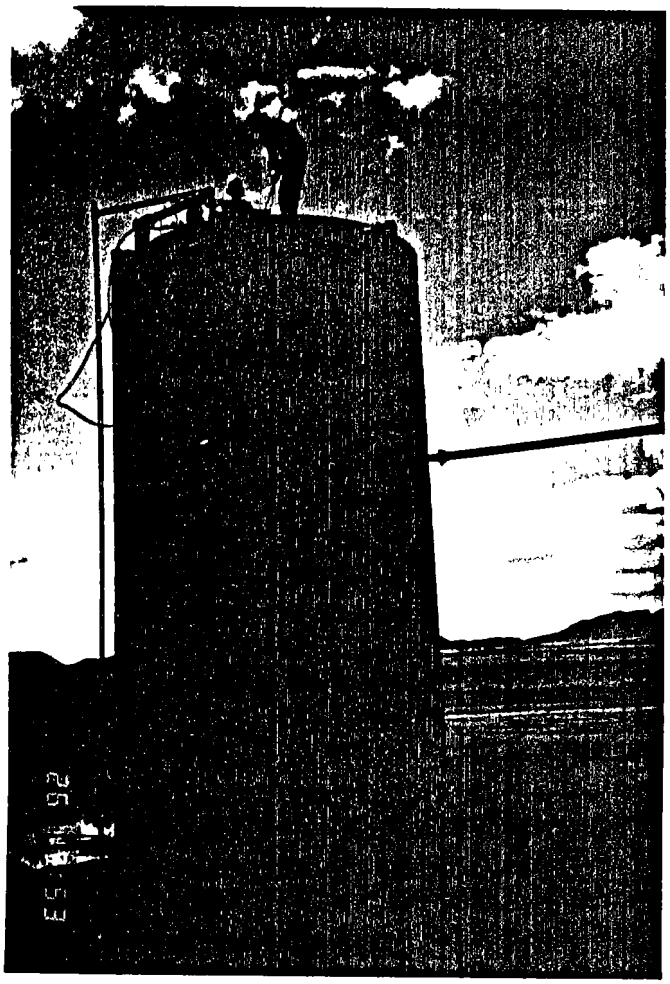


Photo 1. Sampled brine tank

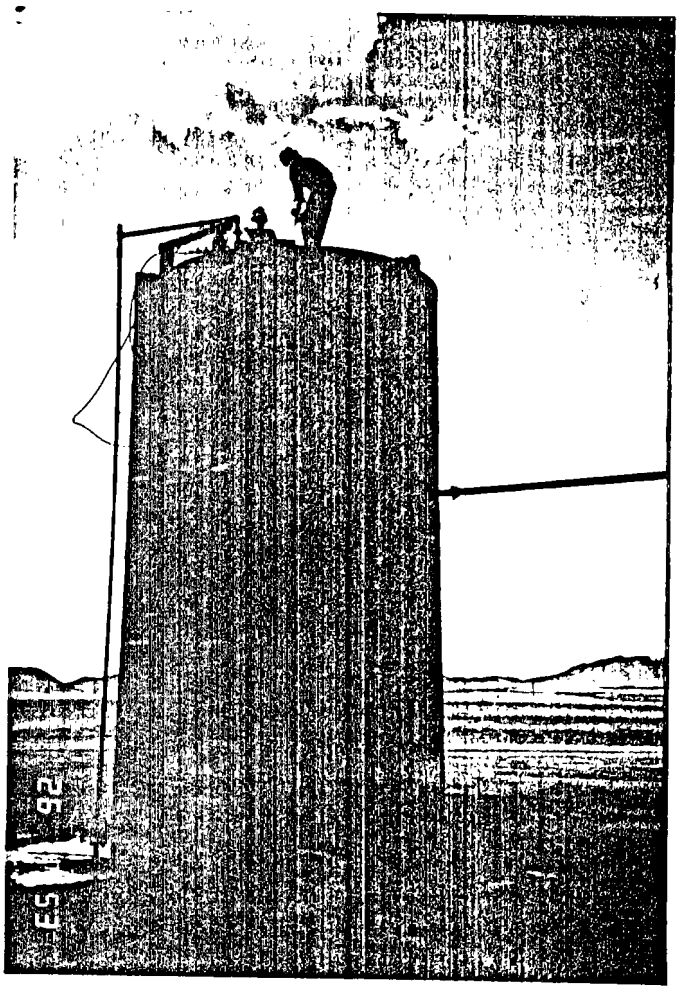


Photo 2. Sampled brine tank

ATTACHMENT B: PERMITS

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-102
Revised 10-1-78

All distances must be from the outer boundaries of the Section.

Operator	Lease	Well No.
AMOCO PRODUCTION COMPANY	USG Section 18	43

Unit Letter	Section	Township	Range	County
F	18	29N	16W	San Juan

Actual Footage Location of Well: 1500 feet from the North line and 1760 feet from the West line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
5176'	Pennsylvanian	Hogback Pennsylvanian	160 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

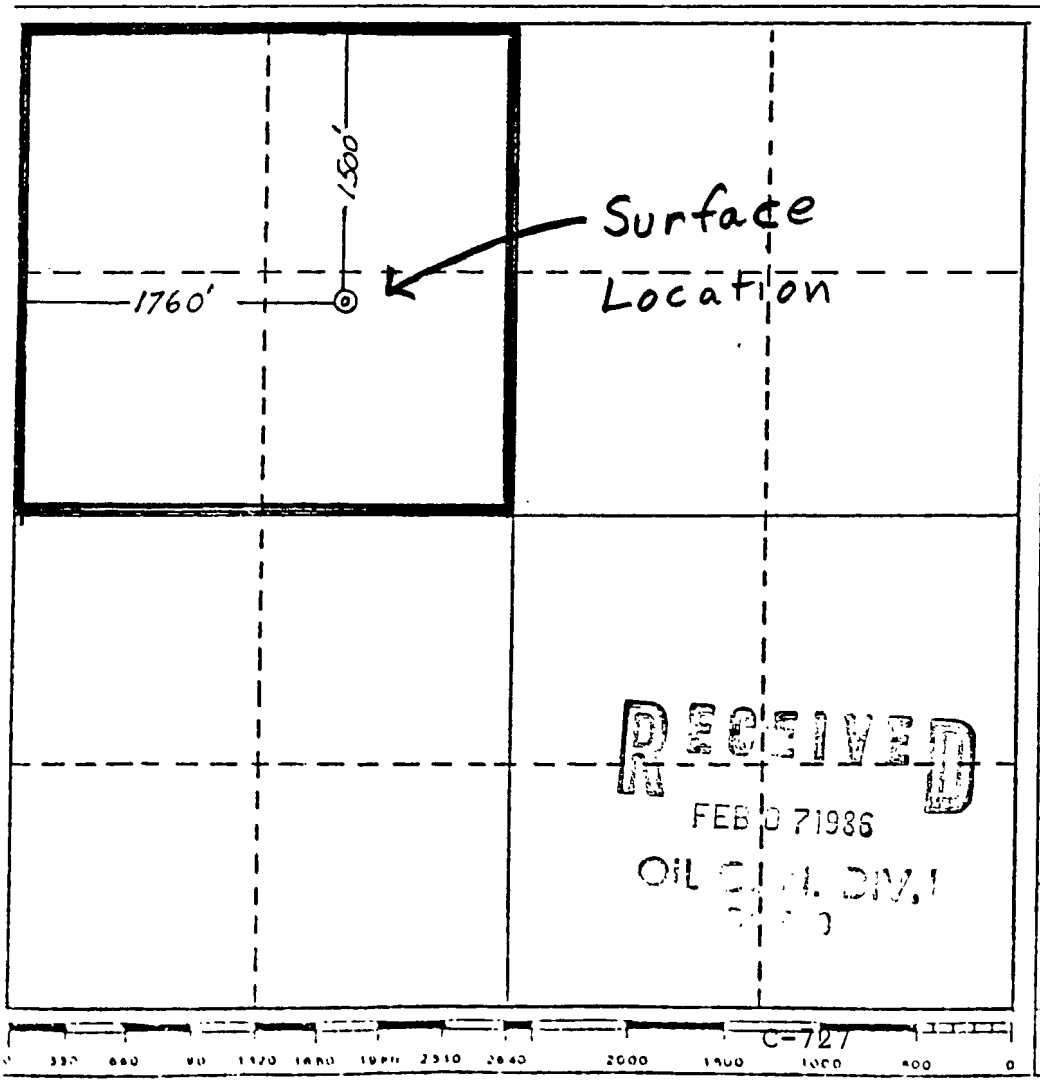
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling. etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Division.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.

B D Shaw

Name: B. D. Shaw

Position: Adm. Supervisor

Company: Amoco Production Co.

Date: 2-5-86

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

Certificate No.

Form 3160-5
(November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir.
Use "APPLICATION FOR PERMIT—" for such proposals.)

RECEIVED
DEC 16 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

5. LEASE DESIGNATION AND SERIAL NO.: I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo Tribe

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: USG Section 18

9. WELL NO.: 43

10. FIELD AND POOL, OR WILDCAT: Hogback Penn/Leadville WC

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SE/NW Sec 18, T29N, R16W

12. COUNTY OR PARISH: San Juan

13. STATE: New Mexico

OIL WELL [X] GAS WELL [ ] OTHER

2. NAME OF OPERATOR: Amoco Production Co.

3. ADDRESS OF OPERATOR: 501 Airport Drive, Farmington, N M 87401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface: 1500' FNL X 1760' FWL

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 5176' GR

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[X]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			
(Other)							

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Moved in and rigged up service unit on 11-11-85. Filled annulus with 29 bbl KCL and released packer. Killed well with 160 bbl 95% KCL and landed cast iron bridgeplug and packer at 6694'. Acidized perforations 6646'-6656' with 98 bbl 28% HCL. Moved packer to 6528' and acidized perforations 6646'-6656', 6610'-6616', 6573'-6582' with 200 bbl 28% HCL and flushed with 160 bbl 2% KCL. Killed well with 320 bbl 9.5% KCL and 100 bbl 10.4# brine. Released packer set at 6694'. Landed 2 7/8" tubing at 6252' and packer at 6252'. Released the rig on 11-21-85.

RECEIVED
DEC 19 1985
OIL CON. DIV.
DIST. 3

I hereby certify that the foregoing is true and correct

SIGNED: D Shaw TITLE: Adm. Supervisor DATE: 11-27-85

(This space for Federal or State office use)

APPROVED BY: TITLE: DATE:

CONDITIONS OF APPROVAL, IF ANY:

C-728

*See Instructions on Reverse Side

NMOCC

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Form 3160-4
(November 1983)
(formerly 9-330)

Form approved.
Budget Bureau No. 1004-0137
Expires August 31, 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN DUPLICATE*
(See other instructions on reverse side)

5. LEASE DESIGNATION AND SERIAL NO.: I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo Tribe

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: USG Section 18

9. WELL NO.: 43

10. FIELD AND POOL, OR WILDCAT: Hogback Penn

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: SE/NW Sec 18, T29N, R16W

12. COUNTY OR PARISH: San Juan

13. STATE: NM

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

1a. TYPE OF WELL: OIL WELL [X] GAS WELL [ ] DRY [ ] Other

b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER [ ] DEEP-EN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] Other

2. NAME OF OPERATOR: Amoco Production Company

3. ADDRESS OF OPERATOR: 501 Airport Drive, Farmington, NM 87401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*

At surface: 1500' FNL X 1760' FWL

At top prod. interval reported below: Same

At total depth: Same

14. PERMIT NO.:

DATE ISSUED:

RECEIVED
SEP 20 1985
OIL CON. DIV.
DIST. 3

RECEIVED
SEP 19 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
7-18-85	8-18-85	9-16-85	5189' KB	5176' GR

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
7283'	7271'	Single	→	0-TD	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 6573'-6656' Penn

25. WAS DIRECTIONAL SURVEY MADE: Yes

26. TYPE ELECTRIC AND OTHER LOGS RUN: FDC-CNL; DIL-GR-SP-CAL; Dipmeter

27. WAS WELL CORED: NO

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	48#, H40	313'	17-½"	472 cf Class B Portland	
9-5/8"	36#, K55	2260'	12-¼"	1665 cf 65:35 Pozzolanic, A Ideal	319 cf Class
7"	23#, 26#, K55	7282'	8-3/4"	236 cf Class B Portland,	271 cf Class B

(over)

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
Flowing through 7" casing				

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
Cast iron Bridgeplug		6745'
Retrievable bridgeplug		6690'

31. PERFORATION RECORD (Interval, size and number)

6573'-6582', 6610'-6616', 6646'-6656',
4 jspf, .50", 100 holes
6700'-6710', 4 jspf, .50", 40 holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
7122'-7260'	59 cf Class B cement
6880'-6888'	59 cf Class B neat
6760'-6772'	5000 gal 15% HCL
6700'-6710'	5000 gal 15% HCL

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
9-16-85	Flowing	Shut-in

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
9-17-85	24 hrs.	32/64	→	448	2913	0	6502

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
No tubing	760 psig	→	448	2913	0	45°

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.): To be vented

TEST WITNESSED BY: Billie Mace

ACCEPTED FOR RECORD
OCT 1 1985
FARMINGTON RESOURCE AREA
BY

35. LIST OF ATTACHMENTS: None

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records.

SIGNED: B D Shaw TITLE: Admin. Supervisor DATE: 9-18-85

*(See Instructions and Spaces for Additional Data on Reverse Side)

C-729

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

NMOCC

37. SUMMARY OF POROUS ZONES: (Show all important zones of porosity and contents thereof; cored intervals; and all drill-stem, tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries):

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
Mancos	Surface		
Dakota	868	1046	
Morrison	1046	2128	
Entrada	2128	2192	
Wingate	2192	2862	
Chinle	2862	4136	
Cutler	4136	5523	
Hermosa	5523	6248	
Ismay	6248	6377	
Desert Creek	6377	6450	
Akah	6450	6730	
Barker Creek	6730	6890	
Pinkerton	6890	7044	
Molas Shale	7044	7136	
Leadville	7136	TD	

38. GEOLOGIC MARKERS

NAME	TOP	
	MEAS. DEPTH	TRUE VERT. DEPTH

C-730

O+3
NMOCD,
Azt.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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TRANSPORTER OIL	
TRANSPORTER GAS	
OPERATOR	
PRORATION OFFICE	

Form C-104
Revised 10-01-78
Format 06-01-83
Page 1

OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

RECEIVED
DEC 0 2 1985
OIL CONSERVATION DIVISION
SANTA FE

REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT OIL AND NATURAL GAS

I.

Operator: Amoco Production Company

Address: 501 Airport Drive Farmington, NM 87401

RECEIVED
SEP 19 1985
OIL CON. DIV
DIST. 3

Reason(s) for filing (Check proper box)

- [x] New Well
- [ ] Recompletion
- [ ] Change in Ownership

Change in Transporter of:

- [ ] Oil
- [ ] Dry Gas
- [ ] Casinghead Gas
- [ ] Condensate

Other (Please explain)

If change of ownership give name and address of previous owner _____

I. DESCRIPTION OF WELL AND LEASE

Lease Name	Well No.	Pool Name, Including Formation	Kind of Lease	Lease No.
USG Section 18	43	Hogback Penn	State, Federal or Fee Indian	I-89-IND-58

Location

Unit Letter F : 1500 Feet From The North Line and 1760 Feet From The West

Line of Section 18 Township 29N Range 16W NMPM, San Juan County

II. DESIGNATION OF TRANSPORTER OF OIL AND NATURAL GAS

Name of Authorized Transporter of Oil [x] or Condensate [ ]: Permian Corporation

Address (Give address to which approved copy of this form is to be sent): P. O. Box 1702 Farmington, NM 87401

Name of Authorized Transporter of Casinghead Gas [ ] or Dry Gas [ ]: To be vented

Address (Give address to which approved copy of this form is to be sent):

If well produces oil or liquids, give location of tanks.	Unit	Sec.	Twp.	Rge.	Is gas actually connected?	When
	F	18	29N	16W	No	

If this production is commingled with that from any other lease or pool, give commingling order number: _____

NOTE: *Complete Parts IV and V on reverse side if necessary.*

V. CERTIFICATE OF COMPLIANCE

I hereby certify that the rules and regulations of the Oil Conservation Division have been complied with and that the information given is true and complete to the best of my knowledge and belief.

BDShaw
(Signature)

Admin. Supervisor
(Title)

9-19-85
(Date)

OIL CONSERVATION DIVISION

APPROVED SEP 19 1985

BY Charles Gholson

TITLE DEPUTY OIL & GAS INSPECTOR, DIST. #3

This form is to be filed in compliance with RULE 1104.

If this is a request for allowable for a newly drilled or deepened well, this form must be accompanied by a tabulation of the deviation tests taken on the well in accordance with RULE 111.

All sections of this form must be filled out completely for allowable on new and recompleted wells.

Fill out only Sections I, II, III, and VI for changes of owner, well name or number, or transporter, or other such change of condition.

Separate Forms C-104 must be filed for each pool in multiply completed wells.

Form C-104
Revised 10-01-78
Format 06-01-83
Page 2

Cast Iron Bridgeplug set at 6745'
Retrievable Bridgeplug set at 6690'

IV. COMPLETION DATA

Designate Type of Completion – (X)	Oil Well	Gas Well	New Well	Workover	Deepen	Plug Back	Same Res'v.	Diff.
	X		X					

Date Spudded	Date Compl. Ready to Prod.	Total Depth	P.B.T.D.
7-18-85	9-16-85	7283'	7271'
Elevations (DF, RKB, RT, GR, etc.)	**Name of Producing Formation**	**Top Oil/Gas Pay**	**Tubing Depth**
5176' GR	Penn	6573'	~~No tubing in hole~~ 6531
Perforations			**Depth Casing Shoe**
~~6573'-6582', 6610'-6616', 6646'-6656', 6700'-6710'~~ 6400-6772			7283'

TUBING, CASING, AND CEMENTING RECORD

HOLE SIZE	CASING & TUBING SIZE	DEPTH SET	SACKS CEMENT
17-½"	13-3/8", 48#, H40	313'	472 cf
12-¼"	9-5/8", 36#, K55	2260'	1984 cf
8-3/4"	7", 23#, 26#, K55	7282'	1321 cf
	2 7/8 ~~Flowing Through 7" Casing~~	6531	

V. TEST DATA AND REQUEST FOR ALLOWABLE (Test must be after recovery of total volume of load oil and must be equal to or exceed top allowable for this depth or be for full 24 hours)

OIL WELL

Date First New Oil Run To Tanks	Date of Test	Producing Method (Flow, pump, gas lift, etc.)	
9-16-85	9-17-85	Flowing	
Length of Test	**Tubing Pressure**	**Casing Pressure**	**Choke Size**
24 hours	No tubing in hole	760 psig	32/64
Actual Prod. During Test	**Oil-Bbls.**	**Water-Bbls.**	**Gas-MCF**
	448	0	2913

GAS WELL 40 102

Actual Prod. Test-MCF/D	Length of Test	Bbls. Condensate/MMCF	Gravity of Condensate
Testing Method (pitot, back pr.)	**Tubing Pressure (Shut-in)**	**Casing Pressure (Shut-in)**	**Choke Size**

Form 3160-5
(November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

5. LEASE DESIGNATION AND SERIAL NO.
I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Navajo Tribe

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT" for such proposals.)

RECEIVED NOV 1985 OIL CONSERVATION DIVISION SANTA FE

RECEIVED NOV 06 1985 BUREAU OF LAND MANAGEMENT FARMINGTON RESOURCE AREA

1. OIL WELL [X] GAS WELL [ ] OTHER

7. UNIT AGREEMENT NAME

2. NAME OF OPERATOR
Amoco Production Co.

8. FARM OR LEASE NAME
USG Section 18

3. ADDRESS OF OPERATOR
501 Airport Drive, Farmington, N M 87401

9. WELL NO.
43

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1500' FNL X 1760' FWL

10. FIELD AND POOL, OR WILDCAT
Hogback Penn/Leadville WC

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
SE/NW Sec 18, T29N, R16W

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
5176' GR

12. COUNTY OR PARISH
San Juan

13. STATE
New Mexico

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other) Additional Completion			[X]
(Other)				(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Moved in and rigged up service unit on 10-8-85. Set retrievable bridgeplug at 6520' and dumped 1200# sand on top. Perforated the following intervals: 6400'-6410', 4 jspf, .50" in diameter, for a total of 40 holes. Pumped interval 6400'-6410' with 5000 gal HCL acid and displaced with 38 bbl 2% KCL water. Perforated the following intervals: 6378'-6388', 6434'-6450', 4 jspf, .50" in diameter, for a total of 104 holes. Set packer at 6357'. Unset packer at 6357' and reset packer at 6293'. Squeezed interval 6378'-6450' with 177 cu. ft. Class B. Unset packer to 6229'. Drilled cement to 6450'. Tagged sand at 6490' and cleaned out to top of bridgeplug. Pressure tested cement squeeze to 1000 psi. Released bridgeplug set at 6520' and reset packer to 6531'. Released the rig on 10-24-85.

RECEIVED
NOV 08 1985
OIL CON. DIV
DIST. 3

I hereby certify that the foregoing is true and correct

SIGNED B S Shaw TITLE Adm. Supervisor

ACCEPTED FOR RECORD
NOV 07 1985
FARMINGTON RESOURCE AREA
BY Smm

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

C-733

*See Instructions on Reverse Side

NMOCC

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

5. LEASE DESIGNATION AND SERIAL NO.
I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Navajo Tribe

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

RECEIVED
OCT 07 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

1. OIL WELL [X] GAS WELL [ ] OTHER

7. UNIT AGREEMENT NAME

2. NAME OF OPERATOR
Amoco Production Co.

8. FARM OR LEASE NAME
USG Section 18

3. ADDRESS OF OPERATOR
501 Airport Drive, Farmington, N.M. 87401

9. WELL NO.
43

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1500' FNL x 1760' FWL

10. FIELD AND POOL, OR WILDCAT
Hogback Penn/Leadville

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
SE/NW Sec 18, T29N, R16W

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
5176' GR

12. COUNTY OR PARISH
San Juan

13. STATE
New Mexico

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			[ ]
(Other) Additional Completion			[X]	(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS: (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Amoco Production Co. requests to further complete the subject well according to the attached procedure.

Verbally approved by Jim Lovato on 10-4-85.

RECEIVED
OCT 15 1985
OIL CON. DIV.
DIST. 3

I hereby certify that the foregoing is true and correct

SIGNED [signature] TITLE Adm. Supervisor DATE 10-4-85

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

APPROVED
OCT 09 1985
Original Signed: STEPHEN MASON
for AREA MANAGER
FARMINGTON RESOURCE AREA

*See Instructions on Reverse Side

NMOCC

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Form 3160-5
(November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO.: I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo Tribe

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: USG Section 18

9. WELL NO.: 43

10. FIELD AND POOL, OR WILDCAT: Hogback Penn/Leadville WC

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SE/NW Sec 18, T29N,R16W

12. COUNTY OR PARISH: San Juan

13. STATE: NM

1. OIL WELL [X] GAS WELL [ ] OTHER

2. NAME OF OPERATOR: Amoco Production Company

3. ADDRESS OF OPERATOR: 501 Airport Drive Farmington, NM 87401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1500' FNL X 1760' FWL

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 5176' GR

RECEIVED
SEP 19 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

OCT 0 2 1985
OIL CONSERVATION DIVISION

Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]
(Other)			

SUBSEQUENT REPORT OF:

WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
(Other) Correction Sundry			[X]

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

The subject well was spud with a 17-½" bit rather than a 12-¼" bit as previously reported. The rest of the casing and cement report is correct.

RECEIVED
SEP 20 1985
OIL CON. DIV.
DIST. 3

I hereby certify that the foregoing is true and correct

SIGNED B D Shaw TITLE Admin. Supervisor DATE 9-19-85

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE ACCEPTED FOR RECORD

CONDITIONS OF APPROVAL, IF ANY:

1985

FARMINGTON RESOURCE AREA

BY

*See Instructions on Reverse Side

NMOCC

735

18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Form approved.
Budget Bureau No. 1004-0137
Expires August 31, 1985

(November 1983)
(Formerly 9-330)

SUBMIT IN DUPLICATE*

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

RECEIVED
SEP 19 1985
OIL CON. DIV.
DIST. 3

RECEIVED
OCT 2 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

RECEIVED
SEP 19 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

1a. TYPE OF WELL: OIL WELL [X] GAS WELL [ ] DRY [ ] Other

b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER [ ] DEEP-EN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] Other

2. NAME OF OPERATOR: Amoco Production Company

3. ADDRESS OF OPERATOR: 501 Airport Drive, Farmington, NM 87401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: 1500' FNL X 1760' FWL
At top prod. interval reported below: Same
At total depth: Same

5. LEASE DESIGNATION AND SERIAL NO.: I-89-IND-58
6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo Tribe
7. UNIT AGREEMENT NAME:
8. FARM OR LEASE NAME: USG Section 18
9. WELL NO.: 43
10. FIELD AND POOL, OR WILDCAT: Hogback Penn
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: SE/NW Sec 18, T29N, R16W
12. COUNTY OR PARISH: San Juan
13. STATE: NM
14. PERMIT NO. / DATE ISSUED:

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
7-18-85	8-18-85	9-16-85	5189' KB	5176' GR

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
7283'	7271'	Single	→	0-TD	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 6573'-6656' Penn

25. WAS DIRECTIONAL SURVEY MADE: Yes

26. TYPE ELECTRIC AND OTHER LOGS RUN: FDC-CNL; DIL-GR-SP-CAL; Dipmeter

27. WAS WELL CORED: NO

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	48#, H40	313'	17-½"	472 cf Class B Portland	
9-5/8"	36#, K55	2260'	12-¼"	1665 cf 65:35 Pozzolanic, A Ideal	319 cf Class
7"	23#, 26#, K55	7282'	8-3/4"	236 cf Class B Portland,	271 cf Class

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
Flowing through 7" casing				

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
Cast iron Bridgeplug	6745'	
Retrievable bridgeplug	6690'	

31. PERFORATION RECORD (Interval, size and number)
6573'-6582', 6610'-6616', 6646'-6656',
4 jspf, .50", 100 holes
6700'-6710', 4 jspf, .50", 40 holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
7122'-7260'	59 cf Class B cement
6880'-6888'	59 cf Class B neat
6760'-6772'	5000 gal 15% HCL
6700'-6710'	5000 gal 15% HCL

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
9-16-85	Flowing	Shut-in

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
9-17-85	24 hrs.	32/64	→	448	2913	0	6502

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
No tubing	760 psig	→	448	2913	0	45°

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.): To be vented

TEST WITNESSED BY: Gilbert Lopez

ACCEPTED FOR RECORD
OCT 2 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA
BY

35. LIST OF ATTACHMENTS: None

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records.

SIGNED: B D Shaw TITLE: Admin. Supervisor DATE: 9-18-85

*(See Instructions and Spaces for Additional Data on Reverse Side)

OPERATOR

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

37. SUMMARY OF POROUS ZONES: (Show all important zones of porosity and contents thereof; cored intervals; and all drill-stem, tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries):

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
Mancos	Surface		
Dakota	868	1046	
Morrison	1046	2128	
Entrada	2128	2192	
Wingate	2192	2862	
Chinle	2862	4136	
Cutler	4136	5523	
Hermosa	5523	6248	
Ismay	6248	6377	
Desert Creek	6377	6450	
Akah	6450	6730	
Barker Creek	6730	6890	
Pinkerton	6890	7044	
Molas Shale	7044	7136	
Leadville	7136	TD	

38. GEOLOGIC MARKERS

NAME	TOP	
	MEAS. DEPTH	TRUE VERT. DEPTH

C-737

Form 3160-5
November 1983)
Formerly 9-331)

~~UNITED STATES~~
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO.: I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo Tribe

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: USG Section 18

9. WELL NO.: 43

10. FIELD AND POOL, OR WILDCAT: Hogback Penn/Leadville WC

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SE/NW Sec 18, T29N, R16W

12. COUNTY OR PARISH: San Juan

13. STATE: NM

OIL WELL [X] GAS WELL [ ] OTHER

NAME OF OPERATOR: Amoco Production Company

ADDRESS OF OPERATOR: 501 Airport Drive Farmington, NM 87401

LOCATION OF WELL (Report location clearly and in accordance with any State requirements. See also space 17 below.) At surface: 1500' FNL X 1760' FWL

PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 5176' GR

RECEIVED SEP 19 1985 BUREAU OF LAND MANAGEMENT FARMINGTON RESOURCE AREA

DIST 0 2 1985

Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

- TEST WATER SHUT-OFF [ ]
- FRACTURE TREAT [ ]
- SHOOT OR ACIDIZE [ ]
- REPAIR WELL [ ]
- (Other) [ ]
- PULL OR ALTER CASING [ ]
- MULTIPLE COMPLETE [ ]
- ABANDON* [ ]
- CHANGE PLANS [ ]

SUBSEQUENT REPORT OF:

- WATER SHUT-OFF [ ]
- FRACTURE TREATMENT [ ]
- SHOOTING OR ACIDIZING [ ]
- (Other) Completion
- REPAIRING WELL [ ]
- ALTERING CASING [ ]
- ABANDONMENT* [X]

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Moved in and rigged up service unit on 8-26-85. Total depth of the well is 7283'. Plugback depth is 7271'. Pressure tested production casing to 3500 psi for 30 minutes. Perforated the following intervals: 7122'-7128', 7218'-7234', 7252'-7260', 4 jspf, .44" in diameter, for a total of 120 holes. Squeezed interval 7122'-7260' with 59 cu. ft. Class B cement. Perforated the following intervals: 6880'-6888', 4 jspf, .44" in diameter, for a total of 32 holes. Squeezed interval 6880'-6888', with 59 cu. ft. Class B Neat cement. Perforated the following intervals: 6760'-6772', 4 jspf, .50" in diameter, for a total of 48 holes. Acidized interval 6760'-6772' with 5000 gal 15% HCL. Set cast iron bridgeplug at 6745'. Perforated the following intervals: 6700'-6710', 4 jspf, .50" in diameter, for a total of 40 holes. Acidized interval 6700'-6710' with 5000 gal 15% HCL. Set retrievable bridgeplug at 6690'. Perforated the following intervals: 6573'-6582', 6610'-6616', 6646'-6656', 4 jspf, .50" in diameter, for a total of100 holes. The well is flowing through the 7" casing. As soon as the pressure goes down, tubing will be landed in the hole and a subsequent sundry will be submitted.

RECEIVED SEP 20 1985 OIL CON. DIV. DIST. 3

I hereby certify that the foregoing is true and correct

SIGNED B.D. Shaw TITLE Admin. Supervisor DATE 9-19-85

(This space for Federal or State office use)

ACCEPTED FOR RECORD

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

SEP 1985

FARMINGTON RESOURCE AREA

BY

*See Instructions on Reverse Side

C-738

NMOCC

18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Form 3160-5
(November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO. I-89-IND-58
6. IF INDIAN, ALLOTTEE OR TRIBE NAME Navajo Tribe
7. UNIT AGREEMENT NAME
8. FARM OR LEASE NAME USG Section 18
9. WELL NO. 43
10. FIELD AND POOL, OR WILDCAT Hogback Penn/Leadville Wildcat
11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA SE/NW Sec18,T29N,R16W
12. COUNTY OR PARISH San Juan
13. STATE NM

1. OIL WELL [X] GAS WELL [ ] OTHER
2. NAME OF OPERATOR Amoco Production Co.
3. ADDRESS OF OPERATOR 501 Airport Drive, Farmington, N.M. 87401
4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements. See also space 17 below.) At surface 1500' FNL x 1760' FWL

RECEIVED
AUG 27 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

14. PERMIT NO.
15. ELEVATIONS (Show whether DF, RT, GR, etc.) 5176' GR

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other) Spud & Set Casing			[x]
(Other)				(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Spud a 12-1/4" hole at 1100 hrs on 7-18-85. Drilled to 313'. Set 13-3/8", 48#, H40 casing at 313' and cemented with 472 cu. ft. Class B Portland. Circulated cement to surface. Pressure tested casing to 1000 psi for 30 minutes. Drilled a 12-1/4" hole to 2260'. Set 9-5/8", 36#, K55 casing at2260'. Cemented with 1665 cu. ft. Pozzolanic 65:35 poz and tailed in with 319 cu. ft. Class A Ideal. Circulated cement to surface. Drilled an 8-3/4" hole to a TD of 7283' on 8-18-85. Set 7", 23# and 26#, K55 production casing at 7282'. Stage 1: cemented with 236 cu.ft. Class B Portland and tailed in with 271 cu. ft. Class B Portland. Stage 2: cemented with 814 cu. ft. Class B Portland. Ran a temperature survey (attached) which indicated the top of cement to be at 300'. The DV tool was set at 5019' and the rig was released on 8-19-85.

SEP 09 1985
OIL CONSERVATION DIVISION

RECEIVED
AUG 29 1985
OIL CON. DIV.
DIST. 3

I hereby certify that the foregoing is true and correct

SIGNED B. Shaw TITLE Adm. Supervisor DATE 8-23-85

(This space for Federal or State office use)

ACCEPTED FOR RECORD

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

AUG 27 1985
FARMINGTON RESOURCE AREA
BY _____

*See Instructions on Reverse Side

NMOCC

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

FORM 432-2

WILSON
SERVICE COMPANY

TEMPERATURE SURVEY

COMPANY AMOCO Production

WELL 43 LEASE USG Section 18

COUNTY San Juan STATE New Mexico

SEC. 18 TWP. 29N RGE. 16W

APPROX. TOP CEMENT 300'

Survey Begins at 100' Ft. Ends at 5018' Ft.

Approx. Fill-Up Max. Temp.

Log Measured From KB Run No. 1

Casing Size	Casing Depth	Diam of Hole	Depth
7" from	to	from 8 3/4"	to
from	to	from	to

Date of Cementing 8/19/85 Time 2:00 am

Date of Survey 8/19/85 Time 3:30 pm

Amount of Cement As Per Report

Recorded by Hodnett Witnessed by

30-045-26420

Form 3160-3
(November 1983)
(formerly 9-331C)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0136
Expires August 31, 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

JUN 28 1984
OIL CONSERVATION DIVISION
SANTA FE

1a. TYPE OF WORK: DRILL [X] DEEPEN [ ] PLUG BACK [ ]

b. TYPE OF WELL: OIL WELL [X] GAS WELL [ ] OTHER [ ] SINGLE ZONE [ ] MULTIPLE ZONE [X]

2. NAME OF OPERATOR: Amoco Production Co.

3. ADDRESS OF OPERATOR: 501 Airport Drive, Farmington, N.M. 87401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 1500' FNL x 1760' FWL
At proposed prod. zone: same

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APR 01 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

5. LEASE DESIGNATION AND SERIAL NO.: I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo Tribe

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: USG Section 18

9. WELL NO.: 43

10. FIELD AND POOL, OR WILDCAT: Hogback Penn/Leadville

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SE/NW Sec18,T29N,R16W

12. COUNTY OR PARISH: San Juan

13. STATE: NM

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 23 miles west of Farmington

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 860'

16. NO. OF ACRES IN LEASE: 4800

17. NO. OF ACRES ASSIGNED TO THIS WELL: 40 ~~160~~ 40

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: 500' So

19. PROPOSED DEPTH: 7239'

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 5176' GR

22. APPROX. DATE WORK WILL START*: As soon as permitted

DRILLING OPERATIONS AUTHORIZED ARE SUBJECT TO COMPLIANCE WITH ATTACHED "GENERAL REQUIREMENTS".

This action is subject to administrative appeal pursuant to 30 CFR 290.

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
17-1/2"	13-3/8"	48#,H-40	200'	354 cu ft Class B
12-1/4"	9-5/8"	36#,K-55	2240'	1057 cu ft Class B
8-3/4"	7"	23#,N-80 20#.K-55	7239'	1634 cu ft Class B

Amoco Production Co. proposes to drill the above well to further develop the Hogback Penn-Leadville reservoirs. The well will be drilled to the surface casing point using native mud. The well will then be drilled to a TD with a low solids nondispersed mud system. Completion design will be based on open hole logs. Copy of all logs will be filed upon completion. Amoco's standard blowout prevention will be employed; see attached drawing for blowout preventer design. Upon completion the well site will be cleaned and the reserve pit filled and leveled.

No H2S gas is expected to be encountered based on the drilling and completion of the USG Section 18 #38.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24. SIGNED: B.D. Shaw TITLE: Adm. Supervisor DATE: 3/27/85

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

RECEIVED
JUN 17 1985
OIL CON. DIV.
DIST. 3

APPROVED AS AMENDED
JUN 12 1985
/s/ J. Stan McKee
for M. MILLENBACH
AREA MANAGER

NMOCC

*See Instructions On Reverse Side

C-741

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-102
Revised 10-1-78

All distances must be from the outer boundaries of the Section.

Operator	Lease	Well No.
AMOCO PRODUCTION COMPANY	USG SECTION 18	43

Unit Letter	Section	Township	Range	County
F	18	29 N	16 W	San Juan

Actual Footage Location of Well: 1500 feet from the NORTH line and 1760 feet from the WEST line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
5176	Penn-Leadville	Hogback Penn-~~Leadville~~ W-C	~~160~~ 40 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

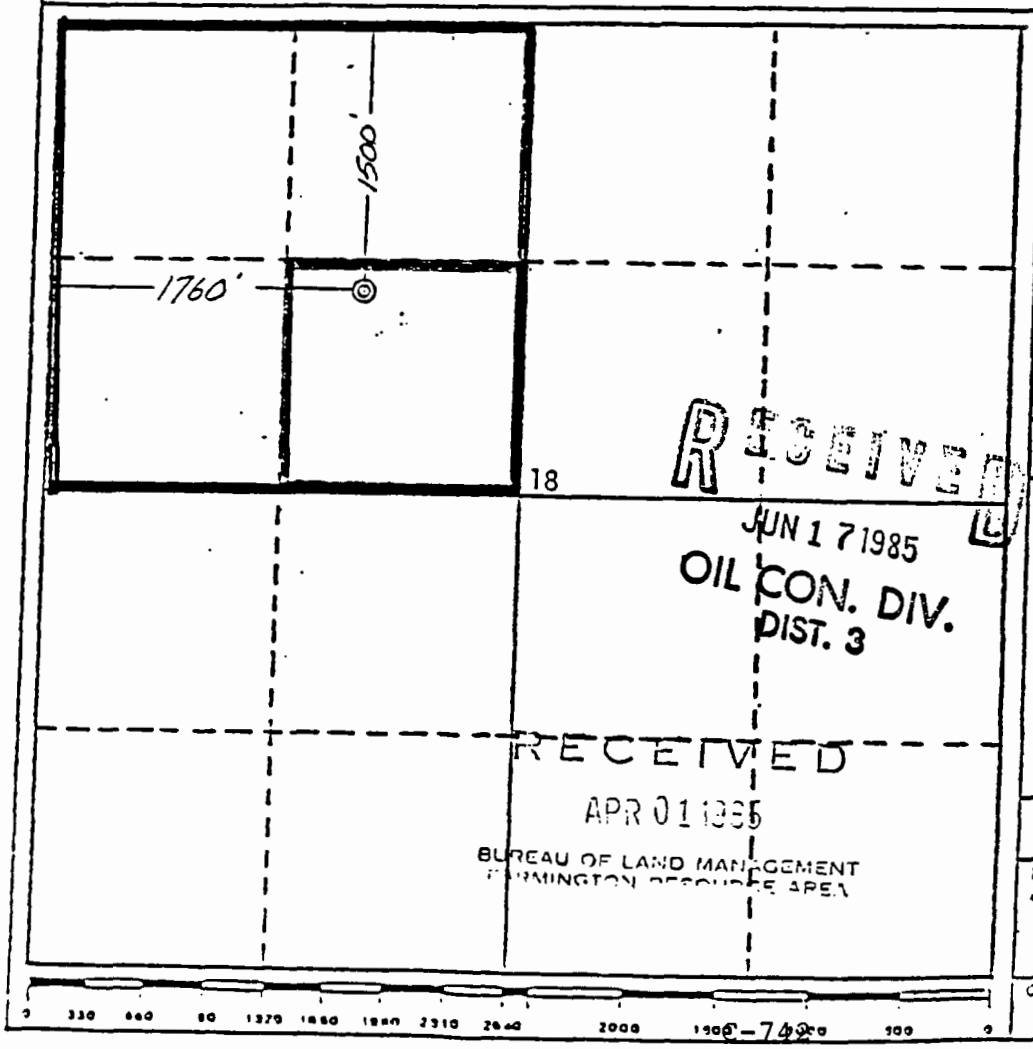
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling. etc?

☐ Yes ☒ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Division.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.

B D Shaw

Name: B. D. Shaw

Position: Adm. Supervisor

Company: Amoco Production Co.

Date: 3/23/8

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

GARY D. VANN NEW MEXICO 7016 REGISTERED PROFESSIONAL LAND SURVEYOR

Date Surveyed: January 21, 1985

Registered Professional Engineer and/or Land Surveyor

Gary D. Vann

Certificate No. 7016

0-5
(Ver 1983)
(erly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO.: I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo Tribal

1. OIL WELL [X] GAS WELL [ ] OTHER

7. UNIT AGREEMENT NAME:

2. NAME OF OPERATOR: Amoco Production Co.

8. FARM OR LEASE NAME: USG Section 18

3. ADDRESS OF OPERATOR: 501 Airport Drive, Farmington, N M 87401

9. WELL NO.: 43

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1500' FNL x 1760' FWL

RECEIVED
MAY 13 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

10. FIELD AND POOL, OR WILDCAT: Hogback Penn/Leadville

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SE/NW Sec 18, T29N, R16W

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 5176' GR

12. COUNTY OR PARISH: San Juan

13. STATE: NM

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			[ ]
(Other) Bottom Hole Location	[X]			(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Amoco Production Company requests approval to amend the bottom hole location of the subject well from same as surface location to 1650' FNL x 1760' FWL.

This well was previously staked to be orthodox for gas spacing but the well was reevaluated as qualifying for oil spacing. The surface location has already been approved archaeologically by the B.I.A. and topographically by the B.L.M. The deviation is being made to remain orthodox for the oil spacing requirements and to satisfy the requirements of the B.I.A. and the B.L.M.

RECEIVED
JUN 17 1985
OIL CON. DIV.
DIST. 3

18. I hereby certify that the foregoing is true and correct

SIGNED B D Shaw TITLE Adm. Supervisor DATE 5-9-85

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

~~APPROVED~~
AS AMENDED
JUN 12 1985
/s/ J. Stan McKee
for M. MILLENBACH
AREA MANAGER

*See Instructions on Reverse Side

NMOCC

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the

OIL CONSERVATION DIVISION

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-102
Revised 10-1-78

All distances must be from the outer boundaries of the Section.

Operator	Lease	Well No.
Amoco Production Co.	USG Section 18	43

Unit Letter	Section	Township	Range	County
F	18	29N	16W	San Juan

Actual Footage Location of Well: 1650 feet from the North line and 1760 feet from the West line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
5176	Penn/Leadville	Undes. Hogback Penn/Leadville	160/40 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

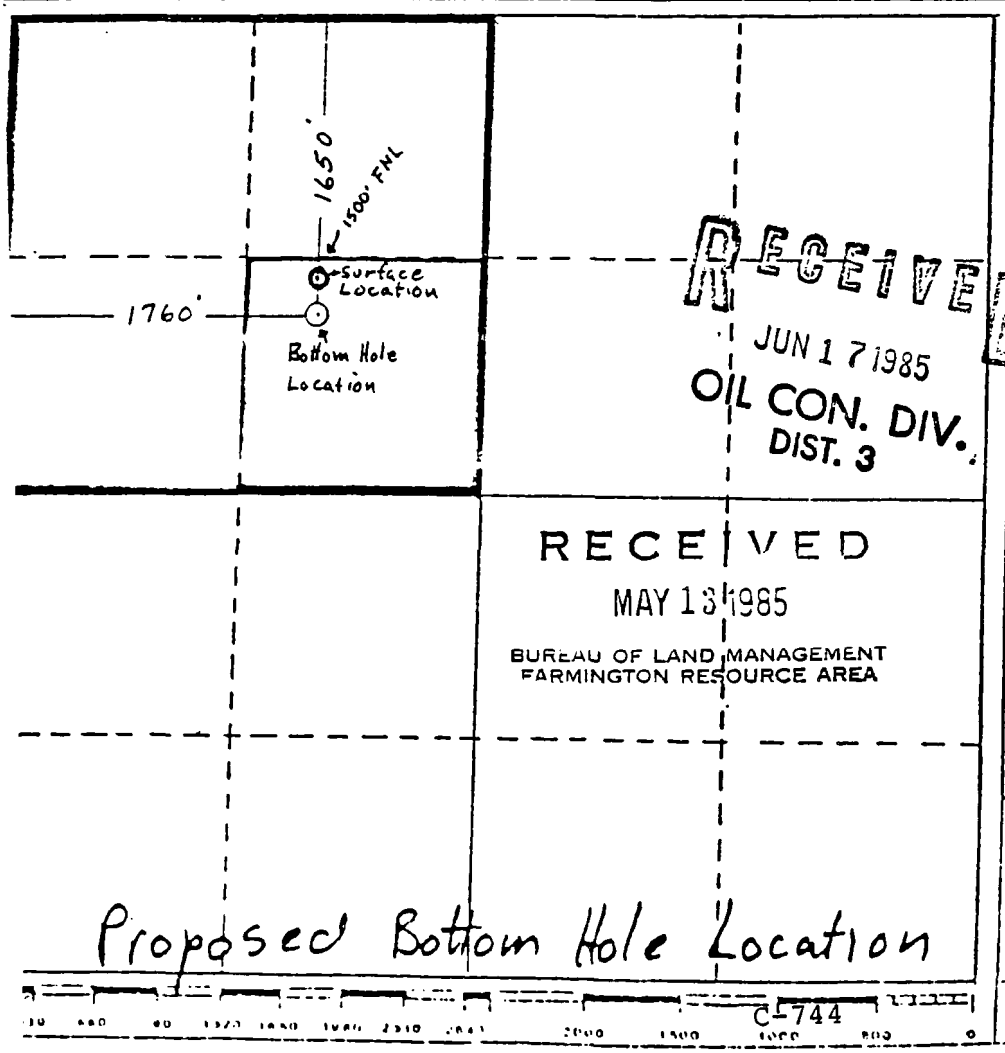
3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling. etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Division.

Proposed Bottom Hole Location



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.

BDShaw

Name: B. D. Shaw

Position: Adm. Supervisor

Company: Amoco Production Co.

Date: 5-9-85

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

Certificate No.

C-744

Sampling Report
Investigation of Cities Service Oil and Gas Corporation's
State E Lease
Lea County, New Mexico
June 27, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of active Permian Basin production sites developed by the New Mexico Oil Conservation Division at the request of EPA. The list was transmitted via telephone to the EPA contractor on June 10, 1986. Site selection from this list took place during the telephone conversation.

New Mexico state officials preferred to list the possible sample sites as shown below. The EPA contractor had no interest in the manner the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites. The list consisted of five production sites in southeast New Mexico:

1. East Hobbs - San Andreas
2. Denton - Devonian
3. Eunice - San Andreas
4. Lovington - Abo
5. Eunice Monument - GBSA

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. No. 5 on the above list (Eunice Monument - GBSA) was selected as the primary sample site. The New Mexico Oil Conservation Division conducted a reconnaissance visit to the primary site. The reconnaissance visit confirmed the appropriateness and availability of the site for sampling on June 27, 1986. Therefore, no back-up site was required.

Site Location

Cities Service Oil and Gas Corporation's State E Lease is located southwest of Hobbs, approximately 2 miles west of Monument, New Mexico. Figure 1 is a map locating the production site.

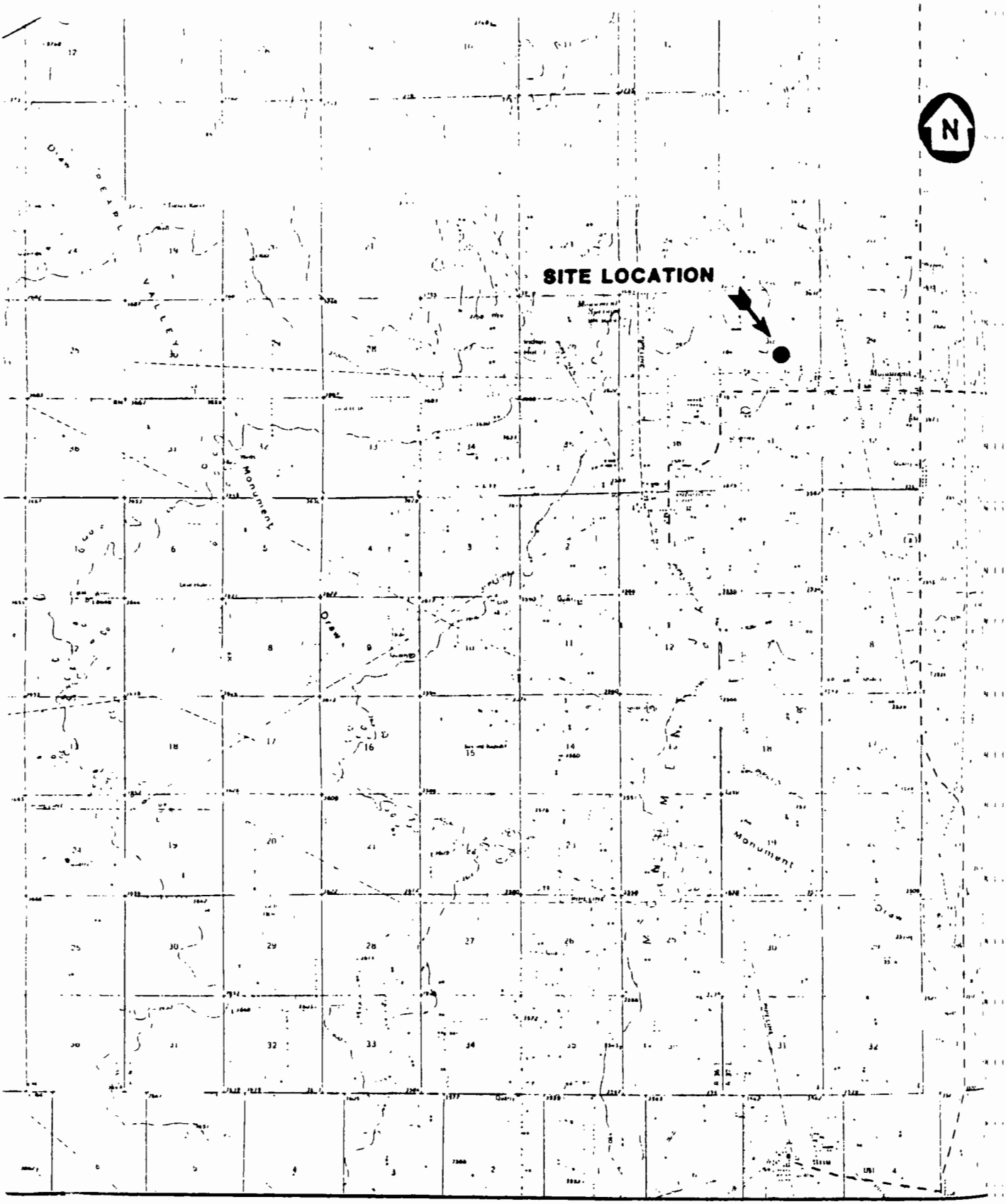


Figure 1. Location of Cities Service State E Lease, Lea County, New Mexico

The site is operated by Cities Service, whose mailing address and telephone number are:

PO Box 1919
Midland, TX 79702
915-685-5600
Contact: Elmer Startz, Regional Operations Manager

Attendees

Sampling of Cities Service State E Lease was performed by CENTEC Corporation personnel on June 27, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Andy Procko, Engineering Manager, Acting Technician
EPA Representative:	Susan de Nagy, Office of Water, Project Officer
State Representatives:	Dave Boyer, NM Oil Conservation Division Eddie Seay, NM Oil Conservation Division Jerry Sexton, NM Oil Conservation Division
Operator Representative:	Joe Gibson, Asst. Production Foreman
American Petroleum Institute Representative:	Bill Freeman, Observer

Site Description

Cities Service State E Lease is located within the Permian Basin in rural flatland. The depth to groundwater is less than 25 feet, and the nearest surface water is over 2 miles away. There is one drinking water well within a 1-mile radius of this site. The soil in this area is mostly sandy rock. The climate at this site location is net evaporation.

This site consists of four actively producing oil wells with a total production of 150 bbl/day and a gas well with production of less than 60,000 SCF per day. Production at this site is sour. The average well depth is 5000 feet. The wells produce a total of 700-800 bbl of water per day. The wells are producing using natural drive.

Figure 2 is a schematic diagram of the production facility. The site consists of a 135 bbl free water knockout tank (shown in Photos 1 and 2 in Attachment A), a 100 bbl heater-treater (shown in Photos 3 and 4 along with the free water knockout tank), and three 500 bbl oil stock tanks. The free water knockout and stock

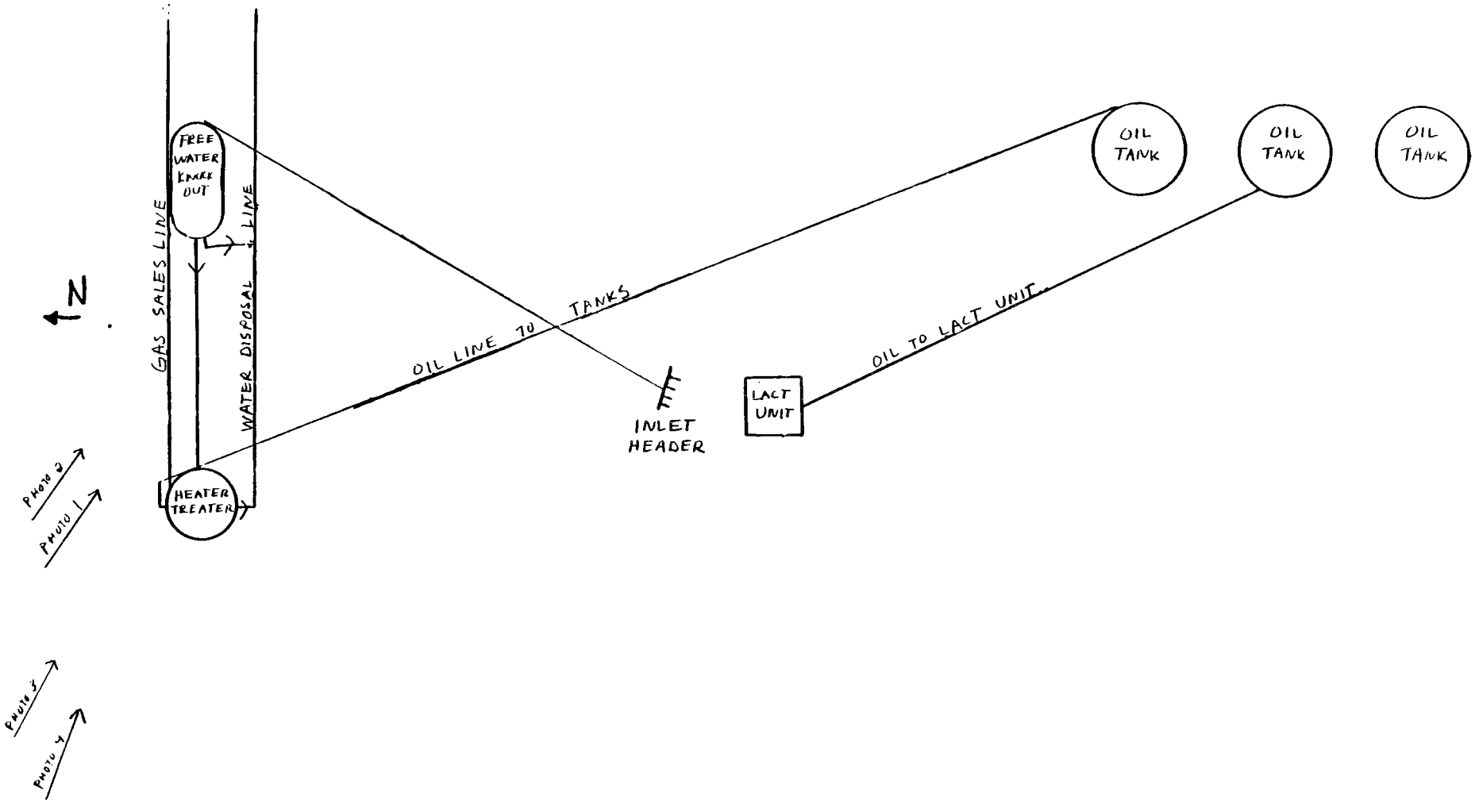


Figure 2. Production Schematic Diagram, Cities Service Oil and Gas, Corp.'s State E Lease

tanks are cleaned every 5 years. The heater treater is cleaned every 1-2 years. The heater treater was cleaned last sometime between June 1985 and June 1986. No biocides are used at this facility.

Disposal Practices

A scale inhibitor (NALCO-VISCO-953) is added to the brine prior to disposal. Brine is disposed by reinjection by Rice Engineering Services. Operation and maintenance costs range between $0.02-0.25 per barrel of produced water.

Permits

This facility operates under Permit No. 30-19-37 issued by the NM Oil Conservation Division. The original Notice of Intention to Drill for the five wells on the lease is shown in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Location

The sample collected at Cities Service State E Lease consisted of one liquid sample. The sample was collected at a valve at the bottom of the free water knockout tank. The sample team requested permission to collect the liquid sample at a point in the exit water line containing the combined water flow lines from the heater treater and the free water knockout tanks. This was not permitted by the onsite representatives.

Sampling Methods and Equipment

At the direction of the EPA Project Officer, the sample was collected by filling the sample bottle directly from the valve at the base of the free water knockout tank. Hydrogen sulfide concentration was less than 0.5 ppm according to Draeger tube tests. Tests for pH of the produced water were conducted onsite after the completion of sampling. Test results gave a pH value of 8.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

Photo 1. Free water knock-out tank, sample point collection

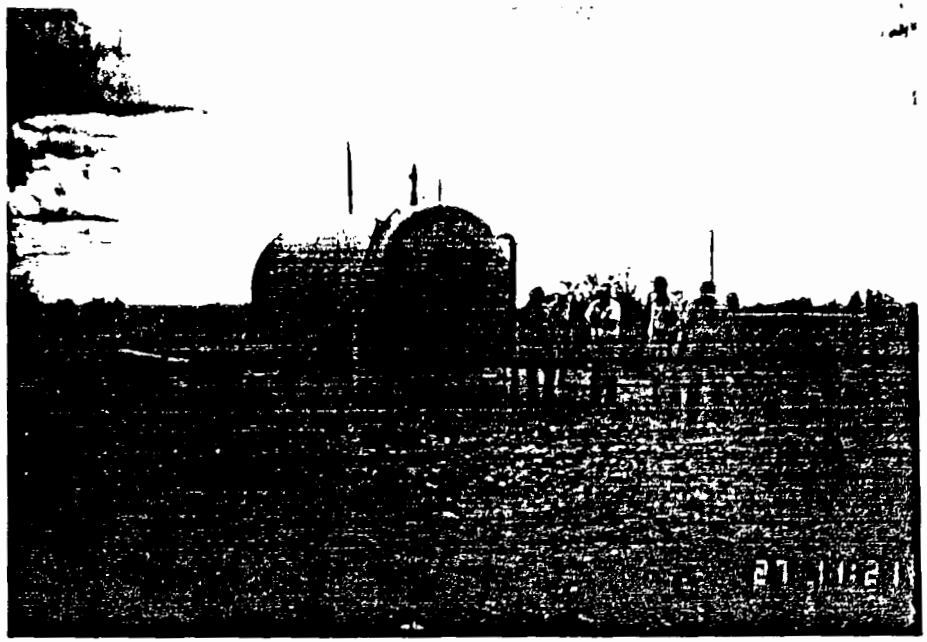


Photo 2. Free water knock-out tank, sample point collection

Photo 3. Heater treater and free water knock-out tank

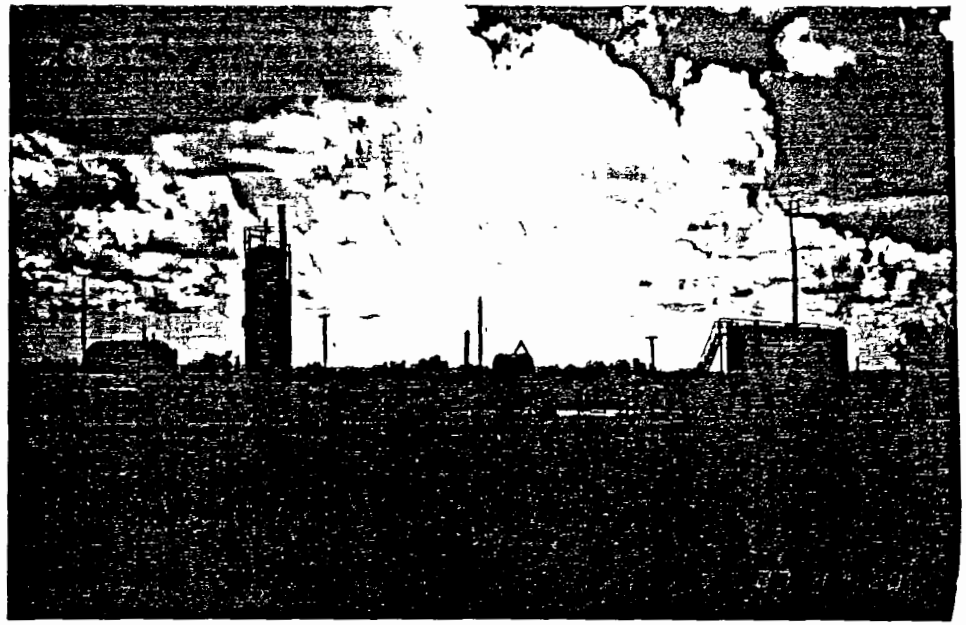


Photo 4. Heater treater and free water knock-out tank

ATTACHMENT B: PERMITS

FORM C-101

NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

NOTICE OF INTENTION TO DRILL

Notice must be given to the Oil Conservation Commission or its proper agent and approval obtained before drilling begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such change will be returned to the sender. Submit this notice in triplicate. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission.

Hobbs, New Mexico (Place) March 11, 1936 (Date)

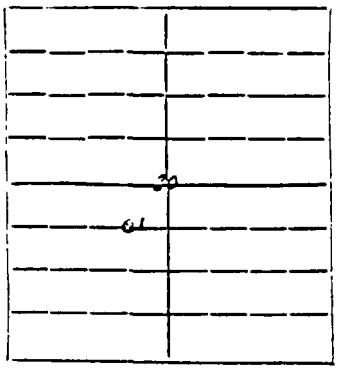
OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.
Gentlemen:

You are hereby notified that it is our intention to commence the drilling of a well to be known as

Empire Gas & Fuel Co. (Company or Operator) State-E (Lease) Well No. 1 in NE SW¼

of Sec. 30, T. 19, R. 37, N. M. P. M., Monument Field, Lea County.

N.



AREA 640 ACRES
LOCATE WELL CORRECTLY

The well is 1980 feet (N.) (S.) of the South line and 1980 feet (E.) (W.) of the West line of Sec. 30-19-37

(Give location from section or other legal subdivision lines. Cross out wrong directions.)

If state land the oil and gas lease is No. ..... Assignment No. .....

If patented land the owner is .....

Address .....

If government land the permittee is .....

Address .....

The lessee is Empire Gas & Fuel Co.

Address Bartlesville, Oklahoma

We propose to drill well with drilling equipment as follows: Rotary Tools

The status of a bond for this well in conformance with Rule 39 of the General Rules and Regulations of the Commission is as follows: O.K.

We propose to use the following strings of casing and to land or cement them as indicated:

Size of Hole	Size of Casing	Weight Per Foot	New or Second Hand	Depth	Landed or Cemented	Sacks Cement
	12½"	50	New	300'	Cement	150
	9 5/8"	40	New	2400'	Cement	700
	7"	24	New	3800'	Cement	150

If changes in the above plan become advisable we will notify you before cementing or landing casing. We estimate that the first productive oil or gas sand should occur at a depth of about 3900' feet.

Additional information:

Approved ....., 19..
except as follows:

OIL CONSERVATION COMMISSION,
By .....
Title .....

Sincerely yours,

Empire Gas & Fuel Co.
Company or Operator

By D. D. Bodie

Position Division Sup't.

Send communication regarding well to

Name D. D. Bodie

Address Hobbs, New Mexico

C-755

FORM C-101

NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

NOTICE OF INTENTION TO DRILL

Notice must be given to the Oil Conservation Commission or its proper agent and approval obtained before drilling begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in triplicate. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission.

Hobbs, New Mexico (Place) 4-23-36 (Date)

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

You are hereby notified that it is our intention to commence the drilling of a well to be known as

Empire Oil and Refining Co. (Company or Operator) State-E (Lease) Well No. 2 in SE¼

of Sec. 30, T. 19, R. 37, N. M. P. M., Monument Field, Lea County.

N.

1	
2	

AREA 640 ACRES
LOCATE WELL CORRECTLY

The well is 330 feet (N.) (S.) of the South line and 2310 feet (E.) (W.) of the West line of Section 30-19-37

(Give location from section or other legal subdivision lines. Cross out wrong directions.)

If state land the oil and gas lease is No. ..... Assignment No. .....

If patented land the owner is .....

Address .....

If government land the permittee is .....

Address .....

The lessee is Empire Oil and Refining Co.

Address Bartlesville, Oklahoma

We propose to drill well with drilling equipment as follows: Rotary

The status of a bond for this well in conformance with Rule 39 of the General Rules and Regulations of the Commission is as follows: O. K.

We propose to use the following strings of casing and to land or cement them as indicated:

Size of Hole	Size of Casing	Weight Per Foot	New or Second Hand	Depth	Landed or Cemented	Sacks Cement
	12½"	50	new	300	cemented	200
	9 5/8"	36	new	2500	Cemented	700
	7"	24	new	3800	Cemented	150

If changes in the above plan become advisable we will notify you before cementing or landing casing. We estimate that the first productive oil or gas sand should occur at a depth of about 3850 feet.

Additional information:

DUPLICATE

APR 27 1936

Approved ..... 19.....
except as follows:

[illegible] to special regulations for [illegible] and testing wells in this area.

OIL CONSERVATION COMMISSION,
By [signature]
Title [illegible]

Sincerely yours,

Empire Oil and Refining Co.
Company or Operator

By [signature]

Position District Clerk

Send communication regarding well to

Name D. D. Bodie

Address Hobbs, New Mexico

C-756

1C-02

NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

NOTICE OF INTENTION TO DRILL

Notice must be given to the Oil Conservation Commission or its proper agent and approval obtained before drilling begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in triplicate. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission.

Hobbs, New Mexico — Place

May 4, 1936 — Date

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

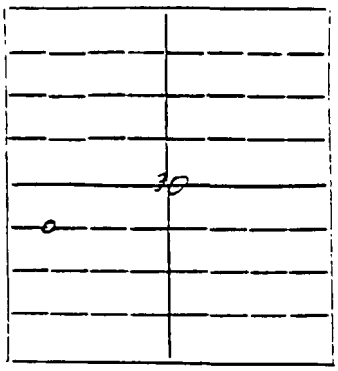
Gentlemen:

You are hereby notified that it is our intention to commence the drilling of a well to be known as

Empire Oil & Refining Co. (Company or Operator) State-E (Lease) Well No. 3 in NW SW¼

of Sec. 30, T. 19, R. 37, N. M. P. M., Monument Field, Lea County.

N.



AREA 640 ACRES
LOCATE WELL CORRECTLY

The well is 1980 feet (N.) (S.) of the South line and 660 feet (E.) (W.) of the West line of Sec. 30-19-37

(Give location from section or other legal subdivision lines. Cross out wrong directions.)

If state land the oil and gas lease is No. _____ Assignment No. _____

If patented land the owner is _____

Address _____

If government land the permittee is _____

Address _____

The lessee is Empire Oil and Refining Co.

Address Bartlesville, Oklahoma

We propose to drill well with drilling equipment as follows: Rotary Tools

The status of a bond for this well in conformance with Rule 39 of the General Rules and Regulations of the Commission is as follows: O.K.

We propose to use the following strings of casing and to land or cement them as indicated:

Size of Hole	Size of Casing	Weight Per Foot	New or Second Hand	Depth	Landed or Cemented	Sacks Cement
	12½"	50	New	300'	Cement	150
	9 5/8"	40	New	2400'	Cement	700
	7"	24	New	3800'	Cement	150

If changes in the above plan become advisable we will notify you before cementing or landing casing. We estimate that the first productive oil or gas sand should occur at a depth of about 3900' feet.

Additional information:

Approved _____, 19____
except as follows:

Subject to special regulations for drilling and casing wells in this area

OIL CONSERVATION COMMISSION,
By [signature]
Title [signature]

Sincerely yours,
Empire Oil & Refining Co.
Company or Operator
By [signature]
Position Division ~~Supt.~~ Clerk

Send communication regarding well to

Name D. D. Bodie

Address Hobbs, New Mexico

C-757

FORM C-101

NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

NOTICE OF INTENTION TO DRILL

Notice must be given to the Oil Conservation Commission or its proper agent and approval obtained before drilling begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in triplicate. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission.

Hobbs, New Mexico (Place) June 10, 1936 (Date)

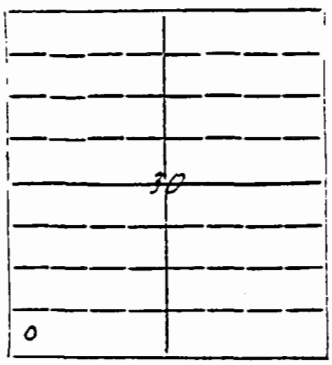
OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

You are hereby notified that it is our intention to commence the drilling of a well to be known as

Empire Oil and Refining Co. (Company or Operator) State-E (Lease) Well No. 4 in SWSW¼

of Sec. 30, T. 19, R. 37, N. M. P. M., Monument Field, Lea County



AREA 640 ACRES
LOCATE WELL CORRECTLY

The well is 330 feet (N.) (S.) of the South line and 330 feet (E.) (W.) of the West line of Section-30-19-37

(Give location from section or other legal subdivision lines. Cross out wrong directions.)

If state land the oil and gas lease is No. _____ Assignment No. _____

If patented land the owner is _____

Address _____

If government land the permittee is _____

Address _____

The lessee is Empire Oil and Refining Co.

Address Bartlesville, Oklahoma.

We propose to drill well with drilling equipment as follows: Rotary Tools

The status of a bond for this well in conformance with Rule 39 of the General Rules and Regulations of the Commission is as follows: O.K.

We propose to use the following strings of casing and to land or cement them as indicated:

Size of Hole	Size of Casing	Weight Per Foot	New or Second Hand	Depth	Landed or Cemented	Sacks Cement
	12½"	50	New	300'	Cement	150
	9 5/8"	40	New	2400'	Cement	700
	7"	24	New	3800'	Cement	150

If changes in the above plan become advisable we will notify you before cementing or landing casing. We estimate the first productive oil or gas sand should occur at a depth of about 3900' feet.

Additional information:

Approved JUN 1 1936, 19____
except as follows:

[illegible] wells 1.

OIL CONSERVATION COMMISSION,
By [illegible]
Title [illegible]

Sincerely yours,

Empire Oil and Refining
Company or Operator

By W. F. Hanlens

Position District Clerk

Send communication regarding well to

Name D. D. Bodie

Address Hobbs, New Mexico

C-758

(Form C-101)
(Revised 7/1/52)

NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

NOTICE OF INTENTION TO DRILL ~~OR RECOMPLETE~~

Notice must be given to the District Office of the Oil Conservation Commission and approval obtained before drilling or recompletion begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in QUINTUPLICATE. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission.

Hobbs, New Mexico (Place) December 15, 1955 (Date)

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Gentlemen:

You are hereby notified that it is our intention to commence the (Drilling) (Recompletion) of a well to be known as

Cities Service Oil Company (Company or Operator)

State E (Lease), Well No. 5, in N (Unit). The well is located 1504.46 feet from the West line and 1020 feet from the South line of Section 30, T. 19-S, R. 37-E, NMPM.

(GIVE LOCATION FROM SECTION LINE) Eumont Pool, Lea County

D	C	B	A
E	F	G	H
L	K	J	I
M	N	O	P

If State Land the Oil and Gas Lease is No. B-1481

If patented land the owner is -

Address -

We propose to drill well with drilling equipment as follows: Rotary

The status of plugging bond is Approved

Drilling Contractor Makin Drilling Co.
Hobbs, New Mexico

We intend to complete this well in the Queen formation at an approximate depth of 3555 feet.

CASING PROGRAM

We propose to use the following strings of Casing and to cement them as indicated:

Size of Hole	Size of Casing	Weight per Foot	New or Second Hand	Depth	Sacks Cement
11 1/4	8 5/8	24#	New	1250	Circulate
7 7/8	5 1/2	14#	New	3350	400

If changes in the above plans become advisable we will notify you immediately.

ADDITIONAL INFORMATION (If recompletion give full details of proposed plan of work.)

Approved, 19
Except as Oil Commission approval of unorthodox location and non-standard unit

OIL CONSERVATION COMMISSION

By

Title

Sincerely yours,

Cities Service Oil Company (Company or Operator)

By

Position Dist. Supt.

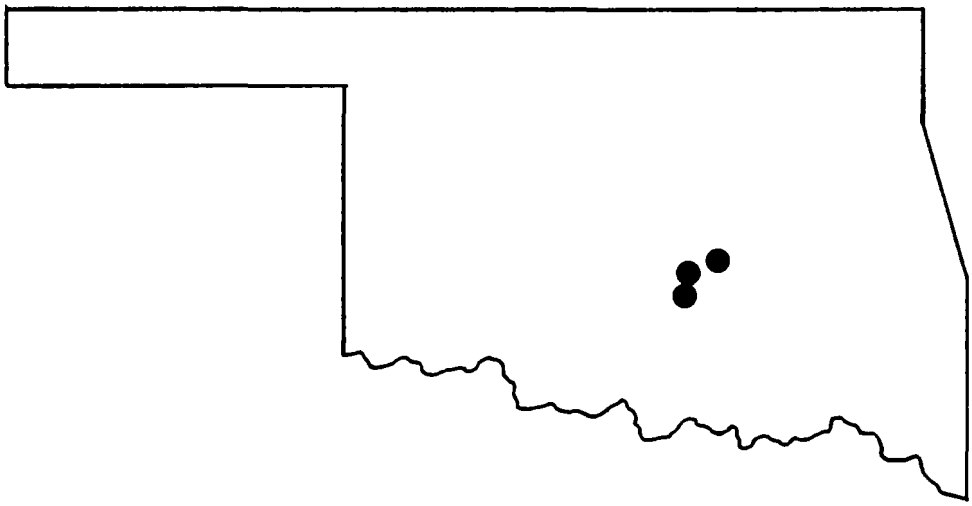
Send Communications regarding well to

Name Geo. M. Geyer

Address Box 97
Hobbs, New Mexico

C-759

OKLAHOMA



Sampling Report
Investigation of Ward Petroleum Corporation's
Rowe Lease Well No. 1-20
Grady County, Oklahoma
June 26, 1986

SITE INFORMATION

Site Selection

This site was specifically selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). In the assignment of random sample sites to various states, Oklahoma was not randomly picked for sampling of drill wastes. Since Oklahoma drilling activity equaled or exceeded the drilling activity of each of the other sampling zones in 1984 (the most recent year drilling statistics were available at the time of selection), it was considered necessary to sample at least one Oklahoma drill site.
Sample site selection was negotiated with the Oklahoma Water Resources Board, who in turn worked in cooperation with the Oklahoma Corporation Commission. The objective was to sample a relatively deep drill site in the Arcoma Basin which was at or near completion. This site would be used to supplement data from other states and basins in the onshore oil and gas sampling program.

The site selected was the Ward Petroleum Corporation's Rowe Lease Well No. 1-20, in Grady County, Oklahoma. No problems were encountered in arranging sampling for June 26, 1986. No back-up site was selected.

Site Location

The location of the Rowe Well No. 1-20 is approximately two miles east of Alex, OK via highway 19 Grady County. Figure 1 is a map indicating the drilling site. The full name and mailing address for Ward Petroleum is:

Ward Petroleum Corporation
P.O. Box 3370
Enid, OK 73702
Main Office Contact: Claud Jackson, Vice President
Phone: 405-242-4444

Attendees

Sampling at the Rowe Lease site was performed by CENTEC Corporation personnel on June 26, 1986. Following is a list of people present at the time of sampling:

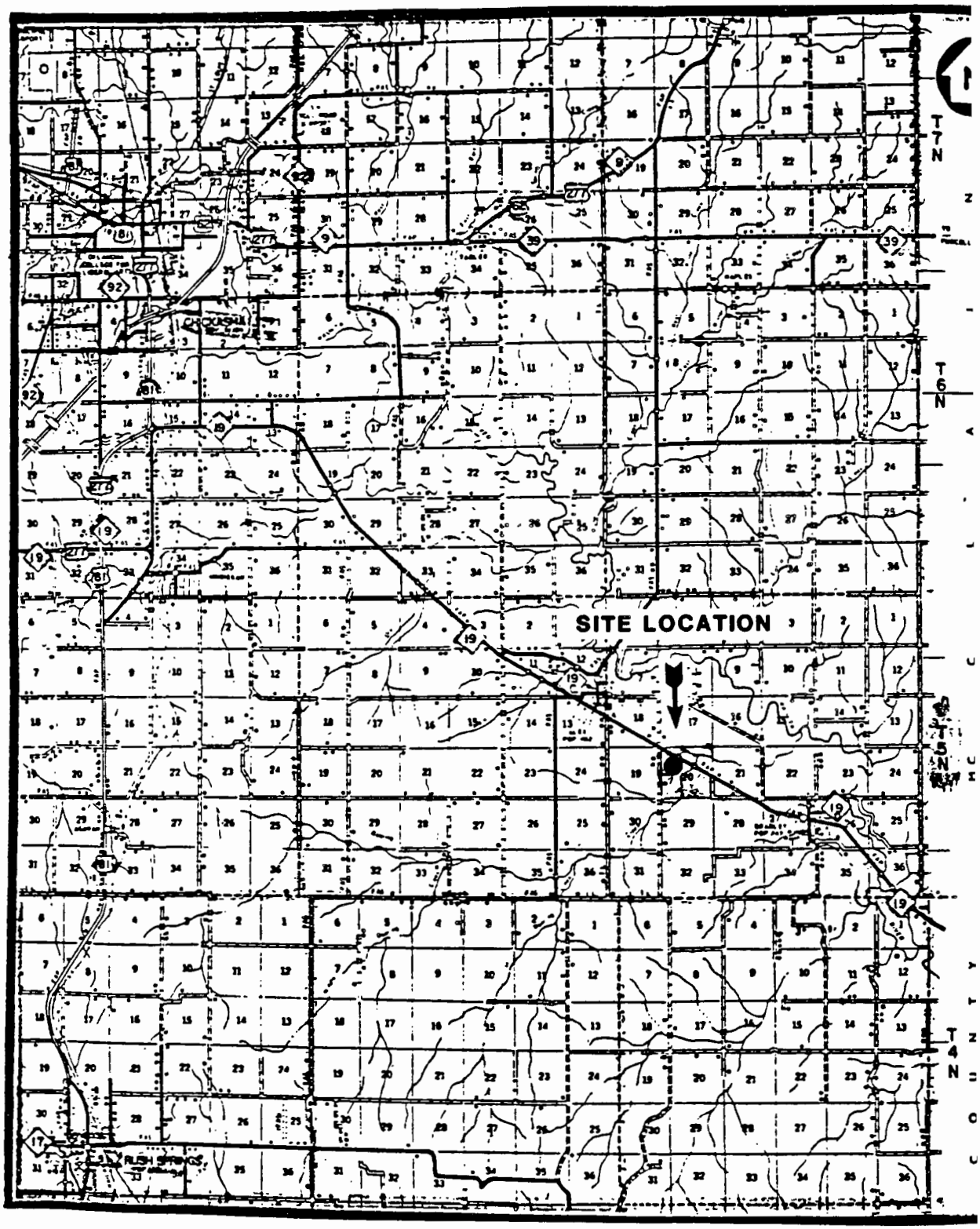


Figure 1. Location of Ward Petroleum Corporation's Rowe Lease Well #1-20, Grady County, Oklahoma

CENTEC Corp. (Sample Team):	Bill Lane, Technician Jamie McIntyre, Team Leader
State Representatives:	Fred Heitman, Head, Water Quality Enforcement, Oklahoma Water Resources Board Richard Pierce, Field Inspector, Oklahoma Corporation Commission
Operator Representatives:	Mark Rupert, Drilling and Completion Manager
American Petroleum Institute Representatives:	George Holliday, Contracted Observer

Richard Pierce of the Oklahoma Corporation Commission briefly visited the site as sampling was is progress. He did not speak at length with the sampling team. Fred Heitman of the Oklahoma Water Resources Board left the site with Mr. Pierce to have an informal meeting regarding the sampling efforts. Mr. Heitman returned to the site alone one hour later.

Site Description

The Rowe Lease site is located in rural flatland. The climate at this site location is net evaporation. The soil is described as a red clay bed three feet under loam. Attachment C contains a soil report and analysis made available by Ward Petroleum. The well was completed in the McLish formation of the Anadarko basin. The well was to be tested in the McLish, Bromide, and Cunningham formations. Figure 2 is a survey of the exact location of the hole.

The depth to the groundwater in the area was estimated by the drilling manager to be 5 feet. The nearest surface water is a stream less than 1/2 mile west of the site. The nearest drinking water well is 1,150 feet from the site.

At the time of sampling, the site consisted of one oil well and one reserve pit. The drilling rig, Ward Drilling Company's Rig No. 5, is shown in Photo 1. There were several trailers onsite serving as offices and living quarters for the crew. These were all situated on the edge of the pit. Figure 3 is an approximate schematic diagram of the site, indicating the directions in which photos were taken (Attachment A).

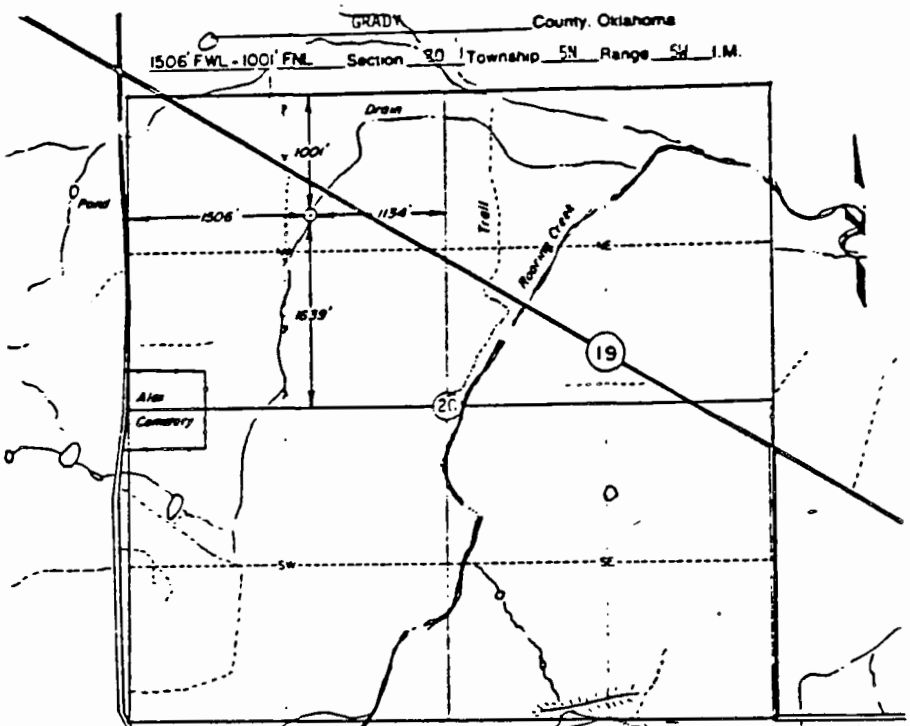
Attachment D contains copies of the drilling and completion programs used by the drilling manager, made available by Ward Petroleum Corporation.

TOPOGRAPHIC LAND SURVEYORS OF OKLAHOMA COMPANY

Surveying and Mapping for the Energy Industry

GRADY County, Oklahoma

1506' FWL - 1001' FNL Section 20 Township 5N Range 5W I.M.



Scale 1" = 1000' Date Staked January 18, 1986

This location has been very carefully staked on the ground according to the best official survey records, maps and photographs available to us, but its accuracy is not guaranteed.

Review this plat and notify us immediately of any possible discrepancy.

ELEVATION:

Operator WARD PETROLEUM CORPORATION

Lease Name: Rowe Well No. 1-20

Topography & Vegetation Pasture, 150' South of R.O.W. Fence 90' West of drain.

Reference Stakes or Alternate Location Stakes Set

Good Drill Site? Fair

Best Accessibility to Location From North

Distance & Direction from Hwy Jct or Town From Jct. SH 19 & SH 76 in Lindsay, go 8.4 miles NW on SH 19 to East Line Section 20-5N-5W.

REGISTERED LAND SURVEYOR VIRGIL R. ROGERS L.S. 569 OKLAHOMA

CERTIFICATE:

I, Virgil R. Rogers a Registered Land Surveyor and an authorized agent of Topographic L.S. of Okla. Co., do hereby certify that the above described well location was surveyed and staked on the ground as shown hereon.

Virgil R. Rogers

Oklahoma Reg. No. 569

Figure 2. Survey of Well Location (size of copy has been reduced)

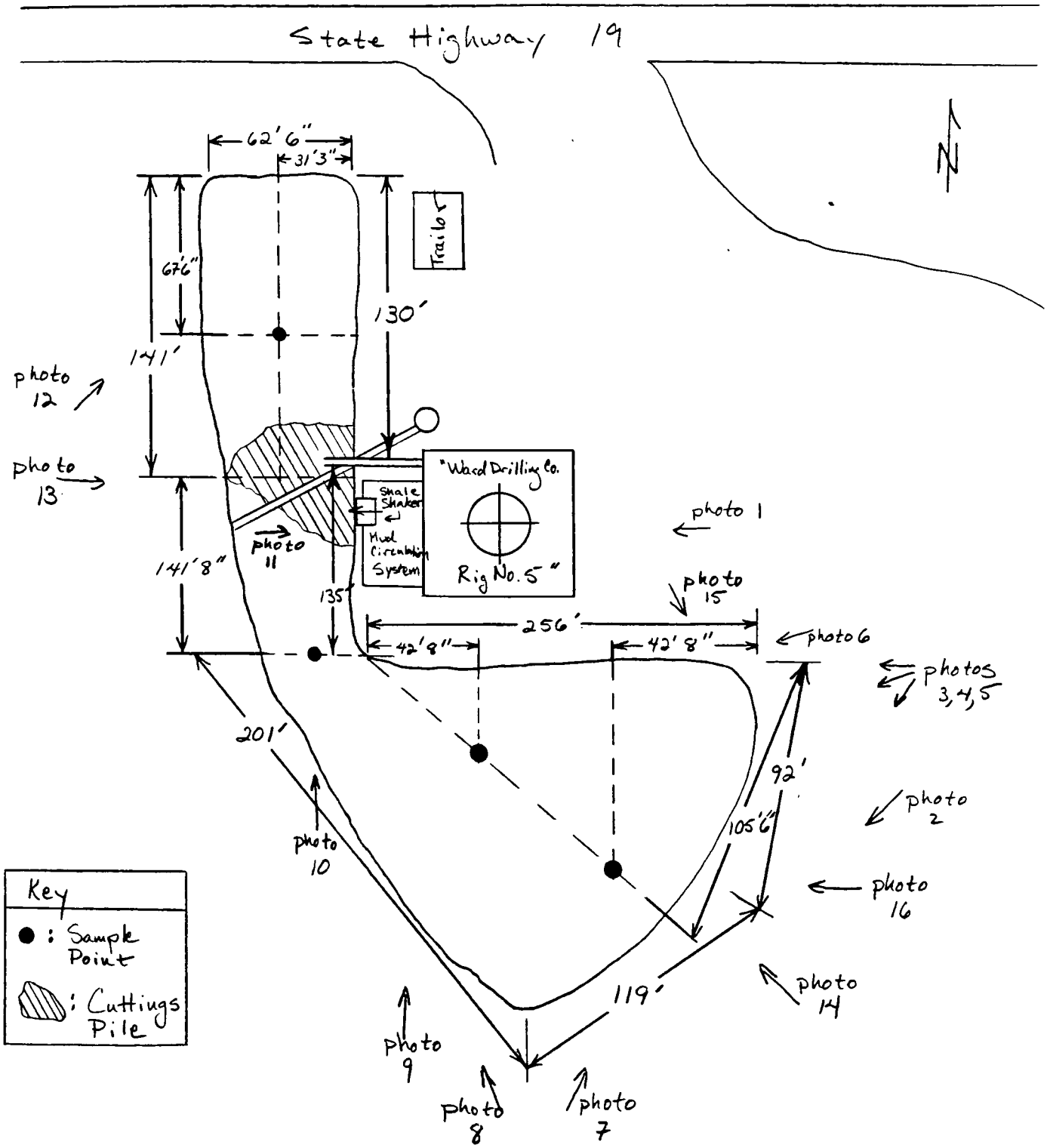


Figure 3. Schematic Diagram of Drilling Site

This site was a developmental oil drilling site. The well was completed at 14,900 feet, where the first test was performed. Total depth had been reached at 15,000 feet. Drilling began on February 19, 1986 and total depth was reached on June 25, 1986. Completion of the well was expected to be final by July 20, 1986.

Drilling was accomplished with two fresh water base muds. These are summarized in the table below:

Mud Type	Depth Range (ft)
Spud Mud	0 - 7,000
Chrome-lignosulfonate	7,000 - 15,000

The spud mud contained a biocide product, "OK15" dithio carbamate, that was used between 0 and 6,000 feet. From 6,000 feet to total depth, the biocide was no longer added to the mud.

One reserve pit was constructed onsite to provide temporary storage of drill cuttings, residual drilling muds from the circulation system, completion fluids, waste oil, and miscellaneous trash. The pit contents were piped from the drilling operation. The pit was in use as of February 19, 1986, and was expected to be cleaned out and restored by September 1, 1986.

Figure 3 shows that the pit was constructed to conform to the local geography, which is why the shape is asymmetrical. The landowners to the east and west of the site would not allow the pit to be extended into neighboring fields that were planted in crops at the time of sampling.

To prevent groundwater contamination, the walls of the pit were "rolled" to eliminate air holes, and the bottom was sealed with a 1/2- to 2-inch layer of bentonitic mud. The pit had nine groundwater monitoring wells located along the east side of the pit to prevent contamination of a drainage ditch running north-south along the east side of the pit. The white pipes visible in Photo 2 are three of the monitoring wells. The monitoring wells consisted of gravel-packed slotted pipes placed at depths of 15 and 28 feet. The monitoring wells and the reserve pit were sampled once per week. Figure 4 is a copy of a laboratory report on monitoring well and pit samples for the week ending May 24, 1986.

The northern leg of the pit directly received drill cuttings from the drilling rig. Photos 10 and 11 show the cuttings pile in relation to the rig. Note that the cuttings had built up to a volume that partitioned the liquid in the north leg from the liquid in the triangular area of the pit. The pit was originally constructed as one continuous volume.

STANDARD TESTING and Engineering Co.

CORPORATE OFFICE & CENTRAL LABORATORY
3400 N. Lincoln Okla. City, OK 73105 (405) 528-0541
Field Offices
902 Trails West Loop Enid, OK 73701 (405) 237-3130
900 S.E. 2nd Lawton, OK 73501 (405) 353-0872
208 Eastside Blvd. Muskogee, OK 74401 (918) 682-7853

6WA60

REPORT Chemical Laboratory Analysis Water Methodology Std.Mthd.,16th Ed

Client Ward Petroleum Purchase Order #

Reported to Don McCullough by Order of Don McCullough

Sampled from Rowe #1 Grady Co., Ward Rig #5 by client Date 5-22-86

Shipped Via Don McCullough Received 5-23-86 Reported 5-19-86

Laboratory Number: 863711

Sample I.D.	Chloride	Sulfate	Chromium	Oil & Grease
Reserve Pit	426mg/ℓ	235mg/ℓ	1.76mg/ℓ	12.2mg/ℓ
#1	31.2mg/ℓ	19.2mg/ℓ	0.04mg/ℓ	3.0mg/ℓ
#3	49.7mg/ℓ	15.1mg/ℓ	0.03mg/ℓ	2.7mg/ℓ
#5	55.0mg/ℓ	13.6mg/ℓ	0.04mg/ℓ	0.4mg/ℓ

THIS REPORT APPLIES ONLY TO THE STANDARDS OR PROCEDURES IDENTIFIED AND TO THE SAMPLE(S) TESTED. THE TEST RESULTS ARE NOT NECESSARILY INDICATIVE OR REPRESENTATIVE OF THE QUALITIES OF THE LOT FROM WHICH THE SAMPLE WAS TAKEN OR OF APPARENTLY IDENTICAL OR SIMILAR PRODUCTS, NOR DO THEY REPRESENT AN ON GOING QUALITY ASSURANCE PROGRAM UNLESS SO NOTED. THESE REPORTS ARE FOR THE EXCLUSIVE USE OF THE ADDRESSED CLIENT AND ARE RENDERED UPON THE CONDITION THAT THEY WILL NOT BE REPRODUCED WHOLLY OR IN PART FOR ADVERTISING OR OTHER PURPOSES OVER OUR SIGNATURE OR IN CONNECTION WITH OUR NAME WITHOUT SPECIAL WRITTEN PERMISSION. SAMPLES NOT DESTROYED IN TESTING ARE RETAINED A MAXIMUM OF THIRTY DAYS.

Charge: Ward Petroleum
Orig. & 1cc To Box 1187
Enid, OK 73702
ATTN: Mark Ruper
1cc Don McCullough
1cc Corporation Commission
1cc lab

Construction Materials, Testing & Inspections
Fabrications Weldment & Erection Inspections
Geo-technical Investigations
Chemical & Bacteriological Analysis

"TEST FOR ASSURANCE"

Respectfully Submitted
STANDARD TESTING AND ENGINEERING CO.
(Original Signed By)

By Cheryl L. Marcham

Figure 4. Laboratory Analyses of Reserve Pit Fluid and Monitoring Wells No. 1, No. 3, and No. 5

The depth of liquid in the pit varied from 1 to 4 feet, and the depth of the sludge was approximately 1 foot.

Pit contents included approximately 25,000 barrels of cuttings, drilling fluids, and wastewater generated from drilling operations, waste engine oil, and approximately 125 barrels of asphalt blend and Soltex used to protect the Springer shale formation from excessive water loss during drilling. The operator suggested that the asphalt blend and Soltex were responsible for the visible sheen on the surface of the pit. In addition, the water systems of the trailers along the sides of the pit emptied directly into the pit. Thus, the pit contained an unknown quantity of raw sewage.

A tank storing diesel onsite held roughly 9,500 gallons. Diesel was being used at a rate of one tank-full every 5 to 6 days. Twenty-five tanks had been used as of the time of sampling.

Disposal Practices

At the time of sampling, the drilling manager intended to apply for a permit to reinject the reserve pit contents into an acceptable formation at the drilling site. Approximately 4,000 barrels had already been removed from the pit and hauled by truck to a centralized disposal well, owned by Road Runner Tank Trucks, 15 miles from the drilling site. If the application to reinject the pit contents at the site was not accepted, the pit contents would all go to the centralized disposal well. (The operator later informed CENTEC that some of the liquid from the pit was disposed of between the surface and production casing strings. Any remaining liquids were to be trucked to a licensed disposal pit.) The remaining solids were to be buried in the pit. The pit would be backfilled and restored at the direction of the landowner.

Permits

A copy of the drilling permit secured by Ward Petroleum Corp. for the Rowe Lease Well No. 20-1 is located in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005).

Sample Point Locations

At the Rowe Lease site, the samples were defined as the supernatant and solid contents of the waste material in the reserve pit.

Sample points were identified based on measurements of pit dimensions. However, the asymmetry of the Rowe Lease pit did not allow for placing sample points at the center of measured quadrants, as is the practice for rectangular pits. Figure 3 indicates the location of the sample points.

Sampling Methods and Equipment

To collect samples from the reserve pit, measurements were made to identify four points evenly spaced within the triangular area and the northern leg of the pit. The measured points were marked by placing stakes along the sides of the pit to facilitate locating sample points.

The sample points were accessed by boat. The boat was rowed to the measured sample points, and was stabilized at that point with two anchors. Referring to the numbered sample points indicated in Figure 3, the liquid samples were collected in the order 1, 2, 3, 4, and the sludge samples were collected in reverse order. These numbers are only used to distinguish the four point locations, and in no way refer to sample labels for tracking purposes.

State representative, Fred Heitman, assisted in the boat for all except the first liquid sample.

The first sample to be collected was the liquid composite. Photo 16 shows samplers taking the first thief sample from the boat. Care was taken not to allow oil floating on the surface of the liquid to enter the thief. The liquid from each sample point was composited in a 5-gallon carboy.

The reserve pit was then sampled for sludge. The coring device was used at the two sample points in the northern leg of the pit, yielding a combined volume of approximately 2 gallons. The dredge was used to sample the triangular area of the pit because the sludge was too liquid to be retained by the coring device. Two full dredges were obtained at these points, yielding a total volume of approximately 5 gallons. The solids were composited in a steel bucket.

The pH of both the liquid and sludge samples was measured onsite after sampling was completed. The pH for both samples was 8.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

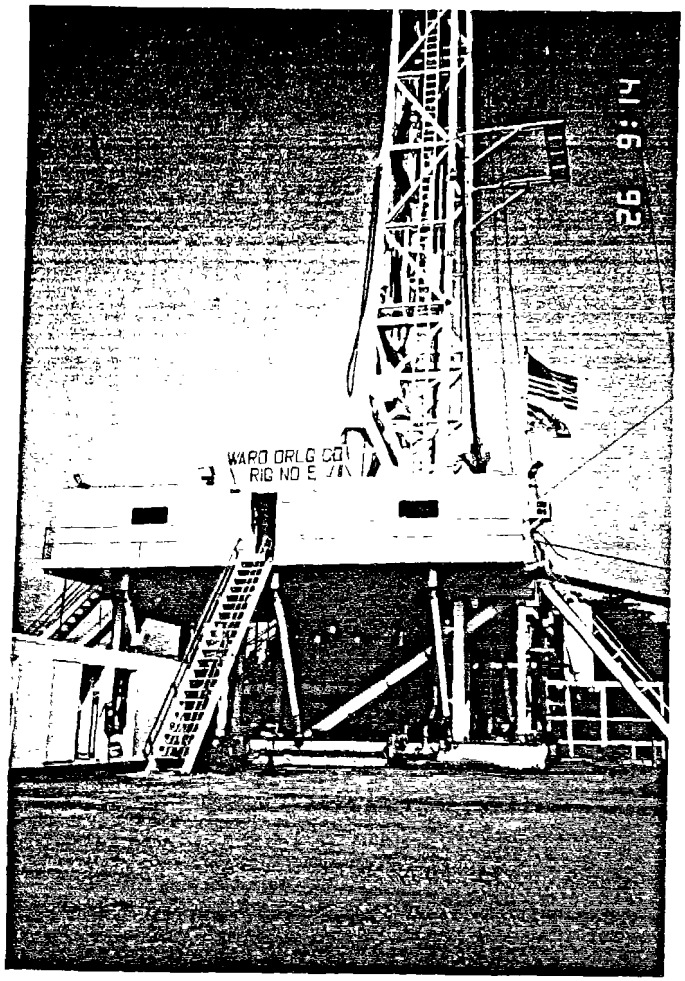
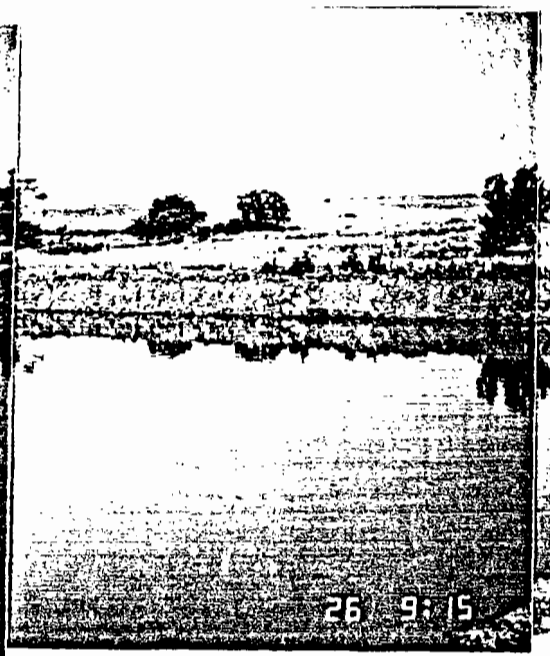


Photo 1. Drilling rig

Photo 2. Southwesterly view along side of triangular area of pit



Photos 3,4,5. View of triangular area of pit from northeast corner

Photo 6. Close-up of liquid surface in pit

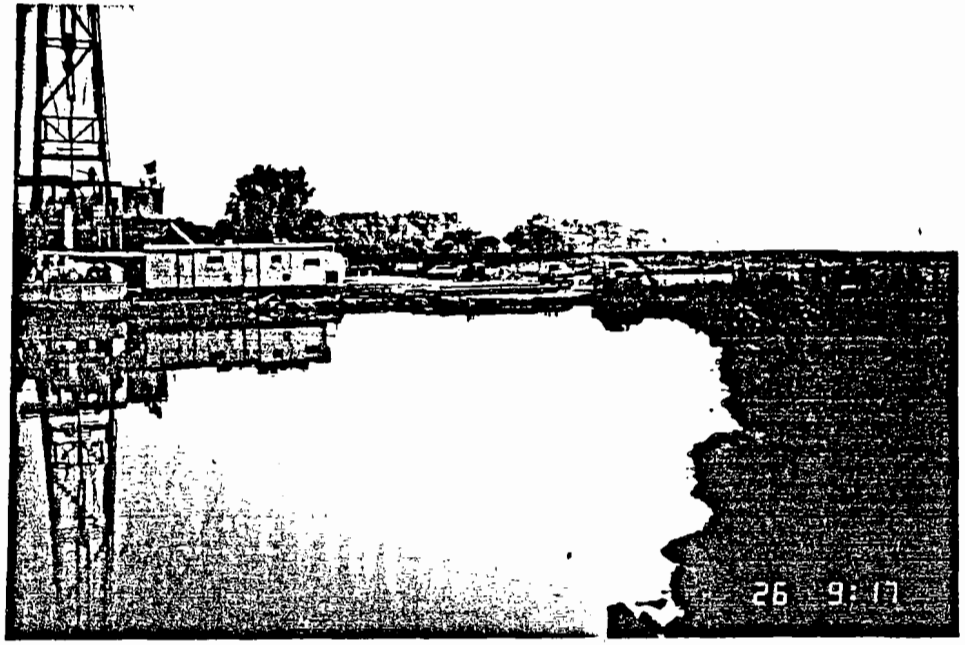


Photo 7. Northern view along side of triangular area of pit

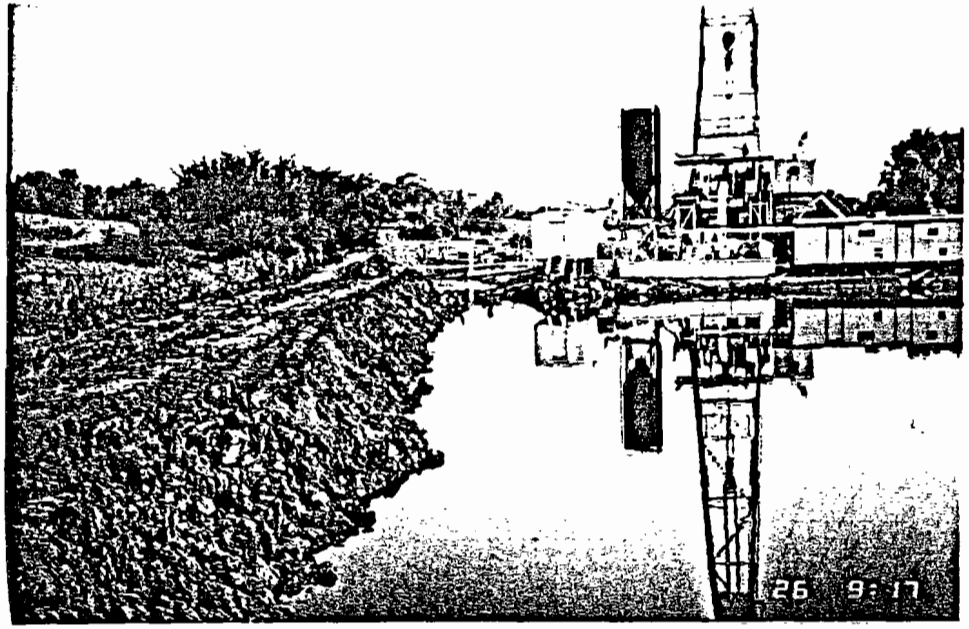


Photo 8. Northwestern view along side of triangular area

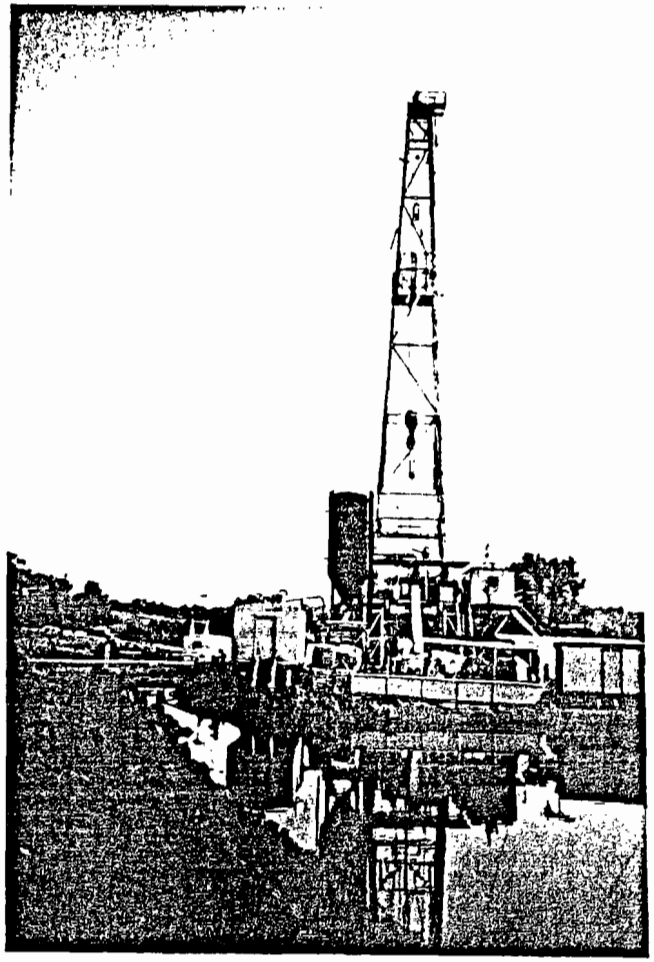


Photo 9. Northwestern view along side of triangular area of pit

Photo 10. Northern view of rectangular area of pit

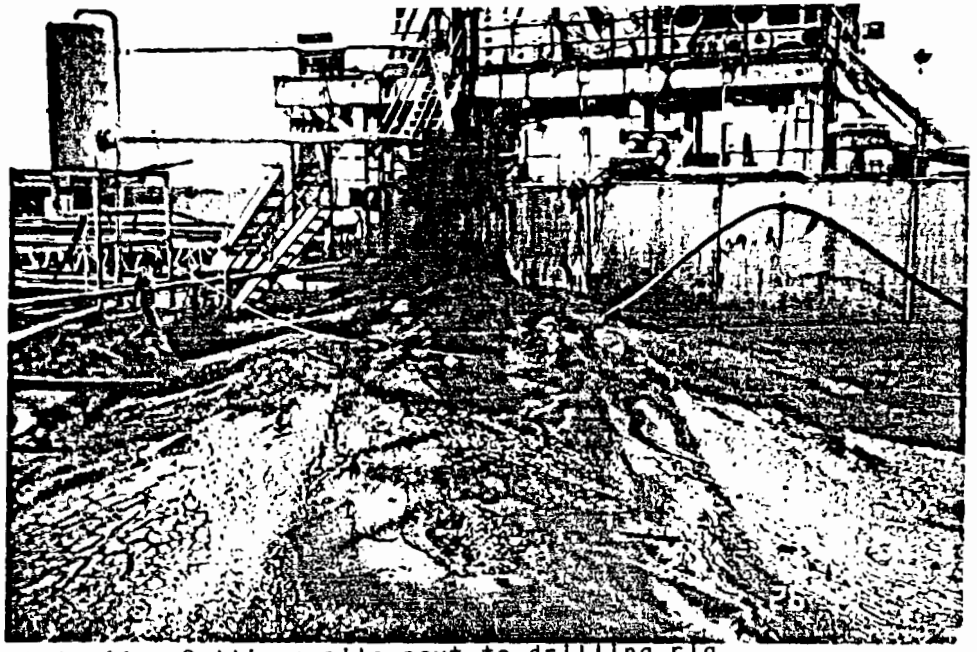


Photo 11. Cuttings pile next to drilling rig

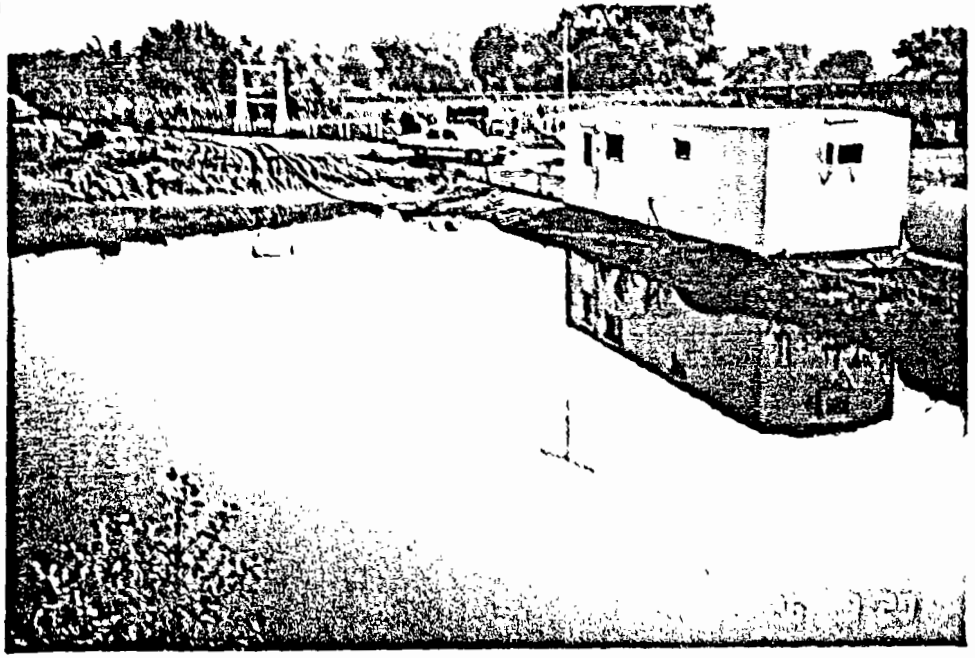


Photo 12. North end of rectangular area of pit

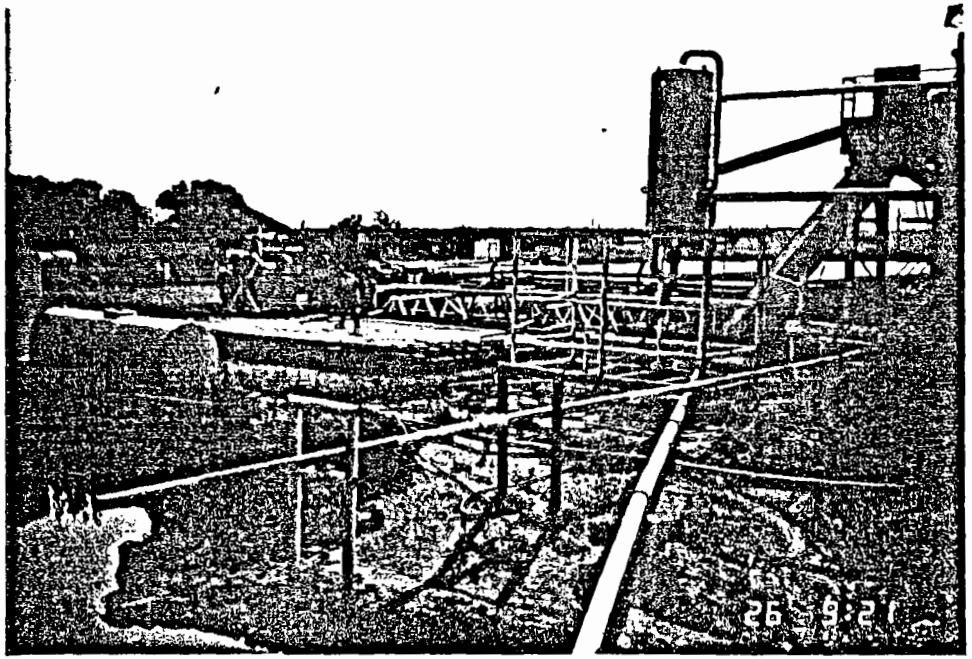


Photo 13. Cuttings line and pipe rack

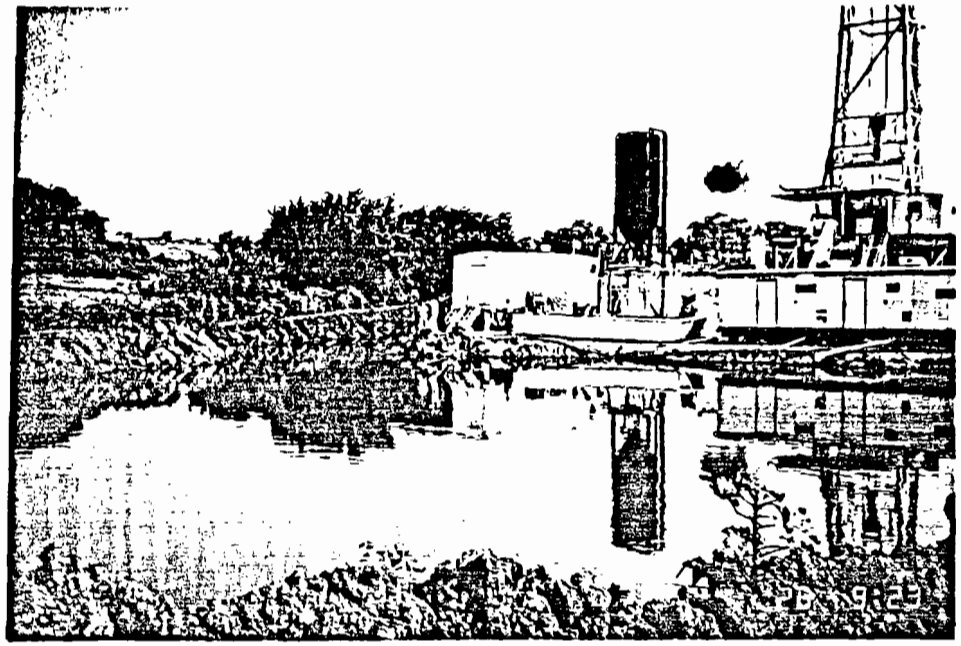


Photo 14. Northwest corner of triangular area of pit

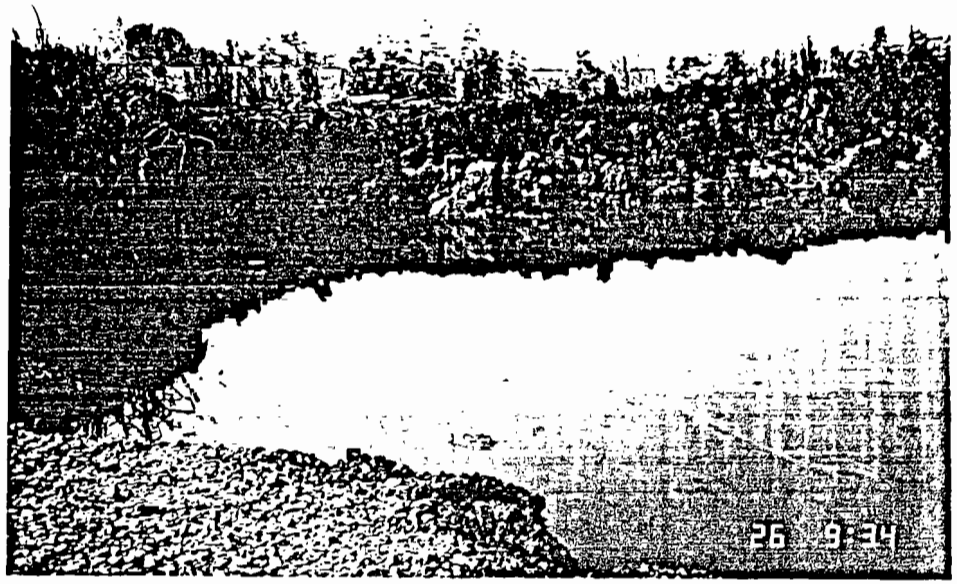
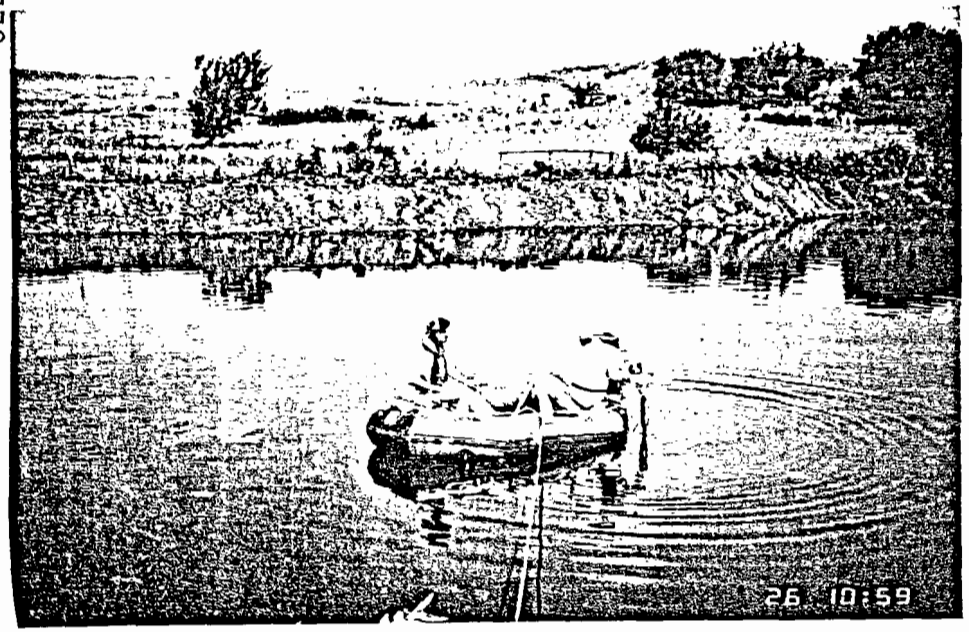
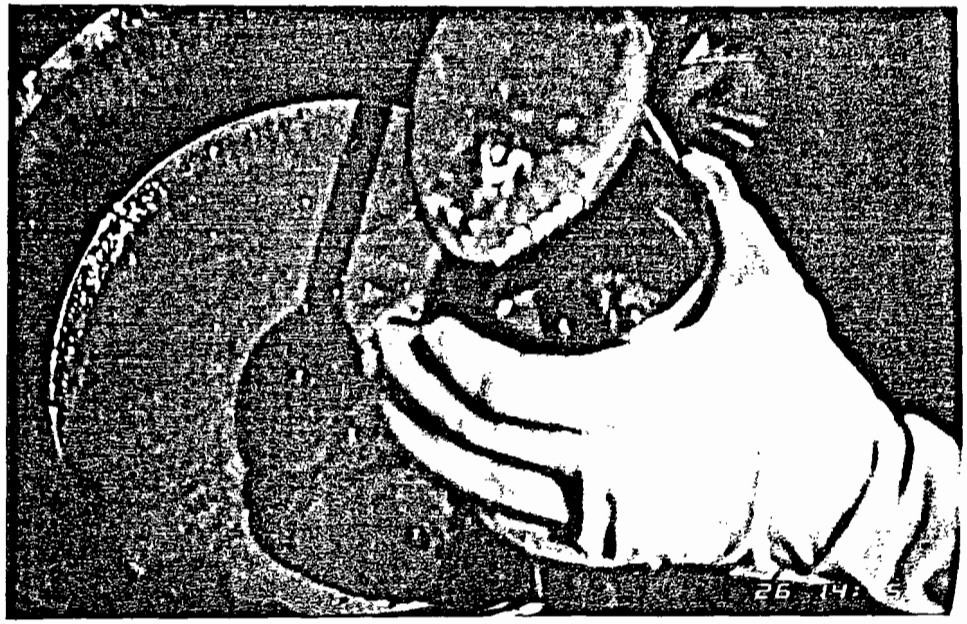


Photo 15. Northeast corner of triangular area of pit





ATTACHMENT B: PERMITS

Amended

OTC/OCC Operator Number 02296

Form No. 1000
(Rev. 1985)

PLEASE TYPE OR PRINT IN BLACK INK ONLY

O.C.C. Number 0117905

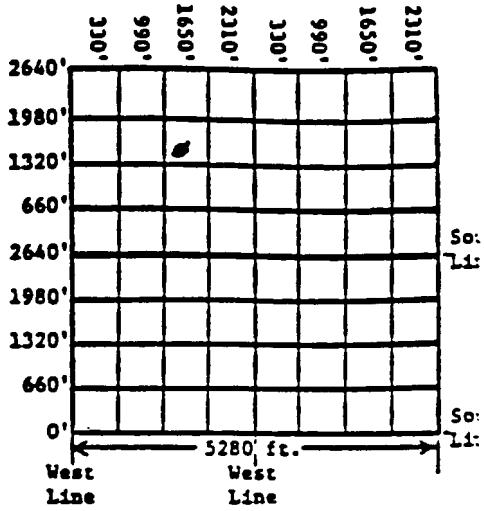
2. API Number 4051.21794

File Original Only

INTENT TO DRILL APPLICATION

OKLAHOMA CORPORATION COMMISSION
Oil & Gas Conservation Division
Jim Thorpe Building
Oklahoma City, Oklahoma 73105-4993
(Rule 3-204)

3. Locate Well and Outline Lease or Spacing Unit



4. NOTICE OF INTENTION TO:

Drill [X] Deepen [ ] Plug Back [ ] Amended [X] Other Chg. of footages

5. WELL LOCATION: (If well is to be directionally drilled, put bottom hole location on reverse side.)

Section	Township	Range	County
20	5N	5W	Grady

Well Location: SW¼ NE¼ NW¼ — Feet from Quarter Section: North/South Line 1001 — West Line 1506

If unspaced - well will be _____ feet from the nearest lease line.

6. Lease Name Rowe — Well No. #1-20

7. Name of Operator: Ward Petroleum Corporation

Address: Box 1187 — Phone (AC/Number): 405 234-3229

City: Enid — State: OK — Zip: 73702

8. WELL LOCATION SURFACE OWNER: (Must be completed.)

Name (If more that one, attach sheet): Eugene Dale Rowe & Grace Rowe

Address: RR 1 — City: Pocasset — State: OK — Zip: 73079

9. Target Formations and Depths (Limit to Ten)

Oil Creek 14,000; Arbuckle 14,350

7026:LCK — 169ABCK

10. Total Depth [X] Plug Back Depth [ ]	11. Ground Elev.	12. Date Oper. to Begin	13. Surf. Casing Depth [X] Stage Collar Depth [ ]
15,000'	1,045'	1-25-86	2,200'

13-a. Do you intend to circulate cement from total depth to surface? (See instructions) Yes [ ] No [X]

SPACING INFORMATION:

14. Spacing Order Numbers and Size of Spacings: order 291208 — OR — 160 acre ~~20 acre~~

15. Application Pending C.D. No. ~~130271~~ — 16. Location Exception Order No. — 17. Increased Density Order No.

Section 20 Township 5N Range 5W API Number

18. Is well being drilled under Federal jurisdiction? Yes ____ No X

19. Is H_2S anticipated? Yes ____ No X

20. Will a fresh water supply well be drilled at this location? Yes ____ No X

Will surface water be used in drilling this well? Yes X No ____

PROPOSED CASING DESIGN: (To include surface casing. If space below is insufficient attach separate sheet.)

21. Casing Size (Inches)	22. Section Length (Feet)	23. Casing Weight (lbs/ft)	24. Casing Grade	25. Setting Depth (Feet)	26. Est. Top of Cement (Feet)	27. Design WHP PSI	28. Design Mud Wght. (ppg)	29. B.O.P. (Class)
9 5/8	2200	36	K-55	2200	Surface	2800	9.5	NA
5 1/2	2600	20	P-110			4000	10.0	5000 psi
5 1/2	2200	20	N-80			4000	10.0	5000 psi
5 1/2	3900	17	N-80			4000	10.0	5000 psi
5 1/2	5300	20	N-80			4000	10.0	5000 psi
5 1/2	1,000	20	S-95	15,000	13,000	4000	10.0	5000 psi

I hereby certify that I am authorized to submit this application, which was prepared by me or under my supervision and direction. The facts and proposals made herein are true to the best of my knowledge and belief.

Signature	Title	Date
Michael Stack	Attorney	1-14-86

Address (if different than No. 7 above): 701 NW 63rd Suite 500 Oklahoma City, OK — Phone (A.C./Number): 843-0363

NOTICE: This application is void if drilling is not started within six (6) months of approval date. An approved copy must be posted on location while drilling and completing.

C-701

ATTACHMENT C: SOIL REPORT

REPORT

Billy B. Tucker, Ph.D.
Agronomist and Soil Scientist

I examined the proposed petroleum drilling site by Ward Petroleum Company in section 20, T 25N, R 5E on January 12, 1986. I examined two proposed sites. One site was north of the highway and east of the waterway and the other was on the south side of the highway and west of the waterway.

The soil on January 12, 1986 was probed to a depth of 4½ feet. No water table was encountered but a sand lens was found at about 40 inches at the southern location. The sand lens was moist but no free water was present. The Grady County Soil Survey showed the soil to be classified as Yahola sand loam and Port loam. The survey reported no water table less than six feet. Based on the inspection and soil survey a drilling pit with a maximum depth of five feet was recommended. Also due to the slowly permeable permian red clay substrata it was felt that lining the pit would not be necessary.

Upon excavation of the pit during location preparation, water seepage was encountered at approximately three feet. I again examined the site on January 31, 1986. Core borings in the pit revealed a water bearing sand lens at approximately five feet below normal ground level.

The sand lens is approximatley 14 inches thick. The sand lens rests upon red bed clay. Water in the bore holes rose to about the three foot level indicating a slight hydrostatic pressure.

The yield of water from the sand lens would be small but probably constant and likely would increase during probable spring rains before closure of the pit. The water in the sand lens constitutes a perched water table.

The shallowness of the perched water no doubt prevents it from being potable for human consumption. In the waterway upstream from the location, on the property line is a water hole and surface water frequently stands in the waterway near the highway bridge.

Several alternatives to alleviate the water were explored. The waterway adjacent to the location is about three feet deep which would not drain off the water by gravity flow.

It was concluded that the only potential of ground water contamination from an unlined pit would be the shallow perched water. However, due to the possible movement of water down stream via the sand lens and the desire of the land owner, lining of the pit is recommended. Pit materials will be removed prior to closure.

Don Hale, Corporation Commission field representative at Duncan was contacted and he concurred in the decision to line the pit.

Lining the pit and removing residual pit fluids and solids will virtually eliminate the possibility of contamination of surface and ground water and in addition will allow for satisfactory reclamation of the pit.

ATTACHMENT D: DRILLING AND COMPLETION PROGRAMS

DRILLING PROGRAM

Conductor Hole

Rig up rathole digger and drill 20" conductor hole to +/- 60'. Run 16" conductor casing and cement with regular grout.

Surface Hole

Drill out from conductor casing with 12 1/4" mill tooth bits. Maintain mud weight as low as possible by frequent jetting of working pits and running all solids control equipment. Utilize premix pit for mixing gel-lime pills and recover as much of pills as possible by using troughs.

Upon reaching +/- 2200', sweep hole with pill and make wiper trip to surface prior to running casing. Lay down 8" drill collars prior to running casing.

Rig up casing crew and run 9 5/8" casing as follows:

2200'	9 5/8"	36#	K-55	ST&C

...using guide shoe and insert float valve. Use top and bottom plugs and thread-loc guide shoe and collar that float valve is installed. Tack weld first 5 connections and install centralizers on joints #1, 3 & 5.

Rig up cementing company and cement 9 5/8" casing using +/- 700 sx "Lite" containing 2% CC and 1/4#/sk celloflake and tail with 250 sx Class "H" with 2% CC and 1/4#/sk celloflake. Cement casing in full tension and WOC a minimum of 4 hours before cutting off.

Production Hole

After cutting off, install 9 5/8" SOW x 10" - 5000 psi casinghead. Pre-heat casing and head prior to welding casinghead and test weld to 1000 psi for 15 minutes. Nipple up 10" - 5000 psi BOP stack, mud cross, and choke manifold, testing all equipment to rated pressure except hydril and test it to 1500 psi. (Install mud gas separator and PVT equipment prior to drilling out. by 8500')

* Pick up 8 3/4" mill tooth bit and TIH to float collar. Pressure test casing to 1000 psi. Drill out using fresh water and continue using gel-lime pills for sweeps until +/- 7000'. Continue running solids control equipment and jet working pits frequently to maintain low mud weights. Depending on length of first mill tooth bit run, a "2" type button bit may be run.

At approximately +/-7000', begin mudding up the hole and maint the following mud program to TD:

Depth	MW	Viscosity	WL	Remarks
7000-8000	8.8-9.0	30-38	25-15	
8000-9000	9.0-9.4	38-40	~~15-10~~	
9000-10000	9.4-9.5	40-42	10-3	WL must be 3.0 @ 10,000'
10000-11000	9.5-10.3	42-50	3.0 or less	* Start additions 2#/bbl Soltex a maintain @ 10,0
11000-12000	10.0-10.3	50-65	3.0 or less	Let hole dictat
12000-13000	10.0-10.3	60-70	3.0 or less	Amount we put
13000-14000	10.0-10.3	70-80	3.0 or less	+ @ what depth
14000-14550	10.0-10.3	70-85	3.0 or less	

hole

As was seen on the Bradley Townsite well, it is imperative that the water loss be maintained as low as possible once we expose the Springer shales to the drilling fluid. The addition of 2#/bbl Solte should aid in stabilizing these water sensitive shales. Also, it m be necessary to add oil or asphalt blend as a secondary control mechanism.

As can be seen in the attached bit records, deviation problems again become a problem from 9000' to TD. For that reason, coupled the slow penetration rates experienced running "slick" on the Bradl Townsite, it is recommended that one or more of the following assemblies be used to improve penetration rates while minimizing ho deviation:

1) Bit, 3 Pt-BH reamer, Rotating blade stab, 10' SDC, Rotating bla stab, shock sub (if required), 1-30' DC, Rotating blade stab, 17-30 DC's, Drlg Jars, 3-30' DC's.

2) Bit, 3 Pt-BH reamer, 2-Rotating blade stab, 10' SDC, Rotating b stab, Shock sub (if required), 1-30' DC, Rotating blade stab, 17-30 DC's, Drlg Jars, 3-30' DC's.

3) Bit, 2-30' DC's, 1 or 2-Rotating blade stab, 10' SDC, Rotating blade stab, Shock sub (if required), 1-30' DC, Rotating blade stab, 17-30' DC's, Drlg Jars, 3-30' DC's.

*It should be noted that a 6 Pt-BH reamer should be employed while drilling the Simpson sands to maintain maximum gage hole. Prior to committing any of these or other assemblies in the hole, discussion should be held with drilling company and operating personnel.

Bit selection should be as follows:

a)	Type 2 and Type 3	3500' to 13000'
b)	Type 5 and Type 7	13000' to 13600'
c)	Type 9	13600' to 14000'
d)	Type 5 and Type 7	14000' to 14550'

Charlie Terrigan.

Bit selection should be coordinated with the mudlogger and/or geologist to aid in maximum effectiveness.

After reaching logging point of +/- 14,450', circulate bottoms up and make 20 stand short trip prior to POOH to log. Run logs as directed by geologic staff. After logging, TIH w/bit to condition hole and WOO as to running 5 1/2" casing or plug and abandon.

If logs indicate production, run casing as dictated in the Completion Section.

If logs indicate the well is dry, plug and abandon the well as directed by the Oklahoma Corporation Commission.

GENERAL COMPLETION PROGRAM

Rowe #1-20

Production Hole

After conditioning hole to run casing, POOH and lay down 6 3/4" drill collars and 4 1/2" drill pipe. Rig up casing crew and run cas (bottom to top) as follows:

1000'	5 1/2"	20#	S-95	LT&C
5300'	5 1/2"	20#	N-80	LT&C
3900'	5 1/2"	17#	N-80	LT&C
2200'	5 1/2"	20#	N-80	LT&C
2600'	5 1/2"	20#	P-110	LT&C

.....using standard float shoe and float collar, with float collar t be run two joints above shoe. Thread-loc float shoe, float collar, in between collar. Install centralizers as directed.

After reaching bottom with casing, circulate bottoms up and lev mud weight out. Work pipe every 15 minutes while circulating and se casing one foot off bottom prior to cementing.

Rig up cementing company and cement based on caliper volumes an cement requirements. Use top and bottom plugs and displace hole wit 6% KCL water. Bump plug with +/- 1000 psi over displacement pressur and bleed off pressure to check floats.

Assuming floats hold, WOC a minimum of 8 hours prior to setting slips. Set slips as directed by Engineering staff. Install 10" - 5 psi x 7 1/16" - 5000 psi tubinghead and 1-2 9/16" - 5000 psi master valve.

Release rig and move off rotary tools.

Sampling Report
Investigation of George Kahn Operating Company's
Mary Allen Tank Battery
Oil Center, Oklahoma
June 27, 1986

SITE INFORMATION

Site Selection

This site was specifically selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). In the assignment of random sample sites to various states, Oklahoma was not randomly picked for sampling of produced fluids. Since Oklahoma production exceeded the production of five other sampling zones in 1984 (the most recent year statistics were available at the time of selection), it was considered necessary to sample at least one Oklahoma production site.

Sample site selection was negotiated with the Oklahoma Water Resources Board, who in turn worked in cooperation with the Oklahoma Corporation Commission. The objective was to sample an active production site in the Arcoma Basin. This site would be used to supplement data from other states and basins in the onshore oil and gas sampling program.

The production site selected was the George Kahn Operating Company's Mary Allen Tank Battery near Oil Center, Oklahoma. No problems were encountered in arranging sampling. No back-up site was required.

Site Location

The George Kahn production facility is located approximately 45 miles southeast of Oklahoma City, OK via Highways 35, 39, and 3W in Pontotoc County. Figure 1 is a map indicating the production facility site. The full name and mailing address for Chevron USA is:

George Kahn Operating Company
P.O. Box 1287
Seminole, OK 74868
Main Office Ph.: 405-382-1566
Main Office Contact: Mike Kahn or
Richard Parrish, Attorney

Attendees

Sampling at the George Kahn production site was performed by CENTEC Corporation personnel on June 27, 1986. Following is a list of people present at the time of sampling:

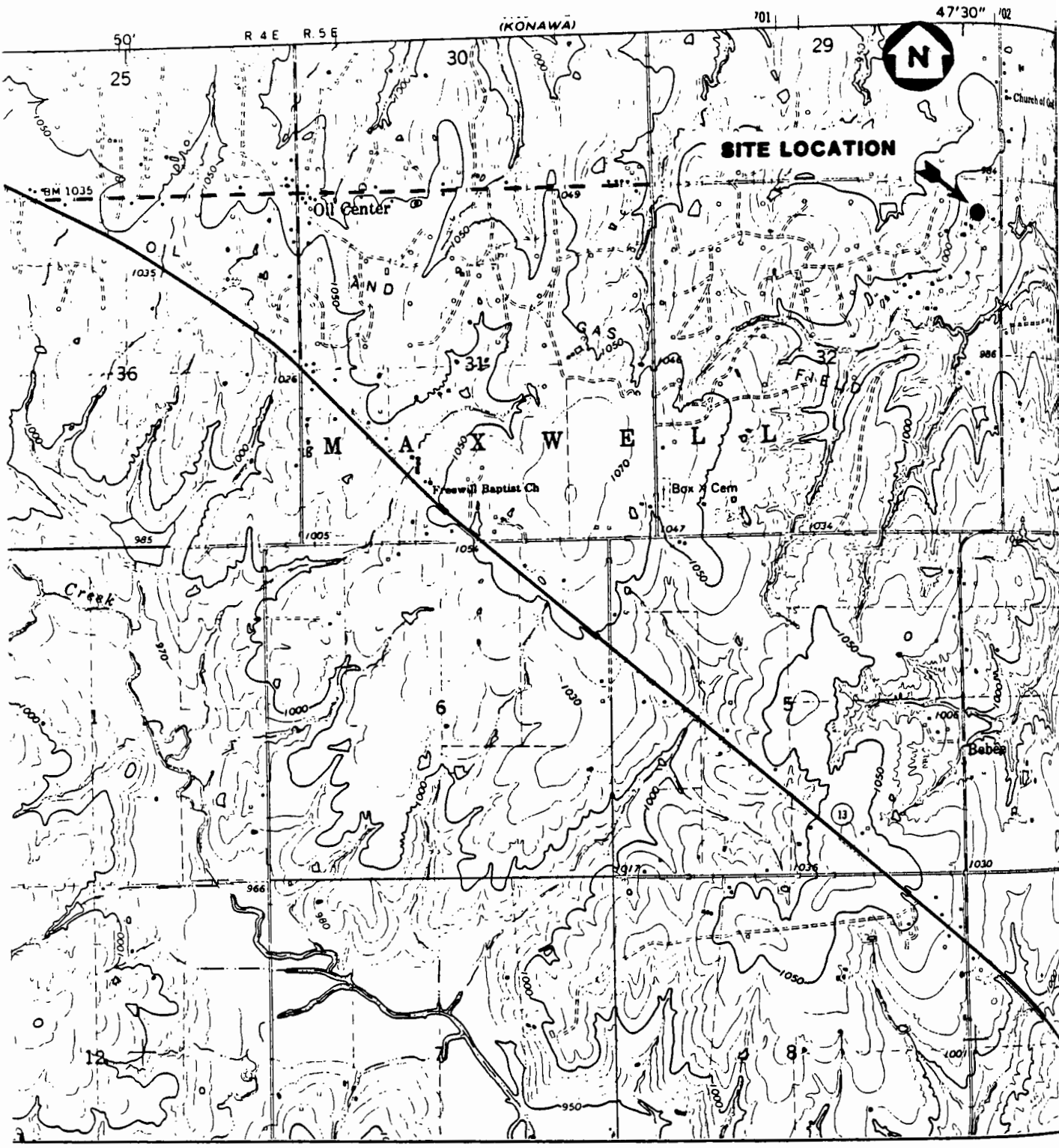


Figure 1. Location of George Kahn Operating Company's Mary Allen Tank Battery, Oil Center, Oklahoma

CENTEC Corp. (Sample Team):	Bill Lane, Technician Jamie McIntyre, Team Leader
State Representatives:	Doyle Harrell, Field Inspector, Oil and Gas Division, Oklahoma Corporation Commission Karen Dihrberg, Geologist, Oklahoma Water Resources Board
Operator Representatives:	None Present
American Petroleum Institute Representative:	George Holliday, Contracted Observer

Information about the site was provided by Mr. Harrell, based on his experience with the operator and local production facilities.

Site Description

The George Kahn production facility is located in a rural, piedmont area. The climate at this site location is net precipitation. The soil is described as loam over clay. The wells serviced by this facility are completed primarily in the Viola Simpson formation, but also in the Hunton, Calvin, and Wewoka formations.

The depth to the groundwater in the area is approximately 250 feet. The nearest surface water is a farm pond located 1/4-mile from the site. There are one or two drinking water wells within a 1/2-mile radius of the site.

The area around the site was being used as grazing land for cows at the time of sampling. There were no fences or cattle guards to block access to the site.

The site consists of one gun barrel, one heater treater, two separation tanks, four stock tanks, and two produced water tanks. Figure 2 is an approximate schematic diagram of the facility, indicating the directions in which photos were taken (Attachment A). The Oklahoma Corporation Commission does not require cleaning of tanks, so it is assumed that the tanks on this site are never cleaned. The produced water tanks are open to the atmosphere at the top (Photo 11), and are made of fiberglass.

At the time of sampling, there were 21 oil wells associated with this tank battery, but the number of producing wells was unknown. The facility received daily quantities of approximately 3 barrels of oil per producing well. The volumetric ratio of oil to water from this formation was estimated to be one to fifty, indicating

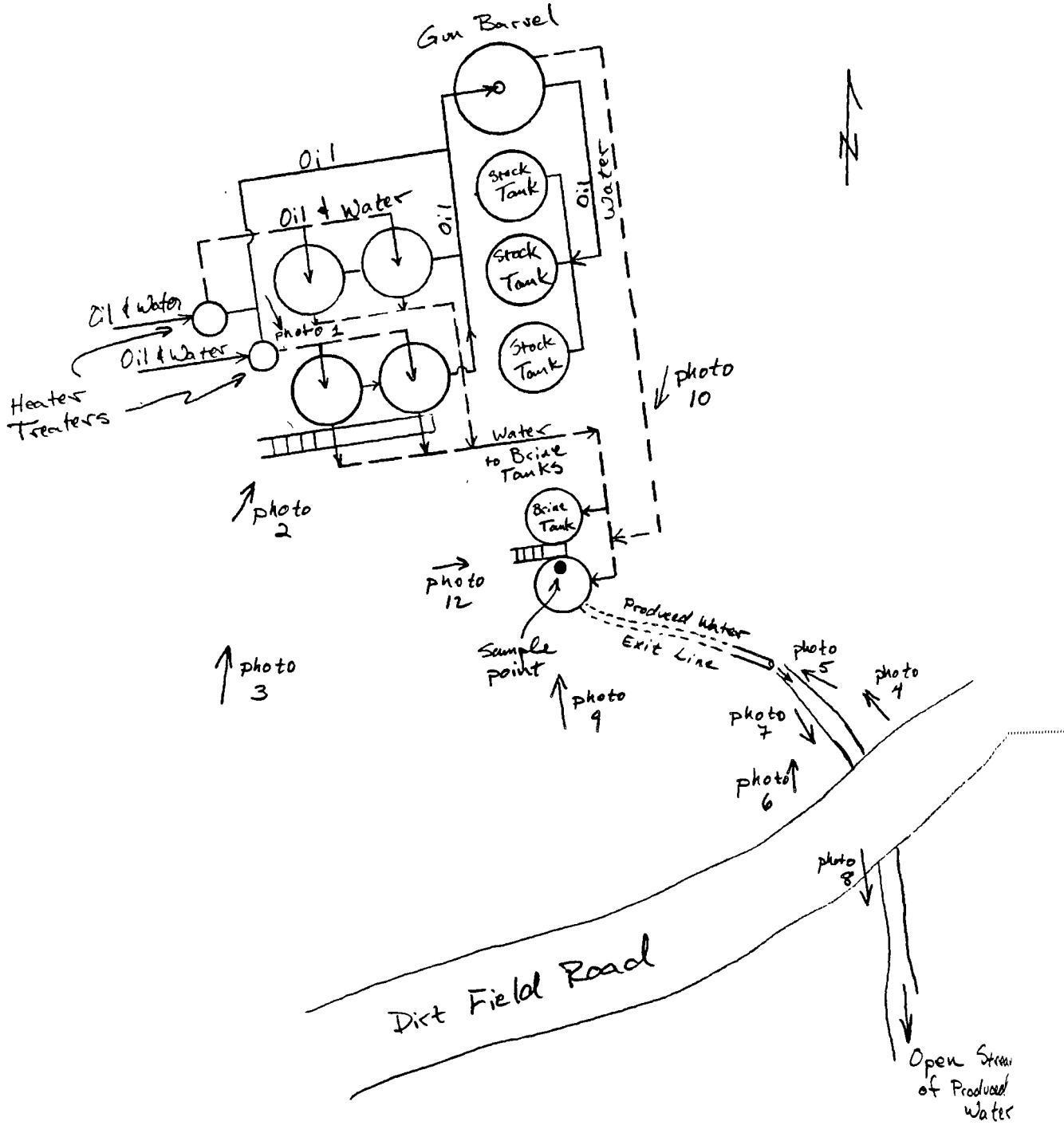


Figure 2. Schematic Diagram of Production Facility

a daily rate of 75 barrels of produced water per well. Depths of wells on this lease vary from 2,500 to 2,600 feet.

Disposal Practices

The produced water was discharged to the surface via pipe from the produced water tanks. The relationship of the discharge point to the tank battery is shown in Photo 4. Photos 6, 7, and 8 show the path of the discharge stream down the hill away from the tank battery. A closeup of the discharge point, Photo 5, indicates a buildup of what might be sulfur along the path of the discharge. The assumption that the substance is sulfur was based on its yellowish appearance and a definite sulfur smell throughout the area.

Permits

State representative Doyle Harrell informed the sample team that direct discharges such as the one at this site are permitted by a special Corporation Commission order, established in 1973. Permission to discharge water directly is based on chlorides content. No operating permits were made available to the sample team at the time of sampling.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005).

Sample Point Locations

At the George Kahn site, the sample was defined as the fluid in the produced water tanks that discharge the water directly. One of the produced water tanks was sampled instead of the discharge pipe shown in Photo 4 because a sample bottle could not be placed under the flow from the pipe without fouling the sample. Figure 2 indicates the sample point from which the fluid sample was composited.

Sampling Methods and Equipment

As shown in Photo 11, the fluid sample was obtained from the open top of the southern produced water tank. The depth of the water in the tank was measured as 6 feet. Thief volumes were taken at depths of 1-1/2, 3, 4-1/2, and 6 feet below the surface, and composited in a 5-gallon glass carboy. Photo 12 is a closeup of the composited sample in the carboy, and the sampling thief. There was a 1- to 2-inch layer of oil on the surface of the water in the tank. Care was taken not to allow the oil to enter the thief as the sample was collected, but there was difficulty keeping the outside of the equipment clean.

The pH of the produced fluid sample was measured onsite after sampling was completed. The pH was in the range between 8 and 9.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

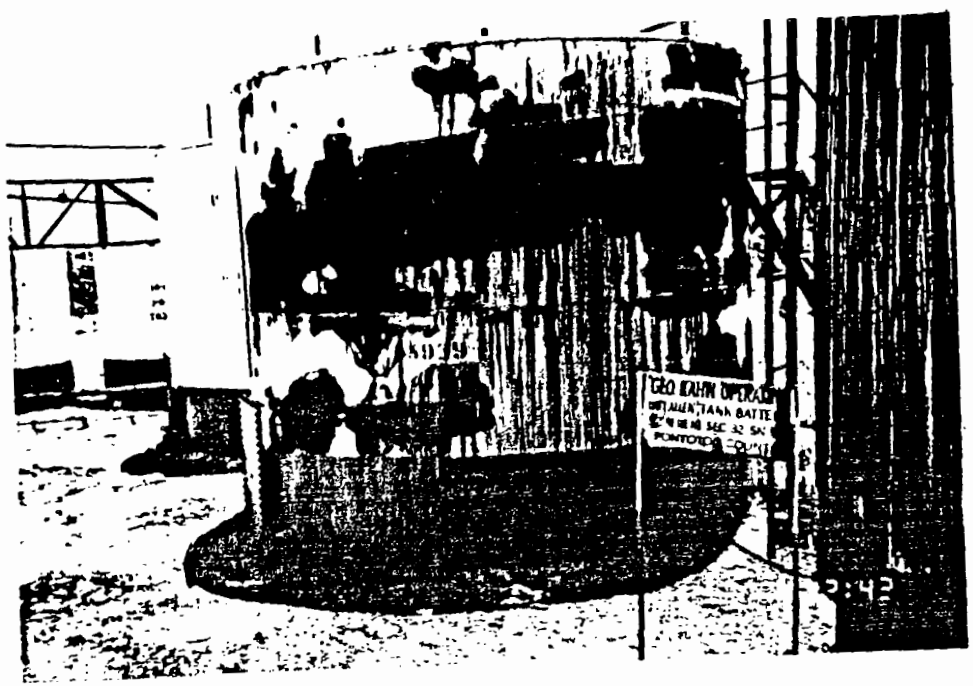


Photo 1. Production tankage

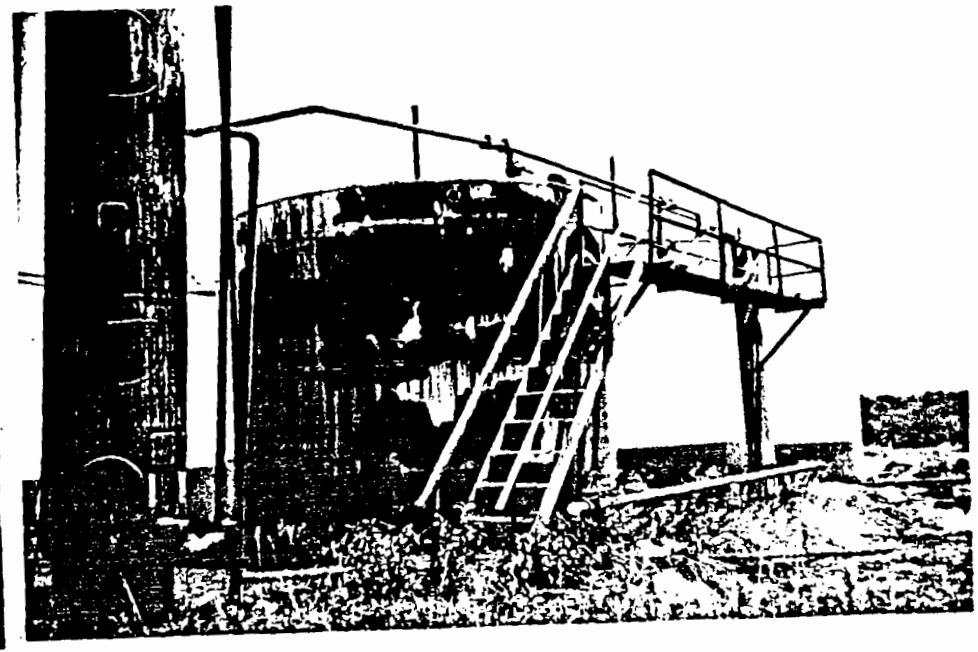


Photo 2. Production tankage

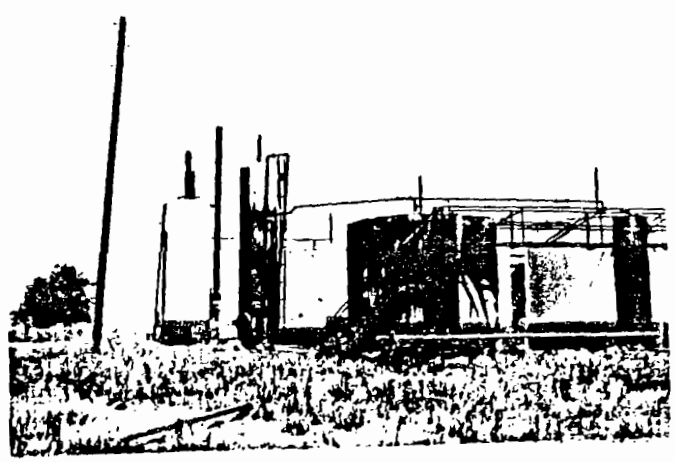


Photo 3. Production tankage

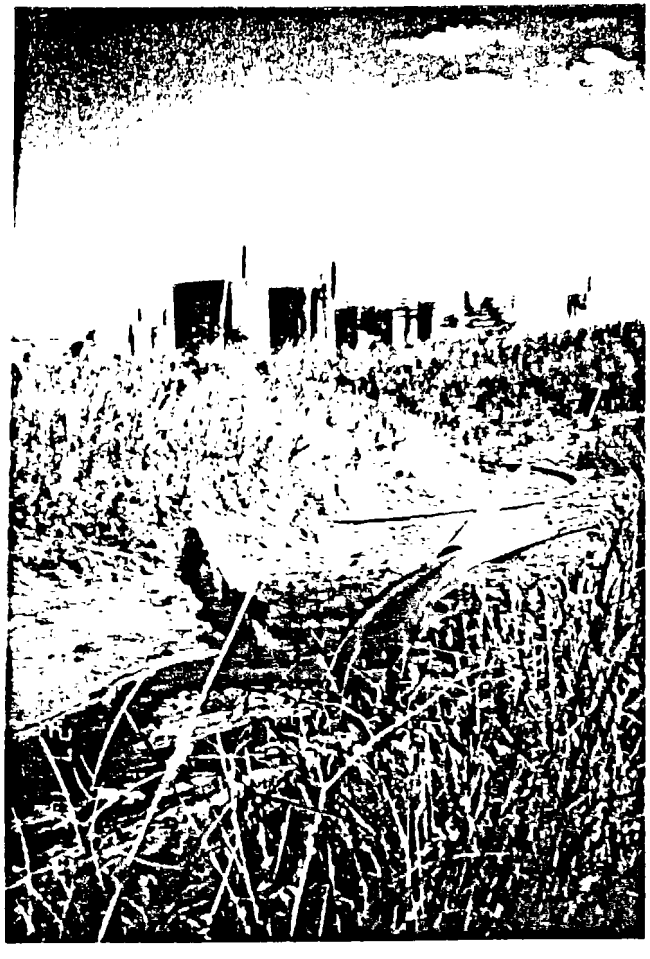


Photo 4. Produced fluid tanks and their discharge

Photo 5. Discharge from produced fluid tanks

Photo 7. Discharge from produced fluid tanks flowing down hill

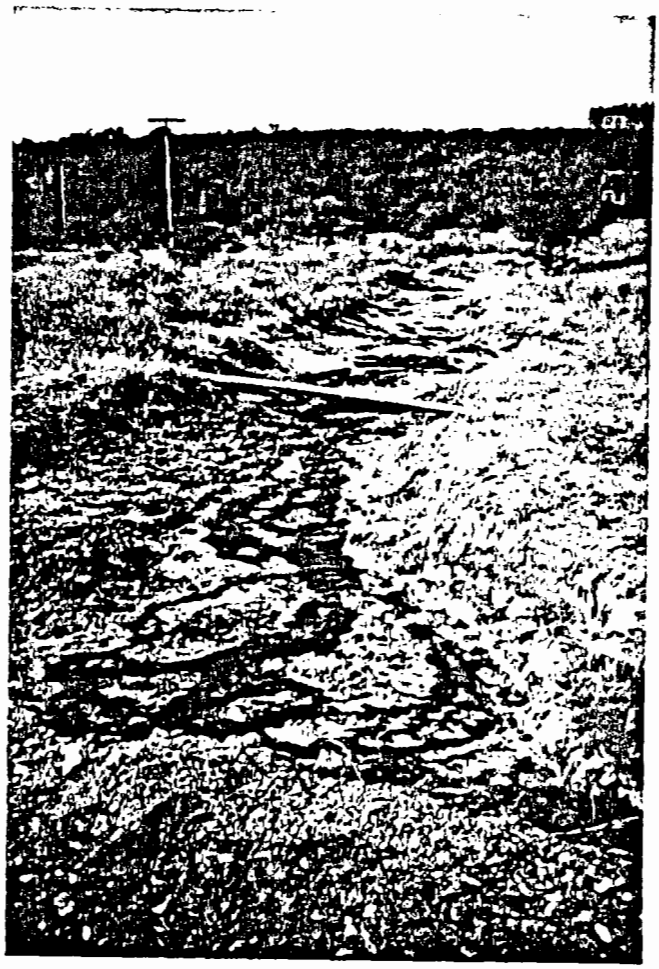


Photo 8. Discharge from produced fluid tanks flowing down hill

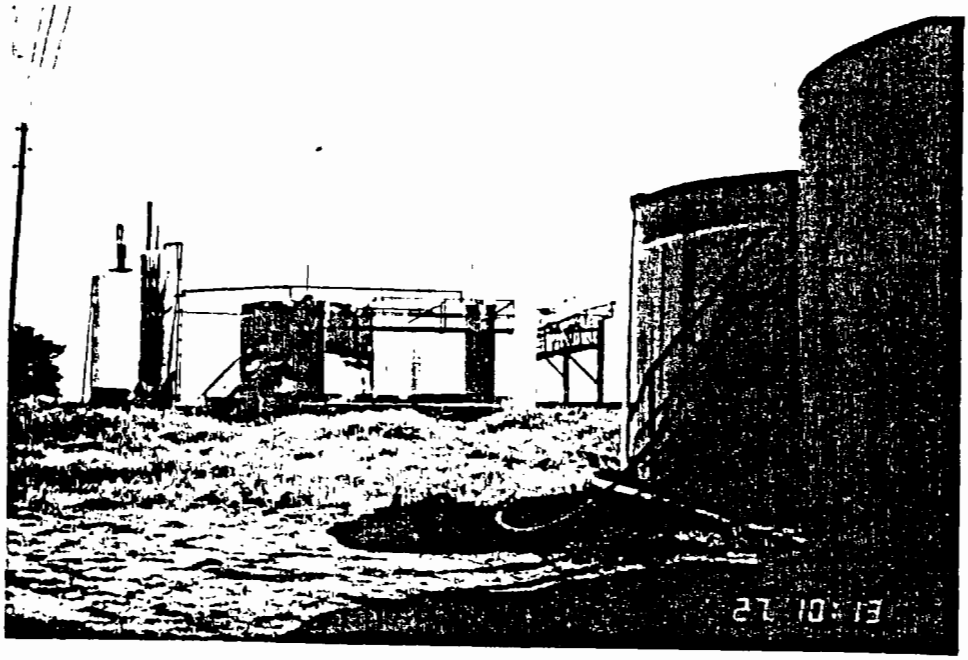


Photo 9. Produced fluid tanks (right) and production tankage (background)

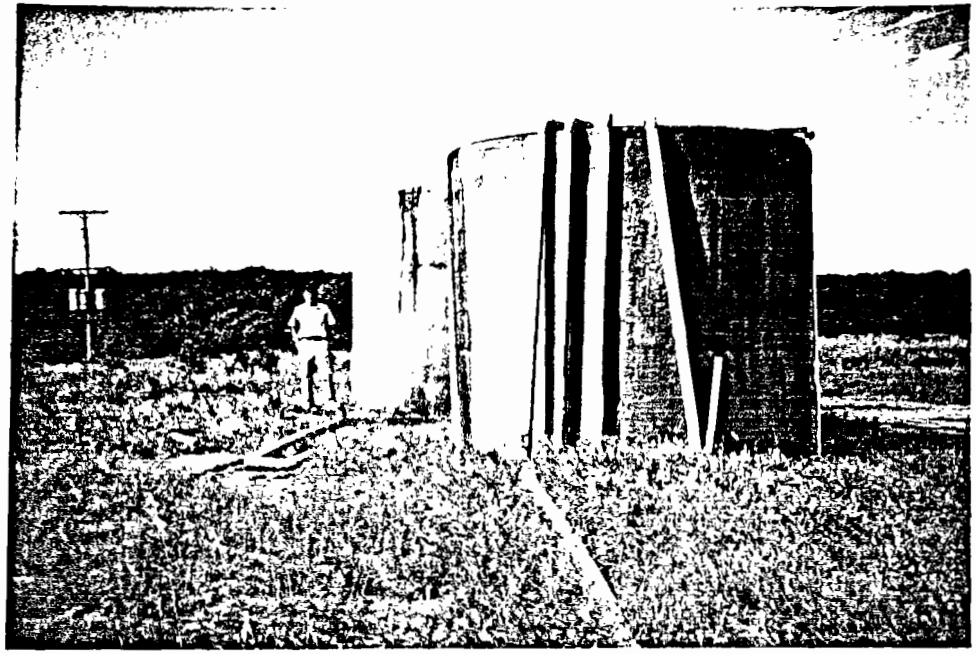


Photo 10. Produced fluid tanks

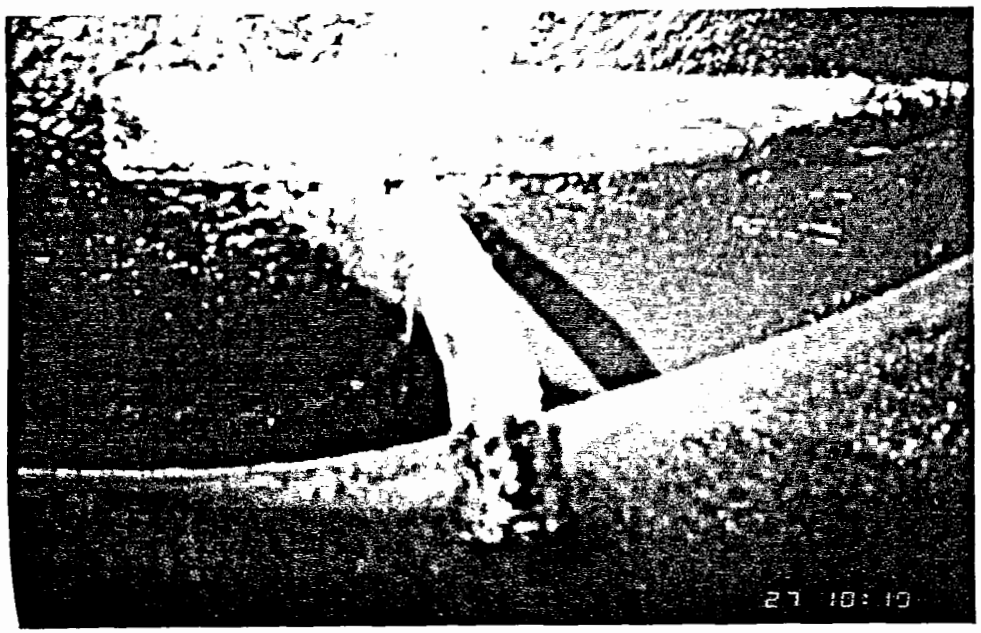


Photo 11. Downward view into produced fluid pool

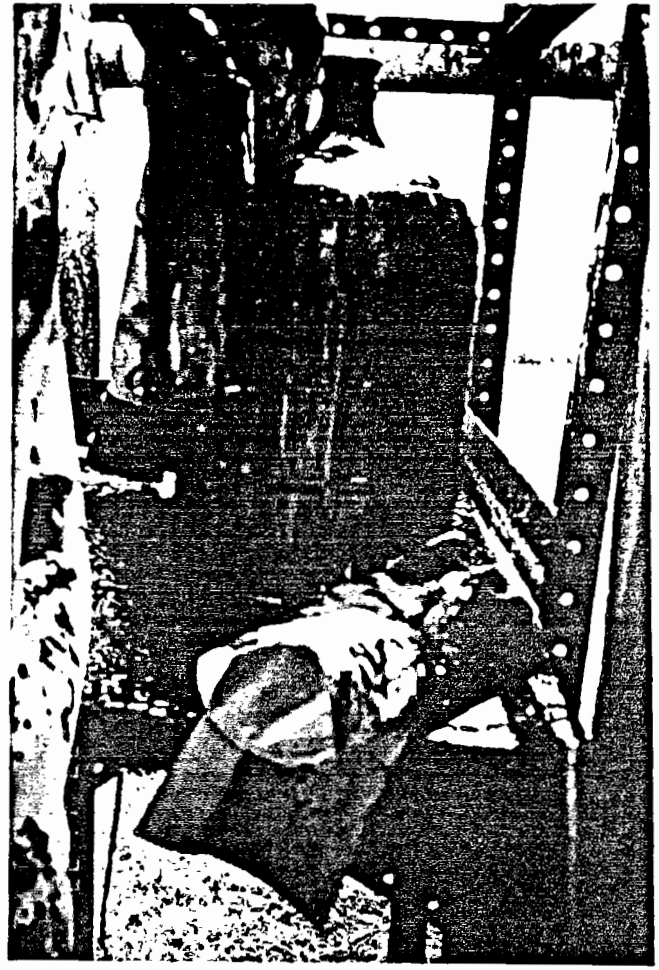


Photo 12. Liquid composite and thief after sampling

ATTACHMENT B: PERMITS

No permit specific to the operation
of this site is available.

Sampling Report
Investigation of Royce Kelly's
Centralized Disposal Pit
McClain County, Oklahoma
June 29, 1986

SITE INFORMATION

Site Selection

This site was specifically selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). An offsite pit was selected for sampling in Oklahoma for two reasons. First, the limited sampling of drill sites in Oklahoma was disproportionate to its drilling activity. (See Appendix B of the EPA Technical Report (EPA 530-SW-87-005).) Second, the Oklahoma Corporation Commission's permitting of offsite pits for disposal of drilling wastes made it desireable to sample these commingled wastes.

Sample site selection was negotiated with the Oklahoma Water Resources Board, who in turn worked in cooperation with the Oklahoma Corporation Commission. The objective was to sample an active offsite drilling waste disposal pit. This site would be used to supplement data from other areas of the U.S. in the onshore oil and gas sampling program.

The Royce Kelly Centralized Disposal Pit in McClain County, Oklahoma, was selected for sampling. No problems were encountered arranging for samples to be taken June 29, 1986. No back-up site was required.

Site Location

The Royce Kelly Centralized Disposal Pit is located approximately 6 miles northwest of Purcell, OK via Highway 74 in McClain County. Figure 1 is a map indicating the disposal pit site. The full name and mailing address for Royce Kelly is:

Royce Kelly Disposal
P.O. Box 98
Maysville, OK 73057
Main Office Ph.: 405-867-5606
Contact (Consulting Engineer): Mr. Royce Kelly, Land Owner and Operator

Attendees

Sampling at the Royce Kelly site was performed by CENTEC Corporation personnel on June 29, 1986. Following is a list of people present at the time of sampling:

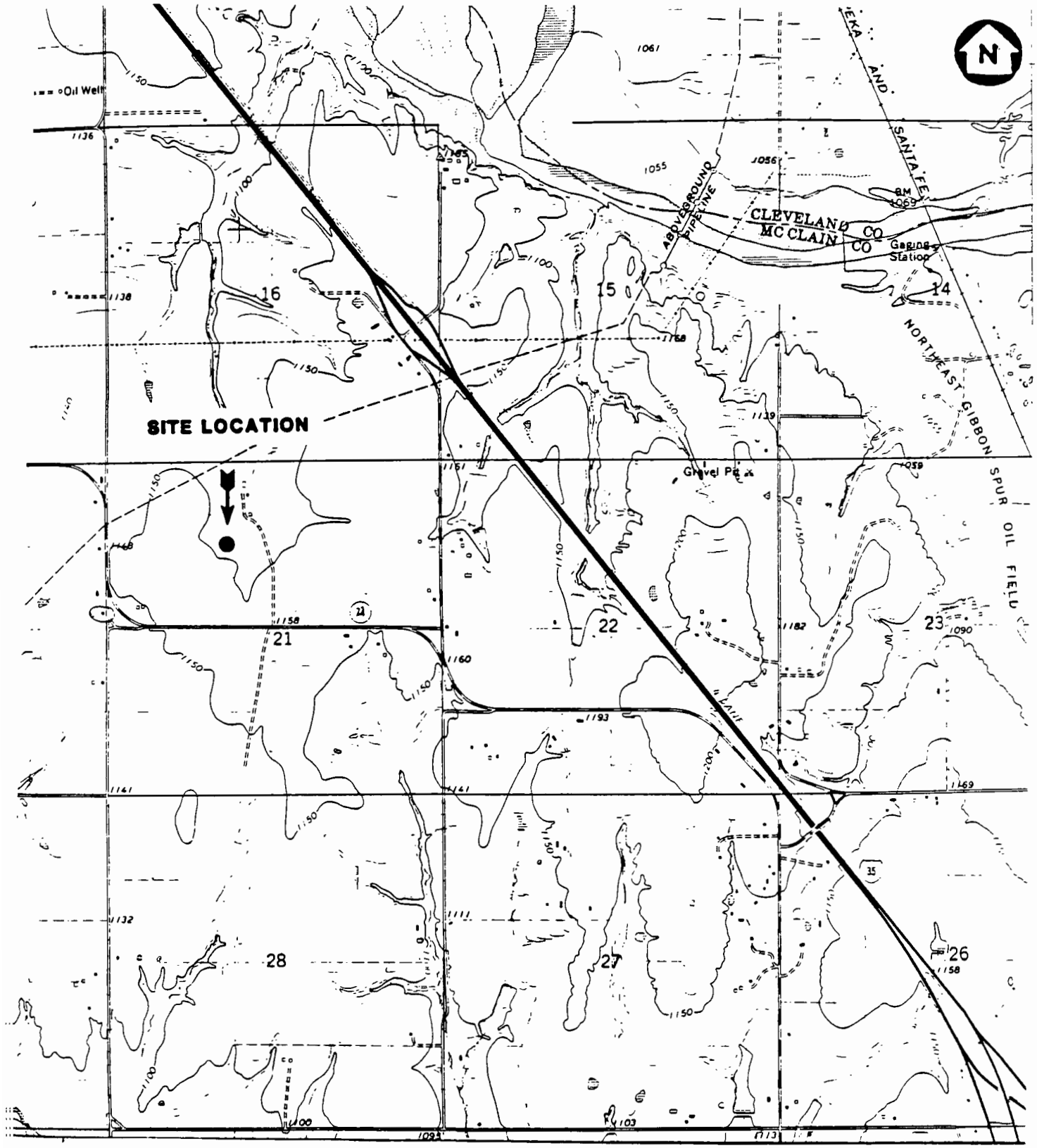


Figure 1. Location of Royce Kelly's Centralized Disposal Pit, McClain County, Oklahoma

CENTEC Corp. (Sample Team):	Bill Lane, Technician Jamie McIntyre, Team Leader
State Representative:	Fred Heitman, Head, Water Quality Enforcement, Oklahoma Water Resources Board
Operator Representative:	Royce Kelly, Land Owner and Operator
American Petroleum Institute Representatives:	George Holliday, Contracted Observer Alan Wilson, Contracted Sample Team Member Earl Hinsley, Contracted Sample Team Member

Site Description

The Royce Kelly site is located in a rural, prairie land area. The climate at this site location is net evaporation. The soil is described as clay.

The depth to the groundwater in the area was estimated to be between 26 and 50 feet, based on the depths of water wells in the area. The nearest surface water is a stream located less than 1/2 mile from the site. There is one drinking water well located less than 1/4 mile from the site, and one well between 1/4 and 1/2 mile from the site.

At the time of sampling, the site consisted of two disposal pits. Figure 2 is an approximate schematic diagram of the site, indicating the directions in which photos were taken (Attachment A). The southern pit is designated as Pit #2, and the northern pit is Pit #3. Both pits are used for disposal of oil well drilling wastes brought to the facility by truck from surrounding counties, including McClain, Oklahoma, Cleveland, Garvin, and Grady. Photo 12 shows a truck unloading sludge into Pit #2. The current charge for disposing into the pit at the time of sampling was $0.25 per barrel.

Pit #2 was first used for disposal of drilling wastes in 1984, and Pit #3 was first used in 1985. Both pits will continue to be used for this purpose for the next 7 to 8 years, depending on the status of the oil industry.

The wastes brought to the site generally consist of drilling muds, drill cuttings, and fresh water. The operator tests every load that comes to the site for chlorides content. The site will not accept any waste that has greater than 1,500 parts per million chlorides. The Oklahoma Corporation Commission (OCC) also tests the pit, once per month. The OCC tests for chlorides, chromium, arsenic, and other compounds.

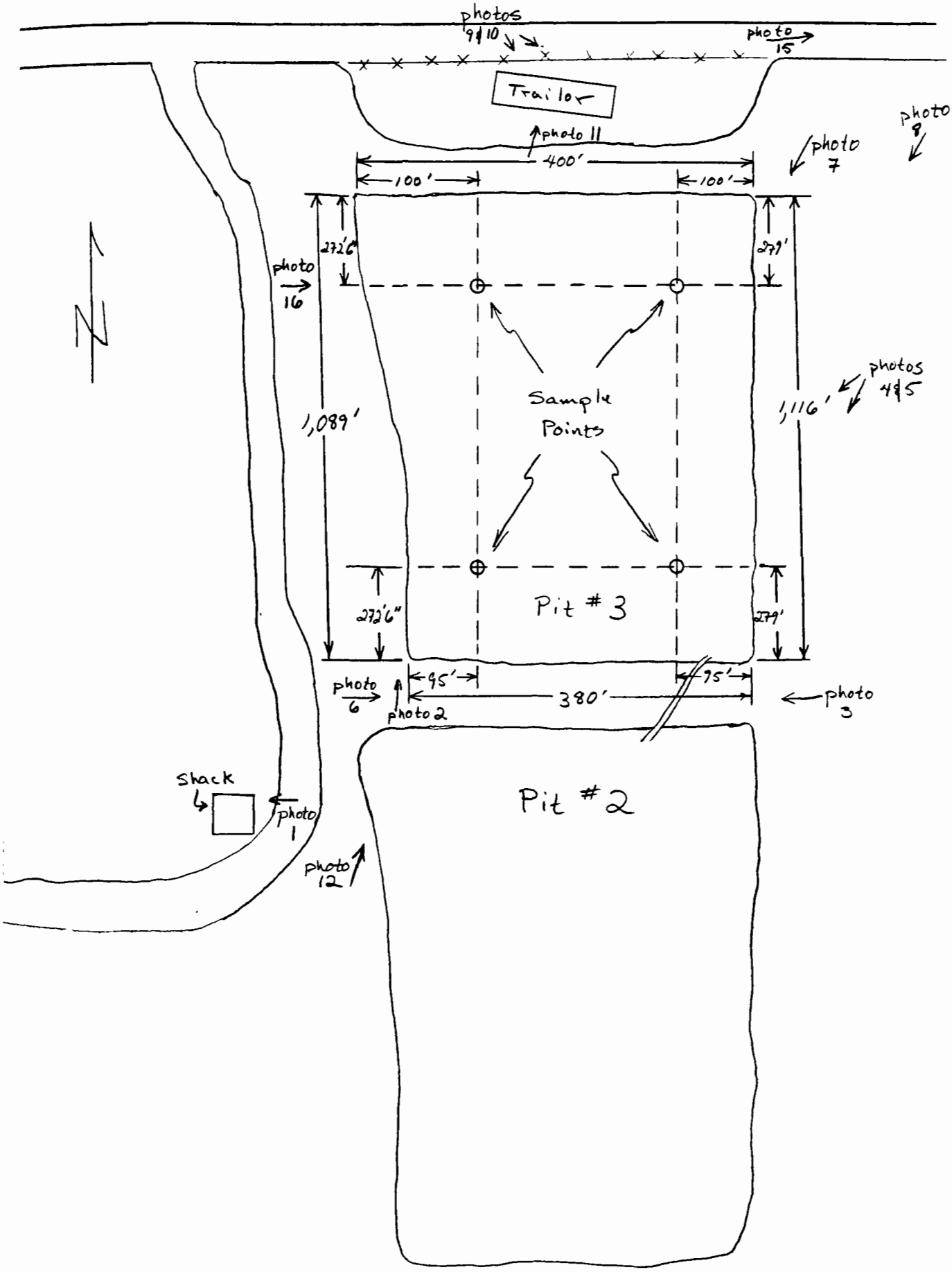


Figure 2. Schematic Diagram of Centralized Disposal Pits

Both pits at the site are lined with one foot of bentonite clay. The sides of the pits have a 4:1 slope. Compaction of the soil within the pit must be 104-112 percent, and this is tested frequently. Both pits were designed to be 40 feet deep.

Pit #2 was nearly full at the time of sampling, and contained sludge with a negligible layer of liquid on top. Pit #3 contained water with an average depth of 24 feet, and sludge an estimated 20 feet deep.

Leak detection monitoring is accomplished by a 25-foot deep monitoring well located 1/4 mile south of the pit site. The well is positioned downstream from the disposal pits in regard to groundwater flow. The well is cemented between 12 and 14 feet and is perforated and gravel-packed.

Permits

No operating permits were made available to the sample team at the time of sampling. However, the sign in Photo 1 shows an Order No. 218841 which was issued to the site by the OCC.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005).

Sample Point Locations

At the Royce Kelly site, the samples were defined as the supernatant and solid contents of the waste material in Pit #3. Pit #2 was not considered for sampling because it had no liquid layer over the sludge.

Sample points were accessed by boat. Figure 2 indicates the measured sample points as well as the actual sample points from which the pit samples were composited.

Sampling Methods and Equipment

To collect samples from Pit #3, the pit was measured to identify the four quadrants shown in Figure 2, and to locate the center of each quadrant. The measured points were marked by placing stakes along the sides of the pit to facilitate locating sample points. Photo 6 shows samplers measuring the levy between Pits #2 and #3.

Sampling was performed by state representative Fred Heitman and CENTEC technician Bill Lane. The boat was rowed to the marked sample points and held in place with two anchors. Photo 16 shows samplers in the boat aligned with a stake on the side of the pit.

The first sample to be collected was the liquid composite. The thief was used to obtain this sample.

The pit was then sampled for sludge. The coring device was not used because the depth of the liquid in the pit was between 21 and 27 feet, and the equipment would have been dangerous to handle under these conditions. Two dredge-fulls were obtained at each quadrant, yielding a total volume of approximately 5 gallons. The solids were composited in a steel bucket.

The samples were tested onsite for pH after sampling was completed. The pH was 8 for both the liquid and sludge samples.

The samples were preserved with ice and held overnight prior to the day of shipment. This was necessary because of time constraints encountered on the day of sampling.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

Photo 1. Shed next to pits

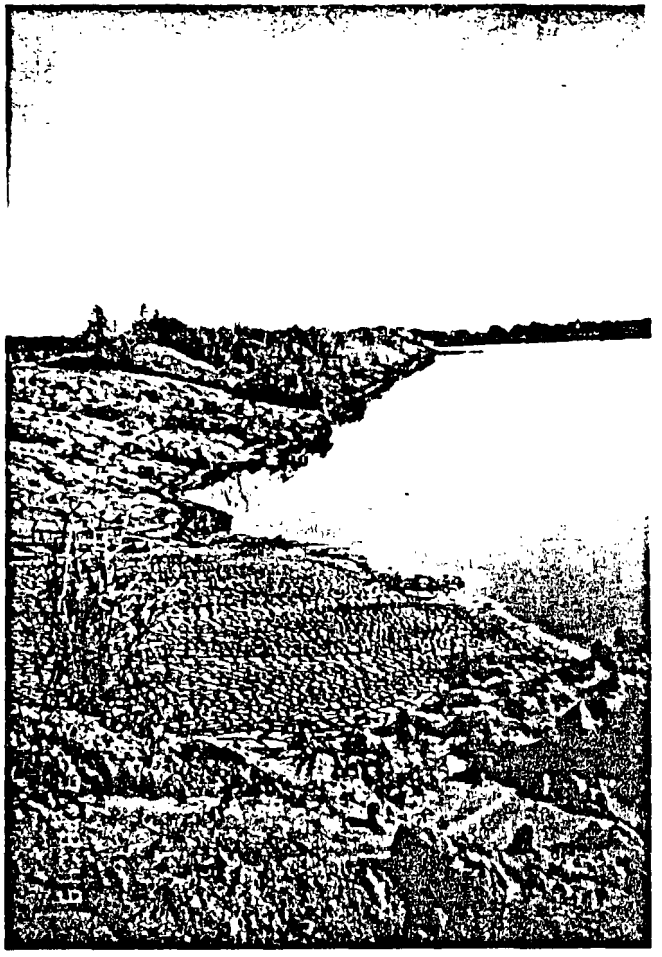
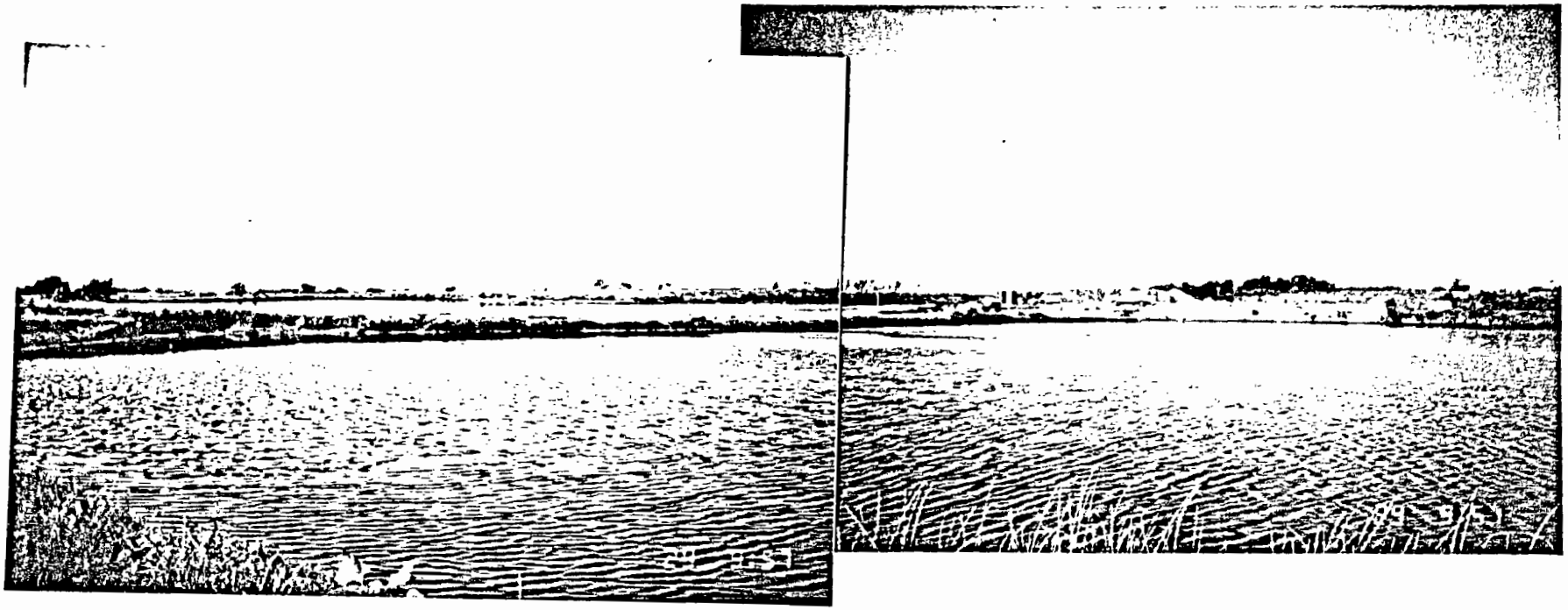


Photo 2. Northerly view of pit #2 from southwest corner

Photo 3. Westerly view of dike between pits



Photos 4,5. Southerly view of pit #2, dike, and pit #3

Photo 6. Samplers measuring south side of pit #2

Photo 7. Southerly view of pit #2

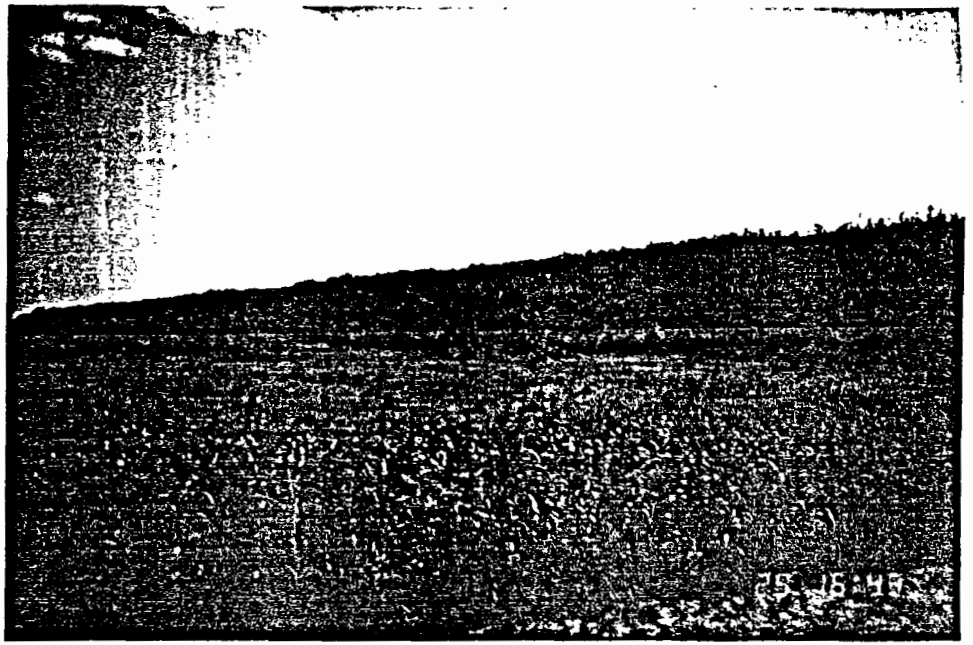
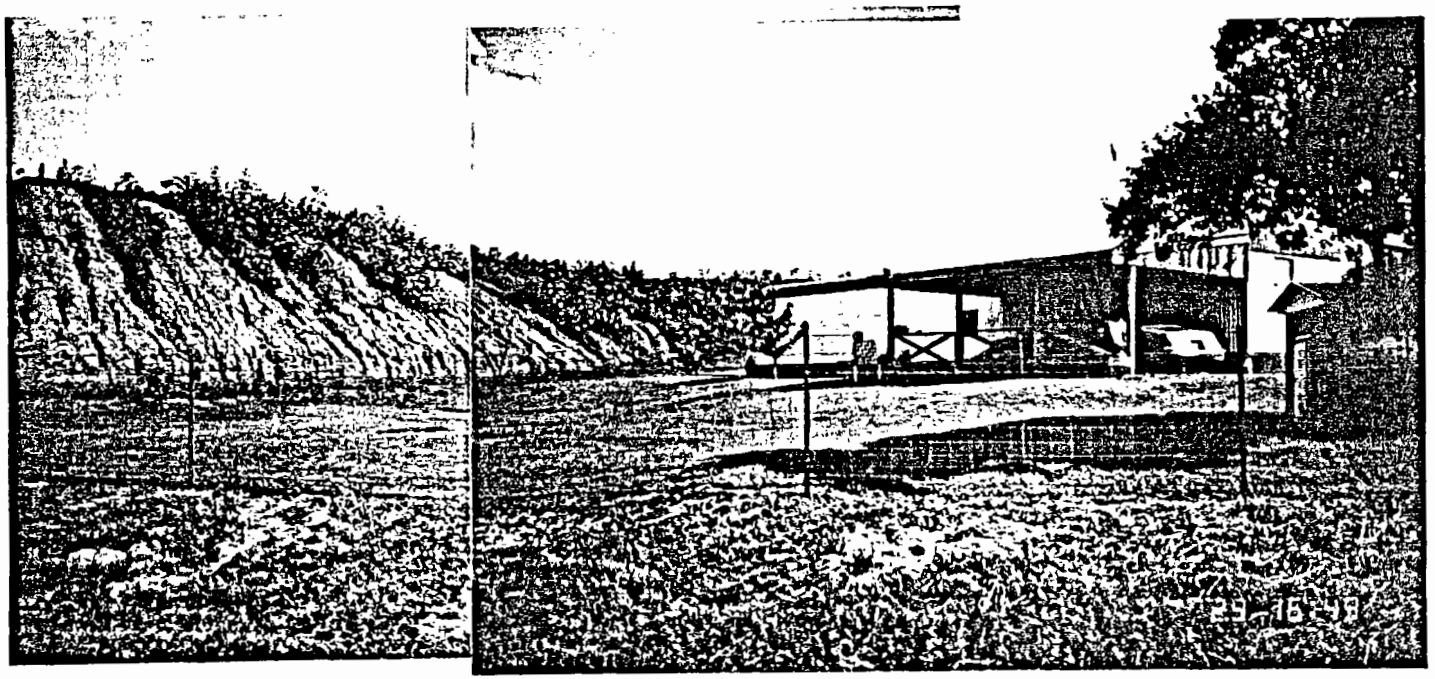


Photo 8. Outside west wall of pit #2



Photos 9,10. Southerly view of trailer at north end of pit #2

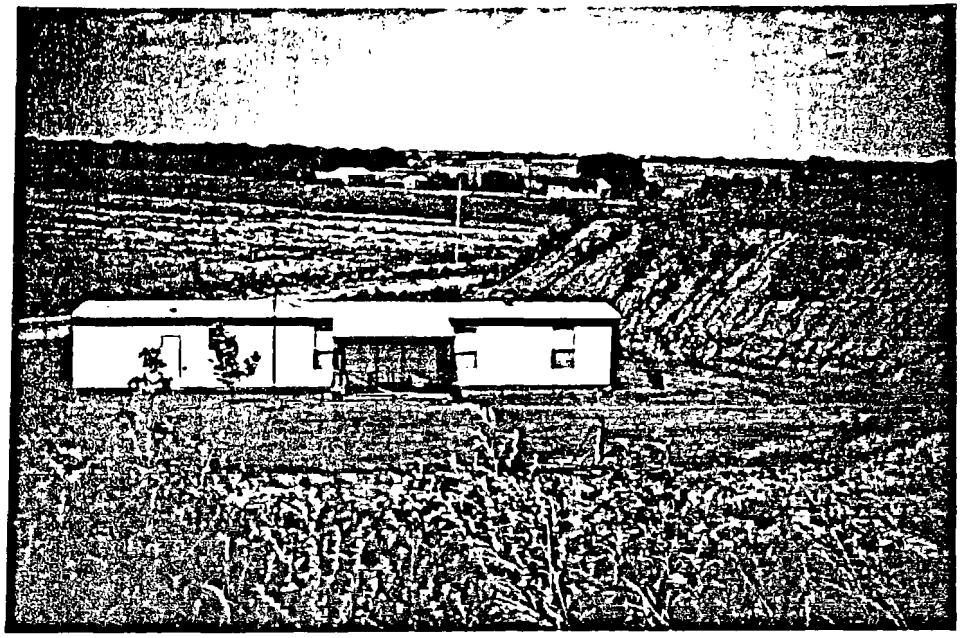


Photo 11. Northerly view of trailer at north end of pit #2

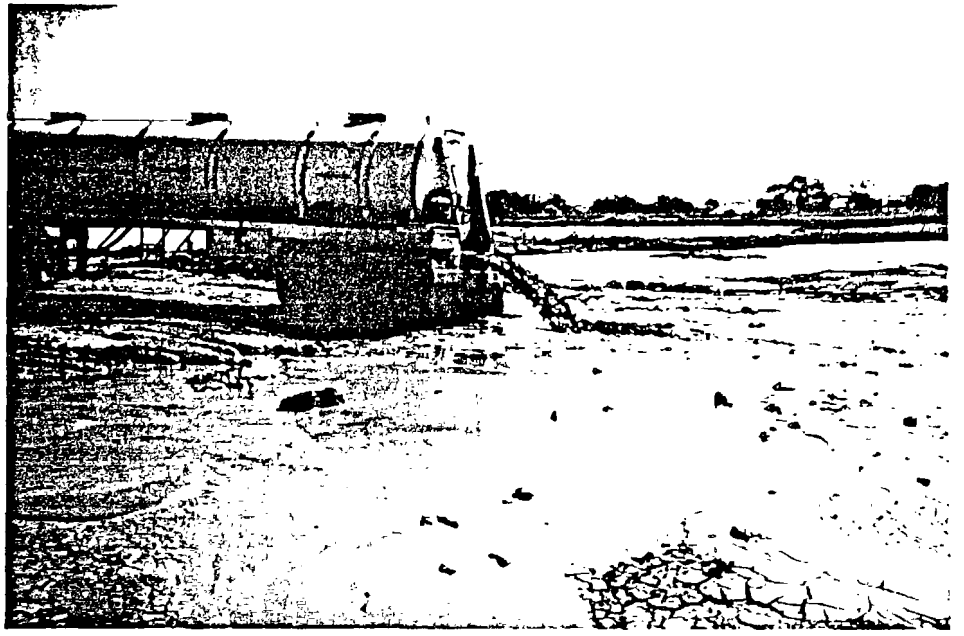


Photo 12. Truck unloading into pit#3

Photo 13. Close-up of "shoreline" of pit #2

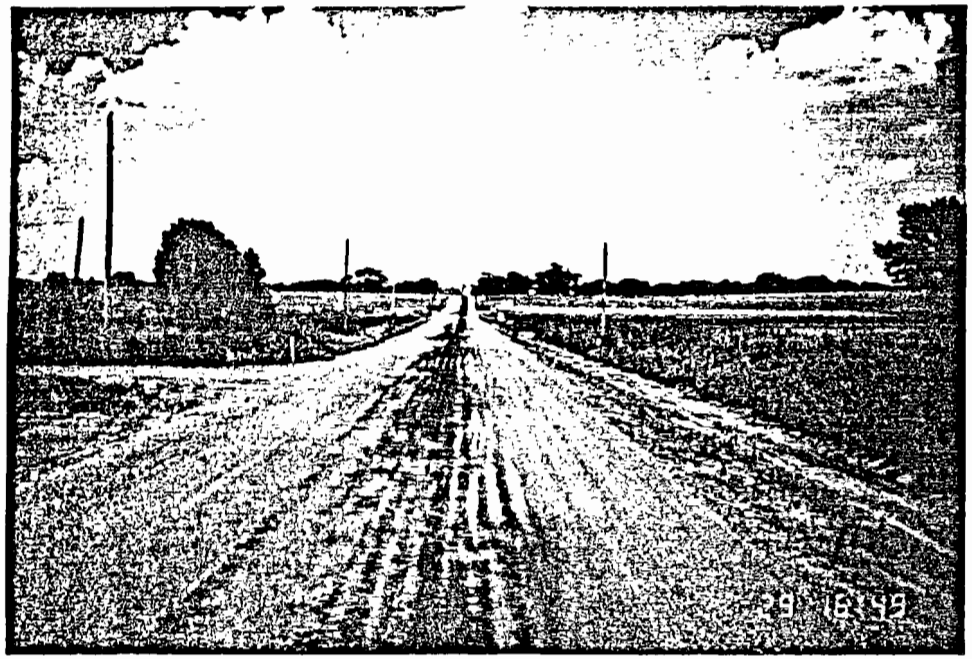


Photo 15. Road leading to site

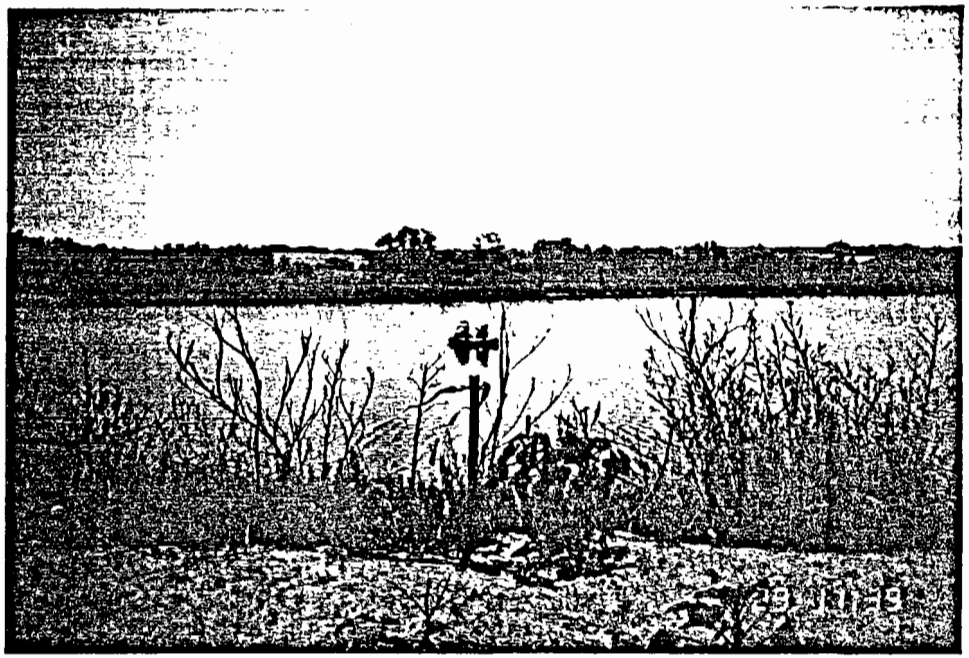
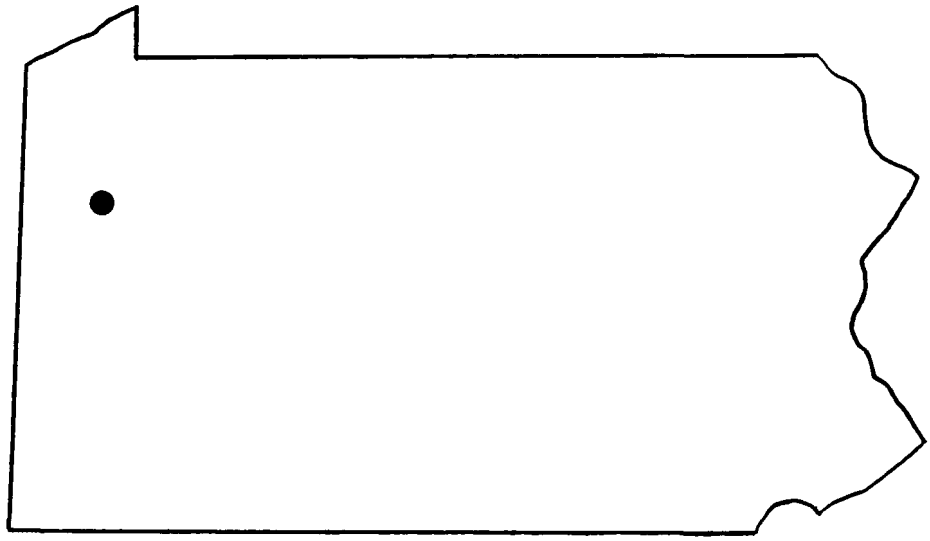


Photo 16. Samplers in pit #2

ATTACHMENT B: PERMITS

No permit specific to the operation
of this site is available.

PENNSYLVANIA



Sampling Report
Investigation of Franklin Brine Treatment Corporation
Franklin, Pennsylvania
September 3, 1986

SITE INFORMATION

Site Selection

This site was specifically selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). The selection was based on personal communication with the Pennsylvania Department of Natural Resources, Bureau of Oil and Gas Management. At the request of EPA, the Department of Natural Resources identified three facilities treating oil and gas wastes in Pennsylvania. Of the three sites, the Franklin Brine Treatment Corporation was actively receiving and commingling drill wastes, fracturing fluids, and produced water prior to treatment. Their treatment consisted of aeration, skimming, neutralization, flocculation, decantation, and disposal of liquid and solids.

EPA specifically selected the Franklin Brine Treatment Corporation facility to obtain technical information and analytical data regarding the practice of using centralized facilities to treat and dispose of wastes from multiple oil and gas sources in Pennsylvania. The Agency is interested in the developing information about the constituents of the wastes, and about the effectiveness of the treatment processes. A more detailed discussion of the rationale for selection of centralized treatment facilities is contained in Appendix B.

No problems were encountered arranging for sampling to be conducted on September 3, 1986.

Site Location

Franklin Brine Treatment Corporation is located 2 miles east of Franklin, PA on Route 322. Figure 1 is a map indicating the treatment site.

The site is operated by Franklin Brine Treatment Corporation, whose mailing address and telephone number are:

PO Box 728
Franklin, PA 16323
814-437-3593

The facility is owned by Cabot Corporation, Boston, MA.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
TOPOGRAPHIC AND GEOLGIC SURVEY

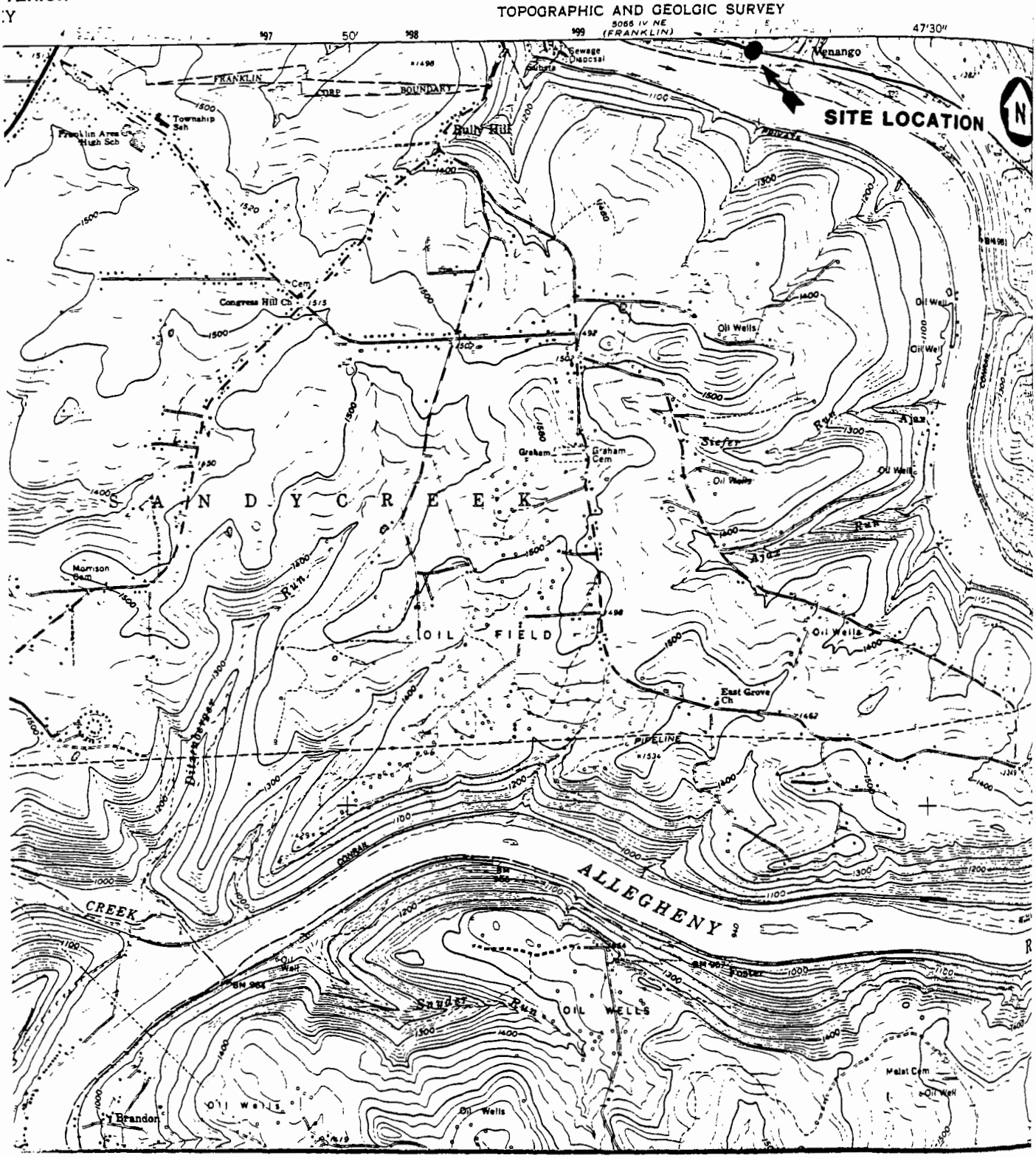


Figure 1. Location of Franklin Brine Treatment Corporation, Franklin, Pennsylvania

Attendees

Sampling of Franklin Brine Treatment Corp. was performed by CENTEC Corporation personnel on September 3, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Jim Kourmadas, Technician
State Representative:	Jim Erb, Bureau Chief, Oil and Gas Management, PA Department of Environmental Resources
Operator Representatives:	Rudy Adamiak, Manager, Franklin Brine Treatment Corporation Jim Trimble, Regional Manager, Cabot Oil and Gas Corporation Fred Shelton, Safety Supervisor, Cabot Oil and Gas Corporation Dave Ballard, Environmental Supervisor, Cabot Oil and Gas Corporation
American Petroleum Institute Representatives:	George Holliday, Contracted Observer Alan Wilson, Contracted Sample Team Member
Other Observers:	Cliff Griffith, PA Natural Gas Association, Environmental Committee

Site Description

Franklin Brine Treatment Corporation is located in the Appalachian Basin in an area characterized as suburban and mountainous. The depth to groundwater is 62 feet, and the nearest surface water (the Allegheny River) is 250 feet away. There are three drinking water wells within a 1-mile radius from the site; the closest well is within a 1/4-mile radius from the site. The soil in this area is clay. The climate at this site is net precipitation.

This site is a central treatment facility for oil and gas produced brines. The facility became operational in May 1985 and began commercial operations in July 1985. Monthly operation hours are 400; annual operation hours are 4,760. Clients are within a 0- to 240-mile radius of the facility. The facility charges between $0.02 and $0.11 per gallon for processing. Price incentives are given for larger volumes.

Figure 2 is a schematic diagram of the treatment facility. The operation is a batch process with a daily permitted capacity of 205,000 gallons. The operation constitutes final treatment prior to discharge to the Allegheny River.

Photo 1 (Attachment A) shows the truck unloading area. The brine proceeds to one of two storage tanks, shown in Photo 2. The facility consists of a treatment sequence of oil skimming, aeration, pH adjustment by lime addition followed by polymer addition, flocculation, and settling. From the settler, the treated water flows into a sample monitoring tank before flowing into a series of manholes where it is finally discharged. The solids flow into a sludge decant tank and then into a manually operated plate and frame filter press shown in Photo 3. All recovered water from the filter press is recycled into the neutralization tank. The sludge is sent to a landfill. Wash water is recycled into the neutralization tank. Daily volume of the operation is variable; a gallon of influent brine produces an average of 0.8 pounds of sludge.

The chemicals used in the process are bulk hydrated lime, Nalco 7182 anionic flocculant, Nalco 71-D5 antifoamant, and Chemex 750 surfactant. Chemex 750 surfactant is used for equipment washing.

The facility uses a manifest system to account for all influent. A copy of the manifest is shown in Attachment C.

Permits

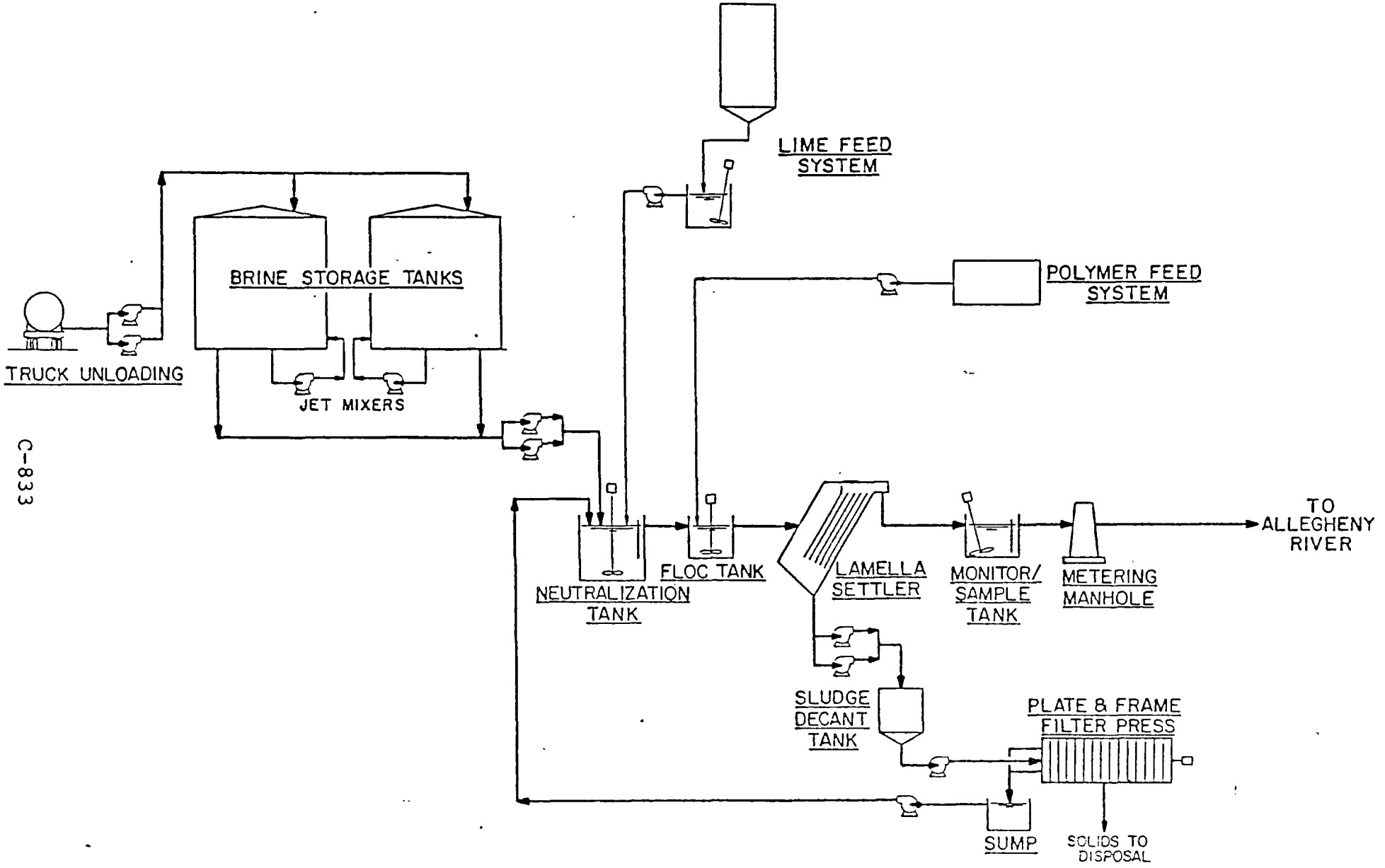
This facility operates under PA NPDES Permit No. 0101508, as shown in Attachment B. This permit requires the monitoring of the following discharge parameters: total suspended solids, oil and grease, aluminum, dissolved iron, osmolality, total dissolved solids, chlorides, and pH. The required frequency for monitoring these parameters is once per week, except for pH which must be measured daily and osmolality which must be measured once every 6 months (see permit for required discharge limitations).

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The samples collected at Franklin Brine Treatment Corp. consisted of two liquid samples (influent and effluent) and one sludge sample. The influent sample was collected at one of the brine feed pumps at the base of the brine tanks. The sample location



C-833

Franklin Brine Treatment Corporation

Figure 2. Flow Diagram

is shown in Photo 4. The effluent sample was collected from the final metering manhole before discharge to the Allegheny River. The location is shown in Photo 5. The sludge sample was taken from the plate frame and filter press. The sludge collected represented the solid waste from the facility's most recent batch operation.

Sampling Methods and Equipment

The influent sample was collected with a 5-gallon glass carboy from a pump valve at the brine feed pump in Photo 4. The effluent sample was taken with a stainless steel bucket which was lowered into the manhole with a rope. The sludge sample was collected by removing the sludge from the plate frame and filter press and placing it in a stainless steel bucket.

Tests for the pH and free chlorine content of the liquid influent and effluent samples were conducted onsite after sampling was completed. The liquid influent pH was measured at 6; the effluent pH was measured at 10. The free chlorine content of both liquid streams was measured at less than 0.2 ppm (i.e., none detected).

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

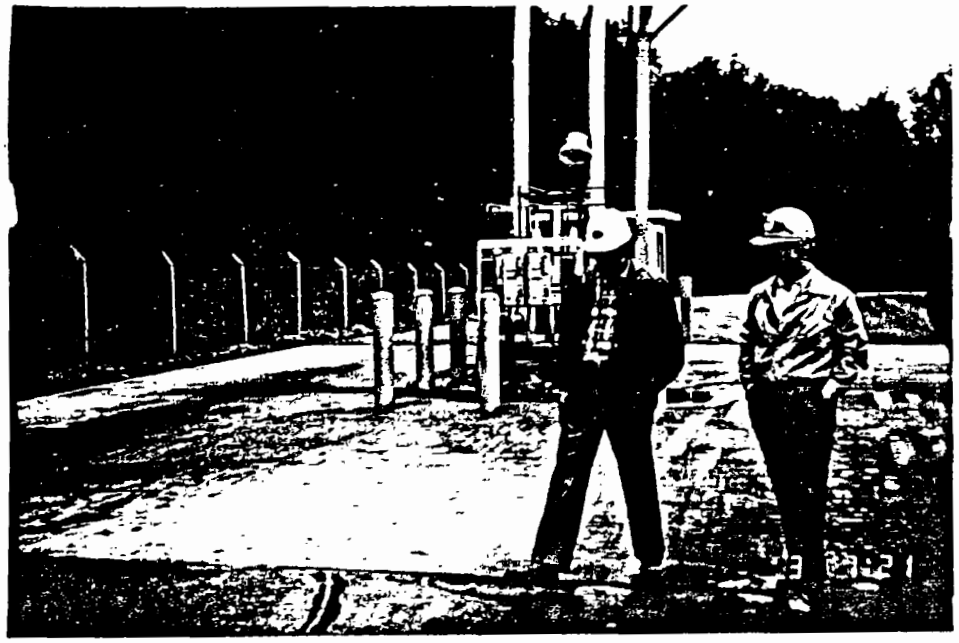


Photo 1. Truck unloading area

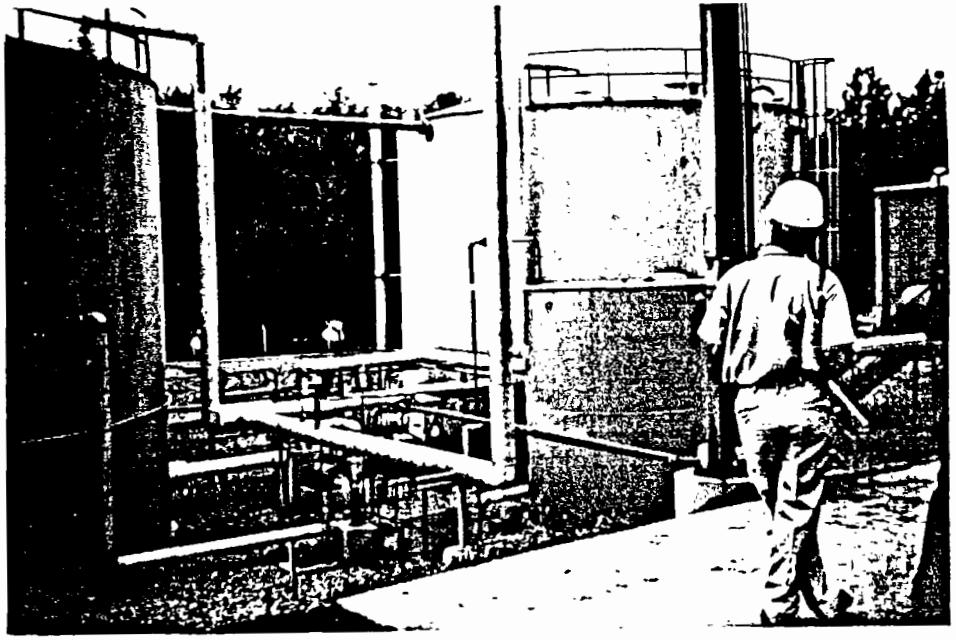


Photo 2. Brine storage tanks

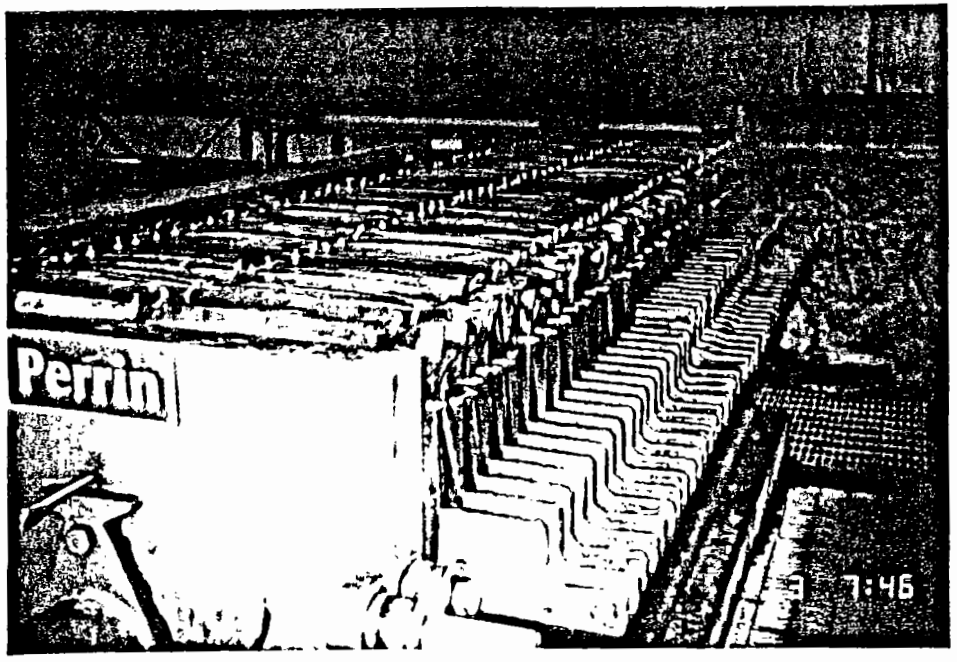


Photo 3. Sludge filter press

C-837

Photo 4. Influent sample collection point

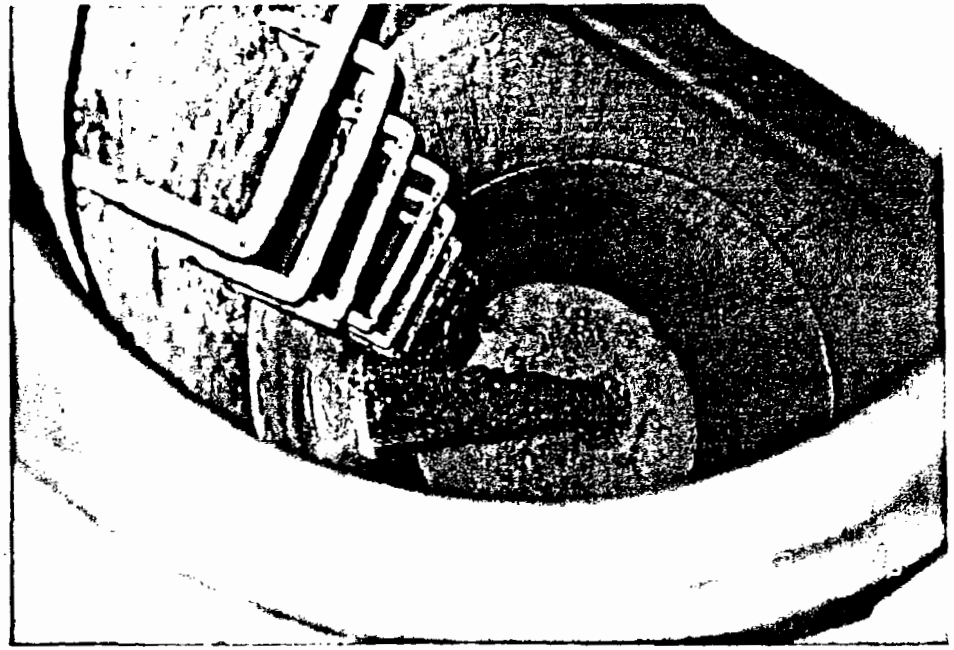


Photo 5. Effluent sample collection point

ATTACHMENT B: PERMITS

ER-BWQ-15.1 9/78 (Rev. 5/81)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF WATER QUALITY MANAGEMENT

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

INDUSTRIAL PERMIT NO. PA 0101508 Amendment No. 2

In compliance with the provisions of the Clean Water Act, 33 U.S.C. Section 1251 et seq. (the "Act") and Pennsylvania's Clean Streams Law, as amended, 35 P.S. Section 691.1 et seq.,

Franklin Brine Treatment Corporation

is authorized to discharge from a facility located at

Cranberry Township, Venango County

to receiving waters named
Allegheny River
in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts A, B, and C hereof.

This permit and the authorization to discharge shall expire at midnight, November 23, 1987

The authority granted by this permit is subject to the following further qualifications:

1. If there is a conflict between the application, its supporting documents and/or amendments and the terms and conditions of this permit, the terms and conditions shall apply.

2. Failure to comply with the terms or conditions of this permit is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. Application for renewal of this permit, or notification of intent to cease discharging by the expiration date, must be submitted to the Department at least 180 days prior to the above expiration date (unless permission has been granted by the Department for submission at a later date), using the appropriate NPDES permit application form. In the event that a timely and complete application for renewal has been submitted and the Department is unable, through no fault of the permittee, to reissue the permit before the above expiration date, the terms and conditions of this permit will be automatically continued and will remain fully effective and enforceable pending the grant or denial of the application for permit renewal.

4. This NPDES permit does not constitute authorization to construct or make modifications to wastewater treatment facilities necessary to meet the terms and conditions of this permit.

PERMIT ISSUED

This permit supercedes Permit #0101508 issued 11-24-82.

DATE JUL 19 1985

BY Peter A. Yeager

Peter A. Yeager, P.E.
Regional Water Quality Manager

TITLE Meadville Regional Office

C-841

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES

STANDARD CONDITIONS RELATING TO INDUSTRIAL WASTES

For Use In Water Quality Management Permits

1971

General

1. The plans for which this permit is issued are approved subject to the condition that the waste treatment plant constructed under said plans will produce an effluent satisfactory to the Department. By this approval, neither the Department nor the Commonwealth of Pennsylvania assumes any responsibility for the feasibility of the plans or the operation of the plant to be constructed thereunder.

2. All relevant and non-superseded conditions of any prior water quality management permits, decrees, or orders issued to the herein permittee or his predecessor shall be continued in full force and effect and together with the provisions of this permit shall apply to his successors, lessees, heirs and assigns.

3. The responsibility for the carrying out of the conditions of this permit shall rest upon the owner, lessee, assignee, or other party in responsible managerial charge of the operation producing the wastewaters and of the waste treatment works herein approved, such responsibility passing with each succession in said control. Approval of a discharge or facilities under a permit shall not be effective as to a new owner until a transfer has been executed and filed on forms provided by the Department and the transfer is approved by the Department.

4. The permittee shall secure any necessary permission from the proper federal authority for any outfall or industrial waste treatment structure which discharges into or enters navigable waters and shall obtain approval of any stream crossing, encroachment or change of natural stream conditions coming within the jurisdiction of the Department.

5. In order to avoid obsolescence of the plans of waste treatment works, the approval of the plans herein granted, and the authority granted in the permit, if not specifically extended, shall cease and be null and void two years from the date of this permit unless the works covered by said plans shall have been completed and placed in operation on or before that date.

6. Approval of plans refers to functional design and not structural stability, which is assumed to be sound and in accordance with good structural design. Failure of the works herein approved because of faulty structural design or poor construction will render the permit void.

7. The Department may at a subsequent time modify, suspend or revoke this permit whenever the waters affected by the presently authorized waste discharge have become so improved in character through natural or artificial processes of conservation or reclamation as to render inimical or harmful the effluent from the works herein approved, or whenever the Department increases treatment requirements for wastes generally.

   Therefore, the permittee is hereby notified that when the Department shall have determined that the public interest requires the further treatment of such of the permittee's industrial wastes as are discharged to the waters of the Commonwealth, then upon notice by the Department and within the time specified, the permittee shall submit to the Department for its approval, plans and a report providing for the required degree of treatment, and after approval thereof, shall construct such works in accordance with the requirements of the Department.

8. If at any time the industrial waste treatment works of the permittee, or any part thereof, or the discharge of the effluent therefrom, shall have created a public nuisance, or such discharge is causing or contributing to pollution of the waters of the Commonwealth, the permittee shall forthwith adopt such remedial measures as are acceptable to the Department.

9. Nothing herein contained shall be construed to be an intent on the part of the Department to approve any act made or to be made by the permittee inconsistent with the permittee's lawful powers or with existing laws of the Commonwealth regulating industrial wastes and the practice of professional engineering, nor shall this permit be construed to sanction any act otherwise forbidden by any of the laws of the Commonwealth of Pennsylvania or of the United States.

Construction

10. The works shall be constructed under expert engineering supervision and competent inspection, and in accordance with plans, designs, and other data as herein approved or amended, and with the conditions of this permit.

11. No radical changes shall be made in the works herein approved without approval of the Department. Revisions which do not increase the rate of flow or change the quality of the effluent, the treatment processes or the point of discharge, may be approved by the Regional Sanitary Engineer upon submission of plans. Other revisions must be approved by a permit.

12. The outfall sewer or drain shall be extended to low water mark of the receiving body of water in such a manner as to insure the satisfactory dispersion of its effluent thereinto; insofar as practicable it shall have its outlet submerged; and shall be constructed of cast iron, concrete, or other material approved by the Department; and shall be so protected against the effects of flood water, ice, or other hazards as to reasonably insure its structural stability and freedom from stoppage.

13. When the herein approved industrial waste treatment works is completed and before it is placed in operation, the permittee shall notify the Department so that an inspection of the works may be made by a representative of the Department.

Operation and Maintenance

14. No matter how well designed and carefully constructed a waste treatment works may be, full effectiveness cannot be developed unless it is efficiently operated. In order to secure such efficiency, protect the waters of the Commonwealth, and insure the most effective and economical dosage when chemicals are used, the permittee is required to place the works under the regular charge of a responsible plant official, and its operation under the control of the designer of the works or other qualified person approved by the Department, for at least one year after completion. Moreover, upon written notice from the Department, the permittee shall maintain one or more skilled operators regularly on duty for such daily periods as the Department may direct.

15. The right to discharge the effluent from the herein approved industrial waste treatment works into the waters of the Commonwealth is contingent upon such operation of these works as will at all times produce an effluent of a quality satisfactory to the Department. If, in the opinion of the Department, these works are not so operated or if by reason of change in the character of wastes or increased load upon the works, or changed use or conditon of the receiving body of water, or otherwise, the said effluent ceases to be satisfactory for such discharge, then upon notice by the Department the right herein granted to discharge such effluent shall cease and become null and void unless within the time specified by the Department, the permittee shall adopt such remedial measures as will produce an effluent which, in the opinion of the Department, will be satisfactory for discharge into the said receiving body of water.

16. No untreated or ineffectively treated wastewaters shall at any time be discharged into the waters of the Commonwealth, and especial care shall be used to prevent accidental "spills" or similar unusual discharges of all raw, finished and waste materials.

17. No storm water, sewage or other industrial wastes not specifically approved herein, shall be admitted to the works for which this permit is issued, unless with the approval of the Department.

18. The various structures and apparatus of the industrial waste treatment works herein approved shall be maintained in proper condition so that they will individually and collectively perform the functions for which they were designed. In order to insure the efficacy and proper maintenance of the treatment works, the permittee shall make periodic inspections at sufficiently frequent intervals to detect any impairment of the structural stability, adequate capacity, or other requisites of the herein approved works which might impair their effectiveness, and shall take immediate steps to correct any such impairment found to exist.

19. Any screenings, and any settled or floated solids, shall at no time be permitted to accumulate in sedimentation basins to a depth sufficient to interfere with the settling efficiency thereof. Any such material removed shall be handled and disposed of so that a nuisance is not created and so that every reasonable and practical precaution is taken to prevent the said material from reaching the waters of the Commonwealth.

20. The permittee shall keep records of operation and efficiency of the waste treatment works and shall submit to the Department, promptly at the end of each month, such report thereon as may be required by the Department.

21. The discharge of untreated or improperly treated industrial wastes to the waters of the Commonwealth is contrary to the requirements of the Department. If, because of accidental breakdown of the treatment works or plant equipment or for other reason, any such discharge should occur, then the operation of the mill or process producing such discharge shall be discontinued until repairs to the treatment works or other satisfactory measures to prevent water pollution shall have been completed.

DEPARTMENT OF ENVIRONMENTAL RESOURCES
STANDARD CONDITIONS RELATING TO EROSION CONTROL 1985
For Use in Water Quality Management Permits

1. By approval of the plans for which this permit is issued, neither the Department nor the Commonwealth of Pennsylvania assumes any responsibility for the feasibility of the plans or the operation of the measures and facilities to be constructed thereunder.

2. If at any time the erosion and sedimentation activities undertaken pursuant to this permit or the discharge of the effluent therefrom is causing or contributing to pollution of the waters of the Commonwealth, the permittee shall forthwith adopt such remedial measures as are acceptable to the Department.

3. This permit does not authorize any earth disturbance controlled by an ordinance enacted by a local municipality. Additional permits must be secured from local municipalities where earthmoving activities are covered by local ordinances.

4. At least seven days before earthmoving will begin, the permittee, by telephone or certified mail, shall notify the Department or its designee of the date for beginning of construction and invite the County Conservation District Representative to attend a pre-construction conference with the contractor.

5. The permittee shall have his erosion control plan available at the site of the activity at all times. All earthmoving activities shall be undertaken in the manner set forth in the erosion and sedimentation control plan identified with this permit. Revisions to the plan shall be approved by the Department.

6. The erosion control measures and facilities shall be constructed under the supervision and competent inspection of an individual trained and experienced in erosion control, and in accordance with plans, designs and other data as herein approved or amended, and with the conditions of this permit. Control facilities shall be frequently inspected to insure effective control.

7. When the herein approved erosion control measures and facilities are completed, the permittee shall notify the Department so that an inspection of the measures and facilities may be made by a representative of the County Conservation District.

8. No storm water, sewage or industrial wastes not specifically approved herein, shall be admitted to the erosion and sedimentation measures and facilities for which this permit is issued, unless with the approval of the Department.

9. Sediment shall at no time be permitted to accumulate in sedimentation basins to a depth sufficient to limit storage capacity or interfere with the settling efficiency thereof. The sediment removed shall be handled and disposed of in a manner that will not create pollution problems and so that every reasonable and practical precaution is taken to prevent the said material from reaching the waters of the Commonwealth.

10. All slopes, channels, ditches or any disturbed area shall be stabilized as soon as possible after the final grade or final earthmoving has been completed. Where it is not possible to permanently stabilize a disturbed area immediately after the final earthmoving has been completed or where the activity ceases for more than 20 days, interim stabilization measures shall be implemented promptly.

11. Upon completion of the project, all areas which were disturbed by the project shall be stabilized so that accelerated erosion will be prevented. Any erosion and sedimentation control facility required or necessary to protect areas from erosion during the stabilization period shall be maintained until stabilization is completed. Upon completion of stabilization, all unnecessary or unusable control measures and facilities shall be removed, the areas shall be graded and the soils shall be stabilized.

12. The responsibility of carrying out the permit conditions shall rest with the owner, lessee, assignee or other responsible manager of earthmoving that affects the approved erosion controls. Such responsibility passes with each control succession.

I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS, OUTFALL 001, WHICH RECEIVES WASTE FROM:

LAT 41°22'23"
LONG 79°47'56"

a. The permittee is authorized during the period from issuance date through expiration date.

b. Based on the production data and anticipated wastewater characteristics and flows described in the permit application and its supporting documents and/or amendments, the following effluent limitations and monitoring requirements apply:

	Discharge Limitations*					Monitoring Requirements		
	Mass Units (lbs/day)		Concentrations (mg/l)					
Discharge Parameter	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instantaneous Maximum	Measurement Frequency	Sample Type	24 Hour Report Under A.3.C?
Flow (MGD)	0.205					Daily	Measured	
Total Suspended Solids	51.3		30		60	1/week	8 hr comp	
Oil & Grease**			15		30	"	Grab	
Aluminum			4		8	"	8 hr comp	
Dissolved Iron					7	"	Grab	
Osmolality					4000 m^{os}/kg*	1/6 months	8 hr comp	
TDS	N/A	N/A	N/A	N/A	N/A	1/week	"	
Chlorides	N/A	N/A	N/A	N/A	N/A	"	"	

** The test method shall be equal to Method 503B, Standard Methods 15th Edition, or EPA Method 413.2.

pH Not less than 6.0 standard units nor greater than 9.0 standard units at all times. Daily Grab

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations(s):

Outfall 001

*Unless otherwise indicated, these are gross discharge limitations.

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if different)

NAME: Franklin Brine Treatment Corp.

ADDRESS: U.S. RT. 322 EAST
P.O. Box 728
Franklin, PA 16323

FACILITY LOCATION: Cranberry Township, Venango County

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004
Expires 2-29-84

(2-16) PERMIT NUMBER: PA0101508

(17-19) DISCHARGE NUMBER: 001

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) QUALITY OR CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
Flow	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT	0.205		MGD						Daily	Measured
Total Suspended Solids	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT	51.3		PPD		30	60	mg/l		1/week	8 hr comp
Oil & Grease	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT					15	30	mg/l		"	Grab
Aluminum	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT					4	8	mg/l		"	8 hr comp
Dissolved Iron	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT						7	mg/l		"	Grab
Osmolality	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT						4000	mOs/kg		1/6 months	8 hr comp
TDS	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT	N/A	N/A		N/A	N/A	N/A			1/week	"

C-846

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319 *(Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)*

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: AREA CODE | NUMBER

DATE: YEAR | MO | DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

NAME [illegible]
ADDRESS U.S. Route 322 East
P.O. Box 728
Franklin, PA 16323
FACILITY LOCATION Cranberry Township, Venango County

PERMIT NUMBER (12-16): PA0101508
DISCHARGE NUMBER (17-19): 001

Expires 2-29-84

MONITORING PERIOD

FROM YEAR (20-21)	FROM MO (22-23)	FROM DAY (24-25)	TO YEAR (26-27)	TO MO (28-29)	TO DAY (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) QUALITY OR CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
Chlorides	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT	N/A	N/A		N/A	N/A	N/A		1	/week	8 hr comp
pH	SAMPLE MEASUREMENT							Stand. Units			
	PERMIT REQUIREMENT				6.0		9.0		Daily		"
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

C-847

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN, AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC § 1001 AND 33 USC § 1319. *(Penalties under these statutes may include fines up to $10,000 and/or maximum imprisonment of between 6 months and 5 years.)*

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: AREA CODE / NUMBER

DATE: YEAR / MO / DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

ER-BWQ-15-Rev. 4/78

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF WATER QUALITY MANAGEMENT

WATER QUALITY MANAGEMENT PERMIT

NO. 6182201-T1

A. PERMITTEE: (Name and Address)

Franklin Brine Treatment Corporation
Parkwest Office Center
Building One, Suite 540
Pittsburgh, PA 15275

B. PROJECT LOCATION

Municipality: Cranberry Township

County: Venango

C. TYPE OF FACILITY (For industrial wastes, type of establishment)

Gas Well Brine Treatment Facility

D. NAME OF MINE, PLANT, AREA SERVED, OUTFALL NO., ETC.

E. THIS PERMIT APPROVES:

1. Plans For Construction Of:
   a. [ ] Pump Stations: Sewers and Appurtenances
   b. [ ] Sewage Treatment Facilities
   c. [X] Industrial Wastes Treatment Facilities
   d. [ ] Mine Drainage Treatment Facilities
   e. [ ] Outfall & Headwall
   f. [ ] Stream Crossing
   g. [ ] Impoundment

2. The Discharge Of: N/A
   a. [ ] Treated
   b. [ ] Untreated
   c. [ ] Sewage
   d. [ ] Industrial Wastes

3. Discharge To: N/A
   a. [ ] Surface Water
   b. [ ] Ground Water

   Name of Stream to which discharged or drainage area in which groundwater discharge takes place or impoundment is located.

4. The Operation of a Mine [ ] N/A
   Maximum Area to be Deep Mined _____ Acres

5. An Erosion and Sedimentation Control Plan [X]
   Project Area is _____ Acres

F. THIS APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:

1. ALL CONSTRUCTION, OPERATIONS, PROCEDURES AND DISCHARGE SHALL BE IN ACCORDANCE WITH APPLICATION NO. 6182201 DATED 11-17-82 ITS SUPPORTING DOCUMENTATION, AND AMENDMENTS DATED 12-16-82, 1-31-83. SUCH APPLICATION, ITS SUPPORTING DOCUMENTATION AND AMENDMENTS ARE HEREBY MADE A PART OF THIS PERMIT.

2. CONDITIONS NUMBERED 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 18 and 19 OF THE Industrial Waste STANDARD CONDITIONS DATED 1971 AND CONDITIONS NUMBERED All OF THE EROSION CONTROL STANDARD CONDITIONS DATED 1973 WHICH CONDITIONS ARE ATTACHED AND MADE PART OF THIS PERMIT.

3. SPECIAL CONDITIONS DESIGNATED A WHICH ARE ATTACHED AND ARE MADE A PART OF THIS PERMIT.

G. THE AUTHORITY GRANTED BY THIS PERMIT IS SUBJECT TO THE FOLLOWING FURTHER QUALIFICATIONS:

1. IF THERE IS A CONFLICT BETWEEN THE APPLICATION ON ITS SUPPORTING DOCUMENTS AND AMENDMENTS AND THE STANDARD OR SPECIAL CONDITIONS, THE STANDARD OR SPECIAL CONDITIONS SHALL APPLY.

2. FAILURE TO COMPLY WITH THE RULES AND REGULATIONS OF THE DEPARTMENT OR WITH THE TERMS OR CONDITIONS OF THIS PERMIT SHALL VOID THE AUTHORITY GIVEN TO THE PERMITTEE BY THE ISSUANCE OF THE PERMIT.

3. THIS PERMIT IS ISSUED PURSUANT TO THE CLEAN STREAMS LAW, ACT OF JUNE 22, 1937, P.L. 1987 AS AMENDED 35 P.S. § 691.1 ET SEQ. AND/OR THE WATER OBSTRUCTION ACT, ACT OF JUNE 25, 1913, P.L. 555 AS AMENDED 32 P.S. § 681 ET SEQ. ISSUANCE OF THIS PERMIT SHALL NOT RELIEVE THE PERMITTEE OF ANY RESPONSIBILITY UNDER ANY OTHER LAW

PERMIT ISSUED

DATE July 19, 1985

DEPARTMENT OF ENVIRONMENTAL RESOURCES

BY Peter A. Yeager

Peter A. Yeager, P.E.

TITLE Regional Water Quality Manager

C-848

APPLICANT

A. Within six months after the herein approved waste treatment works are constructed and placed in operation, the permittee shall submit to the Department evidence of the efficiency and adequacy of such works in treating the waste discharges from this establishment.

ATTACHMENT C: FRANKLIN BRINE
INFLUENT MANIFEST

franklin brine treatment corp.

P.O. Box 728, Franklin PA 16323
(814) 437-3593

MANIFEST NO. 4701

Permit Number: PA—0101508

1. Generator (oil and gas lease owner): _____

2. Telephone: Bus. - ( ) _____ Emergency - ( ) _____

3. Mailing Address: _____

4. Lease Name/Location: _____

5. Type of Water: _____

TO INDUCE FRANKLIN BRINE TREATMENT CORPORATION TO ACCEPT DELIVERY OF THE FLUIDS IDENTIFIED IN THIS MANIFEST AND FOR THE CONSIDERATION OF DISPOSAL OF FLUIDS CONFORMING HEREWITH, ON MY BEHALF AND ON BEHALF OF THE LEASE OWNER/S ABOVE NAMED, WE HEREBY REPRESENT AND DECLARE THAT THIS CONSIGNMENT OF FLUID IS FULLY AND ACCURATELY DESCRIBED AND CONTAINS ONLY COMPONENTS AND SUBSTANCES CUSTOMARILY ASSOCIATED WITH THE ORDINARY COURSE OF OIL AND/OR GAS WELL DRILLING AND PRODUCING OPERATIONS. ALL EXCEPTIONS ARE NOTED UNDER ITEM #10.

6. Generator Agent's Name (please print): _____

7. **Generator Agent's Signature:** _____ 8. Date:___/___/___

9. Generator Agent's Title: _____

10. Exceptions and Comments: _____

_____

11. Transporter: _____ 12. Telephone: ( ) _____

13. Mailing Address: _____

14. Truck Number: _____ 15. Plate Number _____

16. Trailer Number: _____ 17. Plate Number _____

ACKNOWLEDGEMENT OF RECEIPT OF FLUID:

18. Driver's Name:
(please print): _____ 19. Driver's Signature: _____

(Driver's signature certifies that items 1 through 19 are correctly answered to his/her best knowledge, information and belief).

20. Date:___/___/___ 21. Driver's Initials: _____

22. Beginning Gallons: _____ 23. Ending Gallons: _____

24. Unloaded Gallons: _____ 25. Sample Number: _____

CERTIFICATION OF RECEIPT OF FLUID:

26. Operator's Signature: _____ 27. Date:___/___/___

28. Tank No. _____ Temp. _____ pH. _____ Cond. _____

29. Comments: _____

C-853

Sampling Report
Investigation of Mark Resources Corporation's Hazlett Well No. 1
Venango County, Pennsylvania
September 4, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of Appalachian Basin production sites developed by the Pennsylvania Department of Environmental Resources at the request of EPA. The list was transmitted via telephone to the EPA contractor on July 25, 1986. Site selection from this list took place during a telephone conversation on August 26, 1986.

Pennsylvania State officials preferred to list the possible sample sites by operator, type of site, site name, and permit number, as shown below. The EPA contractor had no interest in the manner in which the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites. The list consisted of 26 Appalachian Basin production sites:

	Operator	Type	Site	Permit no.
1.	----------	gas	Kelley #1	37121 41409 00
2.	----------	gas	Armstrong #2	37121 41152 00
3.	----------	gas	W-Small #1	37121 37577 00
4.	----------	gas	H-Snyder #1	37121 41396 00
5.	----------	gas	D-Nelson #1	37121 41311 00
6.	----------	oil	Hill #1	37121 41020 00
7.	----------	oil	Hill #2	37121 41021 00
8.	----------	oil	Hill #3	37121 41022 00
9.	----------	oil	Hill #4	37121 41023 00
10.	Nat'l Fuel Gas	gas	5645	37085 20038 00
11.	Nat'l Fuel Gas	gas	5988	37085 20068 00
12.	Nat'l Fuel Gas	gas	5998	37085 20113 00
13.	NEA Cross	gas	Culbertson #1	37121 37387 00
14.	Mark Resources	gas	Levi #1	37121 36991 00
15.	Mark Resources	gas	Hazlett #1	37121 39794 00
16.	Mark Resources	gas	Burchfied #1	37121 38214 00
17.	Mark Resources	gas	PE Deiter #1	37121 35078 00
18.	Moody & Assoc.	oil	S-2	37121 32937 00
19.	Moody & Assoc.	oil	S-3	37121 32938 00

20.	Moody & Assoc.	oil	S-4	37121 32939 00
21.	Moody & Assoc.	oil	S-5	37121 32940 00
22.	Moody & Assoc.	gas	S-6	37121 32941 00
23.	Moody & Assoc.	gas	S-8	37121 32943 00
24.	Moody & Assoc.	gas	S-9	37121 32944 00
25.	Moody & Assoc.	gas	S-12	37121 38999 00
26.	Moody & Assoc.	gas	S-13	37121 39000 00

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. No. 15 on the above list (Hazlett No. 1) was selected as the primary sample site. No. 10 on the above list (Nat'l Fuel Gas 5645) was selected as a back-up site should sampling at Hazlett No. 1 prove inaccessible or inappropriate. A second back-up site was selected as a precautionary measure. No. 24 on the above list (Moody & Associate's S-9) was selected as a second back-up site.

No problems were encountered in arranging sampling of Hazlett No. 1 September 4, 1986. The back-up sites were not required.

Site Location

Hazlett Well No. 1 is located 5 miles north of Cooperstown, PA on Sugar Lake Road. Figure 1 is a map indicating the site.

The site is operated by Mark Resources Corp., whose mailing address and telephone number are:

Penn Center West
Building II Suite 224
Pittsburgh, PA 15276
412-788-1340

Attendees

Sampling of Hazlett Well No. 1 was performed by CENTEC Corporation personnel on September 4, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Jim Kourmadas, Technician
Operator Representatives:	Matthew Vavro, Assistant Production Superintendent Mel Miser, Production Manager
American Petroleum Institute Representatives:	George Holliday, Contracted Observer Alan Wilson, Contracted Sample Team Member

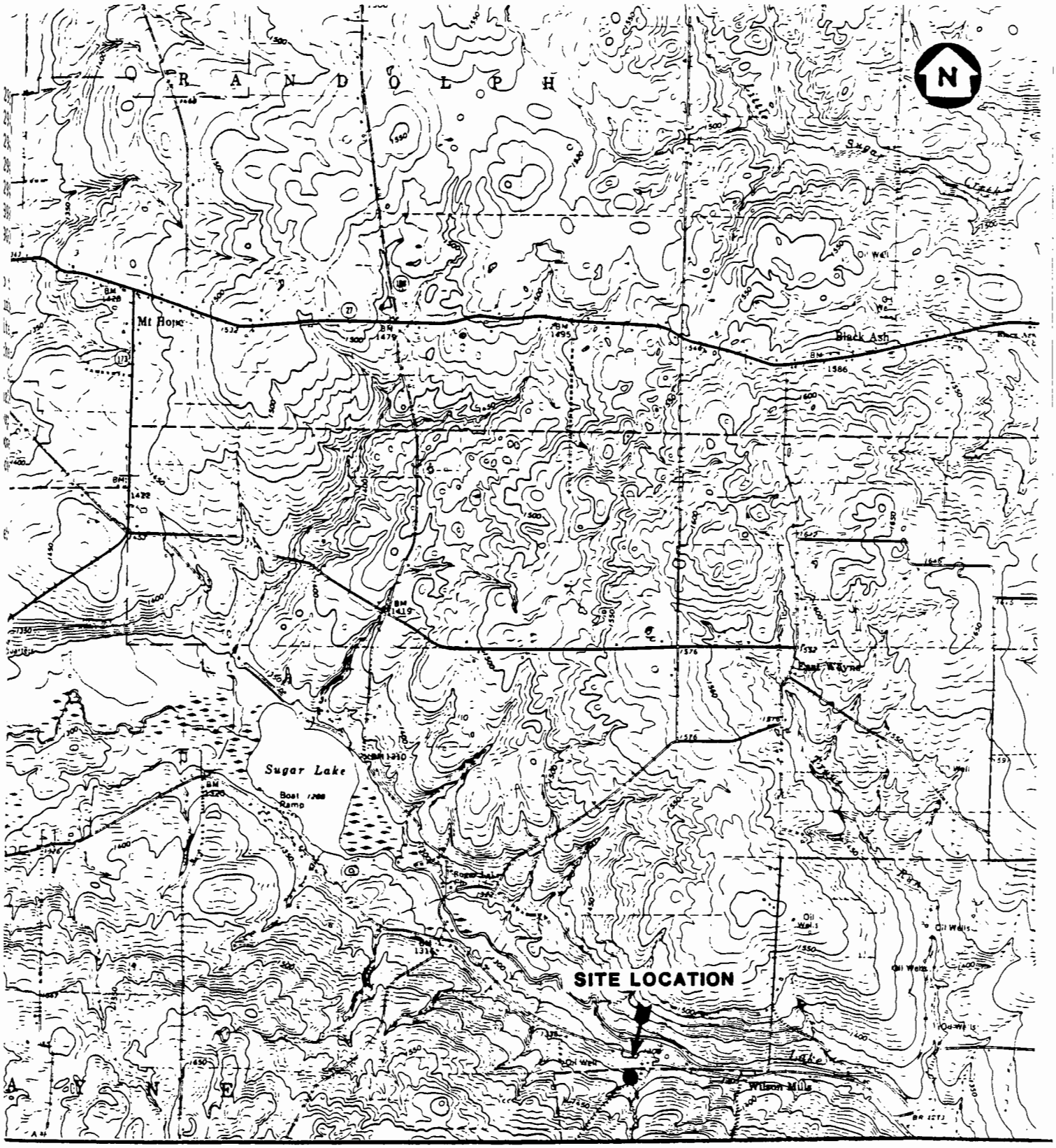


Figure 1. Location of Hazlett Well #1, Venango County, Pennsylvania

Site Description

Hazlett Well No. 1 is located in the Appalachian Basin, in a rural foothill area; the depth to groundwater is 120 feet, and the nearest surface water is 200 feet away. There are two drinking water wells within a 1/4-mile radius of this site. The soil in this area is mostly rock. The climate at this site location is net precipitation.

This site is an actively producing gas well with production of 100,000 bbl per day of natural gas liquids and 2 bbls per month of water. It is one of two wells on its lease. Production at this site is sweet. The well depth is 5,500 feet. The well is producing using natural drive.

Photos 1 and 2 (in Attachment A) show the facility in its entirety. The site consists of a 100 bbl brine tank and a gas well head. The brine tank has never been cleaned. No biocide has been used at this facility. Production was enhanced by fracturing stimulation on 12/84.

Disposal Practices

Brine is disposed by trucking it to a reinjection facility in Ashtabula County in Ohio owned by Universal Energies. There are no other wastes associated with the well.

Permits

The permit for the lease (No. 37-121-39749) is shown in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Location

The samples collected at Hazlett Well No. 1 consisted of two liquid samples. The sample collection point was the brine tank.

Sampling Methods and Equipment

The samples were collected with the sampling thief from the top of the tank through a thiefing hatch. This hatch is shown in Photo 3. The produced water was tested onsite for pH and free chlorine content after the completion of sampling. The pH of the water was 7. Free chlorine content was less than the lowest detectable level of 0.2 ppm.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

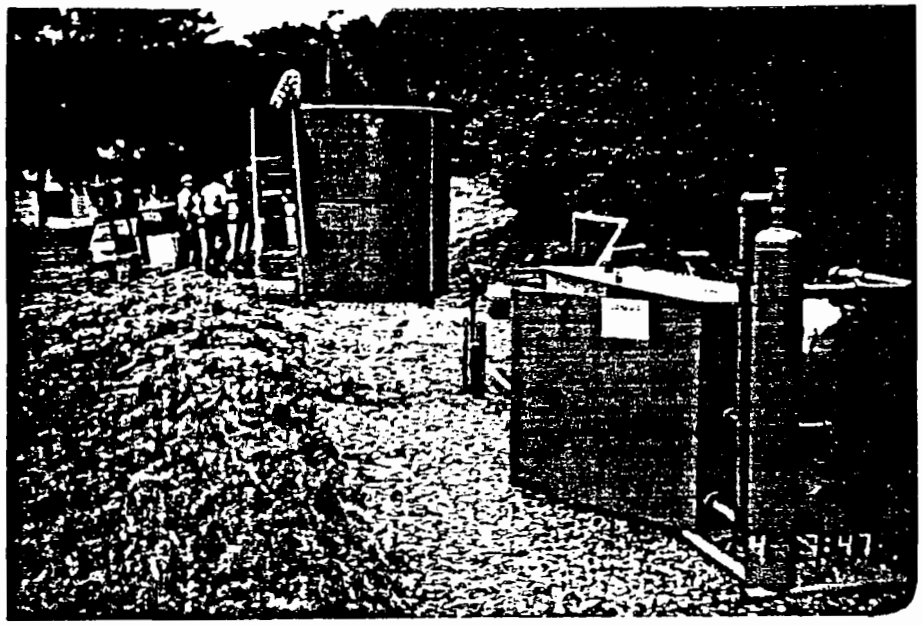


Photo 1. Well head and brine tank

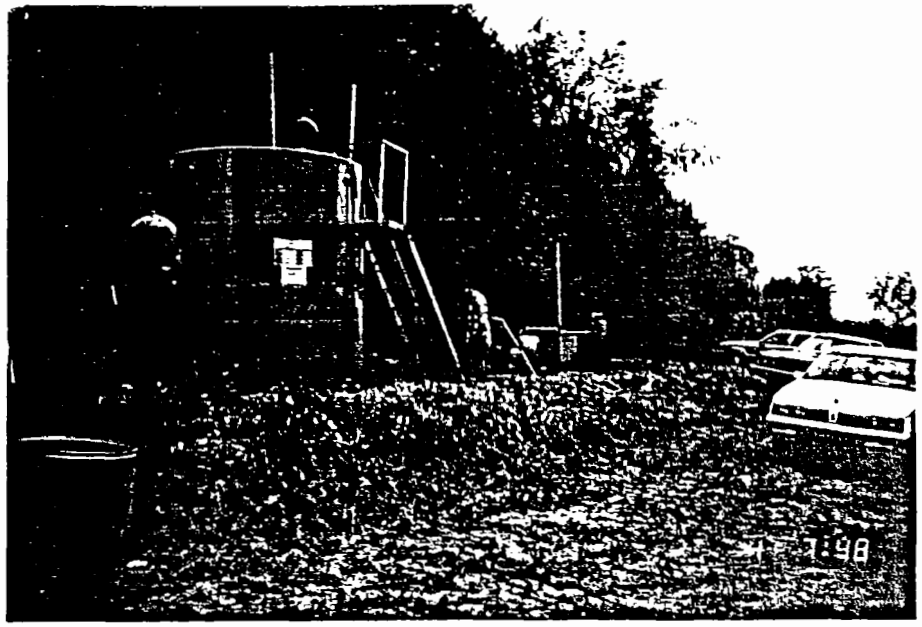


Photo 2. Well head and brine tank

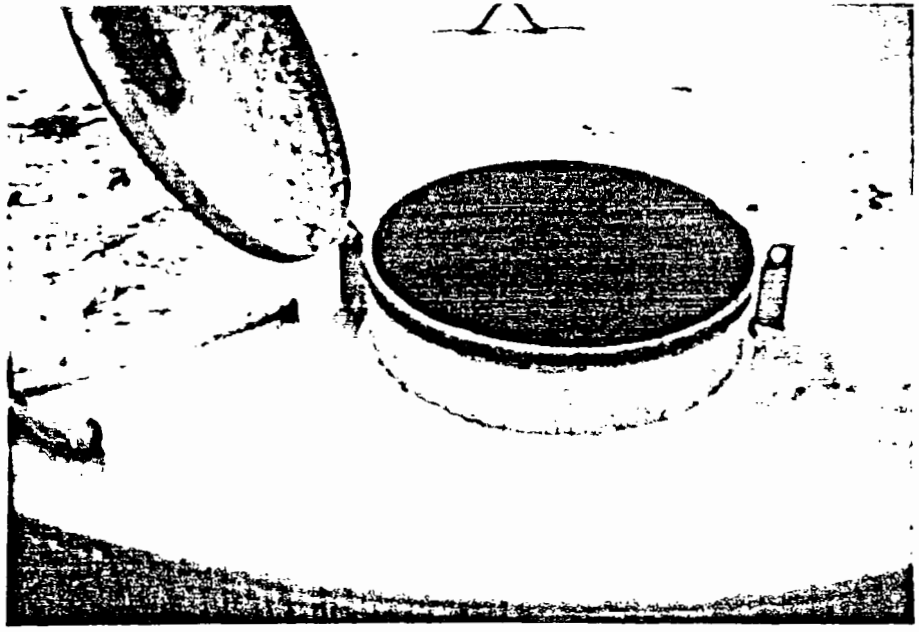


Photo 3. Sampling hatch on top of brine tank

ATTACHMENT B: PERMITS

ER-OG-1-71; Rev. 4/83

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF OIL AND GAS REGULATION
1205 Kossman Building, 100 Forbes Avenue
Pittsburgh, Pennsylvania 15222

DER OFFICE USE ONLY

I.D. No: CNC-32967		
Check No: 9233		Amt: $500
S: N	M.E:	G: N

Lease #: 37-121-054

6 1984

APPLICATION
(See reverse side for Line Item Explanation)

NOTICE OF PROPOSED OR EXISTING WELL LOCATION

(1) MARK RESOURCES CORPORATION
Name of Well Operator

(2) Penn Center West/Building II, Suite 224
Address

Pittsburgh, Pennsylvania 15276
City and State Zip Code

(3) 412/788-1340 Telephone No. (4) October 17, 19 84 Date

(5) Jackson Township
(6) Venango County
(7) C. Hazlett Farm
(8) Well Farm No. #1 (9) Serial No.

(10) Check one: New Well ☒
Drill Deeper (Existing Well) ☐
Re-drill (Existing Well) ☐
Storage Reconditioning (Existing Well) ☐
a. If existing well drilled after February of 1956, give permit number
b. If existing pre-act unpermitted well, give date drilled

(11) N/A
Coal Operator, Lessee, or Owner

(12) N/A
Address

N/A
City and State Zip Code

(11) N/A
Coal Operator, Lessee, or Owner

(12) N/A
Address

N/A
City and State Zip Code

(13) N/A
Name of Gas Storage Reservoir

(14) N/A
Storage Operator

(15) N/A
Address

N/A
City and State Zip Code

(16) Will well penetrate workable coal? ☐ Yes ☒ No
(17) Will well be drilled at a location where the coal has been removed? ☐ Yes ☒ No
(18) Will well be covered by the Oil and Gas Conservation Law? ☒ Yes ☐ No
(19) If answer to (18) is yes, does location fall within an area covered by a spacing order? ☐ Yes ☒ No
(20) Is well part of a project? ☐ Yes ☒ No
If yes, give project number

(21) Anticipated type of well (oil, gas, etc.) Gas
(22) Anticipated total depth 5,350'
(23) Will you move earth? ☒ Yes ☐ No If yes, do you have an erosion and sedimentation control plan? ☒ Yes ☐ No
If no, refer to Line Item Explanation #23 on reverse side.
(24) Will well penetrate or be within 3,000' of an active gas storage reservoir? ☐ Yes ☒ No
If answer is yes, complete lines (13) through (15).

(25) The undersigned well operator is entitled to drill upon the above named farm having fee title thereto, or as the case may be under grant or lease dated January 12 19 77 made by Gerald McDowell and recorded on the 10th day of February 19 77 in the office of the Recorder of Deeds for said county in Book 781, page 363, and subsequently assigned to Mark Resources Corporation on August 4, 1983 and recorded on September 20, 1983 in Book 839, page 854.

This notice, and the enclosed well location map, are herewith submitted to serve notice by certified mail to the owners and lessees of any and all workable coal seams and to the owners and operators of any active gas storage reservoirs the proposed well locations will penetrate or be within 3,000' thereof. Such notice is to be forwarded by the Division of Permitting.

(26) Signature of Well Operator or Authorized Representative

John A. Grego, Jr. Vice President of Operations
Print or type name of signer and title

DER OFFICE USE ONLY
Copies of notice and plat were forwarded to above listed coal and/or gas storage operators, owners, lessees on

(27) Service of a copy of this notice and well location map upon the undersigned is hereby acknowledged and the well location is approved this _____ day of _____ 19____

(28) _____
Gas Storage Operator or Owner

(29) _____
Coal Operator or Owner

DER OFFICE USE ONLY

DRILLING PERMIT

Permit Number WEN-39749 Date Nov. 5 84

This permit covering the well operator and well location shown below is evidence of permission granted to drill in accordance with the pertinent legal requirements subject to the conditions contained herein and on the reverse hereof. Notification must be given to the District Oil and Gas Inspector of the date well drilling will begin at least 24 hours prior to commencement of drilling activities.

Permit expires Nov. 5, 1985 unless drilling is commenced prior to that date and prosecuted with due diligence.

Oil and Gas Inspector
RICHARD A. FORD
Box 2
Roulette, PA 16746
Tele: 814-544-7356

Chief, Division of Permitting

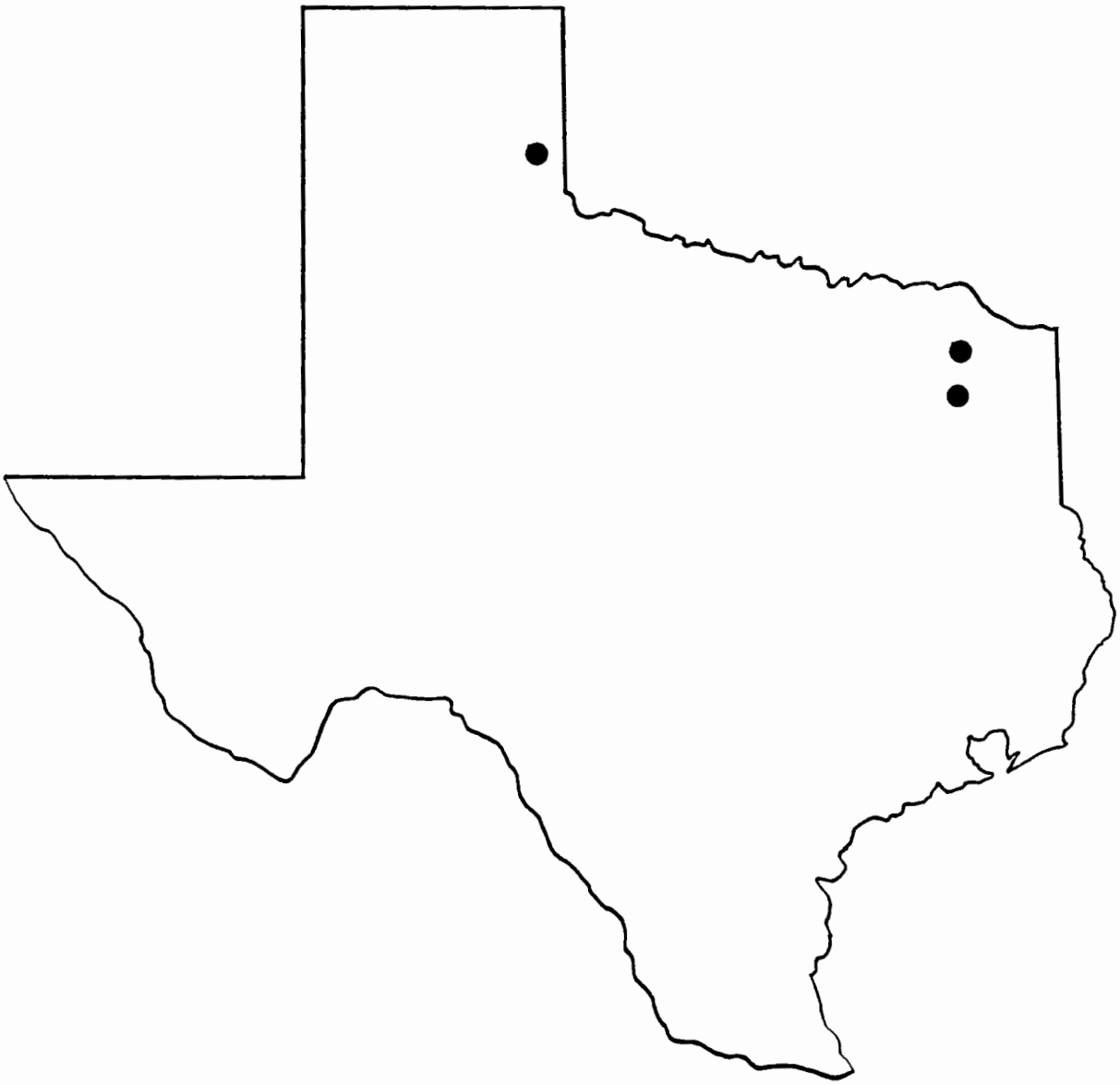
NOTE: Keep one copy of this permit posted at the drilling location.
For special conditions see attached requirements.

jp

PERMIT COPY – VOID UNLESS VALIDATED

C-865

TEXAS



Sampling Report
Investigation of Exxon Company, USA's
Hawkins Field Unit Well No. 1210
Wood County, Texas
June 19, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of Sabine/Tyler Basin drill sites developed by the Texas Railroad Commission at the request of EPA. The list was transmitted via telephone to the EPA contractor on June 11, 1986.

The EPA contractor had no interest in the manner the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites.

Railroad Commission officials listed the possible sample sites by operator and specific location. For simplicity of selection, the list was transmitted using only operator names. Randomization and site selection took place during the telephone conversation.

The list consisted of four drill sites in the Sabine and Tyler Basins:

1. SMK Oil Company
2. Justis Oil Company
3. Exxon U.S.A.
4. Greenwich Oil Company

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. The randomly-selected primary site was No. 3 on the above list, (Exxon U.S.A.). Justis Oil Company (No. 2 on the above list) was selected as a back-up site in the event the primary site was inaccessible or inappropriate.

Further inquiry identified the primary sample site as Exxon Company U.S.A.'s Hawkins Field Unit Well No. 1210 in Wood County, Texas. No problems were encountered in arranging sampling for June 19, 1986. The back-up site was not required.

Site Location

The Exxon Hawkins Well No. 1210 is located approximately 1 mile north of Hawkins, TX via Highway 14 in Wood County. Figure 1 is a map indicating the drilling site. The full name and mailing address for Exxon is:

Exxon Company, USA
16945 Northchase Drive
P.O. Box 4697
Houston, TX 77210-4697
Main Office Contact: Mr. B. Logan Moore, Jr., Division Staff Engineer, Regulatory Affairs
Phone: 713-775-6304

Attendees

Sampling at the Exxon site was performed by CENTEC Corporation personnel on June 19, 1986. Following is a list of people present at the time of sampling:

CENTEC Corp. (Sample Team):	Bill Lane, Technician Jamie McIntyre, Team Leader
State Representatives:	Jerry Mullican, Director, Underground Injection Control, Railroad Commission of Texas (RRC), Oil and Gas Division Windle Taylor, Manager NPDES Program, Underground Injection Control, RRC, Oil and Gas Division Carl Nelson, Laboratory Supervisor, RRC Leslie Savage, Geologist, RRC Frank Groves, Geologist, RRC Randy Early, Kilgore District Director, RRC
Operator Representatives:	L. E. Wallace, Technical Advisor, Houston Drilling Organization B. L. Moore, Jr., Division Staff Engineer, Regulatory Affairs Marvin Myska, Senior Field Superintendent, Hawkins Field Greg Dodson, Production Facilities Engineer

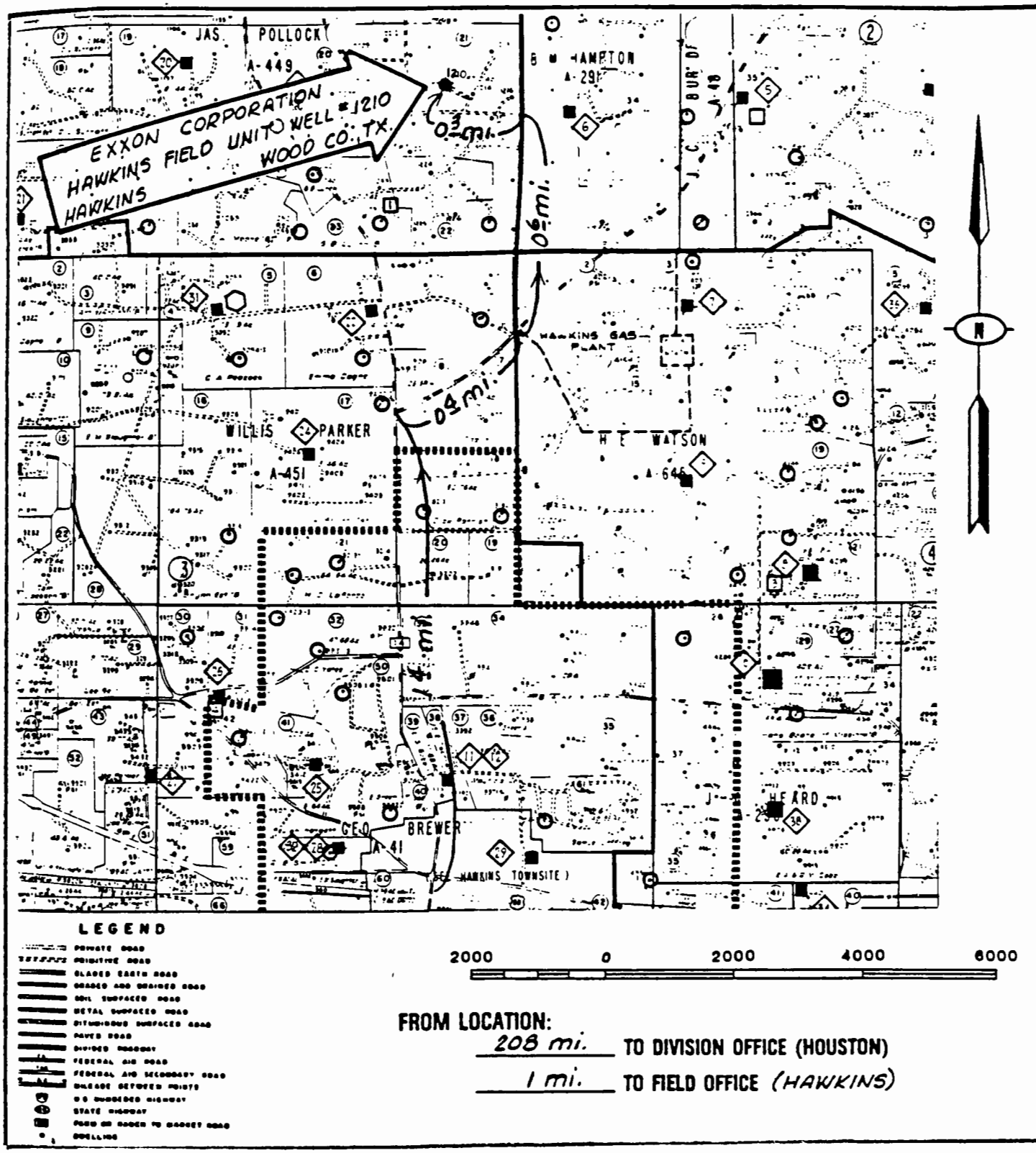


Figure 1. Location of Exxon Corporation's Hawkins Field Unit Well #1210, Wood County, Texas

American Petroleum Institute
Institute Representative: George Holliday, Contracted Observer

Site Description

The Exxon site is located in a rural flatland. The climate at this site location is net evaporation. The soil is described as clay. The site is located over the Woodbine formation of the Tyler Basin. Figure 2 is a survey of the exact location of the hole.

The depth to the groundwater in the area is 58 feet. The nearest surface water is a stream located 300 feet west of the site. The only nearby drinking water well is located more than one mile from the site.

At the time of sampling, the site consisted of one oil well and one reserve pit. The drill rig had been removed from the site. Work on the pipeline from the well head continued for the duration of the sampling efforts. Figure 3 is an approximate schematic diagram of the site, indicating the directions in which photos were taken (Attachment A).

This site was a developmental oil drilling site. The well was drilled into the Woodbine formation of the Tyler basin. The well was permitted to a depth of 5,400 feet, and was actually drilled to a depth of 4,868 feet. Drilling began on June 4, 1986, and the well was completed June 9, 1986.

Drilling was accomplished with freshwater base mud. The quantities of compounds used in the mud are summarized below:

Mud Contents	Volume Used (lbs)
Barium Sulfate (Barite)	5,400
Sodium Montmorillite (Gel)	10,700
Sodium Hydroxide	1,700
Ferrochrome Lignosulfonate	500
Lignite	600
Sodium Bicarbonate	100
Sodium Acid Pyrophosphate (SAPP)	50

One unlined pit was constructed onsite to provide temporary storage of drill cuttings, residual drilling muds from the circulation system, waste cement, and rig wash water. The pit contents were piped from the drilling operation. The pit was in use between June 4 and June 10, 1986.

The pit was designed to the dimensions of 45 x 220 feet (width and length) and 5 feet deep, as shown in the plat provided by Exxon, Figure 4. Figure 3 shows the measured dimensions obtained at the time of sampling, based on the liquid level in the pit at

EXXON - CENTRAL DIVISION - VIL ENGINEERING REPORT ON PROP D DRILLSITE

LOCATION: Hawkins Field Unit, Well No. 1210 STAKED: 4/25/86

FIELD: Hawkins COUNTY: Wood CLASSIFICATION: Oil

RESERVOIR: Woodbine PROPOSED DEPTH: 4900' ELEVATION: 403' (from Topo map)

LOCATION CALLS:

30' E of WL
910' S of NL of the
E. W. Moore "A"
80 acre tract

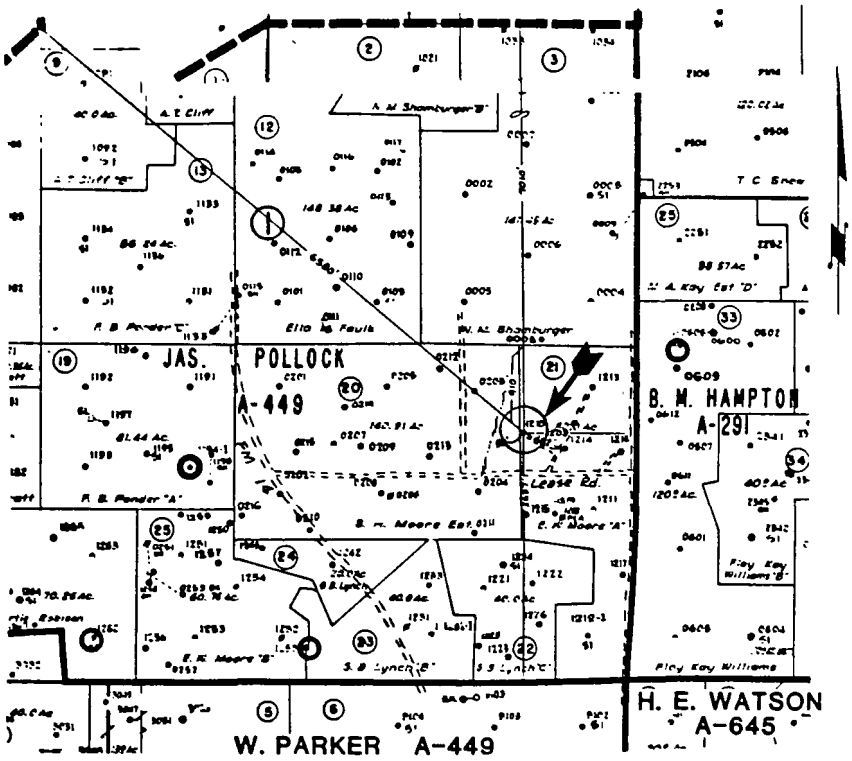
1202' W of EL
2637' N of SL of the
Jas. Pollock Sur., A-449

SURVEY: Jas. Pollock

ABSTRACT NO. 449 LEASE NO. E-61058

APPROVED BY: G.J. Hermsen

STATE PLANE COORDINATES:
Zone: North Central
X = 2,706,730.92
Y = 355,129.31



DISTANCE TO NEAREST STRUCTURE: None apparent within 500'
DISTANCE TO NEAREST OCCUPIED DWELLING: None apparent within 500'
DISTANCE TO NEAREST TOWN: Hawkins is S 1.1 mi.
IS WELL LOCATED IN INCORPORATED AREA? No
ROAD MILEAGE TO NEAREST MAJOR HIGHWAY: F.M. Hwy No. 14 is W 0.7 mi.
ROAD MILEAGE TO NEAREST RAILROAD SUPPLY POINT: Missouri Pacific RR (Hawkins) is S 3 mi.
DISTANCE TO NEAREST LEASE/PUBLIC ROAD: Lease road is SE 480'
IS ROAD HEAVILY TRAVELED? No
DISTANCE TO NEAREST BODY OF WATER: Creek is W 300' (approx.) flowing S
WATER SOURCE: Existing water well (See Pete Gibson for location)
DISTANCE TO NEAREST PIPELINE: None apparent within 300' (M-scoping difficult)
DISTANCE TO NEAREST AIRPORT: Hawk Ranch (pvt) Airstrip is NE 2.8 mi.
DISTANCE TO NEAREST POWER LINE: None apparent within 500'
OTHER ENVIRONMENTALLY SENSITIVE AREAS & DISTANCES: Very thick underbrush
FIELD BOOK REFERENCE: ET-4065 PAGE 2

CMM:jr
May 6, 1986

Figure 2. Map and Description of Well Location

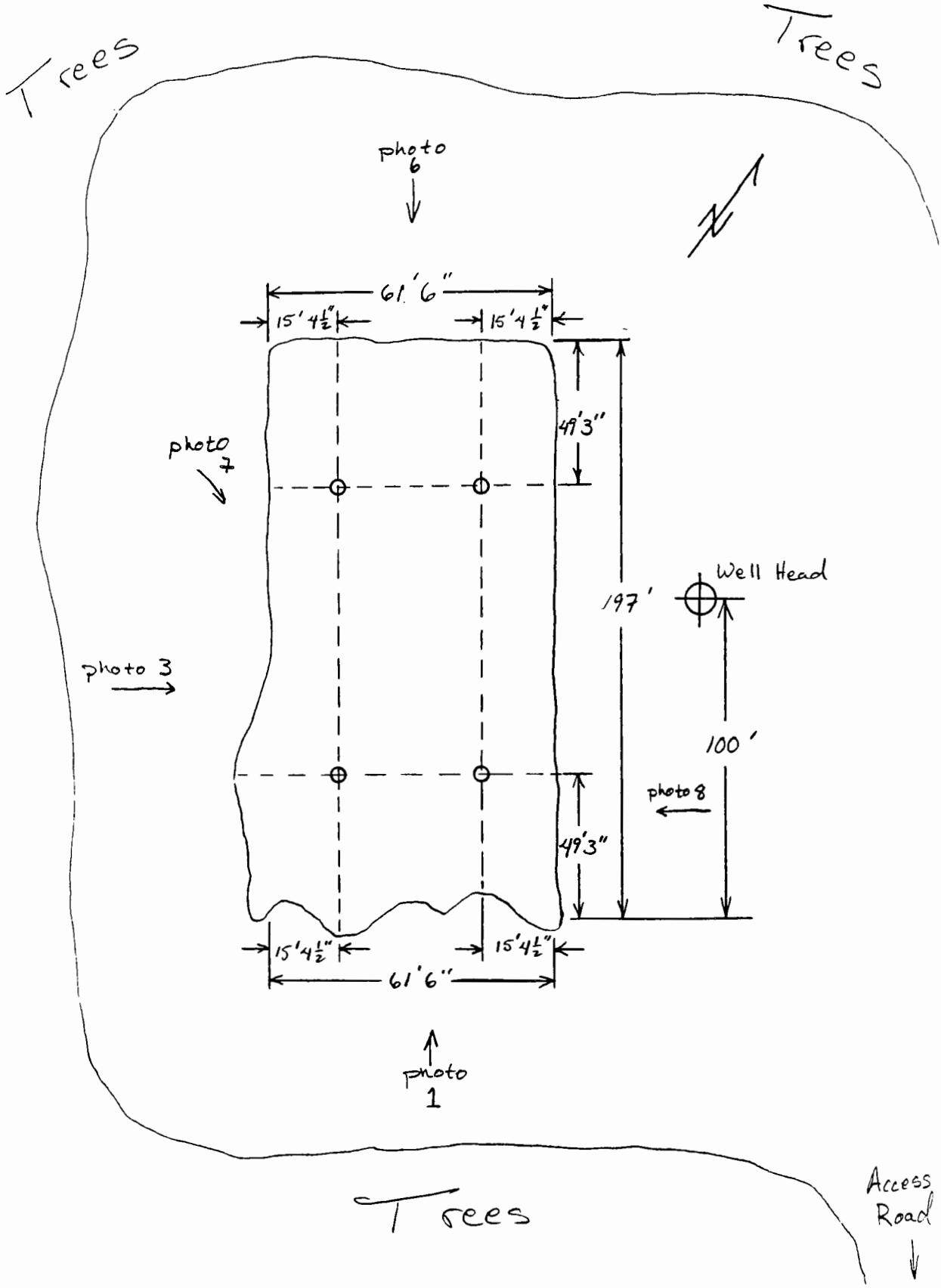


Figure 3. Schematic Diagram of Drilling Site

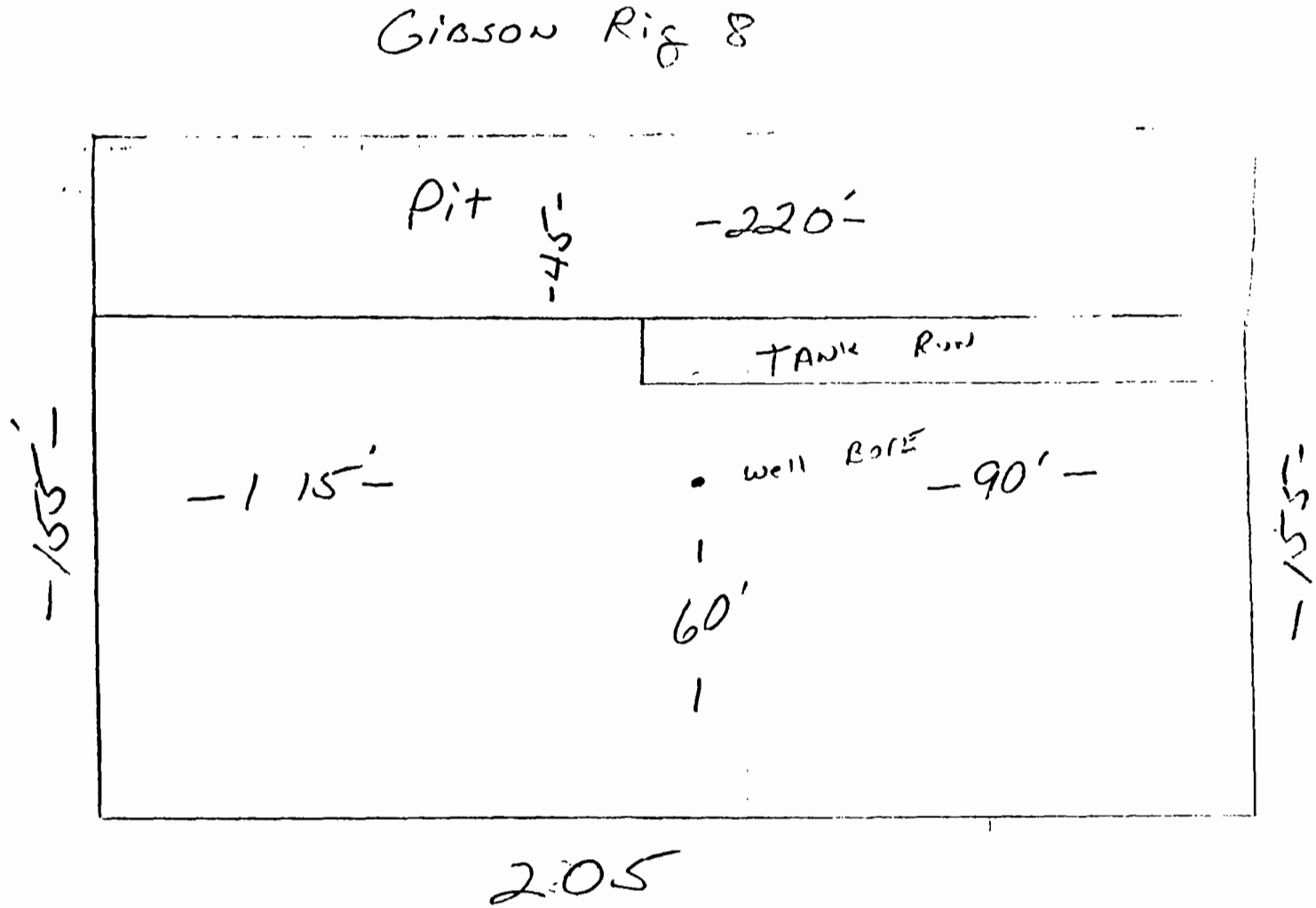


Figure 4. Plat of Drilling Site
(Provided by Exxon)

that time. The pit was constructed both above and below grade due to an upward slope from southeast to northwest. The southeast end of the pit, viewed in Photo 6 in Attachment A, was built up above grade, and the northwest end, viewed in Photo 1, was cut below grade. The depth of liquid in the pit was 2 to 5 feet, and the depth of the sludge was approximately 1 foot.

The operator stated that pit contents included estimated volumes of 350 barrels of cuttings generated from drilling operations, 1,200 barrels of drilling fluids and rig wash water, 20 barrels of waste cement, and a negligible amount of waste lube oil, which entered the pit with the rig wash water. The operator also estimated that the pit contained a total of 5,200 barrels at the time of sampling. These estimates are low in comparison with the measurements made by the sample team, which suggest that there were approximately 7,600 bbls in the pit, assuming an average depth of 3 1/2 feet (see Figure 3 for field measurements.

Tanks storing diesel on site contained roughly 2,000 gallons prior to removal of the drilling rig.

The pit contents were tested by Exxon and by the Texas Railroad Commission, for chlorides levels. Exxon reported a chloride level of 142 parts per million, and the RRC reported 250 parts per million. Figure 5 is a copy of a laboratory report on pit fluid contents, ordered by Exxon, dated June 16, 1986.

Disposal Practices

At the time of sampling, the operator expected to dispose of the fluid and solids from the reserve pit by hauling them to a land farm where they would be spread out and disked into the ground. The specific land farm had not been identified at that time. The pit was to be backfilled and the area to be restored to nearly its original state.

Permits

A copy of the drilling permit secured by Exxon for the Hawkins Well No. 1210 is located in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005).

Sample Point Locations

At the Exxon site, the samples were defined as the supernatant and solid contents of the waste material in the reserve pit.

Gas Services, Inc.
P. O. Box 2029
Tyler, Texas 75710-2029
214-593-2535

COMPANY: EXXON, USA

LEASE: HAWKINS FIELD UNIT 1210

SAMPLE DATE: 6-12-86

TEST DATE: 6-16-86

PIT H_2O SAMPLE

Na	287.5	MG/L	
Ca	88	"	
Mg	11.5	"	
K	12.2	"	
Cl	142		
HCO_3	0	"	
SO_4	320	"	
CO_3	20	"	
Fe	96.2	"	
Total Suspended Solids	10,202	MG/L	(Appears to be clay particles)
Total Dissolved Solids	998	MG/L	
Total ~~Dissolved~~ Solids	11,200	"	
Specific Conductivity	1,050		
PH	8.35		
Specific Gravity	1.00004		
P Alkalinity	20		
M Alkalinity	680		
Total Alkalinity	700		
H_2S	NIL		

Figure 5. Laboratory Analysis of Reserve Pit Fluid

Figure 3 indicates the sample points from which the pit samples were composited.

Sampling Methods and Equipment

To collect samples from the reserve pit, the pit was measured to identify the four quadrants shown in Figure 3, and to locate the center of each quadrant. The measured points were marked by placing stakes along the sides of the pit to facilitate locating sample points.

The sample points were accessed by boat. The boat was pulled to the measured sample points via three ropes, as shown in Photos 4 through 7. State and company personnel volunteered to assist with the ropes.

The first sample to be collected was the liquid composite. The liquid from each sample point was composited in a 5-gallon carboy, shown in the boat in Photo 4.

The reserve pit was then sampled for sludge. The dredge was used to sample the sludge because the sludge was too liquid to be retained by the coring device. Two full dredges were obtained at each quadrant, yielding a total volume of approximately 5 gallons. Photo 6 shows the sample team taking a sludge sample. The solids were composited in a steel bucket.

The pH of both the liquid and the sludge sample was measured onsite after sampling was completed. The pH for both samples was 7.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

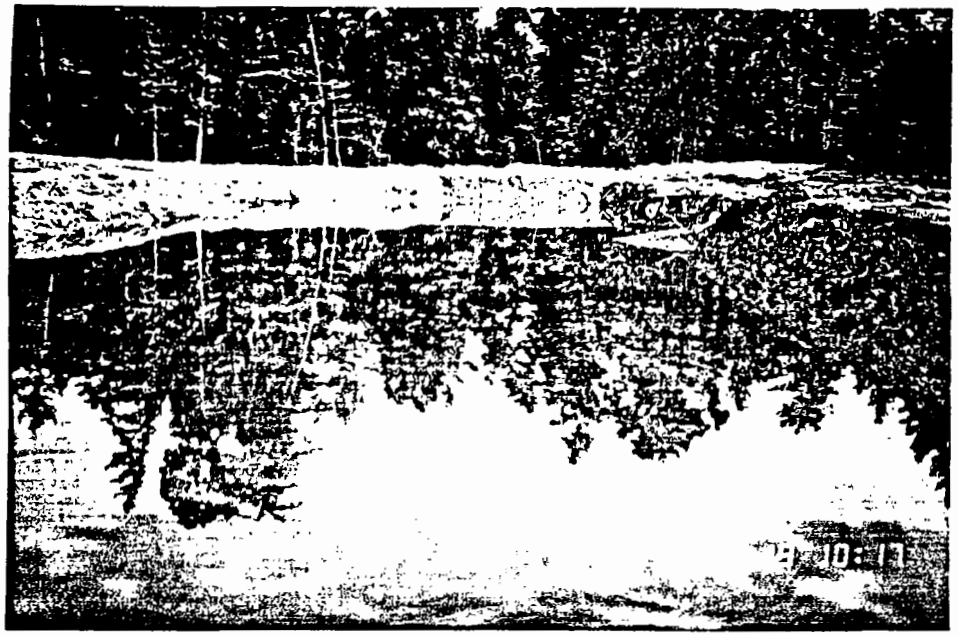


Photo 1. Northwesterly view of reserve pit

Photo 2. Liquid surface of reserve pit

Photo 3. Northeasterly view across reserve pit

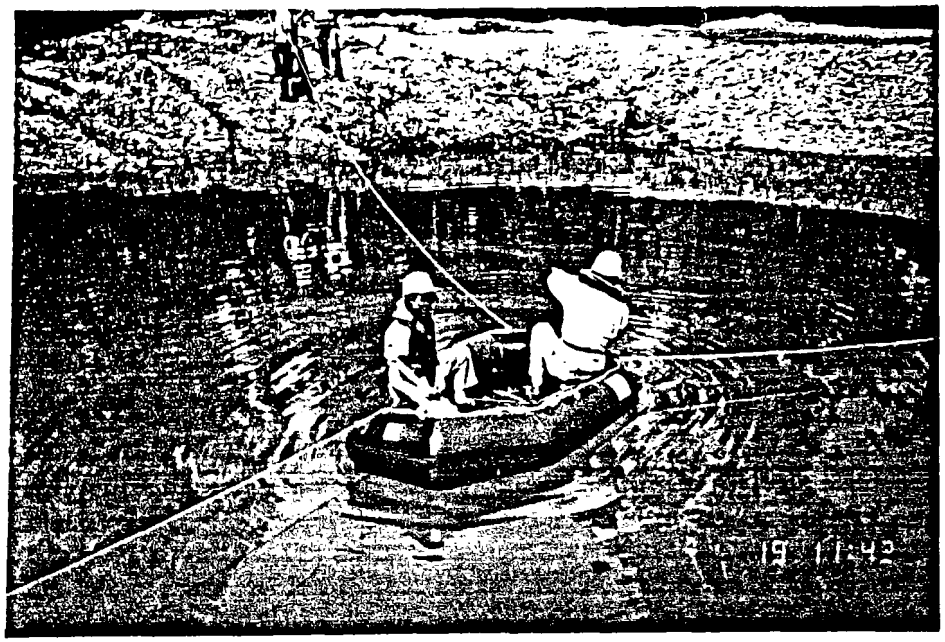
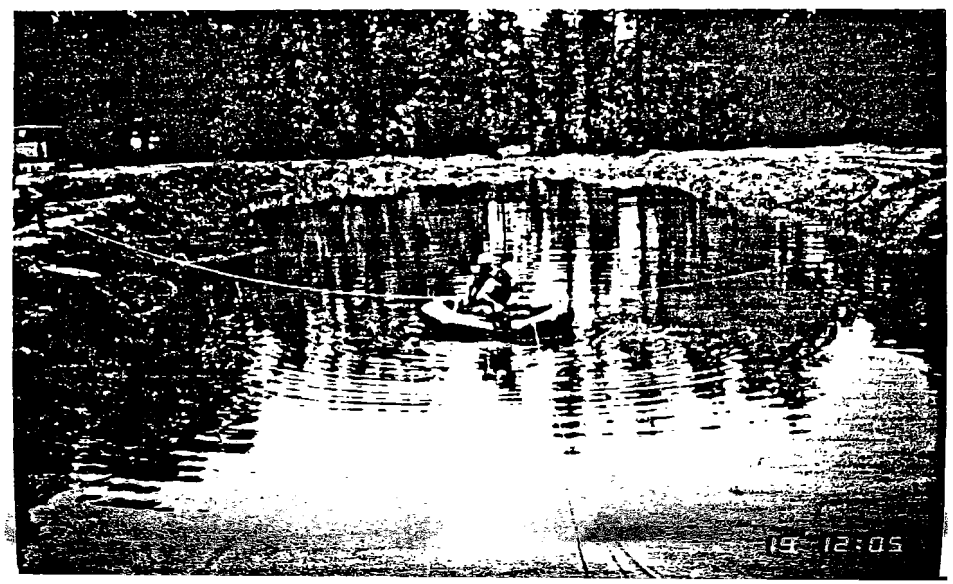


Photo 4. Liquid sampling in east corner of reserve pit

Photo 5. Samplers preparing to sample sludge with dredge



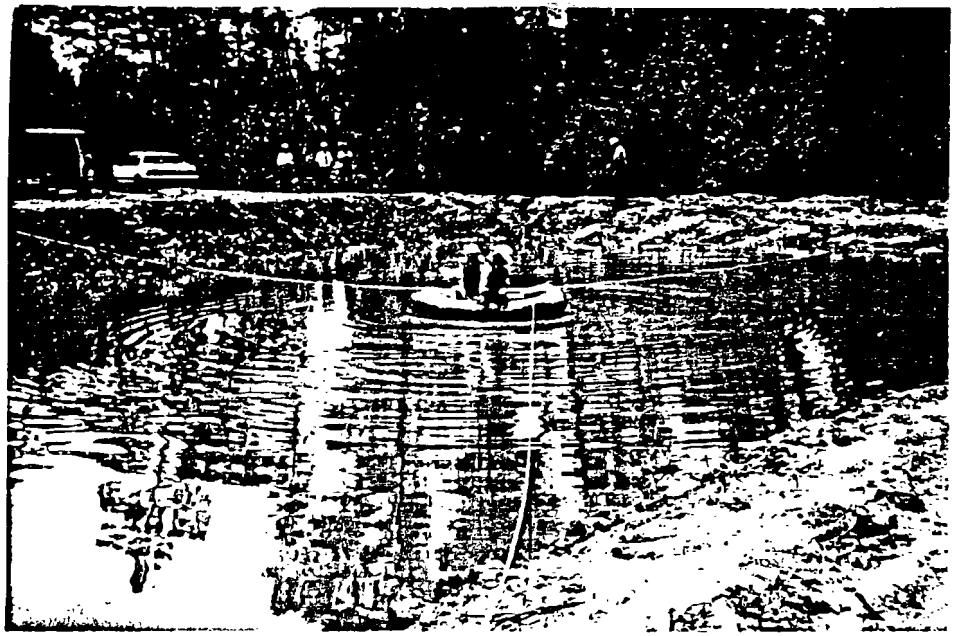


Photo 7. Dredge sampling in south corner of reserve pit

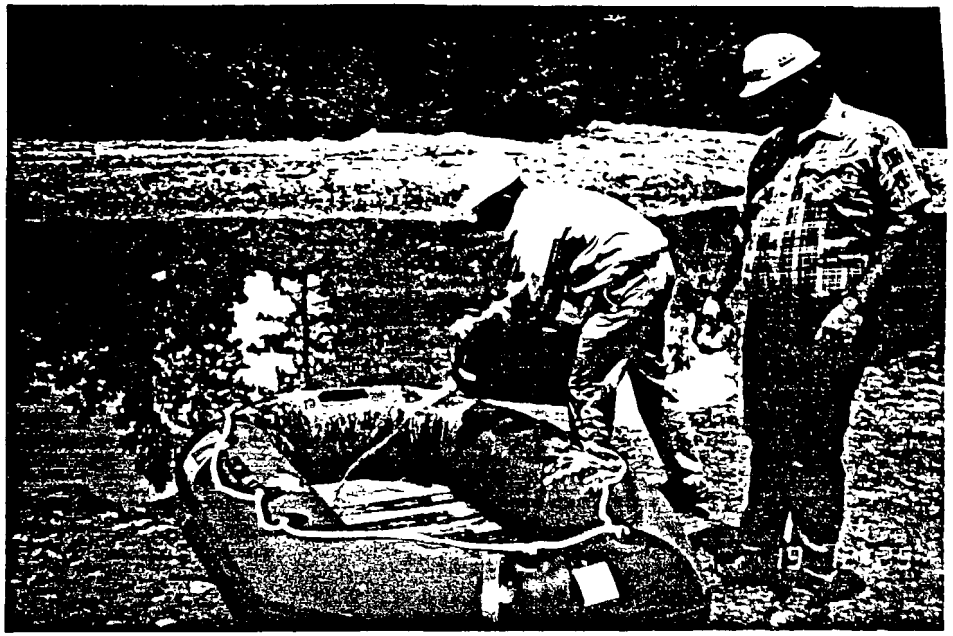


Photo 8. Rinsing boat after sampling

Photo 9. Pouring liquid sample

ATTACHMENT B: PERMITS

R ROAD COMMISSION OF TEX
OIL & GAS DIVISION
PERMIT TO DRILL, DEEPEN OR PLUG BACK ON REGULAR LOCATION

~~BTS~~ WF

IMIT NUMBER: 301789	DATE OF PERMIT: 5/02/86	DISTRICT: 06
NUMBER: 42 499 31471	FORM W-1 (dated): 5/01/86	COUNTY: WOOD
E OF OPERATION: DRILL		ACRES: 10,591

RATOR: 257097

EXXON CORP.
P.O. BOX 4698, RM. 571F
HOUSTON TX 77210

NOTICE
NO ALLOWABLE WILL BE ASSIGNED unless well protects all fresh water sands with sufficient surface casing. Where Commission rules do not specify surface casing requirements, contact the Texas Department of Water Resources for depth to which fresh water sands must be protected.

District Office Telephone No.: 214 984-3026

SE NAME: HAWKINS FIELD UNIT	WELL NUMBER: 1210
ATION: 1 MILES NORTH FROM HAWKINS	TOTAL DEPTH: 5,400

TION, BLOCK and/or SURVEY: SEC=> BLK=> SVY=>JAS. POLLOCK AB=>449

'ANCE -- LEASE LINES	-- SURVEY LINES	-- NEAREST WELL ON LEASE
580 FNWC - 7010 FNL	1202 FEL - 2637 FSL	482

NOTE THE CONDITIONS ON THE REVERSE SIDE, PARTICULARLY CONCERNING SPACING RULE CHANGE. IT IS THE OPERATOR'S RESPONSIBILITY TO INSURE THAT THE PERMITTED LOCATION COMPLIES WITH THE DENSITY AS WELL AS THE SPACING RULES IN EFFECT ON THE SPUD DATE. A RULE 37 AND/OR RULE 38 EXCEPTION WILL BE REQUIRED IF, BECAUSE OF A FIELD RULE CHANGE, THE LOCATION IS NOT IN COMPLIANCE WITH THE COMMISSION FIELD RULES ON THE SPUD DATE.

.D(S)

HIS PERMIT AND ANY ALLOWABLE ASSIGNED MAY BE REVOKED IF A CHECK TENDERED TO HE COMMISSION IS NOT HONORED. *

HAWKINS

RECEIVED
MAY 12 1986
REGULATORY AFFAIRS
SOUTHEAST TEXAS DIV.

THIS PERMIT SUBJECT TO THE CONDITIONS ON THE BACK OF THIS FORM.

THE OPERATOR SHOULD CONSIDER THE REQUIREMENTS OF THE NATURAL GAS POLICY ACT OF 1978, AS AMENDED, (NGPA), AND APPLICABLE STATE OR FEDERAL REGULATIONS.

Based upon the representations made on the FORM W-1 and those made on any plat or plats filed therewith, it is believed that the operation indicated, when carried out at that point which you have represented to be the location of the above designated Well, complies as of the date thereof, with the provisions of the applicable spacing rule SUBJECT TO THE LIMITATIONS, IF ANY, SET OUT ABOVE. Compliance with the applicable Commission spacing rule renders it unnecessary that you secure a special Commission permit to cover this indicated operation at the location shown, the same being classed as regular.

PHONE: (512) 445-1314

DIRECT INQUIRIES TO: DRILLING PERMIT SECTION, OIL AND GAS DIVISION

MAIL: Capitol Station-P. O. Drawer 12967 Austin, Texas 78711

Sampling Report
Investigation of Mobil's C. W. Belcher Lease
Production Facility
Talco, Texas
June 20, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of Tyler Basin production sites developed by the Texas Railroad Commission at the request of EPA. The list was transmitted via telephone to the EPA contractor on June 16, 1986. Randomization and site selection took place during the telephone conversation.

The EPA contractor had no interest in the manner the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites.

Railroad Commission officials listed the possible sample sites by operator and specific location. For simplicity of selection, the list was transmitted using only operator names. The list consisted of five production sites:

1. Hunt Oil
2. Amoco Production
3. Arco Oil and Gas
4. Mobil
5. Union

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. The randomly-selected primary site was No. 4 on the above list (Mobil Oil). No. 1 on the above list (Hunt Oil) was selected as a back-up site in the event the primary site was inaccessible or inappropriate.

Further inquiry identified the primary sample site as the Mobil Oil Company C. W. Belcher Lease Production Facility near Talco, Texas. No problems were encountered in arranging sampling for June 20, 1986. The back-up site was not required.

Site Location

The Mobil C. W. Belcher Lease (01796) production facility is located approximately 3 miles east of Talco, TX via highway 71 in Titus County, and approximately 14 miles north of Mount Pleasant. Figure 1 is a map indicating the production facility site. The full name and mailing address for Mobil is:

Mobil Producing Texas and New Mexico Inc.
Nine Greenway Plaza-Suite 2700
Houston, Texas 77046
Main Office Ph.: 713-871-5351
Main Office Contact: K.K. Defenbaugh,
Environmental and Regulatory Engineer

Attendees

Sampling at the Mobil Oil C. W. Belcher production site was performed by CENTEC Corporation personnel on June 20, 1986. Following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bill Lane, Technician Jamie McIntyre, Team Leader
State Representative:	Roy Ottmers, Engineering Technician, Texas Railroad Commission, Kilgore Dist.
Operator Representatives:	K.K. Defenbaugh, Environmental and Regulatory Engineer E.G. Patton, Production Supervisor Larry McClanahan, Production Technician
American Petroleum Institute Representatives:	George Holliday, Contracted Observer
Other Groups:	R.B. Welch, Sales Engineer, Petrolite Oil Field Chemicals Group

Site Description

The Mobil C. W. Belcher production facility is located in a rural, piedmont area. The climate at this site location is net precipitation. The soil consists largely of sand and clay. According to the permit application for a large pit on site, there are no drinking water wells within one mile of the site, and no fresh water in the area (Attachment B). The average chlorides content of the produced brine is described in the permits as being 10,000 mg/l.

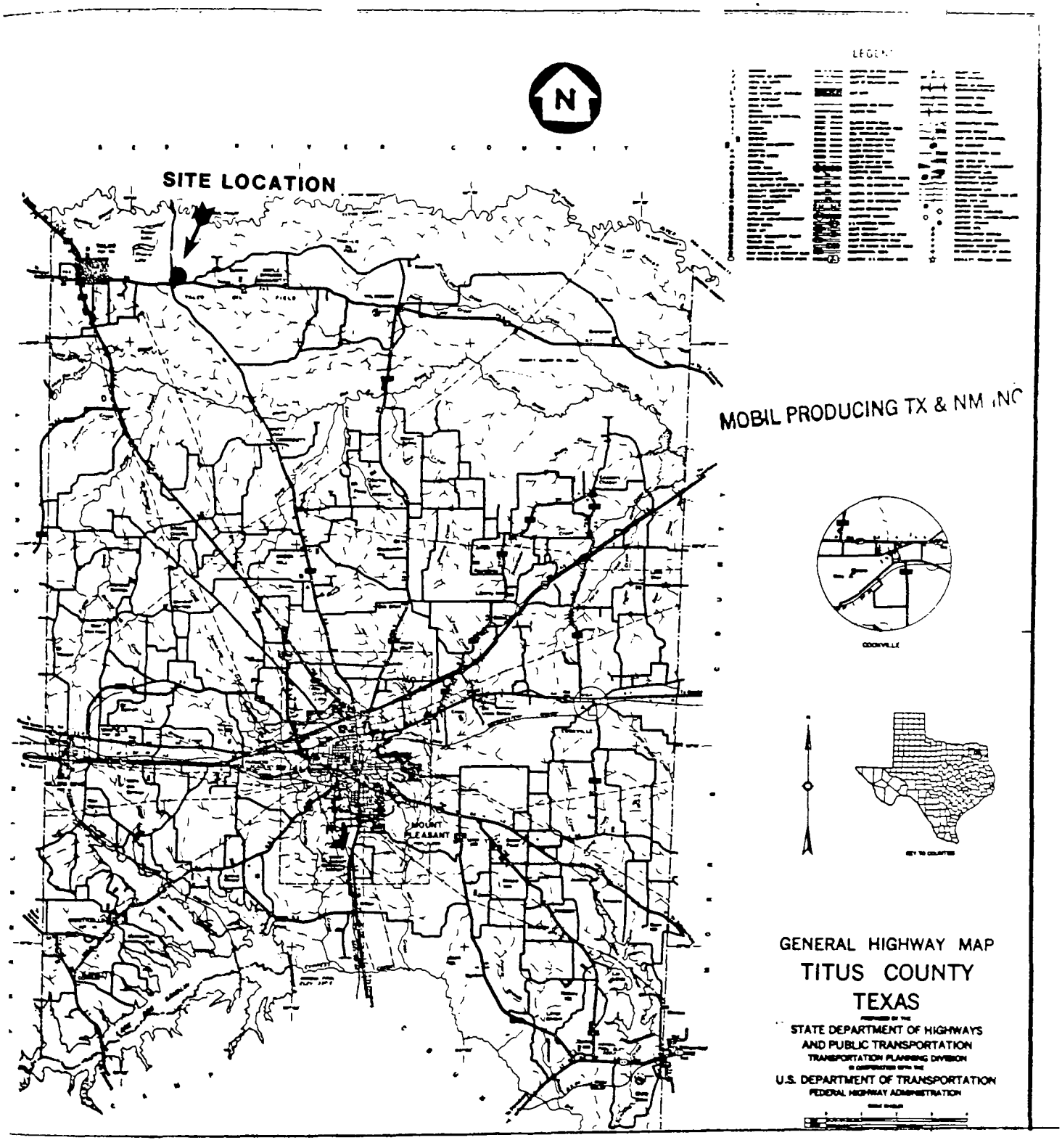


Figure 1. Location of Mobil's C. W. Belcher Lease Production Facility, Talco, Texas

The site consists of one heater-treater, three free water knock outs, two brine tanks, four stock tanks, five brine pits, and three injection wells. One of the two brine tanks is used to settle out solids and hydrocarbons, and the other serves as a suction tank to two pumps that feed the injection wells. Photo 1 shows the brine tanks with signs in front indicating the presence of H_2S gas. Figure 2 is an approximate schematic diagram of the facility, indicating the directions in which photos were taken (Attachment A). Figure 3 is a plat of the C. W. Belcher lease, showing the location of the pits and tankage in relation to the injection wells.

Oil enters the production area from nine producing wells located on the Lucy Blackburn lease as well as the C. W. Belcher lease. Referring to Figure 2, the free water knock out (FWKO) closest to the brine tanks receives the C. W. Belcher oil, the FWKO closest to the stock tanks receives the Blackburn oil, and the FWKO between these two is used to test the output of individual wells.

At the time of sampling, there were nine oil wells collectively producing daily quantities of 400 barrels of oil and 6,000 barrels of produced water.

As stated in the pit permits located in Attachment B, the use of the brine pits is "limited to collection of produced water prior to disposal." Figure 4 is a drawing of overhead and side views of the five pits, and Figure 5 is a more detailed drawing of Pits B through E. The general purpose of the pit system is to receive brine from the production system only when there is overflow from the brine tanks, when tanks are being cleaned, or in the event of an emergency. The smaller pits receive incoming brine from the brine tanks, and provide for skimming oil and settling solids prior to Pit A. The largest pit (A) is lined with 4 inches of gunnite, and was constructed below grade with 2 feet of freeboard above grade (Photo 2). Pit A is filled on an average of once per week.

All tanks on the facility are cleaned once every 3 years. The pits are cleaned every 5 years.

Disposal Practices

Produced brine is disposed of in three injection wells on the C. W. Belcher lease, located as shown in Figure 3. The injection wells are Nos. 3, 4, and 7. Brine that is released to the pits on site is also eventually injected into these wells. Any solids collected when tanks and pits are cleaned are buried at a location on the lease, either at the production tank battery site or at a well site.

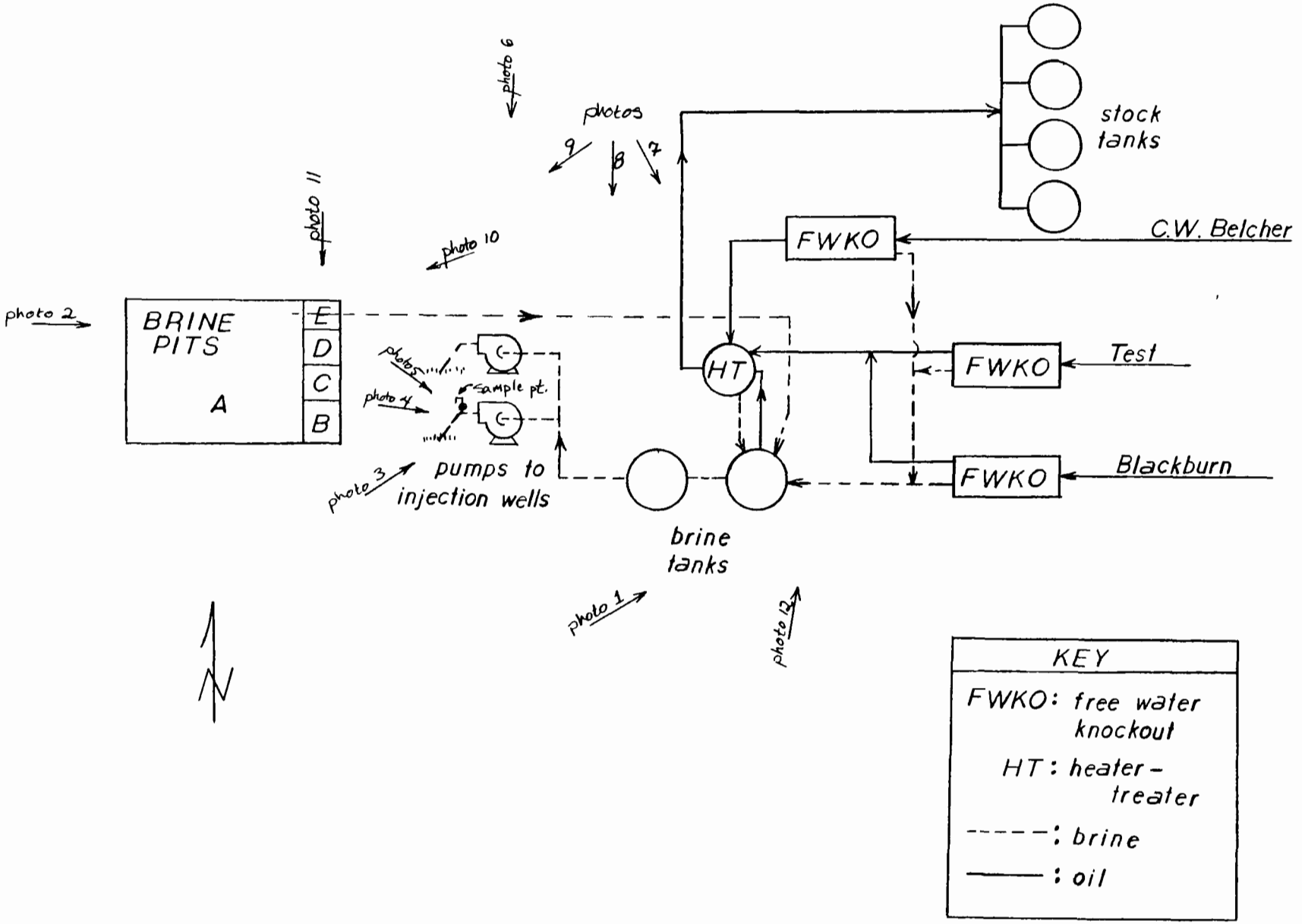


Figure 2. Schematic of Production Facility

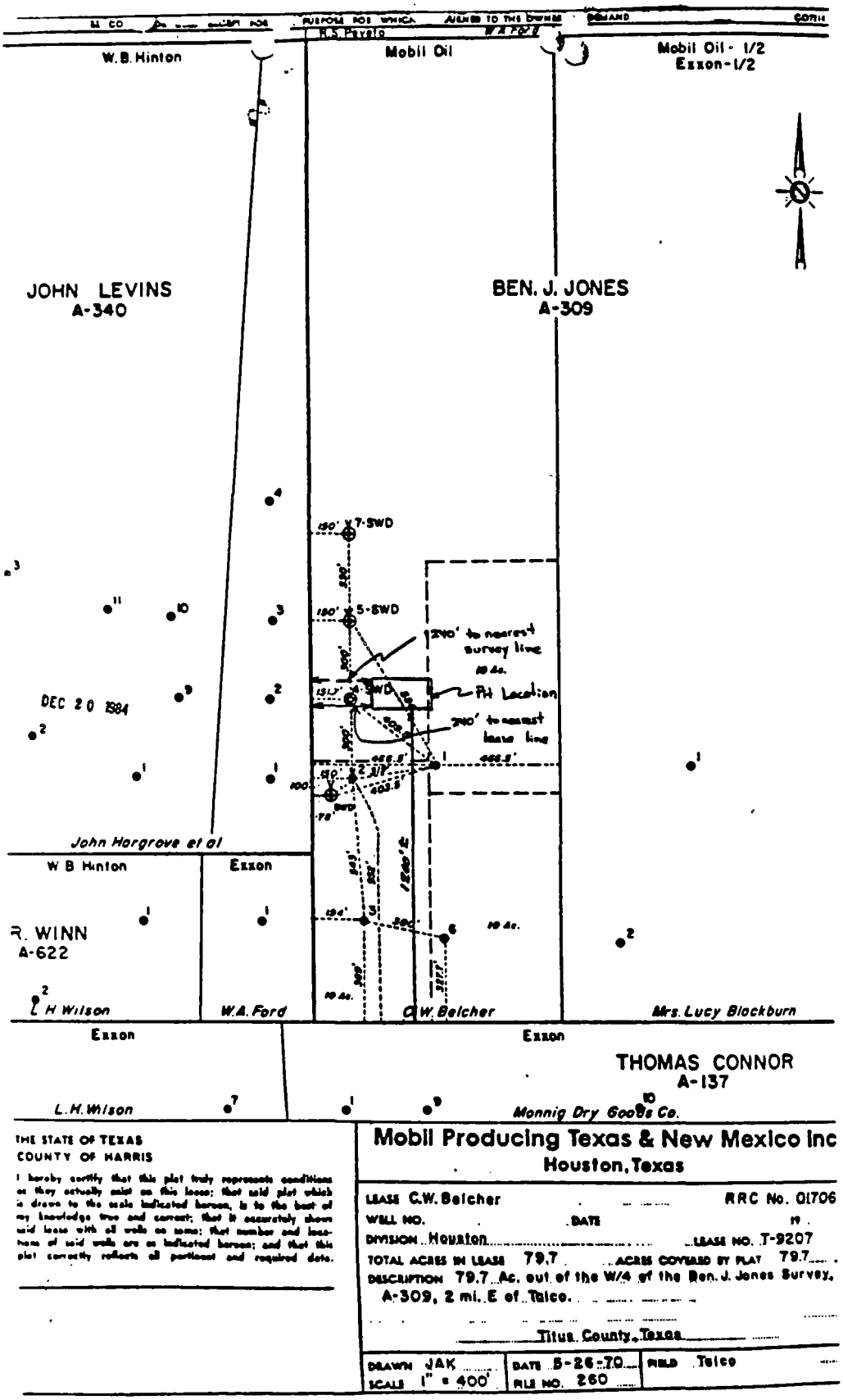


Figure 3. Plat of Wells Serviced by Production Site

MOBIL PRODUCING TX & NM INC

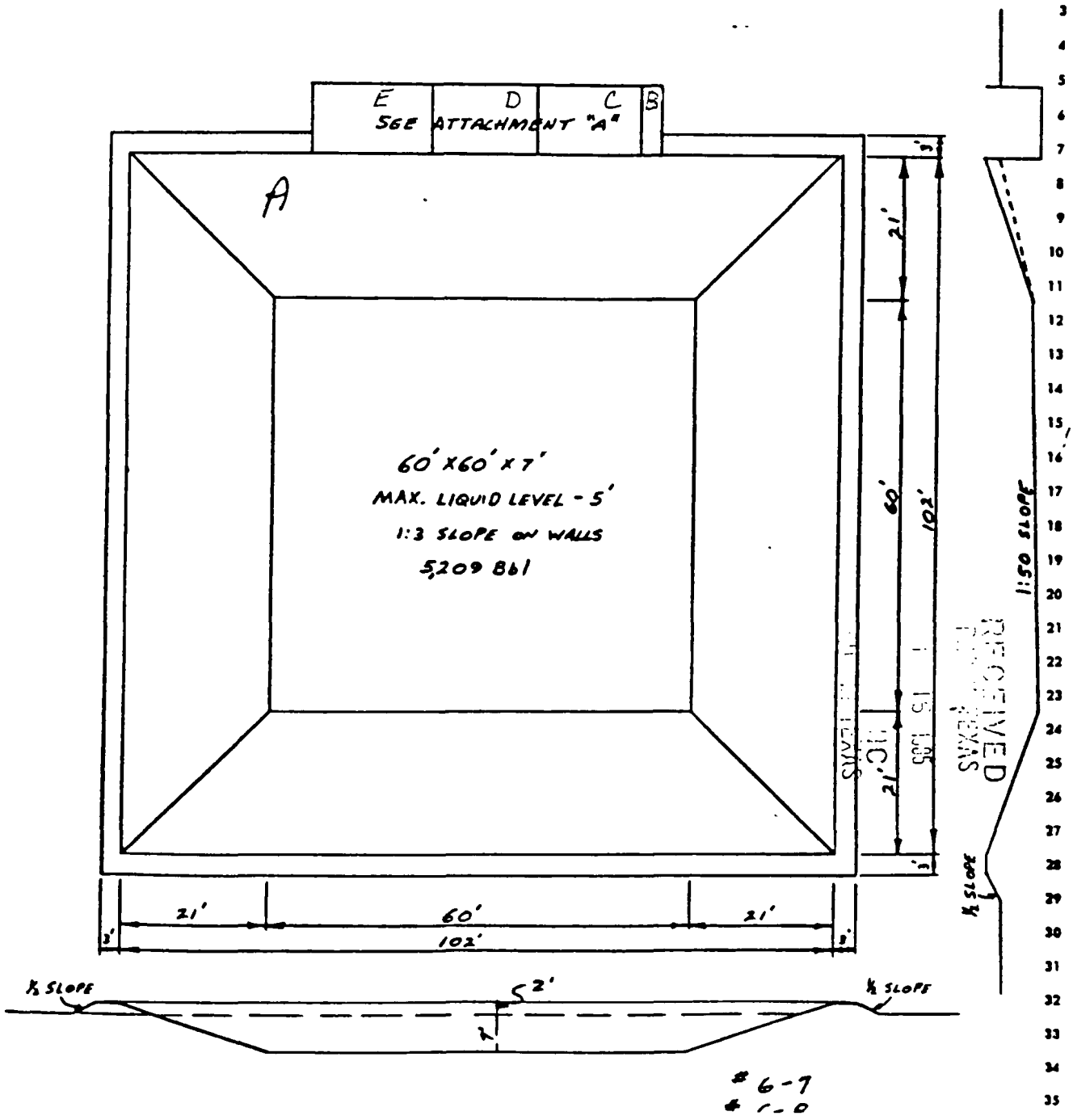


Figure 4. Brine Pits on Mobil Production Site
(drawing provided by Mobil)

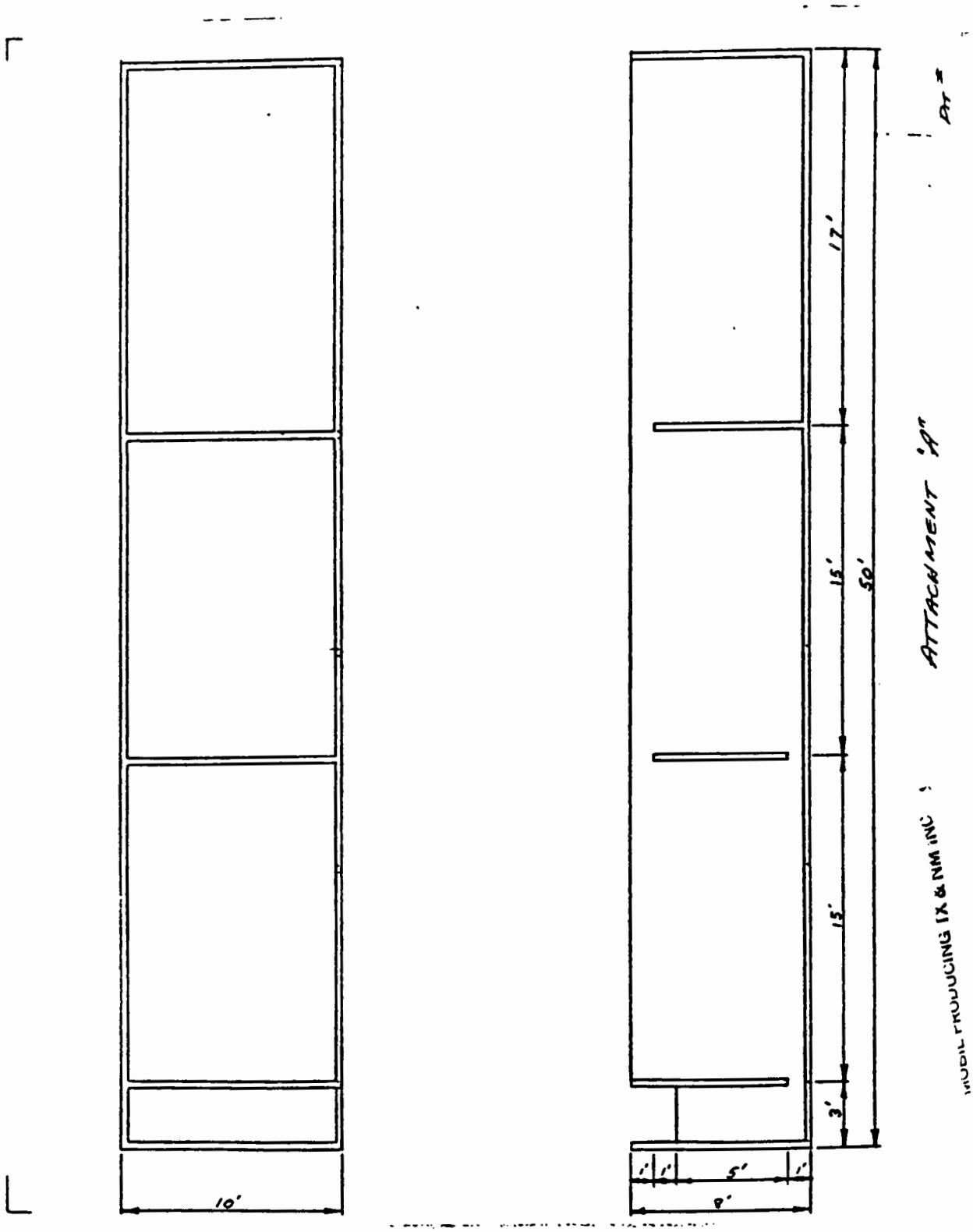


Figure 5. Detail of Brine Pits (drawing provided by Mobil)

Permits

Permit numbers for the five pits on site are P002372A through P002372E. The issuing authority for all these permits is the Texas Railroad Commission, Oil and Gas Division. Copies of these permits are located in Attachment B. Permits for two of the three injection wells on the lease are also included in Attachment B. No permit was available for Injection Well No. 7, but a copy of its Plugging Record was provided by the Railroad Commission.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005).

Sample Point Locations

At the C. W. Belcher site, the sample was defined as the fluid leaving the two pumps that feed the injection wells on site. Figure 2 indicates the sample point from which the fluid sample was composited.

Sampling Methods and Equipment

As shown in Photos 3 and 4, the fluid sample was obtained through a pipe that tapped the discharge line from one of the two injection well feed pumps. The operator replaced a pressure gauge with the sampling pipe to enable sampling at this point. When the pressure gauge was replaced, the pressure read 53 psi in the 4-inch diameter discharge line. The temperature of the fluid in this line was approximately 130°F, as indicated on a meter in the line.

The sample was collected in a 1-gallon glass jar, and composited in a 5-gallon glass carboy (Photo 5). Immediately after the CENTEC team was through collecting their sample, the operator collected a quantity of sample from the same sample port.

The pH of the produced fluid sample was measured onsite after sampling was completed. The pH of this sample was 8.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

Photo 1. Brine holding tanks

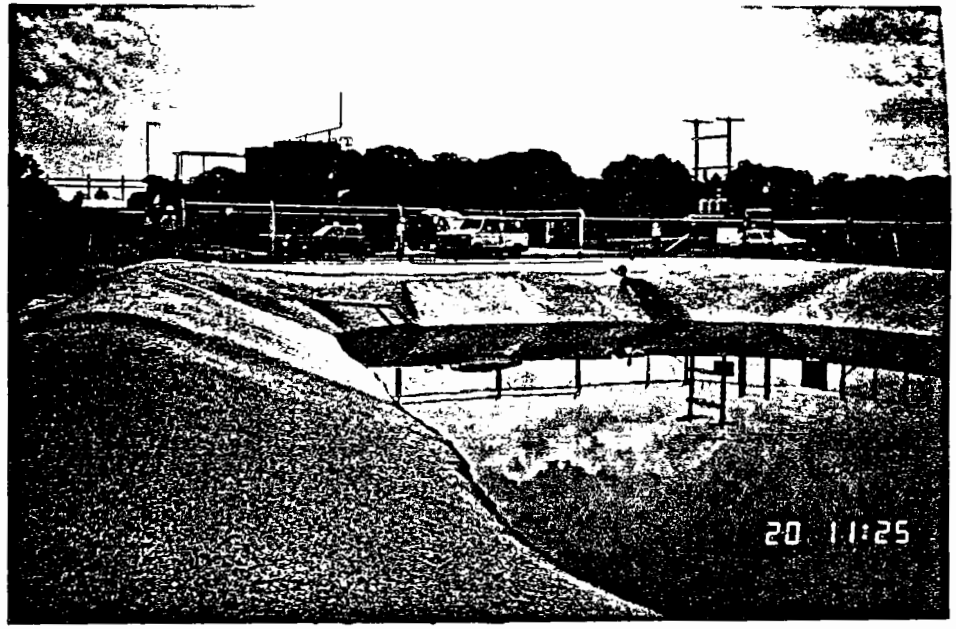


Photo 2. Easterly view of site across brine pit

Photo 3. Brine sampling

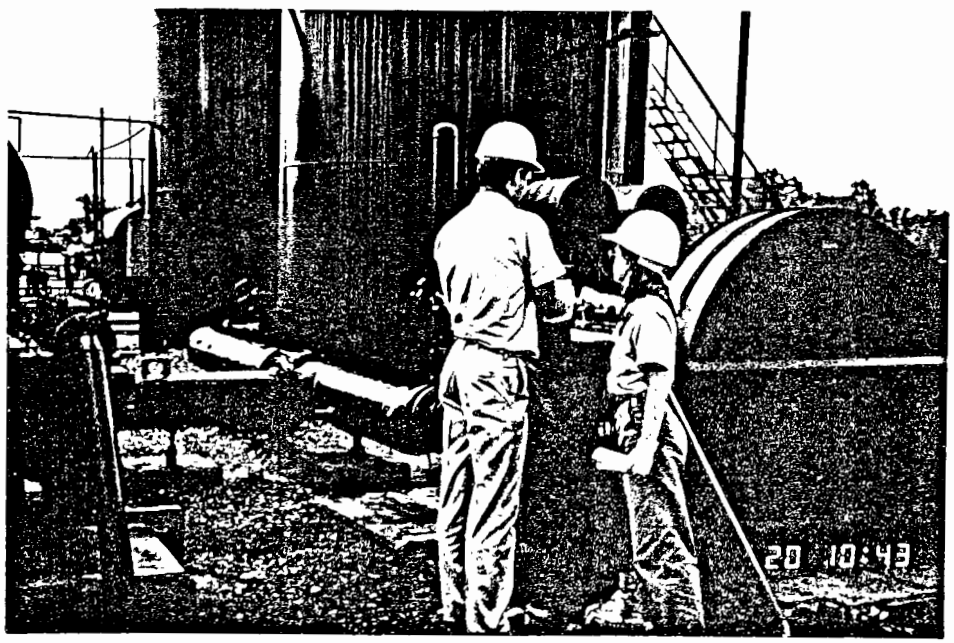


Photo 4. Brine sampling

Photo 5. Pouring liquid composite

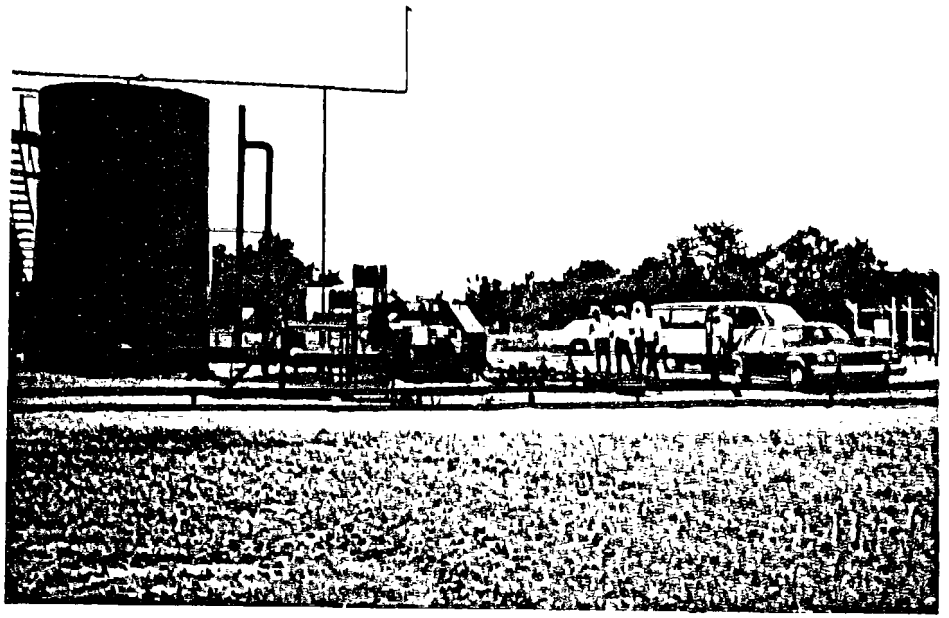


Photo 6. Southerly view of brine tank (left) and pump (center)

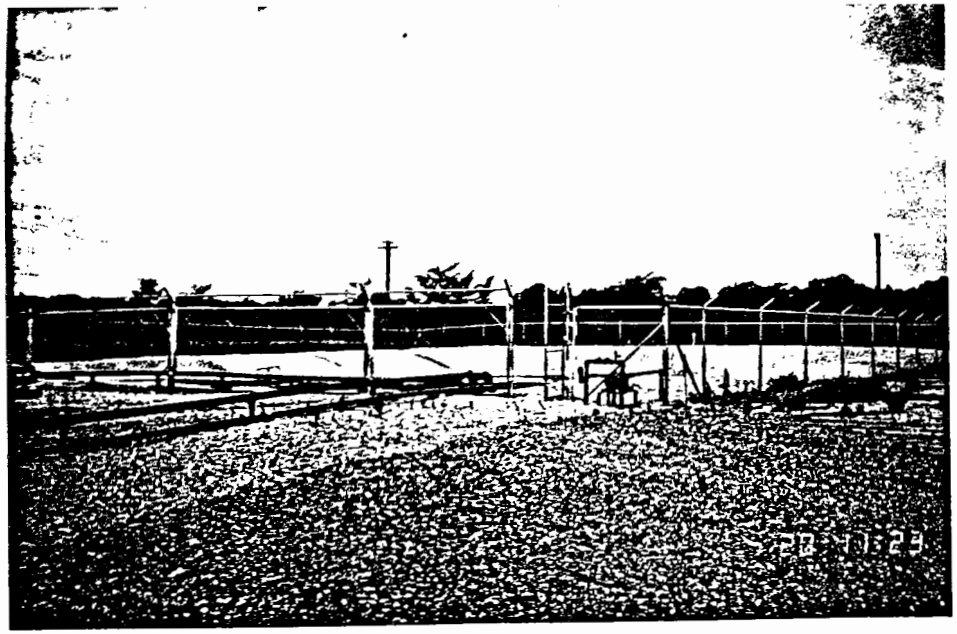


Photo 10. Westerly view of brine pit

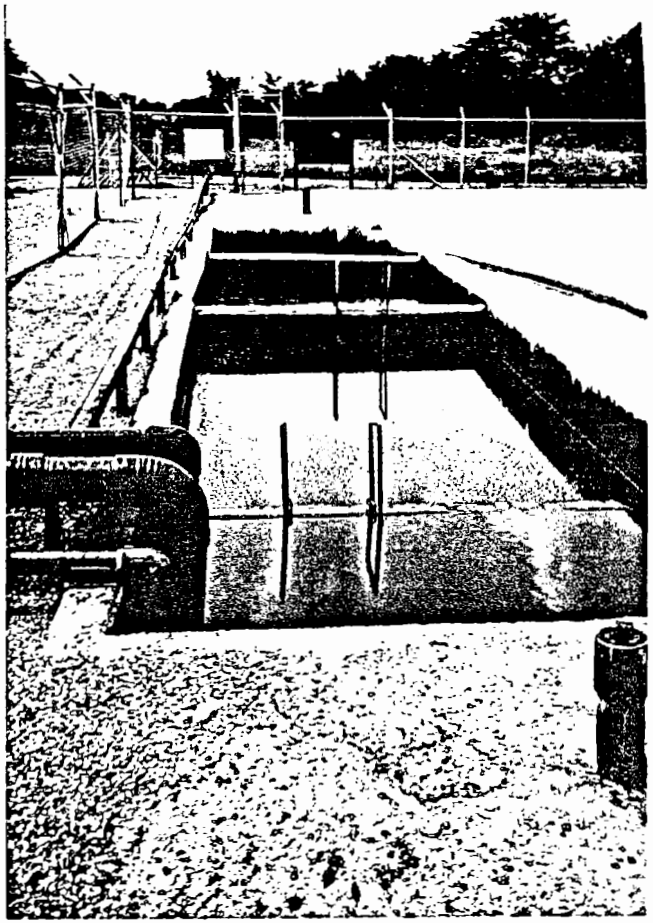


Photo 11. Skim tanks ("pits") at east end of brine pit

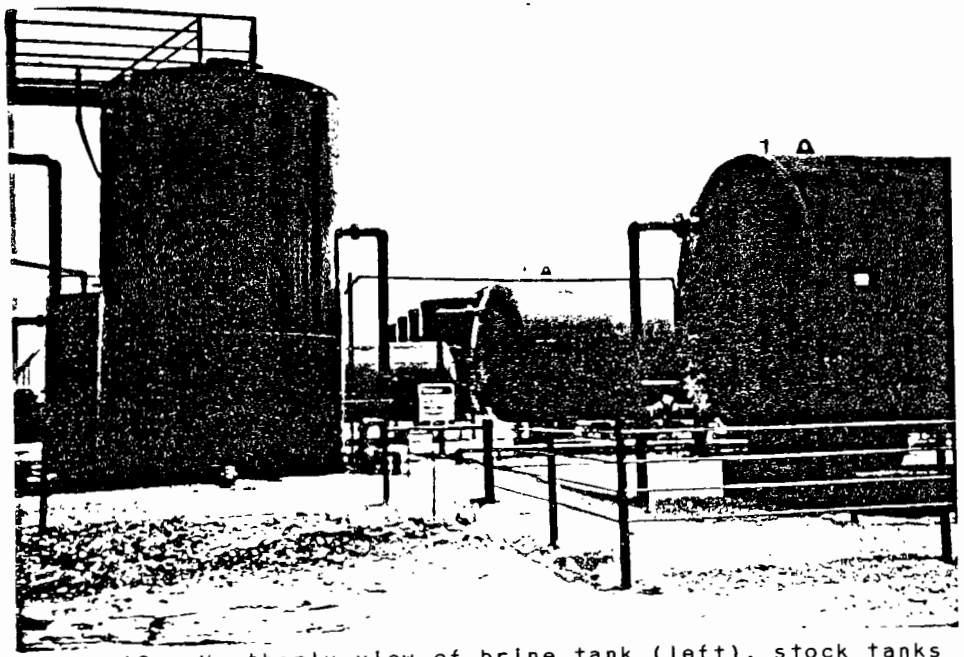


Photo 12. Northerly view of brine tank (left), stock tanks (in background), and FWKOs

ATTACHMENT B: PERMITS

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

BUDDY TEMPLE, Chairman
JAMES E. (JIM) NUGENT, Commissioner
MACK WALLACE, Commissioner

J. H. MORROW, P.E.
Director
JERRY W. MULLICAN
Director of Underground
Injection Control

1701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

PERMIT TO MAINTAIN AND USE A PIT

LARGE PIT

Pit Permit No. P002372A

Mobil Producing Tx. & N.M. Inc.
Nine Greenway Plaza, Suite 2700
Houston, Texas 77046

Based on information contained in your amended application (Form H-11) dated October 14, 1985, you are hereby authorized to maintain and use the pit designated herein:

Type of Pit: Collecting Pit
C. W. Belcher (01706) Lease, Pit #6-7 (A)
1200 feet FSL and 240 feet FWL of the Ben J. Jones Survey, A-309
Titus County, RRC District 06

Authority is granted to maintain and use the pit in accordance with Statewide Rule 8 and subject to the following conditions:

1. Use of the pit is limited to collection of produced water prior to disposal. No other oil field fluids or oil and gas wastes may be stored or disposed of in the pit.

2. The capacity of the pit may not exceed 5,000 barrels.

3. At least 2 feet of freeboard must be maintained between the fluid level in the pit and the top of the pit dikes.

4. The pit must be constructed of gunite at least 4 inches thick.

5. The pit must be equipped with a leak detection system to detect leaks in the pit.

6. If the leak detection system indicates pit failure, the District Office must be notified of that fact within 24 hours of detection of pit failure.

C-907

An Equal Opportunity Employer

7. If the leak detection system indicates pit failure, the pit must be inspected for deterioration and leaks within 5 days of detection of pit failure. After inspection, the pit must be replaced or repaired before resuming use of the pit.

8. The permittee must maintain a record of when the pit is inspected and the results of each inspection. This record must be maintained by the permittee for the life of the pit, and, upon request of the Commission, the record shall be filed with the Commission.

9. Unless otherwise required by conditions of this permit, construction, use, and maintenance of the pit shall be in accordance with the information represented on the application (Form H-11) and attachments thereto.

10. A sign shall be posted at the pit which shall show the pit permit number in numerals at least one inch in height.

11. The pit must be dewatered, backfilled, and compacted within 120 days of final cessation of use of the pit. Final closure of the pit must be accomplished in such a manner that rainfall will not collect at the pit location after pit closure. Upon final closure, the District Office shall be notified in writing.

12. This permit is nontransferable without the consent of the Commission. Any request for permit transfer should be filed with the Director of Underground Injection Control.

13. This permit does not authorize the discharge of any oil and gas wastes from the pit.

This authorization is granted subject to review and cancellation should investigation show that such authorization is being abused.

APPROVED AND ISSUED ON November 15, 1985.

Jerry W. Mullican, Director
Underground Injection Control

☐ New Application 00237a A

☐ Application for Renewal

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division
Application for Permit to Maintain and Use a Pit

AMENDED
Form H-11
May 1984
Comply with instructions on reverse side

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC Dist. No.	4. County of pit site
Mobil Producing TX. & N.M. Inc.	572550	6	Titus

5. Operator's Address (Street, City, State and Zip Code)
Nine Greenway Plaza, Suite 2700, Houston, Texas 77046

6. Name of Lease, Project or Facility of Pit Location: C. W. Belcher Lease
MPTM's Pit No. 6-7 (A)

7. RRC Oil Lease No. or 8. RRC Gas ID No.: 01706

9. Pit Location
• Section _____ Block _____ Survey Ben J. Jones Abstract No. A-309
• Location is 3 miles East (direction) from Talco, Texas (nearest town)

10. a. Is pit bottom below ground level? [X] Yes [ ] No
b. Artificial liner? [X] Yes [ ] No
c. If lined, equipped with a leak detection system? [X] Yes [ ] No

11. Name and Address of Surface Owner
Odel Belcher
Hwy. 71 East
Talco, Texas 75487

12. Are wastes or fluids from operations other than your own? [X] Yes [ ] No

13. Type of pit (refer to Item F of instructions)
Collecting - Gunite 4" thick

14. a. Describe land use surrounding pit location:
Pasture
b. Is land surrounding pit location productive agricultural land? [ ] Yes [X] No

15. a. Briefly explain the need for this pit:
This pit will replace old unlined pit #6-1. It will be used mainly for storage of salt water. Occasionally, it will be used to collect salt water for short periods of time.

15. b. Type of waste or fluid: Salt Water

15. c. Chloride concentration: 10,000 mg/l

16. Pit is [X] Proposed [ ] Existing
If existing, date constructed _____

17. Dikes
a. Height above ground level 2 feet Width at base 116 feet
b. Are dikes designed to keep wastes or fluids in the pit? [X] Yes [ ] No
c. Are dikes designed to keep stormwater runoff out of the pit? [X] Yes [ ] No
d. Source of Dike Material: [X] Excavated from pit [ ] Adjacent borrow pit
[ ] Off-site excavation (describe material):

18. Pit capacity (barrels) 5000

19. Inside pit dimensions two feet below top of dike
Length 90 feet Width 90 feet
Depth: from ground level to deepest point 5* feet

20. Wastes or fluids are transported to pit by (check all that apply):
[ ] Contract Hauler [ ] Applicant's truck [X] Pipe [ ] Other: _____

21. a. Distance to nearest water well within one-mile of pit: None feet
21. b. Depth of this water well: None feet

22. Depth to shallowest fresh water _____ feet
Source of information: No fresh water in area.
[ ] measured/observed [ ] well owner [ ] electric log [X] TDWR

23. Have you included all attachments required by the Instructions on the reverse side of this form? Yes (Prior submittals of 12-19-84 plus plat to show Item 10-C & leak detection system descr.)*

RECEIVED
R. R. C. OF TEXAS
OCT 28 1985
O. G.
KILGORE, TEXAS

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

K. K. Defenbaugh
Signature

K. K. Defenbaugh, Env. & Reg. Engineer
Name of Person (type or print) Title

Telephone 713/871-5351 (Area Code Number) Date October 14, 1985

• RRC DISTRICT USE ONLY •

Application Information Review

Date received 10/29/85
Date inspected 10/31/85
Inspector Dalton Martin

[✓] Location [✓] Liner [✓] Agricultural Land [✓] Dimensions
[✓] Grade Construction [✓] Type Pit [✓] Capacity [✓] Dikes [✓] Waste Transport

Comments: "Final Inspection"

RHO

• RRC AUSTIN OFFICE ONLY •

Date received 5-20-85 Pit code 03 Pit type CL-CTG Permit no. P002372A Permit date 11-15-85

C-909

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

BUDDY TEMPLE, Chairman
JAMES E. (JIM) NUGENT, Commissioner
MACK WALLACE, Commissioner

J. H. MORROW,
Dir
JERRY W. MULLI
Director of Undergr
Injection Co

1701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711

PERMIT TO MAINTAIN AND USE A PIT

Pit Permit No. P002372B

Mobil Producing Tx. & N.M. Inc.
Nine Greenway Plaza, Suite 2700
Houston, Texas 77046

Based on information contained in your amended application (Form H-11) dated October 14, 1985, you are hereby authorized to maintain and use the pit designated herein:

Type of Pit: Collecting Pit
C. W. Belcher (01706) Lease, Pit #6-7 (B)
1200 feet FSL and 240 feet FWL of the Ben J. Jones Survey, A-309
Titus County, RRC District 06

Authority is granted to maintain and use the pit in accordance with Statewide Rule 8 and subject to the following conditions:

1. Use of the pit is limited to collection of produced water prior to disposal. No other oil field fluids or oil and gas wastes may be stored or disposed of in the pit.

2. The capacity of the pit may not exceed 200 barrels.

3. At least 2 feet of freeboard must be maintained between the fluid level in the pit and the top of the pit dikes.

4. The pit must be constructed of gunite at least 4 inches thick.

5. The pit must be equipped with a leak detection system to detect leaks in the pit.

6. If the leak detection system indicates pit failure, the District Office must be notified of that fact within 24 hours of detection of pit failure.

7. If the leak detection system indicates pit failure, the pit must be inspected for deterioration and leaks within 5 days of detection of pit failure. After inspection, the pit must be replaced or repaired before resuming use of the pit.

8. The permittee must maintain a record of when the pit is inspected and the results of each inspection. This record must be maintained by the permittee for the life of the pit, and, upon request of the Commission, the record shall be filed with the Commission.

9. Unless otherwise required by conditions of this permit, construction, use, and maintenance of the pit shall be in accordance with the information represented on the application (Form H-11) and attachments thereto.

10. A sign shall be posted at the pit which shall show the pit permit number in numerals at least one inch in height.

11. The pit must be dewatered, backfilled, and compacted within 120 days of final cessation of use of the pit. Final closure of the pit must be accomplished in such a manner that rainfall will not collect at the pit location after pit closure. Upon final closure, the District Office shall be notified in writing.

12. This permit is nontransferable without the consent of the Commission. Any request for permit transfer should be filed with the Director of Underground Injection Control.

13. This permit does not authorize the discharge of any oil and gas wastes from the pit.

This authorization is granted subject to review and cancellation should investigation show that such authorization is being abused.

APPROVED AND ISSUED ON November 15, 1985.

Jerry W. Mullican, Director
Underground Injection Control

☐ New Application 002372 B

☐ Application for Renewal

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

Application for Permit to Maintain and Use a Pit

AMEND
Form H
May 19
Comply with instructions on reverse

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC Dist. No.	4. County of pit site
Mobil Producing TX. & N.M. Inc.	572550	6	Titus

5. Operator's Address (Street, City, State and Zip Code)
Nine Greenway Plaza, Suite 2700, Houston, Texas 77046

6. Name of Lease, Project or Facility of Pit Location: C. W. Belcher Lease
MPTM's Pit No. 6-7 (B)

7. RRC Oil Lease No. or 8. RRC Gas ID No.: 01706

9. Pit Location
• Section _____ Block _____ Survey Ben J. Jones Abstract No. A-309
• Location is 3 miles East (direction) from Talco, Texas (nearest

10. a. Is pit bottom below ground level? ☒ Yes ☐ No
b. Artificial liner? ☒ Yes ☐ No
c. If lined, equipped with a leak detection system? ☒ Yes ☐ No

11. Name and Address of Surface Owner
Odel Belcher
Hwy. 71 East
Talco, Texas 75487

12. Are wastes or fluids from operations other than your own? ☒ Yes ☐ No

13. Type of pit (refer to item F of instructions)
Collecting - Gunite 4" thick

14 a. Describe land use surrounding pit location:
Pasture
b. Is land surrounding pit location productive agricultural land? ☐ Yes ☒ No

15. a. Briefly explain the need for this pit:
This pit will replace old unlined pit #6-1. It will used mainly for storage of salt water. Occasionally, it will be used to collect salt water for short perio of time.

15. b. Type of waste or fluid: Salt Water

15. c. Chloride concentration: 10,000 mg/l

16. Pit is ☒ Proposed ☐ Existing
If existing, date constructed _____

17. Dikes
a. Height above ground level 2 feet Width at base 116 feet
b. Are dikes designed to keep wastes or fluids in the pit? ☒ Yes ☐ No
c. Are dikes designed to keep stormwater runoff out of the pit? ☒ Yes ☐ No
d. Source of Dike Material: ☒ Excavated from pit ☐ Adjacent borrow pit
☐ Off-site excavation (describe material):

18. Pit capacity (barrels) 178

19. Inside pit dimensions two feet below top of dike
Length 17 feet Width 10 feet
Depth: from ground level to deepest point 6* feet

20. Wastes or fluids are transported to pit by (check all that apply):
☐ Contract Hauler ☐ Applicant's truck ☒ Pipe ☐ Other: _____

21. a. Distance to nearest water well within one-mile of pit: None feet
21. b. Depth of this water well: None feet

22. Depth to shallowest fresh water _____ feet
Source of information: No fresh water in area.
☐ measured/observed ☐ well owner ☐ electric log ☒ TDWR

23. Have you included all attachments required by the Instructions on the reverse side of this form? Yes (Prior submittals 12-19-84 plus plat to show Item 10-C & leak detection system descr.)*

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete to the best of my knowledge.

K. K. Defenbaugh
Signature

K. K. Defenbaugh, Env. & Reg. Engineer
Name of Person (type or print) Title

Telephone 713/871-5351 (Area Code, Number) Date October 14, 1985

RECEIVED
R. R. C. OF TEXAS
OCT 25 1985
KILGORE, TEXAS

• RRC DISTRICT USE ONLY •
Application Information Review

Date received 10/29/85
Date inspected 10/31/85
Inspector Dalton Martin

☒ Location ☒ Liner ☒ Agricultural Land ☒ Dimensions
☒ Grade Construction ☒ Type Pit ☒ Capacity ☒ Dikes ☒ Waste Transport

Comments:
"Final Inspection"

RHO

C-912

• RRC AUSTIN USE ONLY •
Date received 10-15-85 Pit code 03 Pit type CLCT6 Permit no. P002372B Permit date 11-15-85

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

UDDY TEMPLE, Chairman
AMES E. (JIM) NUGENT, Commissioner
IACK WALLACE, Commissioner

J. H. MORROW, P.E.
Director
JERRY W. MULLICAN
Director of Underground
Injection Control

701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

PERMIT TO MAINTAIN AND USE A PIT

Pit Permit No. P002372C

Mobil Producing Tx. & N.M. Inc.
Nine Greenway Plaza, Suite 2700
Houston, Texas 77046

Based on information contained in your application (Form H-11) dated October 14, 1985, you are hereby authorized to maintain and use the pit designated herein:

Type of Pit: Collecting Pit
C. W. Belcher (01706) Lease, Pit #6-7 (C)
1200 feet FSL and 240 feet FWL of the Ben J. Jones Survey, A-309
Titus County, RRC District 06

Authority is granted to maintain and use the pit in accordance with Statewide Rule 8 and subject to the following conditions:

1. Use of the pit is limited to collection of produced water prior to disposal. No other oil field fluids or oil and gas wastes may be stored or disposed of in the pit.

2. The capacity of the pit may not exceed 160 barrels.

3. At least 2 feet of freeboard must be maintained between the fluid level in the pit and the top of the pit dikes.

4. The pit must be constructed of gunite at least 4 inches thick.

5. The pit must be equipped with a leak detection system to detect leaks in the pit.

6. If the leak detection system indicates pit failure, the District Office must be notified of that fact within 24 hours of detection of pit failure.

7. If the leak detection system indicates pit failure, the pit must be inspected for deterioration and leaks within 5 days of detection of pit failure. After inspection, the pit must be replaced or repaired before resuming use of the pit.

8. The permittee must maintain a record of when the pit is inspected and the results of each inspection. This record must be maintained by the permittee for the life of the pit, and, upon request of the Commission, the record shall be filed with the Commission.

9. Unless otherwise required by conditions of this permit, construction, use, and maintenance of the pit shall be in accordance with the information represented on the application (Form H-11) and attachments thereto.

10. A sign shall be posted at the pit which shall show the pit permit number in numerals at least one inch in height.

11. The pit must be dewatered, backfilled, and compacted within 120 days of final cessation of use of the pit. Final closure of the pit must be accomplished in such a manner that rainfall will not collect at the pit location after pit closure. Upon final closure, the District Office shall be notified in writing.

12. This permit is nontransferable without the consent of the Commission. Any request for permit transfer should be filed with the Director of Underground Injection Control.

13. This permit does not authorize the discharge of any oil and gas wastes from the pit.

This authorization is granted subject to review and cancellation should investigation show that such authorization is being abused.

APPROVED AND ISSUED ON November 15, 1985.

Jerry W. Mullican, Director
Underground Injection Control

0023 C

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

AMENDED
Form H-11
May 1984

☐ New Application
☐ Application for Renewal

Application for Permit to Maintain and Use a Pit

Comply with instructions on Reverse Side

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC Dist. No.	4. County of pit site
Mobil Producing TX. & N.M. Inc.	572550	6	Titus

5. Operator's Address (Street, City, State and Zip Code)
Nine Greenway Plaza, Suite 2700, Houston, Texas 77046

6. Name of Lease, Project or Facility of Pit Location: C. W. Belcher Lease
MPTM's Pit No. 6-7 (C)
7. RRC Oil Lease No. or 8. RRC Gas ID No.: 01706

9. Pit Location
• Section _____ Block _____ Survey Ben J. Jones Abstract No. A-309
• Location is 3 miles East (direction) from Talco, Texas (nearest town)

10. a. Is pit bottom below ground level? ☒ Yes ☐ No
b. Artificial liner? ☒ Yes ☐ No
c. If lined, equipped with a leak detection system? ☒ Yes ☐ No

11. Name and Address of Surface Owner
Odel Belcher
Hwy. 71 East
Talco, Texas 75487

12. Are wastes or fluids from operations other than your own? ☒ Yes ☐ No

13. Type of pit (refer to item F of instructions)
Collecting - Gunite 4" thick

14. a. Describe land use surrounding pit location:
Pasture
b. Is land surrounding pit location productive agricultural land? ☐ Yes ☒ No

15. a. Briefly explain the need for this pit:
This pit will replace old unlined pit #6-1. It will be used mainly for storage of salt water. Occasionally, it will be used to collect salt water for short periods of time.

15. b. Type of waste or fluid: Salt Water

15. c. Chloride concentration: 10,000 mg/l

16. Pit is ☒ Proposed ☐ Existing
If existing, date constructed _____

17. Dikes
a. Height above ground level 2 feet Width at base 116 feet
b. Are dikes designed to keep wastes or fluids in the pit? ☒ Yes ☐ No
c. Are dikes designed to keep stormwater runoff out of the pit? ☒ Yes ☐ No
d. Source of Dike Material: ☒ Excavated from pit ☐ Adjacent borrow pit
☐ Off-site excavation (describe material):

18. Pit capacity (barrels)
157

19. Inside pit dimensions two feet below top of dike
Length 15 feet Width 10 feet
Depth: from ground level to deepest point 6* feet

20. Wastes or fluids are transported to pit by (check all that apply):
☐ Contract Hauler ☐ Applicant's truck ☒ Pipe ☐ Other: _____

21. a. Distance to nearest water well within one-mile of pit: None feet
21. b. Depth of this water well: None feet

22. Depth to shallowest fresh water _____ feet
Source of information: No fresh water in area.
☐ measured/observed ☐ well owner ☐ electric log ☒ TDWR

23. Have you included all attachments required by the instructions on the reverse side of this form?
Yes (Prior submittals of 12-19-84 plus plat to show Item 10-C & leak detection system descr.)*

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

K. K. Defenbaugh
Signature

K. K. Defenbaugh, Env. & Reg. Engineer
Name of Person (type or print) Title

Telephone 713/871-5351 (Area Code Number) Date October 14, 1985

• RRC DISTRICT USE ONLY •

Application Information Review

Date received 10/29/85
Date inspected 10/31/85
Inspector Dalton Martin
Comments: "Final Inspection"

☑ Location ☑ Liner ☑ Agricultural Land ☑ Dimensions
☑ Grade Construction ☑ Type Pit ☑ Capacity ☑ Dikes ☑ Waste Transport

RECEIVED
R.R.C. TEXAS
OCT 25 1985
O. G.
KILGORE, TEXAS

RHD

• RRC AUSTIN USE ONLY •

Date received 10-15-85 Pit code 03 Pit type CLCTG Permit no. P002372C Permit date 11-15-85

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

BUDDY TEMPLE, Chairman
JAMES E. (JIM) NUGENT, Commissioner
MACK WALLACE, Commissioner

J. H. MORROW, P.E.
Director
JERRY W. MULLICAN
Director of Underground
Injection Control

1701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

PERMIT TO MAINTAIN AND USE A PIT

Pit Permit No. P002372D

Mobil Producing Tx. & N.M. Inc.
Nine Greenway Plaza, Suite 2700
Houston, Texas 77046

Based on information contained in your application (Form H-11) dated October 14, 1985, you are hereby authorized to maintain and use the pit designated herein:

Type of Pit: Collecting Pit
C. W. Belcher (01706) Lease, Pit #6-7 (D)
1200 feet FSL and 240 feet FWL of the Ben J. Jones Survey, A-309
Titus County, RRC District 06

Authority is granted to maintain and use the pit in accordance with Statewide Rule 8 and subject to the following conditions:

1. Use of the pit is limited to collection of produced water prior to disposal. No other oil field fluids or oil and gas wastes may be stored or disposed of in the pit.

2. The capacity of the pit may not exceed 160 barrels.

3. At least 2 feet of freeboard must be maintained between the fluid level in the pit and the top of the pit dikes.

4. The pit must be constructed of gunite at least 4 inches thick.

5. The pit must be equipped with a leak detection system to detect leaks in the pit.

6. If the leak detection system indicates pit failure, the District Office must be notified of that fact within 24 hours of detection of pit failure.

7. If the leak detection system indicates pit failure, the pit must be inspected for deterioration and leaks within 5 days of detection of pit failure. After inspection, the pit must be replaced or repaired before resuming use of the pit.

8. The permittee must maintain a record of when the pit is inspected and the results of each inspection. This record must be maintained by the permittee for the life of the pit, and, upon request of the Commission, the record shall be filed with the Commission.

9. Unless otherwise required by conditions of this permit, construction, use, and maintenance of the pit shall be in accordance with the information represented on the application (Form H-11) and attachments thereto.

10. A sign shall be posted at the pit which shall show the pit permit number in numerals at least one inch in height.

11. The pit must be dewatered, backfilled, and compacted within 120 days of final cessation of use of the pit. Final closure of the pit must be accomplished in such a manner that rainfall will not collect at the pit location after pit closure. Upon final closure, the District Office shall be notified in writing.

12. This permit is nontransferable without the consent of the Commission. Any request for permit transfer should be filed with the Director of Underground Injection Control.

13. This permit does not authorize the discharge of any oil and gas wastes from the pit.

This authorization is granted subject to review and cancellation should investigation show that such authorization is being abused.

APPROVED AND ISSUED ON November 15, 1985.

Jerry W. Mullican, Director
Underground Injection Control

☐ New Application 0023?D

☐ Application for Renewal

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

Application for Permit to Maintain and Use a Pit

AMENDED
Form H-11
May 1964
Comply with instructions on reverse side

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC Dist. No.	4. County of pit site
Mobil Producing TX. & N.M. Inc.	572550	6	Titus

5. Operator's Address (Street, City, State and Zip Code)
Nine Greenway Plaza, Suite 2700, Houston, Texas 77046

6. Name of Lease, Project or Facility of Pit Location: C. W. Belcher Lease
MPTM's Pit No. 6-7 (D)

7. RRC Oil Lease No. or 8. RRC Gas ID No.: 01706

9. Pit Location
• Section _____ Block _____ Survey Ben J. Jones Abstract No. A-309
• Location is 3 miles East (direction) from Talco, Texas (nearest town)

10. a. Is pit bottom below ground level? ☒ Yes ☐ No
b. Artificial liner? ☒ Yes ☐ No
c. If lined, equipped with a leak detection system? ☒ Yes ☐ No

11. Name and Address of Surface Owner
Odel Belcher
Hwy. 71 East
Talco, Texas 75487

12. Are wastes or fluids from operations other than your own? ☒ Yes ☐ No

13. Type of pit (refer to item F of instructions)
Collecting - Gunite 4" thick

14 a. Describe land use surrounding pit location:
Pasture
b. Is land surrounding pit location productive agricultural land? ☐ Yes ☒ No

15. a. Briefly explain the need for this pit:
This pit will replace old unlined pit #6-1. It will be used mainly for storage of salt water. Occasionally, it will be used to collect salt water for short periods of time.

15. b. Type of waste or fluid: Salt Water

15. c. Chloride concentration: 10,000 mg/l

16. Pit is ☒ Proposed ☐ Existing
If existing, date constructed _____

17. Dikes
a. Height above ground level 2 feet Width at base 116 feet
b. Are dikes designed to keep wastes or fluids in the pit? ☒ Yes ☐ No
c. Are dikes designed to keep stormwater runoff out of the pit? ☒ Yes ☐ No
d. Source of Dike Material: ☒ Excavated from pit ☐ Adjacent borrow pit
☐ Off-site excavation (describe material):

18. Pit capacity (barrels) 157

19. Inside pit dimensions two feet below top of dike
Length 15 feet Width 10 feet
Depth: from ground level to deepest point 6* feet

20. Wastes or fluids are transported to pit by (check all that apply):
☐ Contract Hauler ☐ Applicant's truck ☒ Pipe ☐ Other: _____

21. a. Distance to nearest water well within one-mile of pit: None feet
21. b. Depth of this water well: None feet

22. Depth to shallowest fresh water _____ feet
Source of information: No fresh water in area.
☐ measured/observed ☐ well owner ☐ electric log ☒ TDWR

23. Have you included all attachments required by the instructions on the reverse side of this form? Yes (Prior submittals of 12-19-84 plus plat to show Item 10-C & leak detection system descr.)*

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

K. K. Defenbaugh
Signature

K. K. Defenbaugh, Env. & Reg. Engineer
Name of Person (type or print) Title

Telephone 713/871-5351 (Area Code Number) Date October 14, 1985

• RRC DISTRICT USE ONLY •

Application Information Review

Date received 10/29/85
Date inspected 10/31/85
Inspector Dalton Martin

☑ Location ☑ Grade Construction ☑ Liner ☑ Type Pit ☑ Agricultural Land ☑ Capacity ☑ Dimensions ☑ Dikes ☑ Waste Transport

Comments: "Final Inspection"

RRO

RECEIVED
R.R.C. OF TEXAS
OCT 25 1985
O. G.
KILGORE, TEXAS

• RRC AUSTIN USE ONLY •

Date received 10-25-85 Pit code 03 Pit type CLCTG Permit no. P0023720 Permit date 11-15-85

C-918

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

BUDDY TEMPLE, Chairman
JAMES E. (JIM) NUGENT, Commissioner
MACK WALLACE, Commissioner

J. H. MORROW, P.E.
Director
JERRY W. MULLICAN
Director of Underground
Injection Control

1701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

PERMIT TO MAINTAIN AND USE A PIT

Pit Permit No. P002372E

Mobil Producing Tx. & N.M. Inc.
Nine Greenway Plaza, Suite 2700
Houston, Texas 77046

Based on information contained in your application (Form H-11) dated October 14, 1985, you are hereby authorized to maintain and use the pit designated herein:

Type of Pit: Collecting Pit
C. W. Belcher (01706) Lease, Pit #6-7 (E)
1200 feet FSL and 240 feet FWL of the Ben J. Jones Survey, A-309
Titus County, RRC District 06

Authority is granted to maintain and use the pit in accordance with Statewide Rule 8 and subject to the following conditions:

1. Use of the pit is limited to collection of produced water prior to disposal. No other oil field fluids or oil and gas wastes may be stored or disposed of in the pit.

2. The capacity of the pit may not exceed 25 barrels.

3. At least 2 feet of freeboard must be maintained between the fluid level in the pit and the top of the pit dikes.

4. The pit must be constructed of gunite at least 4 inches thick.

5. The pit must be equipped with a leak detection system to detect leaks in the pit.

6. If the leak detection system indicates pit failure, the District Office must be notified of that fact within 24 hours of detection of pit failure.

7. If the leak detection system indicates pit failure, the pit must be inspected for deterioration and leaks within 5 days of detection of pit failure. After inspection, the pit must be replaced or repaired before resuming use of the pit.

8. The permittee must maintain a record of when the pit is inspected and the results of each inspection. This record must be maintained by the permittee for the life of the pit, and, upon request of the Commission, the record shall be filed with the Commission.

9. Unless otherwise required by conditions of this permit, construction, use, and maintenance of the pit shall be in accordance with the information represented on the application (Form H-11) and attachments thereto.

10. A sign shall be posted at the pit which shall show the pit permit number in numerals at least one inch in height.

11. The pit must be dewatered, backfilled, and compacted within 120 days of final cessation of use of the pit. Final closure of the pit must be accomplished in such a manner that rainfall will not collect at the pit location after pit closure. Upon final closure, the District Office shall be notified in writing.

12. This permit is nontransferable without the consent of the Commission. Any request for permit transfer should be filed with the Director of Underground Injection Control.

13. This permit does not authorize the discharge of any oil and gas wastes from the pit.

This authorization is granted subject to review and cancellation should investigation show that such authorization is being abused.

APPROVED AND ISSUED ON November 15, 1985.

Jerry W. Mullican, Director
Underground Injection Control

☐ New Application 0023,2E

☐ Application for Renewal

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

Application for Permit to Maintain and Use a Pit

AMENDED
Form H-11
May 1984
Comply with instructions on Reverse Side

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC Dist. No.	4. County of pit site
Mobil Producing TX. & N.M. Inc.	572550	6	Titus

5. Operator's Address (Street, City, State and Zip Code)
Nine Greenway Plaza, Suite 2700, Houston, Texas 77046

6. Name of Lease, Project or Facility of Pit Location: C. W. Belcher Lease
MPTM's Pit No. 6-7 (E)
7. RRC Oil Lease No. or 8. RRC Gas ID No.: 01706

9. Pit Location
• Section _____ Block _____ Survey Ben J. Jones Abstract No. A-309
• Location is 3 miles East (direction) from Talco, Texas (nearest town)

10. a. Is pit bottom below ground level? ☒ Yes ☐ No
b. Artificial liner? ☒ Yes ☐ No
c. If lined, equipped with a leak detection system? ☒ Yes ☐ No

11. Name and Address of Surface Owner
Odel Belcher
Hwy. 71 East
Talco, Texas 75487

12. Are wastes or fluids from operations other than your own? ☒ Yes ☐ No

13. Type of pit (refer to item F of instructions)
Collecting - Gunite 4" thick

14 a. Describe land use surrounding pit location:
Pasture
b. Is land surrounding pit location productive agricultural land? ☐ Yes ☒ No

15. a. Briefly explain the need for this pit:
This pit will replace old unlined pit #6-1. It will be used mainly for storage of salt water. Occasionally, it will be used to collect salt water for short periods of time.

15. b. Type of waste or fluid: Salt Water

15. c. Chloride concentration: 10,000 mg/l

16. Pit is ☒ Proposed ☐ Existing
If existing, date constructed _____

17. Dikes
a. Height above ground level 2 feet Width at base 116 feet
b. Are dikes designed to keep wastes or fluids in the pit? ☒ Yes ☐ No
c. Are dikes designed to keep stormwater runoff out of the pit? ☒ Yes ☐ No
d. Source of Dike Material: ☒ Excavated from pit ☐ Adjacent borrow pit
☐ Off-site excavation (describe material):

18. Pit capacity (barrels) 25

19. Inside pit dimensions two feet below top of dike
Length 2 feet Width 10 feet
Depth: from ground level to deepest point 7* feet

20. Wastes or fluids are transported to pit by (check all that apply):
☐ Contract Hauler ☐ Applicant's truck ☒ Pipe ☐ Other: _____

21. a. Distance to nearest water well within one-mile of pit: None feet
21. b. Depth of this water well: None feet

22. Depth to shallowest fresh water _____ feet
Source of information: No fresh water in area.
☐ measured/observed ☐ well owner ☐ electric log ☒ TDWR

23. Have you included all attachments required by the instructions on the reverse side of this form? Yes (Prior submittals of 12-19-84 plus plat to show Item 10-C & leak detection system descr.)*

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

K. K. Defenbaugh
Signature

K. K. Defenbaugh, Env. & Reg. Engineer
Name of Person (type or print) Title

Telephone 713/871-5351 (Area Code Number) Date October 14, 1985

• RRC DISTRICT USE ONLY •
Application Information Review

RECEIVED
R. R. C. OF TEXAS
OCT 25 1985
O. G.
KILGORE, TEXAS

Date received 10/29/85
Date inspected 10/31/85
Inspector Dalton Martin
☑ Location ☑ Liner ☑ Agricultural Land ☑ Dimensions
☑ Grade Construction ☑ Type Pit ☑ Capacity ☑ Dikes ☑ Waste Transport
Comments:
"Final Inspection" C-921
RHO

• RRC AUSTIN USE ONLY •
Date received 10-15-85 Pit code 03 Pit type CLCTG Permit no. P002372E Permit date 11-15-85

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

BUDDY TEMPLE, Chairman
JAMES E. (JIM) NUGENT, Commissioner
MACK WALLACE, Commissioner

J. H. MORROW, P.E.
Director
JERRY W. MULLICAN
Director of Underground
Injection Control

1124 S. IH 35 | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

PERMIT TO DISPOSE OF OIL OR GAS WASTE BY INJECTION
INTO A POROUS FORMATION NOT PRODUCTIVE OF OIL AND GAS

PERMIT NO. 05052

bil Producing TX. & N.M. Inc.
ne Greenway Plaza, Suite 2700
uston, Texas 77046

sed on information contained in your application (Form W-14) dated November 12, 1984, u are hereby authorized to dispose of salt water or other oil and gas wastes into your ll designated as follows:

C.W. Belcher Lease, (01706), Well No. 3
Talco Field, Titus County, RRC District 06

thority is granted to inject into strata in the subsurface depth interval from 2634 feet 2736 feet at a maximum surface injection pressure not to exceed 1300 psig, in cordance with Statewide Rule 9 of the Railroad Commission of Texas, and subject to the llowing conditions:

1. A cement squeeze must be performed immediately above the disposal zone.

2. Injection must be through tubing set on a packer. The packer must be set no higher than 100 feet above the top of the permitted interval.

3. The District Office must be notified 48 hours prior to:
   a. running tubing and setting packer;
   b. beginning any workover or remedial operation;
   c. conducting any required pressure tests or surveys.

4. The wellhead must be equipped with a pressure observation valve on the tubing and for each annulus.

5. Prior to beginning injection, and subsequently after any workover, an annulus pressure test must be performed. The test pressure must equal the maximum authorized injection pressure or 500 psig, whichever is less, but must be at least 200 psig.

6. Form W-2 or G-1 must be filed in duplicate with the District Director within 30 days after completion or conversion to disposal.

7. The injection pressure and injection volume must be monitored at least monthly and be reported annually on Form H-10 to the Commission's Austin Office.

8. Written notice of the intent to transfer the permit must be submitted to the Director of Underground Injection Control at least 15 days prior to the date the transfer will occur (File Form P-4).

RECEIVED
R.R.C. OF TEXAS
FEB 22 1985
P.C.
KILGORE, TEXAS

vided further that, should it be determined that such injection fluid is not confined the approved strata, then the permission given herein is suspended and the disposal ration must be stopped until the fluid migration from such strata is eliminated.

ROVED AND ISSUED ON February 15, 1985.

e: Maximum surface injection pressure is ited to 1300 psig.

Jerry W. Mullican
Director of Underground Injection Control

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

JOHN H. POERNER, Chairman
JAMES E. (JIM) NUGENT, Commissioner
MACK WALLACE, Commissioner

BOB R. HARRIS P.E.
Chief Engineer
J. H. MORROW, P.E.
Assistant Chief Engineer

1124 S. IH 35 • CAPITOL STATION - P.O. DRAWER 12967 • AUSTIN, TEXAS 78711

July 25, 1979

Mobil Oil Corporation
Nine Greenway Plaza, Suite 2700
Houston, TX 77046

PERMIT NO. 01528

Gentlemen:

This will acknowledge receipt of your "Application to Dispose of Salt Water by Injection into a Porous Formation Not Productive of Oil or Gas" (Form W-14) covering your well designated thereon as follows:

C. W. Belcher (01706) Lease, Well No. 4, Talco Field, Titus County, RRC District 6

Based on well completion data submitted on Form W-14 showing casing, tubing, and cementing record, permission to dispose of salt water into this well is approved by the Commission. It is required that the well be so cased and completed that water can enter no formation other than the strata encountered at the depth interval from 3200 feet to 3325 feet. It is required that the well be equipped with an aboveground bradenhead observation valve. Maximum injection pressure is limited to 800 psi.

Any permission to inject water into this well previously granted is herewith cancelled and shall have no further force or effect. Upon completion or conversion to injection, Form W-2 must be filed in duplicate with the Railroad Commission District Office.

In the event the well is presently carried on the proration schedule, you are requested to notify the Commission in writing as to the date said disposal operations commence. If the well is a dual (producing well and salt water disposal well), you will be required to obtain multiple completion authority if the injection string is part of the multiple completion. Further, Commission District Office must be notified prior to any workover or remedial operations. Notify the Commission District Office prior to running tubing and setting packer.

Yours very truly,

Willis C. Steed
for George F. Singletary, Jr.
Senior Engineer

GFS:mm

cc: RRC District - Kilgore
Proration - 6
Texas Department of Water Resources

RECEIVED
R. R. C. OF TEXAS
JUL 1979
O. G.
KILGORE, TEXAS

An Equal Opportunity Employer

Plugging Record

RA [redacted]

OIL AND GAS DIVISION

Form W-3
Rev. 9/1/67

FILE IN DUPLICATE WITH DISTRICT OFFICE OF DISTRICT IN WHICH WELL IS LOCATED WITHIN THIRTY DAYS AFTER PLUGGING

1. RRC District: 6

4. RRC Lease or Id. Number: 01706

2. FIELD NAME (as per RRC Records): TALCO

3. LEASE NAME: C.W. BELCHER

5. Well Number: 7 SWD

6. OPERATOR: MOBIL OIL CORPORATION

10. County: TITUS

7. ADDRESS: P.O. BOX 2448 CORPUS CHRISTI TEXAS 78403

11. Date Drilling Permit Issued: 6-10-49

8. SURFACE LOCATION: 150 FEET FROM WEST LINE, AND 330 FEET FROM NORTH WELL #5 ~~LINE~~

12. Date Drilling Commenced: 7-19-49

9. SECTION, BLOCK, AND SURVEY: BEN JONES SURVEY

13. Date Drilling Completed: 7-23-49

15. Type of Well (Oil, Gas, Dry)*: SALT WATER DISPOSAL

16. Type of Completion (Single, Dual, Etc.): SINGLE

17. Total Depth: 4240

14. Date Well Plugged: 9-13-71

18. FORM W-1 (Intention to Drill) Filed in Name of: MAGNOLIA PETROLEUM COMPANY

19. Manner of Placement

PLUG #1	25	SACKS	TOP	2808	BOTTOM	2908	TYPE	CEMENT
PLUG #2	40	SACKS	TOP	500	BOTTOM	600	TYPE	CEMENT
PLUG #3	35	SACKS	TOP	186	BOTTOM	290	TYPE	CEMENT
PLUG #4	10	SACKS	TOP	0	BOTTOM	10	TYPE	CEMENT

20. Was Well filled with Mud-Laden Fluid, according to the regulations of the Railroad Commission: YES [X] NO [ ]

21. How was Mud applied? PUMP

22. Mud Weight: 9.5 LBS/GAL

23. Depth of Deepest Fresh Water: APPROX 60 FEET

24. Have all Abandoned Wells on this Lease been Plugged according to RRC Rules? YES [X] NO [ ]

25. If NO, Explain

26. Name and Address of Party Plugging Well: ACID ENGINEERING INC. P.O. BOX 729, DENVER CITY, TEXAS

27. Casing and Tubing Record after Plugging

	SIZE	PUT IN WELL FEET	PUT IN WELL INCHES	LEFT IN WELL FEET	LEFT IN WELL INCHES
	10 3/4"	240	—	240	—
	7"	4231	—	4231	—
AT TOP —	4 1/2"	2886	—	2886	—
ON BOTTOM —	5 1/2"	23	—	23	—

28. Names and Addresses of Surface Owner of Well Site and Operators of Offset Producing Leases

WILLIAM BELCHER TALCO TEXAS
W.B. HINTON BOX 1237 MT. PLEASANT TEXAS
HUMBLE OIL & REFINING CO. P.O. BOX 2025 TYLER TEXAS 75701

RECEIVED
R. R. C. OF TEXAS
SEP 1971
O. G.
KILGORE, TEXAS

29. Was Notice given before Plugging to each of the above and RRC District Office? YES [X] NO [ ]

CERTIFICATE:

I declare under penalties prescribed in Article 6036c, R. C. S., that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

Mark A. Watson
REPRESENTATIVE OF COMPANY

SUPERVISOR
TITLE

9-24-71
DATE

Signature: REPRESENTATIVE OF RAILROAD COMMISSION

*All Dry Holes, Fill in Reverse Side.

C-924

Sampling Report
Investigation of Murexco Petroleum, Inc.'s
Frye Lease Oil Well No. 1-29
Wheeler County, Texas
June 23, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of Anadarko Basin drill sites developed by the Texas Railroad Commission at the request of EPA. The list was transmitted via telephone to the EPA contractor on June 11, 1986. Randomization and site selection took place during the telephone conversation.

The EPA contractor had no interest in the manner the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites.

Railroad Commission officials listed the possible sample sites by operator and specific location. For simplicity of selection, the list was transmitted using only operator names. The list consisted of six Anadarko Basin drill sites:

1. David W. Slowson
2. Hober Oil and Gas
3. Dyco Petroleum Company
4. Murexco
5. Santa Fe Petroleum
6. Kaiser Francis

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. The randomly-selected primary site was No. 4 on the above list (Murexco). No. 5 on the above list (Santa Fe Petroleum) was selected as a back-up site in the event the primary site was inaccessible or inappropriate.

Further inquiry identified the primary sample site as the Murexco Petroleum Incorporated's Frye Lease Oil Well No. 1-29, in Wheeler County, Texas. No problems were encountered in arranging sampling for June 23, 1986. The back-up site was not required.

Site Location

Murexco Frye Well No. 1-29 is located approximately 6 miles northeast of Wheeler, TX via Highway 152 and a county road 2 miles west of Highway 592 in Wheeler County. Figure 1 is a map indicating the drilling site. The full name and mailing address for Murexco is:

Murexco Petroleum, Incorporated
Glen Lakes Tower
Suite 1550
9400 North Central Expressway
Dallas, TX 75231
Main Office Ph.: 806-665-1653
Contact (Consulting Engineer): Mr. C.W. Kelly, Jr., President, C.W. Kelly, Jr. Inc. ph.: 214-368-2490

Attendees

Sampling at the Murexco site was performed by CENTEC Corporation personnel on June 23, 1986. Following is a list of people present at the time of sampling:

CENTEC Corp. (Sample Team):	Bill Lane, Technician Jamie McIntyre, Team Leader
State Representatives:	Jerry Mullican, Director, Underground Injection Control, Railroad Commission of Texas (RRC), Oil and Gas Division Windle Taylor, Manager NPDES Program, Underground Injection Control, RRC, Oil and Gas Division Carl Nelson, Laboratory Supervisor, RRC Leslie Savage, Geologist, RRC Frank Groves, Geologist, RRC
Operator Representative:	C.W. Kelly, Jr., President, C.W. Kelly, Jr. Inc., Contractor for Murexco
American Petroleum Institute Representative:	George Holliday, Contracted Observer

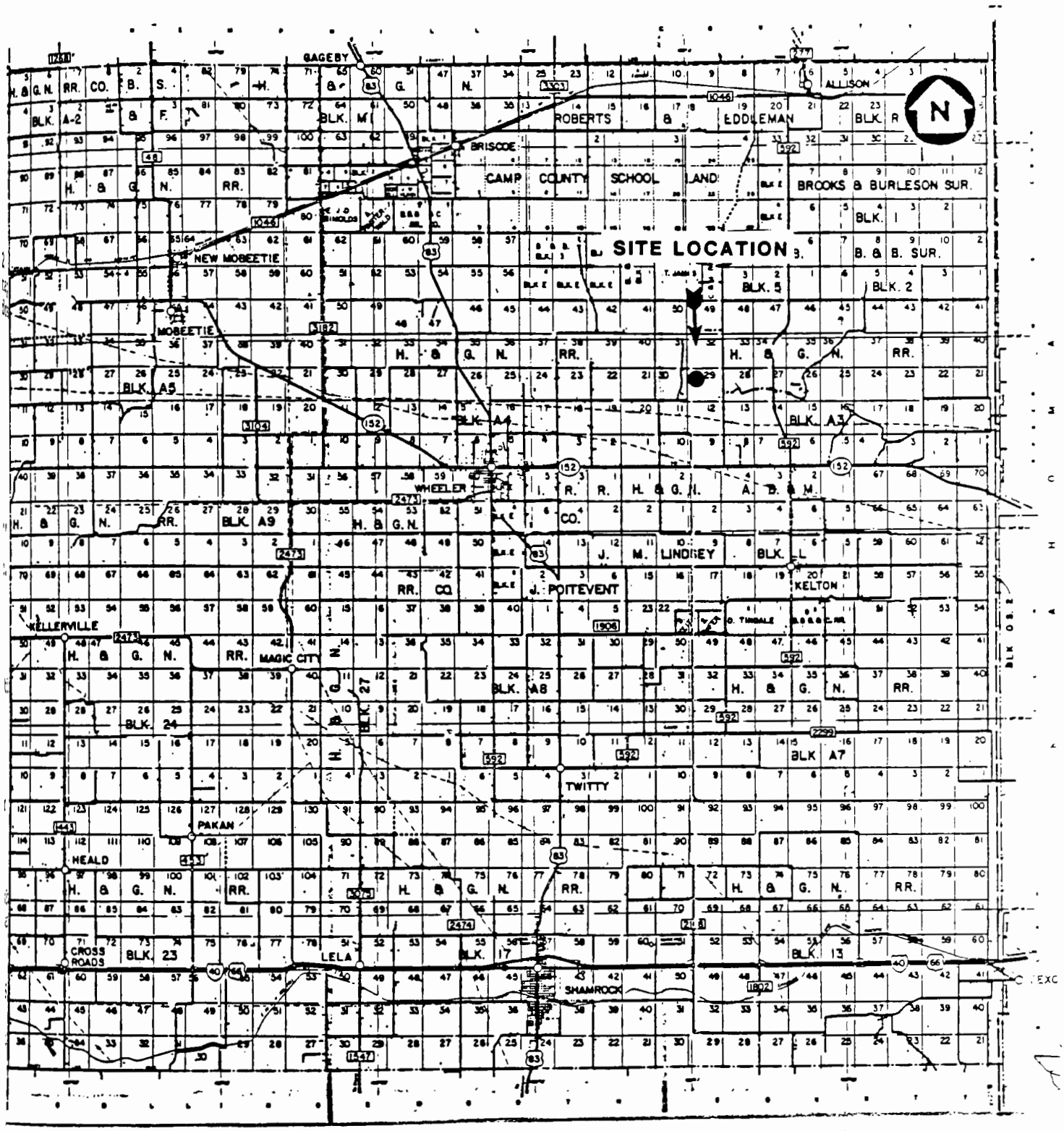


Figure 1. Location of Murexco Petroleum's Frye Lease Well #1-29, Wheeler County, Texas

Site Description

The Murexco site is located in rural flatland. The climate at this site location is net evaporation. The soil is described as sandy loam. The site is located over the Granite Wash formation of the Anadarko basin. Figure 2 is a survey of the exact location of the hole.

The depth to the groundwater in the area is 50 feet. The nearest surface water is a stream located 1/2 mile from the site. There is one drinking water well located 1/4 to 1/2 mile from the site.

At the time of sampling, the site consisted of one oil well and one reserve pit. The drill rig had been disassembled but was still at the site, as shown in Photos 2, 3, and 6. The entire area (approximately 210 x 350 feet) is fenced in. Figure 3 is an approximate schematic diagram of the site, indicating the directions in which photos were taken (Attachment A).

This site was an exploratory oil drilling site. The well was completed at 12,500 feet. Drilling began March 20, 1986 and was completed by June 13, 1986. Copies of weekly drilling reports are located in Attachment C.

Attachment D contains copies of mud reports from March 20 to April 23, when drilling reached total depth. Drilling was accomplished with three fresh water base muds. These are summarized in the table below:

Mud Type	Depth Range (ft)
Pre-Mix	0 - 7,606
Low Solid Non-Dispersed (LSND)	7606 - 11,182
Chemical	11,182 - 12,500

Details of the mud contents are available in the mud reports.

Lost circulation occurred three times during drilling. The first volume of mud lost was approximately 200 barrels between 5,402 and 5,430 feet. The second lost volume was approximately 200 barrels at 6,195 feet. The final loss was approximately 150 barrels at 8,686 feet.

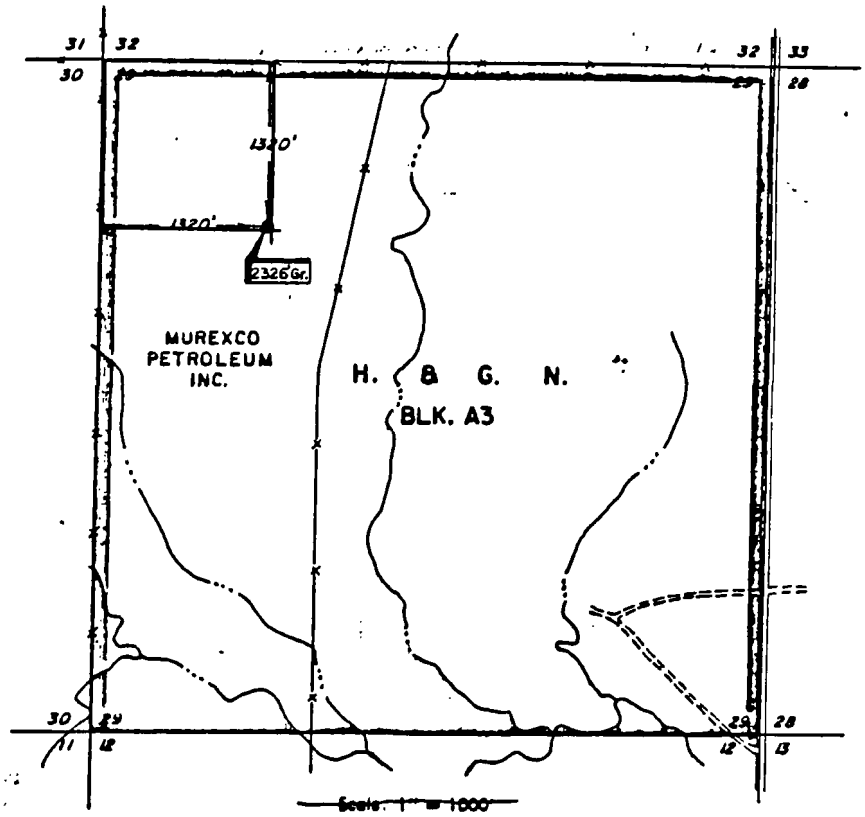
The drilling reports for May 1 and 2 describe the perforation of the zone between 11,810 and 12,075 feet with a total of 84 holes. Following this, the well received acidizing and fracturing treatments, between depths of 11,950 and 12,066 feet. Copies of the frac/acid logs are located in Attachment D. Details of the acid and frac fluid contents are available in these logs and in the drilling reports.

PLAT SHOWING
PROPOSED NEW WELL LOCATION

WHEELER County, Texas

Description: 1320' FNL & 1320' FWL

29 Section A3 Block H.&G.N. Survey



This location has been very carefully staked on the ground according to the best official survey records, maps, and photographs available to us, but its accuracy is not guaranteed.

Review this plat and notify us immediately of any possible discrepancy.

Date Staked: February 21, 1986

Operator: Murexco Petroleum Inc.

Lease Name: Frye Well No.: #1-29

Topography & Vegetation Sandy, pasture

Good Drill Site? Yes Reference Stakes or Alternate Location Stakes Set None

Best Accessibility to Location From East 3/4 mile county road

Distance and Direction from Hwy Jct. or Town From Jct. 152 & FM 592, East of Wheeler, Go West on Hwy. 152, 2 miles; thence North on county road 2.5 miles; thence West on ranch trail 3/4 mile to location in Section 29.

STATE OF TEXAS
ROGER D. LAMB
4159
REGISTERED PUBLIC SURVEYOR

This [illegible] Texas Railroad Commission Form 1 "Application to Drill . . ."

STATEMENT:

I, Roger D. Lamb a Registered Public Surveyor and an authorized agent of Topographic Engineering Co., do hereby certify that the above described well location was surveyed and staked on the ground as shown herein.

Roger D. Lamb

Texas Reg. No. 4159

TOPOGRAPHIC LAND SURVEYORS

420 Hughes Bldg.
(806) 665-7218
Pampa, Texas 79065

Figure 2. Survey of Well Location (Size of scale has been reduced)

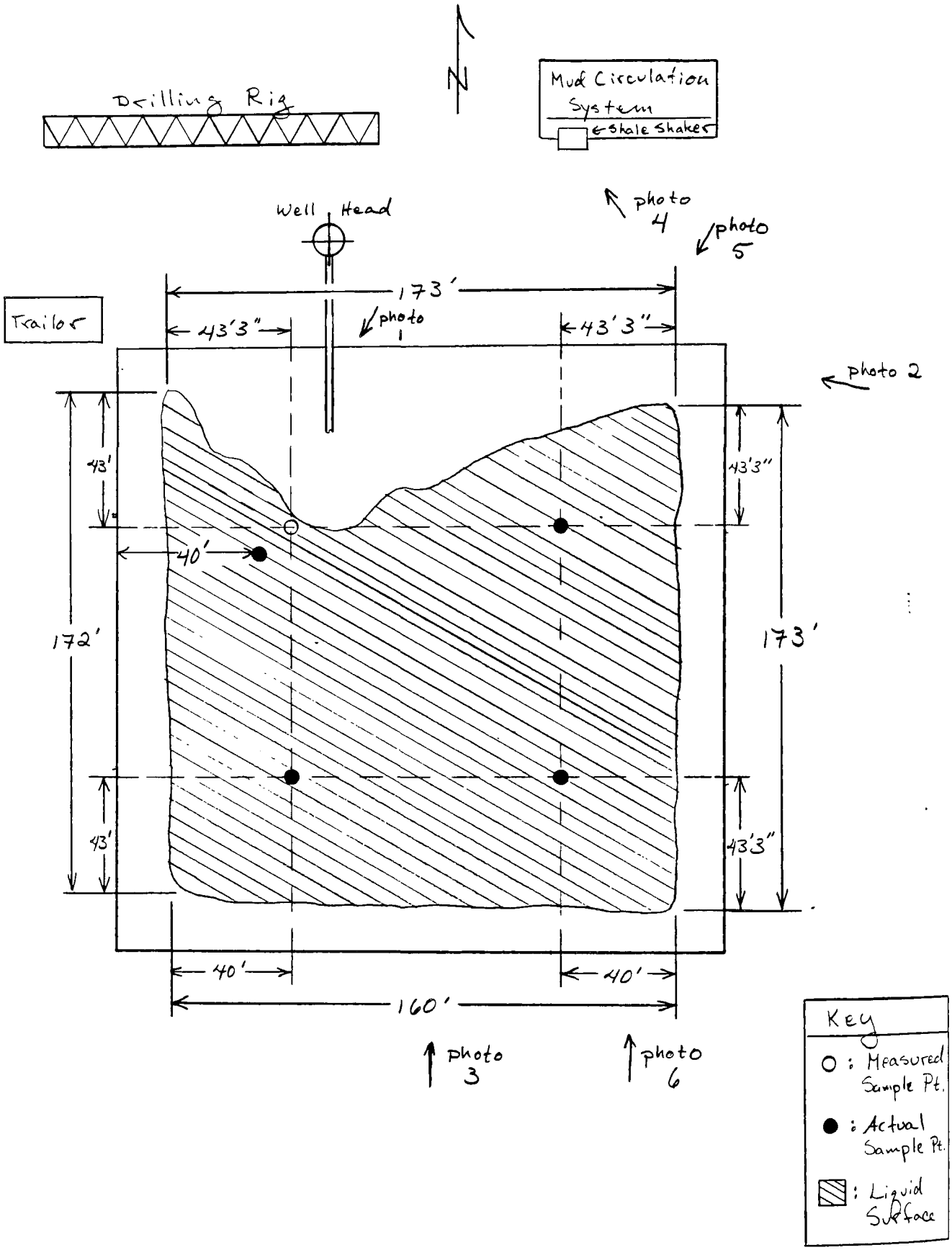


Figure 3. Schematic Diagram of Drilling Site

One unlined pit was constructed onsite to provide temporary storage of drill cuttings, residual drilling muds from the circulation system, completion fluids, waste crude oil, and miscellaneous trash. The pit contents were piped from the drilling operation. The pit was in use between March 19 and June 13, 1986.

The pit was designed to the dimensions of 175 x 175 feet square, and 6 feet deep. Figure 3 shows the measured dimensions obtained at the time of sampling, based on the liquid level in the pit at that time. The pit was constructed both above and below grade due to a upward slope from north to south. The north end of the pit, viewed in Photo 1, was built up above grade, and the south end, viewed in Photo 2, was cut below grade. The depth of liquid in the pit was approximately 1 foot, and the depth of the sludge was approximately 2 feet.

Tanks storing diesel on site contained roughly 4200 gallons prior to removal of the drilling rig. Approximately 20 gallons of waste crude oil was generated by completion date. The waste crude oil was disposed of in the reserve pit on site.

The pit contents were tested on June 20, 1986 by Murexco. At that time the pH was 6.0, the specific gravity was 1.03, and the chlorides content was 23,900 parts per million.

Disposal Practices

The fluid from the reserve pit will be vacuumed into a truck and hauled to an injection well. The specific injection well was not identified at the time of sampling. The solids in the pit will be allowed to dry out for one year. The pit will ultimately be backfilled and compacted.

Permits

Copies of permits secured by Murexco Petroleum Inc. for drilling and ground water protection at the Frye 1-29 well are located in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005).

Sample Point Locations

At the Murexco site, the samples were defined as the supernatant and solid contents of the waste material in the reserve pit.

There was only one sample point where a discrepancy between the actual and measured sample points was caused by the inaccessibility of the measured point. This occurred in the southwest quadrant of the pit where the cuttings pile was located. Figure 3 indicates the measured sample points as well as the actual sample points from which the pit samples were composited.

Sampling Methods and Equipment

To collect samples from the reserve pit, the pit was measured to identify the four quadrants shown in Figure 3, and to locate the center of each quadrant. The measured points were marked with stakes to facilitate locating sample points.

The sample points were accessed by boat. The boat was pulled to the measured sample points via three ropes, as shown in Photo 5. State personnel volunteered to assist with the ropes.

The first sample to be collected was the liquid composite. The thief was used to collect this sample.

The reserve pit was then sampled for sludge. The dredge was used to sample the sludge because the sludge was too liquidous to be retained by the coring device. One dredge volume was obtained at each quadrant, yielding a total volume of approximately 4 gallons. The solids were composited in the steel bucket shown in Photo 7.

The liquid and sludge samples were tested onsite for pH after sampling was completed. The pH was 7 for both samples.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

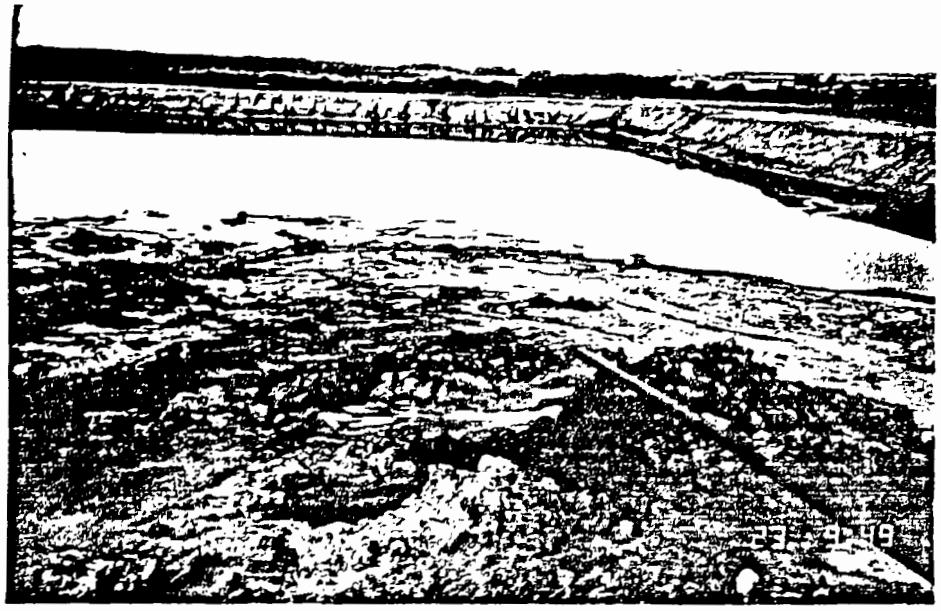


Photo 1. Southerly view of cuttings pile and

Photo 2. Northwesterly view across reserve pit

Photo 3. Northerly view across reserve pit

Photo 4. Attendees

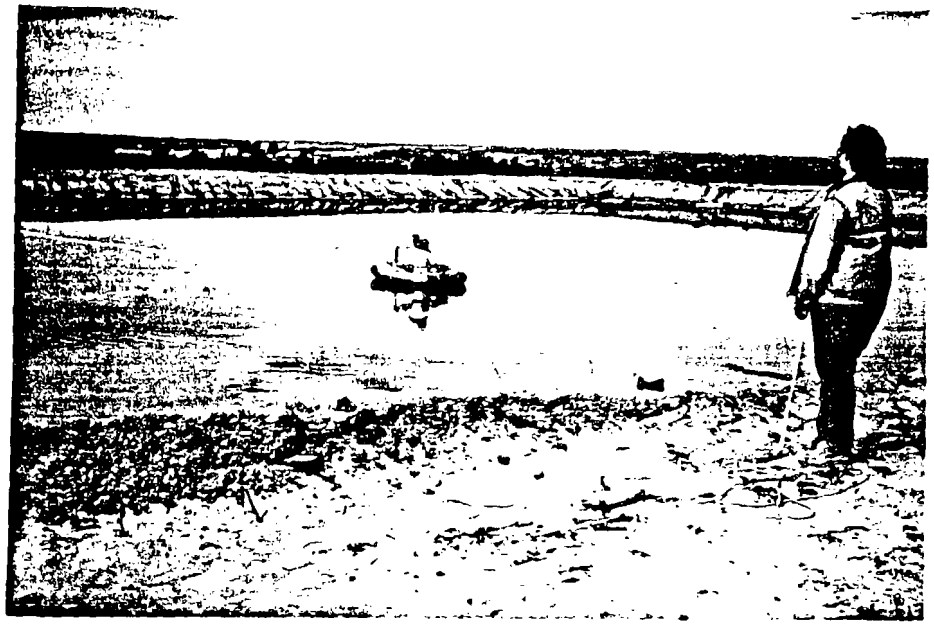


Photo 5. Liquid sampling in northeast corner of reserve pit

Photo 6. Liquid sampling in northeast corner of reserve pit

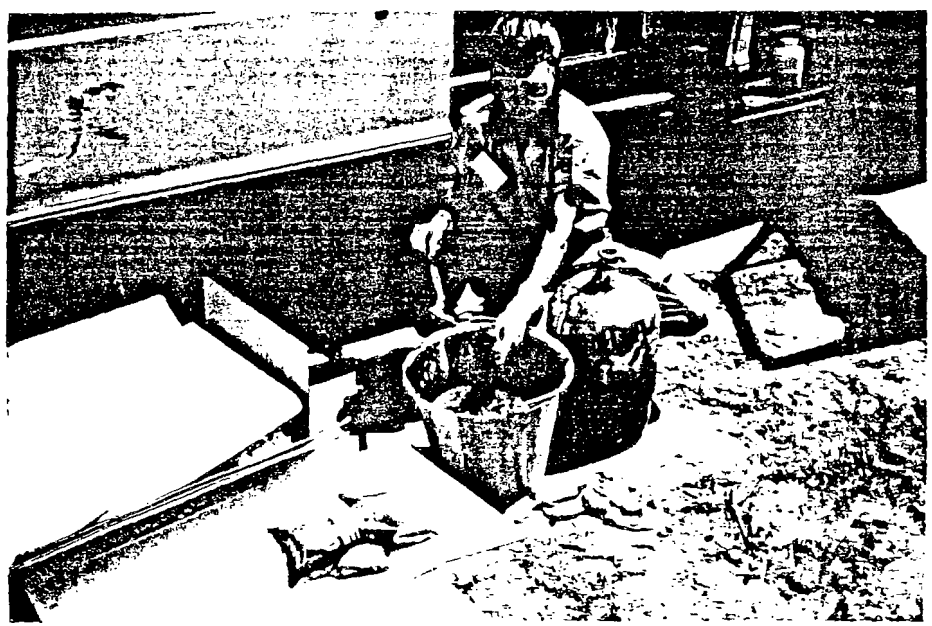


Photo 7. Filling sludge sample jar from sludge composite

ATTACHMENT B: PERMITS

DEPT[ ]F USABLE-QUALITY GROUND WATER TO[ ] PROTECTED

SC 1736

The information requested is essential in order for this agency to provide an appropriate response. Please allow for receipt of this form in our offices at least one week before your operation begins. Due to the volume of these requests, it is difficult for us to handle telephone inquiries, and such only serve to delay the processing of these forms. Complete, keep the bottom sheet (yellow) for your files and mail the top 4 sheets of this 5-sheet set of carbon-backed forms to the address below; 1 of them will be returned to you bearing our response and others will be sent to the Austin and appropriate district office of the Railroad Commission.

REFER TO: SC. [illegible] if commenting or [illegible] recommendation below.

MAR 17 1986 ENG.

Surface Casing
Texas Department of Water Resources
P.O. Box 13087
Austin, Texas 78711 (Phone: 512/475-6176)

Date 3-12-86

J.N. Woods 214/696-3463
Name of person preparing this request & Telephone No. w/AC

Murexco Petroleum, Inc.
Company (operator's name as on RRC form W-1)

9400 N. Central Expway, LB 178
Mailing Address

Dallas TX 75231
City and State Zip Code

Do not write in this space

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#16

DC aul

TYPE OR PRINT IN INK

Lease Name Frye Well No. 1-29

County Wheeler Railroad Commission District No. 10

Section No. 29 Block No. A3 Township

Survey H & B N No. Abstract No. A-

Distances, in feet, and directions measured at right angles from each of two intersecting Section or Survey lines (NOT LEASE LINES) 1320 feet from North line and 1320 feet from west line

Distance (in miles) and direction from a nearby town in this County (name the town). ±6 NE from Wheeler, TX

Elevation (if available) 2326' GR Proposed Total Depth 12,500'

Geologic Formation at T.D. Granite Wash

Map (Attach a map showing surrounding Surveys and your well site. The map may be a Xerox or other, including hand drawn, copy of an ownership map but must show Surveys, etc. The scale should be either 1"=4,000' or 1"=3,000'. A part of an ownership map such as those by Heydrick, Tobin, South Texas, Southwest, Midland, Zingery, etc., is preferable to a surveyor's plat.

Additional data (check if attached):

Log of same or nearby well _____ (The applicable type of well log of a nearby well that shows the aquifers).
ALWAYS attach the electric log of any well that is to be reentered.

DO NOT WRITE HERE FOR TDWR USE ONLY

The TEXAS DEPARTMENT OF WATER RESOURCES' recommendation for the protection of usable-quality ground water at the referenced location is as follows:

The interval from the land surface to 10 feet into the Permian red beds must be protected. The top of the Permian red beds is estimated to occur at a depth of 250 feet.

Very truly yours,

R. N. Webster
R. N. Webster
Geologist, Surface Casing, TDWR

Date 3/14/86 dh
typed by TDWR

NOTE: The depth to which we recommend that usable-quality water strata should be protected is intended to apply only to the subject well. Approval of the well-completion methods for protection of this ground water falls under the jurisdiction of the Railroad Commission of Texas. This recommendation is intended for normal drilling and production operations only and does not apply to salt water disposal operations. It should not be used as a recommendation for fieldwide usable-quality water protection rules.

TDWR-0051 (Rev. 5-4-81)

R(.ROAD COMMISSION OF TEX
OIL & GAS DIVISION
PERMIT TO DRILL, DEEPEN OR PLUG BACK ON REGULAR LOCATION

MAR 1986

PERMIT NUMBER	DATE OF PERMIT	DISTRICT
299517	3/13/86	10
API NUMBER	**FORM W-1 (dated)**	**COUNTY**
42 483 31273	3/12/86	WHEELER
TYPE OF OPERATION		**ACRES**
DRILL		650

OPERATOR 593997

MUREXCO PETROLEUM, INC.
9400 N.CENTRAL EXP,#1550-LB 178
DALLAS TX 75231

NOTICE
NO ALLOWABLE WILL BE ASSIGNED unless well pro all fresh water sands with sufficient surface casing. W Commission rules do not specify surface casing req ments, contact the Texas Department of Water Reso for depth to which fresh water sands must be protec

District Office Telephone No.: 806 665-1653

LEASE NAME	WELL NUMBER
FRYE	1029
LOCATION	**TOTAL DEPTH**
6 MILES NE FROM WHEELER	12,500

SECTION, BLOCK and/or SURVEY
SEC=>29 BLK=>A3 SVY=>H & GN AB=>

DISTANCE -- LEASE LINES	-- SURVEY LINES	-- NEAREST WELL ON LEASE
1320 FNL - 1320 FWL	1320 FNL - 1320 FWL	NA

NOTE THE CONDITIONS ON THE REVERSE SIDE, PARTICULARLY CONCERNING SPACING RULE CHANGE. IT IS THE OPERATOR'S RESPONSIBILITY TO INSURE THAT THE PERMITTED LOCATION COMPLIES WITH THE DENSITY AS WELL AS THE SPACING RULES IN EFFECT ON THE SPUD DATE. A RULE 37 AND/OR RULE 38 EXCEPTION WILL BE REQUIRED IF, BECAUSE OF A FIELD RULE CHANGE, THE LOCATION IS NOT IN COMPLIANCE WITH THE COMMISSION FIELD RULES ON THE SPUD DATE.

FIELD(S)

* THIS PERMIT AND ANY ALLOWABLE ASSIGNED MAY BE REVOKED IF A CHECK TENDERED TO
* THE COMMISSION IS NOT HONORED.

WILDCAT

** LIMITATIONS **

WILDCAT ABOVE 12,500 FEET.
REGULAR PROVIDED THIS WELL IS NEVER DRILLED DEEPER THAN 12500 FEET.

THIS PERMIT SUBJECT TO THE CONDITIONS ON THE BACK OF THIS FORM.

THE OPERATOR SHOULD CONSIDER THE REQUIREMENTS OF THE NATURAL GAS POLICY ACT OF 1978, AS AMENDED, (NGPA), AND APPLICABLE STATE OR FEDERAL REGULATIONS.

Based upon the representations made on the FORM W-1 and those made on any plat or plats filed therewith, it is believed that operation indicated, when carried out at that point which you have represented to be the location of the above designated Well, complies a the date thereof, with the provisions of the applicable spacing rule SUBJECT TO THE LIMITATIONS, IF ANY, SET OUT ABOVE. Complia with the applicable Commission spacing rule renders it unnecessary that you secure a special Commission permit to cover this indica operation at the location shown, the same being classed as regular.

PHONE: (512) 445-1314 DIRECT INQUIRIES TO: DRILLING PERMIT SECTION, OIL AND GAS DIVISION MAIL: Capitol Station-P. O. Drawer 12 Austin, Texas 78711

SECTION II — DATA ON WELL COMPLETION AND LOG (Not Required on Retest)

1. Type of Completion: New Well [X] Deepening [ ] Plug Back [ ] Other [ ]

25. Permit to Drill, Plug Back or Deepen — DATE 3-13-86 — PERMIT NO. 299517
Rule 37 Exception — CASE NO.
Water Injection Permit — PERMIT NO.
Salt Water Disposal Permit — PERMIT NO.
Other — PERMIT NO.

2. Notice of Intention to Drill this well was filed in Name of: Murexco Petroleum, Inc.

27. Number of producing wells on this lease in this field (reservoir) including this well: 1

28. Total number of acres in this lease: 650

29. Date Plug Back, Deepening, WorkOver or Drilling Operations: Commenced 3-20-86; Completed 4-25-86

30. Distance to nearest well, Same Lease & Reservoir: None

31. Location of well, relative to nearest lease boundaries of lease on which this well is located: 1320 Feet From North Line and 1320 Feet from West Line of the Frye Lease

32. Elevation (DF, RKB, RT, GR, ETC.): 2326' GR

33. Was directional survey made other than inclination (Form W—12)? [ ] Yes [X] No

34. Top of Pay: 11,950'
35. Total Depth: 12,500'
36. P. B. Depth: 12,331'
37. Surface Casing Determined by: Field Rules [ ]; Recommendation of T.D.W.R. [X] Dt. of Letter 3-14-86; Railroad Commission (Special) [ ] Dt. of Letter

38. Is well multiple completion? No

39. If multiple completion, list all reservoir names (completions in this well) and Oil Lease or Gas ID No.

FIELD & RESERVOIR	GAS ID or OIL LEASE #	Oil—O Gas—G	WELL #
NA	–	–	–

40. Intervals Drilled by: Rotary Tools X; Cable Tools

41. Name of Drilling Contractor: Petren Drlg.

42. Is Cementing Affidavit Attached? [ ] Yes [ ] No

43. CASING RECORD (Report All Strings Set in Well)

CASING SIZE	WT #/FT.	DEPTH SET	MULTISTAGE TOOL DEPTH	TYPE & AMOUNT CEMENT (sacks)	HOLE SIZE	TOP OF CEMENT	SLURRY VOL. cu. ft.
13 3/8"	54.5	257'	—	Cl "A" & "H" 200 sx	17 1/2"	Surface	313
8 5/8"	32#	3502'		Cl "A" 2020 sx	10 1/4"		3982.6
5 1/2"	20#	12,505'		Cl "H" (550 sx)	7 7/8"	10,550'	

44. LINER RECORD

Size	TOP	Bottom	Sacks Cement	Screen

45. TUBING RECORD

Size	Depth Set	Packer Set
2 7/8"	12,331'	11,870'

46. Producing Interval (this completion) Indicate depth of perforation or open hole

From 11,950' - 11,956'	XX 11,992' - 12,001'	
From 11,960' - 11,966'	XX 12,010' - 12,018'	
From 11,970' - 11,973'	To	
From 11,980' - 11,987'	To	

47. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

Depth Interval	Amount and Kind of Material Used
11,950' - 12,018'	117,200 gals RXL-5, 237,000# 20/40 Ottawa Sd acidized: 3000 gals 15% HCL acid w/126 ball sealers.

48. FORMATION RECORD (LIST DEPTHS OF PRINCIPAL GEOLOGICAL MARKERS AND FORMATION TOPS)

Formations	Depth	Formations	Depth
Cleveland	10,500		
Granite Wash	11,800		

REMARKS

ATTACHMENT C: DRILLING REPORTS

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
JUNE 6 - 12, 1986

FRYE #1-29/COMPLETION
Wheeler Co., TX
Sweetwater Creek Prospect

Murexcoh/Operator
MPI WI:
1986-A

6/6/86
Began allowable tst @ 11 AM. SITP 950#, SICP 1450. Open to tank on 20/64" chk. Gas vol. 340 MCF/D, flo'd 47 BO, 3 BW during 24 hr tst. @ end of tst - FTP 200#, CP 700#. Well left flo'g to frac tank on 20/64" chk.

6/7/86
200# FTP & 700# FCP. Flo on 20/64" chk, rec. 43 BO & no wtr in 21 hrs.

6/8/86
SI well Saturday 6/7/86 @ 6 PM.

6/9/86
SI.

6/11/86
84 hr SITP 2400#, SICP 2900#. SI.

6/12/86
107 HR SITP 2825, SICP 3100#. @ 7 AM: Opened well on 32/64" to 38/64" chk to keep from freezing. Flo'd 38 BO in 1st 2 hrs, FTP 1000#, FCP 1500#.

DRLRPT/D 1

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MAY 30 - JUNE 5, 1986

FRYE #1-29/COMPLETION
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

5/30/86
MI & RU Hootus Tst Unit w/1.0 MMBTU heater. Opened well on 6/64" chk @ 9 AM 5/30/86. SITP 3500#, SICP 3800#. @ 10 AM flo on 10/64" chk, 3200# FTP 550/600 MCF/D. Flo some liquid, mostly oil, no measurement yet.

5/31/86
SITP 3500#, SICP 3800#. Opn well @ 9 AM, flo'g thru tst separator on 7/64" chk. Put o 10/64" chk @ 11 AM w/3100# FTP & 3300# FCP @ rate of 1216 MCF/D. Press & rate dec thru out test period. This AM: Flo'g on 10/64" chk w/1825 FTP & 2150 FCP @ rate of 626 MCF Rec. 152 BO & no wtr in 22 hrs.

6/1/86
Cont to flo well thru tst separator on 10/64" chk. Press & rate continue to dec but no as rapidly. @ 7 AM flo'g well on 10/64" chk w/1300# FTP & 1625 FCP @ 586 MCF/D. Recov 121 BO & no wtr last 24 hrs. Cum oil recovered 273 bbl.

6/2/86
Cont. to flo well thru tst separator on 10/64" chk. Well appears to be stabilizi Press & rate have remained constant last 12 hrs. @ 7 AM 925 FTP, 1500 FCP on 10/64" ch @ rate of 473 MCF/d. Rec. 110 BO & trace of wtr. Total rec. 383 BO 13 BW.

6/3/86
24 hr flo rec. 76 BO, 3 1/2 BW, total fluids rec. 456 BO, 16 1/4 BW. Thurman McGlophli took recombined samples for analysis @ 3 PM 6/2/86. 1 PM sample to BJ for analysis: Wtr - grav. 1.010, pH 5.8, Chlorides 40,270, Na 24,000, Ca 3000, Fe 150, Mg 640; Oil 48.8 API.

6/4/86
Flo on 10/64" chk w/725# FTP & 1350#. Press has remained constant & gas rate constant last 24 hrs. Rec. 323 MCF/D, 58 BOPD, 1 BW/D.

6/5/86
Flo'd well on 10/64" chk w/avg. FTP of 675# & 1300# CP. Avg. gas rate of 300 MCF/D, 64 BO, 1 BW. Well press & rate has been fairly constant for last 60 hrs. Released tst unit @ 7:00 AM.

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MAY 16 - 22, 1986

FRYE #1-29/COMPLETION
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

5/16/86
Gas est. 50 MCFPD in 5 1/2" csg - no fluid. PU Baker junk basket & 4.520" G ring & run on sd line to 12,150' touching nothing. POH w/J basket, 1 piece of metal in basket. ND BOP, NU xmas tree. Start FL w/swb 5000', rec. 43 bbl in 2 hrs. Final FL 5200', 100# psi on csg @ 7 PM. Gas before, during & after swb pull. 1596 BFTR. SI @ 7 PM. King Rig Released. This AM: 220# TP, 900# CP, 16/64" chk. Gas for 10 min & spraying fluid & died. Swb'g unit on way.

5/17/86
12 hr SITP 220, SICP 900. Open on 16/64" chk - to 0 in 10 min w/dry gas, then flowed spray of fluid (10 bbls) & died. RD King WO rig. MI & RU King swb unit. SICP 1000#, FL @ 5000'. Rec. 82 bbls in 6 hrs, well flo'g @ 4 PM, CP 900#. Flo'd 31 bbls from 4 PM to 7 PM. CP dropped to 650# @ 7 PM, 20% cond., 80% frac fluid, 12 hr rec. 123 bbls. 1473 BLTR, left flo'g on 3/4" chk w/flo crew.

5/18/86
Well flo'd 34 bbls in 12 hrs, CP dropped to 500# @ 1AM, tbg flo died @ 2 AM, CP inc. to 900# @ 7 AM. Start FL 4500', scattered to 9000'. Made 1 swb run rec. 5 BF. Tbg flo'd 13 bbls in 3 hrs, CP dropped to 500#, tbg flo died. FL w/swb @ 8500' & thinly scatted to SN, 1 run/hr. Rec. 23 bbls in 7 hrs, 40% oil, 60% load. Gas meas. 360 MCFPD after swb pull, gas meas 5 min after swb run 240 MCFPD, left tbg opn on 3/4" chk @ 6 PM, CP 500#.

5/19/86
Flo'd 9 BC overnite, tbg dead @ 7 AM, CP 1000#. Start FL 4500' & scattered to 9000'. Rec. 5 bbl on 1st run, flo'd 17 bbl in 3 hrs. CP dropped to 500#, tbg flo died @ 10:30 AM, FL w/swb @ 8500' & scattered to SN. 1 run/hr, 7 hr rec. 26 BF, CP dropped to 350#, 50% cond, gas vol. after swb 400 MCFPD; 30 min after, 240 MCFPD. Rec. 41 BC, 16 BFW. Left opn to tank on 3/4" chk @ 6 PM.

5/20/86
Well flo'd 21 bbl in 13 hrs, tbg flo dead @ 7 AM, CP 400#. Start FL w/swb 8500' & scattered to SN, made 1 run/hr, rec. 17 bbl in 10 hrs. 24 hr rec. 38 BF, 7 BW, gas vol. meas. directly after swb 400 MCFPD, 1 hr after swb pull 240 MCFPD. Left tbg opn to tank on 3/4" chk @ 5 PM. SI. Drop from report until work begins.

5/21/86
SI 8 AM, hook-up flo line to frac tank & pit. Opn @ 11 AM on 3/4" chk, 4 hr SITP 400#, SICP 725#, left opn to tank. This AM: SICP 500#, FTP 0. Gas vol. @ 8 AM 140 MCFPD, flo'd 36 BF in 21 hrs. PU Petroleum Tech WL & RIH w/tandem bombs, set @ 11,985' for 7 day build-up. Start tst 9:30 AM, May 21, 1986. No further report until May 29, 1986.

DRLRPT/D 1

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MAY 23 - 29, 1986

FRYE #1-29/COMPLETION
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

5/29/86
Pull bomb 9:30 AM, May 28, 1986. Petro Tech pulled bomb & ran static, 168 hr dead wt. SITP 3410#, SICP 3696#. BHT (11,985'), 210°F. Fluid sample results from 5/21/86:

Wtr		Oil
Grav.	1.057	48.4 API corrected
pH	5.4	Pour pt. 12°F
Chlorides	45,373	
bicarbonates	254	
Na	24,924	
Ca	30,999	
Mg	642	
Fe	144	

DRLRPT/D 1

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MAY 9 - 15, 1986

FRYE #1-29/COMPLETION
Wheeler Co., TX
Sweetwater Prospect

Murexco/Operator
MPI WI:
1986-A

5/13/86
15 1/2 hr SICP 600#, opn csg to tanks on 1/2" chk, gas for 2 min, press down to 0# & then solid fluid. Rec. 757 bbl in 24 hrs. 1709 BLTR.

5/14/86
@ 7 AM FCP 155 on 42/64" chk, rec. 12 bbl fluid, 10% cond. @ 8 AM FCP 95# on 1 1/2" chk, rec. 42 bbl fluid, 150-200 MCFPD. @ 9 AM 60# FCP on 1 1/2" chk, rec. 36 bbl fluid. 1709 BFLTR. Flo 48 bbl 9 AM - 11 AM, no fluid 11 AM - 7 AM. Gas flo 200 MCFPD 11 AM - 1 PM. Gas dec. to small blow 7 AM 5/14/86. Baker milling tool in hole to mill pkr @ 1200'.

5/15/86
PU Baker mill & pkr picker. PU Dotco bumper sub, hydraulic jars & 6 DC. RIH w/32 J 2 7/8" 8 rd tbg, tag pkr w/2' in on 33rd J (978') + KB correction 14', tag top of Baker pkr @ 1200'. Start milling pkr @ 9:50 AM, 40 bbl 10# brine to load & circ hole during milling oper., mill over pkr in 4 hrs, pkr free & going down hole @ 1:50 PM. POH w/pkr, had to jar thru 1st 12 csg couplings. Shut blind rams @ 6 PM, leave csg opn to tank w/King Drlg. 2 man crew to watch well overnite. Start flo'g @ 8 PM, flo'd 105 bbl in 3 hrs, no fluid from 11 PM - 7 AM.

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MAY 9 - 15, 1986

FRYE #1-29/COMPLETION
Wheeler Co., TX
Sweetwater Prospect

Murexco/Operator
MPI WI:
1986-A

5/9/86
1050# FCP on 12/64" chk. Open to 16/64" ck, 925# FCP @ 2:30 PM, open to 24/64" chk, @ 4:30 AM 550# FCP, flo 28 BPH. Rec. 648 bbl in 21 hrs. 1570 BLTR. SI @ 4:30 AM. This AM: SICP 950#. RU McCullough, run G-ring, set pkr.

5/10/86
SICP 950#. RU McCullough WL & run 4.437" OD G-ring & junk basket to 12,181'. Rec. 2 pieces rubber from junk basket. SIH w/5 1/2" Bkr Model F B-1 pkr, pkr set dwn @ 12,050' from surf will not go up or dwn, pkr jumped up hole 1'. SICP 1100#, flo well on 16/64" chk after flo'g for 5 min, pkr jumped up hole, 50' to 12,000', pkr will not go up or down, cont. flow no fluid to surf, flo on 24/64" chk, press to 0. No gas flow. Call BJ pump truck. RU BJ, load csg 26 bbl 10# brine & press to 1800#, held solid, bleed off press & set tool. POH w/wireline, RD McCullough & BJ & SI. SDFN.

5/11/86
SICP 90#, bleed off. RU Dotco rev. circ unit, press csg to 3100#, pump out plug, SD, SICP 1200#. Dotco pmp'd 266 bbl 10# brin w/additives, pmp rate 3/4 bbl/min @ 1900#. ISIP 1900#. Flo back 150 bbl, show of gas on last 50 bbl. Call BJ pmp truck to attempt to kill well, wait 3 hrs for BJ. CP built up to 1250#. RU BJ kill truck @ 6:30 PM. Pmp 300 bbls 10# brine w/additives, 1st 150 bbls 5 1/2 bpm @ 2600#, 2nd 150 bbls @ 5 1/2 bpm @ 2100#, ISIP 1900#. Open on 24/64" chk, press down to 0# in 20 min. Flo'g solid steam fluid, flo 75 bbl in 75 min. SI @ 9 PM.

5/12/86
10 hr SICP 750#, BJ pmp'd 300 bbl 10# brine w/additives, press inc. to 2100# & stabilized, 5 1/2 bpm rate. SD. ISIP 1950#, 15 min. 1650#, 1 hr. 1100#. Opn csg to tank on 24/64" chk, flo back 45 bbl in 50 min. SI press inc. to 500# in 2 hrs. BJ pmp'd 300 bbls 10.2# brine w/additives, rate 5 1/2 bpm @ 2100#. ISIP 1950#, 15 min 1650#. SI for day @ 3:30 PM. Total pmp'd to attempt to kill well 896 bbl. This AM: SICP 600#, flo'g to tank on 34/64"chk.

DRLRPT/D 2

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MAY 2 - 8, 1986

FRYE #1-29/COMPLETION
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco /Operator
MPI WI:
1986-A

5/6/86
25 psi FTP, 75% oil rec. 6 BF lite mist open to 1" chk. Made swb run, FL 10,000', run swb to 11,500', no fluid rec., cups torn. RU BJ to kill well, pmp 65 bbl 2% KCL w/ additives via tbg, bleed off press, press csg to 3500# for 10 min - OK. Remove tree unseat pkr, run 10 J tbg thru perf, TOH. POOH w/tbg & pkr. SDFN. This AM: prep to frac.

5/7/86
SICP 125. RU BJ. Frac w/117,200 gal RXL 5, base fluid 2% KCL w/.25/gal xcid 102, 1 gal claytrol 3, 1 gal inflo-40/1000 gal, ran 5% diesel thru 4 ppg sd, tot sd 237,000# 20-40 ottowa, flush w/11,130 gal 10# brine. During pad, press inc. from 3100# to 4100#. @ start 1 ppg 4100# w/3 ppg on form, press dec. from 4130# to 3200# in 7 min, start flush. Complete job 12:30 PM. Tot sd used 217,000#. Avg. press 36 BPM @ 3800; ISTP 2700# w/10# brin, 5 min 2300#, 10 min 2170#, 15 min 2010#. 2 PM SICP 1950#. SI for gel to break. 2933 BLYTR. This AM: SICP 1450.

5/8/86
SICP 1450#, open on 12/64" chk, @ 11:30 AM 1100# FCP, reduced chk to 8/64", @ 4:30 PM 1300# FCP, open to 12/64 chk, @ 5:30 PM 1200# FCP, @ 8:30 PM 1300# FCP; Opn to 16/64" chk @ 12:30 1100# FCP. Reduce to 12/64" chk. This AM: 1050# FCP on 12/64" chk. Open to 16/64" chk @ 8:30 AM 1000# FCP. Total fluid recovered 754 bbls, 2179 BFTR.

DRLRPT/D 4

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MAY 2 - 8, 1986

FRYE #1-29/COMPLETION
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco /Operator
MPI WI:
1986-A

5/2/86
RU King Drlg. Pulling Unit, RU Welex to perf. Start FL 150' from surf. 2 7/8" tbg delivered from W.G. Baker, threads on talley, 403 J 2 7/8" 8.7# N-80 (12,597.5'). Correlate w/CCL & prep to perf w/4" hollow carrier, 120° phasing, hole size .56", penetration 14.8". 1st run failed, 2nd run perf 11,992-12,001' 19 holes; 12,010-12,018 17 holes; 3rd run start FL 90' from surf, perf 11,970-73' 7 holes; 11,980-87' 15 holes; 4th run FL 90' from surf, perf 11,950-56' 13 holes, 11,960-11,966' 13 holes, total perfs 84 holes. SIH w/tbg & pkr. Run 150 J. SDFN. This AM: TIH, 0 TP, 0 CP.

5/3/86
SITP 0, SICP 0. Cont TIH w/tbg, threads off talley 403 J 2 7/8" 8.7# N-80, (12,512.98') tbg & tools in hole 1 5 1/2" Baker Model R full bore pkr (5.75') 1 2 3/8" standard SN w/change overs (2.25') 382 J 2 7/8" 8.7# N-80 (11,862.14'), total 11,870.14'. Set pkr w/18,000# compression, install tree close BOP. Start swb'g, FL surf after 4 hr., FL 8000', tot. rec. 41 BW.

5/4/86
SITP 0, SICP 0, lite gas blow. Start FL 7500'. FL 300' above SN 3' flare in front of swb. Rec. 18 bb. RU BJ to acidize w/3000 gal 15% HCL + . 1 gal/1000 NE-6 & 1 gal/1000 Claytrol 3, run 6 bbl acid without balls, 126 7/8" ball sealers in 66 bbl acid, flush w/62 bbl 2% KCL, hole loaded @ 57 bbl form. taking fluid @ 2500 psi. Pmp 5 bbl/min @ 3200#, ball out to 5000#, surge balls, cont. flush, SDFN. Avg. rate 4.8 BBl/min @ 3400#, ISTP 1650 psi, 5 min 1510 psi, 10 min 1470 psi, 15 min 1450# psi, BLTR. @ 1 PM SITP 1300 psi on 32/64", cont. flow dwn to 300 psi, open to 1" chk, w flo'd 20 bbl, start swb'g, FL @ surf. FL @ 7 PM 3600' & scattered to 8800' & solid to Rec. 96 bbl, 36 BLTR.

5/5/86
SITP 900#, SICP 250#, open on 32/64" chk. @1 hr. FTP 420, 32/64" chk, 70% oil, est. gas 300 MCF. @3 hr. FTP 0 on 32/64" chk, good gas blow, flo'd 25 bbl, open to 1" chk, bleed off. @4 hrs FL 8000', scattered 75% oil, strong blow behind swb. FL 9500' scat, swb 10 bbl, no fluid on last run, tearing rubber off cups, cannot swb below 10,300'. R w/overshot to clean out rubber, started out @ 10,500', nothing recovered. RIH w/swb cu to 10,300' pushed to 10,900', FL @ 9500', lite blow, no fluid rec. Cups torn, wait 1 5:30 PM, FL 9280'. Swb stacked out @ 10,900', no fluid rec. Rec. 25 BO, 11 BW. 107 wtr rec. after acid, 25 BLTR. SDFN. This AM: SITP 925, SICP 300, open on 1" chk, flo oil, set chk @ 48/64".

DRLRPT/D 3

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
4/25/86 - 5/1/86

FRYE #1/COMPLETION
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

4/25/86
LDDP, set 5 1/2" csg. Circ, cmt. ND BOP, set slips. Jet & clean pit, RD. Rig Released 7 AM 4/25/86. Run 5 1/2" as follows:

1 Baker Float shoe; 2 [redacted]1/2" 20# N-8 LT&C (84.42'), 1 Baker line float collar; 270 J 5 1/2" 20# N-80 LT&C; 29 J 20# S-95 LT&C; 1 J 5 1/2" 20# P 110 LT&C; total length 12,513.31'. Thread locked FC, 1st J, shoe, ran 20 centrailizers. BJ cmt'd job. 10 bbl gel wtr spacer, mix 550 sx Cl "H" cmt + 3% KCL + 10#/sx gilsonite, + 1/4#/sx celo flake, + .8% FL 19 slurry @ 14.8#/gal, yield 1.39, volume 136 bbl. Displaced w/272 bbl 2% KCL w/1 gal/1000 gal NE-6.

5/1/86
Made final cut on 5 1/2" csg. Install B Section tst to 1500#. Install 6" X 5000# hydraulic BOP. RU Welex. Ran CBL/CCL/GR w/portable mast. Tagged [redacted] w/1000# press on well. Had good to excellent bonding from PBTD @ 12,331' to top of cmt @ 10,550' across interval to be perforated 12,075-11,810, had 80% partial bonding.

DRLRPT/D 5

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
APRIL 18 - 24, 1986

FRYE #1-29/DRILLING
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

4/18/86
Depth 11,195' (55'), 29 days from spud. MW 9, V 47. Survey: 11,169' 1 1/8°. This AM: drlg.

4/19/86
Depth 11,405' (210'), 30 days from spud. MW 9, V 38. This AM: drlg.

4/20/86
Depth 11,652' (247') 31 days from spud. MW 9+, V 39. This AM: drlg.

4/21/86
Depth 11,915' (263') 32 days from spud. M 9, V 41. This AM: drlg.

4/22/86
Depth 12,270' (355'), 33 days from spud. MW 9, V 42. Survey: 11,169' 1 1/8°. This AM: drlg.

4/23/86
Depth 12,500' (230'), 34 days from spud. MW 9.2, V 55. Survey: 11,169' 1 1/2°; 12,244' 1 1/2°; 12,496' 1 1/2°. RU Schlumberger, first log on bot 8 AM, 12,503', DIL/BHC/GR/Calip.

4/24/86
Depth 12,500' TD, 35 days from spud. MW 9.2, V 51. 1st log DIL/SFL 12,478-3516'; Sonic 12,478-8500'; LDT/CNL/ML 12,478-8500'. This AM: LDDP.

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
APRIL 11 - APRIL 17, 1986

FRYE #1-29/DRILLING
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

4/11/86
Depth 9400' (214'), fm sh. 22 days from spud. MW 9, V 35. Survey: 7453' 3/4°. This AM: drlg.

4/12/86
Depth 9510' (110'), 23 days from spud. MW 8.9, V35. Survey: 7453' 3/4°. This AM: drlg.

4/13/86
Depth 9839' (329'), 24 days from spud. MW 9, V 36. This AM: drlg.

4/14/86
Depth 10,165' (326'), 25 days from spud. MW 9, V 34. This AM: drlg.

4/15/86
Depth 10,470' (305'), 26 days from spud. MW 9, V 36. Survey: 10,460' 1°. This AM: drlg.

4/16/86
Depth 10,825' (355'), 27 days from spud. MW 9, V 36. Survey: 10,460' 1°. This AM: drlg.

4/17/86
Depth 11,140' (315'), 28 days from spud. MW 9, V 34. Survey: 10,460' 1°. This AM: drlg.

DRLRPT/D 5

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
APRIL 4 - 10, 1986

FRYE #1-29/DRILLING
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

4/4/86
Depth 7550' (280'), 15 days from spud, fm. sh. MW 8.8, V 32. This AM: Drlg.

4/5/86
Depth 7935' (389'), 16 days from spud. Fm sh. MW 8.8, V 35. This AM: Drlg.

4/6/86
Depth 8219' (284'), 17 days from spud. FM sh. MW 8.9, V 34. This AM: trip.
Survey 1°

4/7/86
Depth 8450' (231'), 18 days from spud. MW 8.9, V34. This AM: drlg.

4/8/86
Depth 8745' (295'), 19 days from spud. MW 9.0, V 34. This AM: drlg.

4/9/86
Depth 9010' (265'), 20 days from spud. Fm sh, lm & sd. MW 9, V 35. Survey: 7453' 3/4°. This AM: drlg.

4/10/86
Depth 9186' (176'), fm 95% sh, 21 days from spud. MW 9+, V 35. Survey: 7453' 3/4°. This AM: TIH.

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MARCH 28 - APRIL 3, 1986

FRYE #1-29/DRILLING
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

3/29/86
Depth 5485' (450'), 9 days from spud. Fm. dolo. MW 8.7, V 30. This AM: drlg.

3/28/86
Depth 5038' (700'), 8 days from spud. Fm. dolo. MW 8.7, V 30. Survey: 3527' 1/4°
This AM: drlg.

3/30/86
Depth 5885' (400'), 10 days from spud. Fm. dolo. MW 8.6, V 42. This AM: drlg.

3/31/86
Depth 6270' (385'), 11 days from spud. Fm. dolo. MW 8.9, V 32. This AM: drlg.

4/1/86
Depth 6600' (330'), 12 days from spud. Fm. Sh. MW 8.8, V 32. Survey:
3513' 1/4°. This AM: drlg.

4/2/86
Depth 6900' (300'), 13 days from spud. MW 8.9, V33. Survey: 3513' 1/4°.
This AM: drlg.

4/3/86
Depth 7270' (370'), 14 days from spud. FM. sh. MW 8.8, V 32. This AM: drlg.

MUREXCO PETROLEUM, INC.
WEEKLY DRILLING REPORT
MARCH 21 - 27, 1986

FRYE #1-29/DRILLING
Wheeler Co., TX
Sweetwater Creek Prospect

Murexco/Operator
MPI WI:
1986-A

3/21/86
FIRST REPORT: Depth 257' (217'), fm. redbed. RU, drld. to 257'. RU Csg crew. Ran 7 jts 13 3/8", 54.5#, K-55 csg (262.68'), set @ 257'. RU & cmt w/100 sx 85-15 "A" + 3% salt, 1/4# seal-a-flak + 100 sx Class "H" w/3% cacl. Circ 15 bbls cmt. WOC. This AM: NU on 13 3/8" csg. Spud @ 5:45 PM, 3-20-86.

3/22/86
Depth 1475' (1218'). NU 13 3/8" csg. Drl. plug & 59' cmt. Survey: 553' 1/4°; 1057' 1/4°. This AM: drlg.

3/23/86
Depth 2551' (1076'). Fm. lime. Three days from spud. Survey: 1328' 1/2°; 2050' 0°. This AM: drlg.

3/24/86
Depth 3390' (839'). Fm. sh. Survey: 2521' 1/2°; 3000' 3/4°. This AM: drlg.

3/25/86
Depth 3527' (137'). FM sh. 5 days from spud. RU BJ. Ran: 1 shoe 1'; 25 jts 8 5/8" 32# K-55 LTC 1026.44'; 58 jts 8 5/8" 24# K-55 LTC 2410.82', 2 jts 8 5/8 32# K-55 LTC 80.65'; DV tool 3'; total 85 jts 3521.91'. Set 8 5/8" @ 3501.91'. Ran centralizers on 1st, 3rd, 5th & 9th jts, 1 cent. above & below DV tool & 1 every 4th jt thereafter, (11 cent. ran). 4 gist bars on shoe, 6 on next 2 collars. Survey 3513' 1/4°. This AM: cmt'g 8 5/8" @ 3501.91'.

3/26/86
Depth 3555' (28'), 6 days from spud. Fm. lime. Drld cmt. Checked BOP. WOC to 1" top. Cmt'd 294' of 1" of 100 sx Class "H" 1.96 yrd, 12.7 wt. Cut off & weld head. NU & cut DL. Survey: 3527' 1/4°. This AM: drlg.

3/27/86
Depth 4335' (780'). FM sh. 7 days from spud. Survey: 3527' 1/4°. This AM: drlg.

DRLRPT/D 3

ATTACHMENT D: MUD REPORTS

)) 323-9321 (214) 368-2490

C. W. KELLEY, JR., INC.

Consulting Engineer
7818 IDLEWOOD LANE
DALLAS, TEXAS 75230

June 24, 1986

Mr. Jerry Mullican
Director
Underground Injection Control
Railroad Commission of Texas
P. O. Drawer 12967
Austin, Texas 78711-2967

RE: Murexco Petroleum
Frye #1-29

Dear Mr. Mullican:

Enclosed please find the information you requested on the above referenced well.

If you need any additional information, please let me know.

Sincerely,

C. W. Kelley, Jr.

C. W. Kelley, Jr.

CWKjr/as
Enclosures

BJ-TITAN SERVICES COMPANY

FRAC/ACID LOG

Ticket No. 28849

Date 5-6-86 District YUKON
Company MURFIXCO PETRO. Rig
Lease FRYE Well No. 120-29
County WHEELER State TEXAS
Location SEC. 29-BLK. 87 Field
FORMATION GRANITE WASH - A
JOB TYPE: RXL-5 FRAC
WELL DATA: Total Depth 12,500
Tubing: Size Weight Factor bpif
Depth Volume
Casing: Size 5½ Weight 20 Factor .0232 bpif
Depth 11,950 Volume 265.3
Liner: Size Weight Factor bpif
Depth Volume
Packer: Make Set at
Bridge Plug: Make Set at
Perforation: Size SPF Total Shots 84
From 11,950 To 12,066 From To
From To From To
From To From To

FRAC OR ACID DATA

31 gals of X-CIDE 102
20,875 LBS. POTASSIUM CHLORIDE
125 gals of CLATROL-3
237,000 LBS. 20/40 SAND
125 gals of INPLO-40
5000 GALS. DIESEL

SOB Size Type Sp. Gr. No.
Other Diverter Type Volume

JOB PROCEDURE

41,200 gals/bbls of RXL-5 w/ PAD ppg Sand w/ scf
12,000 gals/bbls of RXL-5 w/ 1 ppg Sand w/ scf
15,000 gals/bbls of RXL-5 w/ 2 ppg Sand w/ scf
17,000 gals/bbls of RXL-5 w/ 3 ppg Sand w/ scf
16,000 gals/bbls of RXL-5 w/ 4 ppg Sand w/ scf
16,000 gals/bbls of RXL-5 w/ 5 ppg Sand w/ scf
11,142 gals/bbls of BRINE w/ FLUSH ppg Sand w/ scf
gals/bbls of w/ ppg Sand w/ scf
gals/bbls of w/ ppg Sand w/ scf

COMPANY REPRESENTATIVE CHUCK KELLEY TREATER: DAVE HAMMONA

TIME AM/PM	PRESSURES PSI TUBING	ANNULUS	FLUID PUMPED DATA TOTAL FLUID	Pumped Per Time Period	RATE Bbls/Min.	REMARKS
10:01						PRIME UP & PRESSURE TEST
10:27		230	0		8.4	START PAD
11:27		4100	981		35	START 1 PPG.
11:35		4000	1266		38	START 2 PPG
11:44		4130	1623		37	START 3 PPG.
11:54		3750	2027		36	START 4 PPG.
12:03		3900	2464		37	START 5 PPG.
12:10		3950	2667		36	START FLUSH
12:16		3970	2933		35	SHUT DOWN

AVG. PRESS. 3700 PSI MAX. PRESS. 4130 PSI AVG. RATE 35 BPM LOW RATE 8.4 BPM MAX RATE 38

ISIP 2700 PSI 5 MIN: 2360 PSI 10 MIN: 2170 PSI 15 MIN: 2010 PSI 30 MIN:

JUN 19 '86 10:02 B J TITAN OKC P.1

BJ-TITAN SERVICES COMPANY

6000 TOP PRESSURE
4-5 BPM

FRAC/ACID LOG

Ticket No. 326933

Date 5-3-86 District ELK CITY
Company MUSKEGO Rig
Lease FRYS Well No. 120-29
County WHEELER State TEXAS
Location SEC. 29-BLK 53 Field
FORMATION GRANITE WASH - A
JOB TYPE: ACID BREAK DOWN

WELL DATA: Total Depth
Tubing: Size 2 7/8 Weight 8.7 Factor .00496 bpif
Depth Volume 58.9
Casing: Size 5 1/2 Weight 20 Factor .0222 bpif
Depth Volume 1.5
Liner: Size Weight Factor bpif
Depth Volume
Packer: Make Set at 11,884
Bridge Plug: Make Set at
Perforation: Size SPF Total Shots 84
From 11,950 To 12,066 From To
From To From To
From To From To

FRAC OR ACID DATA

3000 gals of 15% HYDROCHLORIC ACID
3 GALS NE-6, 3 GALS. CLAYTROL-3
gals of
2541 gals of KCL WATER FLUSH - 1 GAL. CLAYTROL
SOB Size 7/8 Type Sp. Gr. 1.1 No 126
Other Diverter Type Volume

JOB PROCEDURE

gals/bbls of w/ ppg Sand w/ scf/bbl N2
gals/bbls of w/ ppg Sand w/ scf/bbl N2
gals/bbls of w/ ppg Sand w/ scf/bbl N2
gals/bbls of w/ ppg Sand w/ scf/bbl N2
gals/bbls of w/ ppg Sand w/ scf/bbl N2
gals/bbls of w/ ppg Sand w/ scf/bbl N2
gals/bbls of w/ ppg Sand w/ scf/bbl N2
gals/bbls of w/ ppg Sand w/ scf/bbl N2
gals/bbls of w/ ppg Sand w/ scf/bbl N2

COMPANY REPRESENTATIVE CHUCK KELLEY TREATER DAVE HAMMOND

TIME AM/PM	PRESSURES PSI TUBING	ANNULUS	FLUID PUMPED DATA TOTAL FLUID	Pumped Per Time Period	RATE Bbls/Min.	REMARKS
10:30						ARRIVE ON LOCATION
11:44						PRIME UP & PRESSURE TEST 6500 PSI
11:56	0	2060	0		3.2	START ACID
11:58	20	2030	6		4.3	START BALLS
12:10	2600	2000	56.7		3.0	WELL LOADED
12:12	3300	2000	60.5		4.9	ACID ON PERFS
12:14	3180	2000	91.4		4.9	START FLUSH
12:26	5170	2000	124.9		4.8	BALLED OFF
12:34	3650	2000	124.9		5.1	RESUME FLUSH
12:36	3650	2000	131.9		5.1	SHUT DOWN

AVG. PRESS. 3400 PSI MAX. PRESS. 5170 PSI AVG. RATE 4.8 BPM LOW RATE 3.2 BPM MAX RATE 5.1 BPM

ISIP 1650 PSI 5 MIN: 1510 PSI 10 MIN: 1470 PSI 15 MIN: 1450 PSI 30 MIN: PSI

C-963

Form No. SR 0609

HUGHES DRILLING FLUIDS
10777 N.W. Freeway, Suite 700
P.O. Box 22753
Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR	CONTRACTOR	RIG NO
REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RAN

WELL NAME AND NO	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE "	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT MI DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL/STK	STK MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER "	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	F.L.	PIT	F.L.	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb/cu ft) Sp.G				
Funnel Viscosity (sec/qt) API " °F				
Plastic Viscosity cP " °F				
Yield Point (lb/100 ft²)				
Gel Strength (lb/100 ft²) 10 sec/10 min				
Filtrate API (cm³/30 min)				
API/HTHP Filtrate (cm³/30 min) " °F				
Cake Thickness (32nd in. API/HTHP)				
Solids Content (% by Vol.) calculated retort				
Liquid Content (% by Vol.) Oil/Water				
Sand Content (% by Vol.)				
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud				
pH Strip Meter " °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf/Mf)				
Alternate Alkalinity Filtrate (P1/F2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY													
STARTING INVENTORY													
RECEIVED													
USED LAST 24 HR													
CLOSING INVENTORY													
ORDERED TODAY													

EQUIPMENT

DESANDER	MUD CLE
DESILTER	DEGASSI
HI SP SHAKER	CENTRIF

DAILY COST

CUMULATIVE COST

ENGINEER	PHONE NO	MOBILE PHONE	WORK PHONE

[illegible] AND MAY BE USED AT THE USER'S [illegible] COMPLETENESS AND NO

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P O Box 27753
Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.			
DATE 19		DEPTH	
SPUD DATE		PRESENT ACTIVITY	
OPERATOR	CONTRACTOR		RIG NO
REPORT FOR	REPORT FOR		SECTION TOWNSHIP, RANGE
WELL NAME AND NO	FIELD OR BLOCK NO	County Parish or Offshore area	STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE MODEL	ASSUMED EFF	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL STK	STK MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL MIN	GAL MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES		
Sample From	FL PIT	FL PIT
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb cu ft) Sp G		
Funnel Viscosity (sec qt) API @ °F		
Plastic Viscosity (cP) @ °F		
Yield Point (lb 100 ft²)		
Gel Strength (lb 100 ft²) 10 sec 10 min		
Filtrate API (cm³ 30 min)		
API HTHP Filtrate (cm³ 30 min) @ °F		
Cake Thickness (32nd in API HTHP)		
Solids Content (% by Vol) calculated retort		
Liquid Content (% by Vol) Oil Water		
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud		
pH Strip Meter @ °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (P_f M_f)		
Alternate Alkalinity Filtrate (P1/P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS		
WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY													
STARTING INVENTORY													
RECEIVED													
USED LAST 24 HR													
ON HAND													

EQUIPMENT	
DESANDER	MUD CLEANER
DESILTER	DEGASSER
HI SP SHAKER	CENTRIFUGE
DAILY COST	
CUMULATIVE COST	

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Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO

REPORT FOR | REPORT FOR | SECTION TOWNSHIP, R

WELL NAME AND NO | FIELD OR BLOCK NO | County, Parish or Offshore area | STATE PROVINCE

DRILLING ASSEMBLY / CASING / MUD VOLUME (BBL) / CIRCULATION DATA

BIT SIZE	TYPE	JET SIZE	SURFACE "	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN	ANNULAR VEL (FT/M) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME		PUMP MAKE MODEL	ASSUMED EFF % / CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL STK / STK MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER "	MUD TYPE		BBL MIN / GAL MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	F.L. PIT	F.L. PIT
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb/cu ft) SpG		
Funnel Viscosity (sec qt) API " °F		
Plastic Viscosity cP " °F		
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec/10 min	/	/
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min) " °F		
Cake Thickness (32nd in API HTHP)	/	/
Solids Content (% by Vol) calculated retort		
Liquid Content (% by Vol) Oil/Water	/	/
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud		
pH Strip Meter " °F		
Alkalinity Mud (P_m)		
Alkalinity Filtrate (P_f/M_f)	/	/
Alternate Alkalinity Filtrate (P1/P2)	/	/
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

EQUIPMENT

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
ORDERED TODAY														

DESANDER | MUD CL
DESILTER | DEGAS
HI-SP SHAKER | CENTRI

DAILY COST

CUMULATIVE COST

HOME PHONE | MOBILE PHONE | WHSE PHONE

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Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO

REPORT FOR | REPORT FOR | SECTION, TOWNSHIP, RANGE

WELL NAME AND NO | FIELD OR BLOCK NO | County Parish or Offshore area | STATE/PROVINCE

DRILLING/ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP #1 SIZE X IN		ANNULAR VEL (FT/MIN)
						#2 X IN		DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES		
Sample From	FL PIT	FL PIT
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb/cu ft) SpG		
Funnel Viscosity (sec qt) API @ °F		
Plastic Viscosity cP @ °F		
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec/10 min	/	/
Filtrate API (cm³/30 min)		
API/HTHP Filtrate (cm³/30 min) @ °F		
Cake Thickness (32nd in API/HTHP)	/	/
Solids Content (% by Vol) calculated retort		
Liquid Content (% by Vol) Oil/Water	/	/
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud		
pH Strip Meter @ °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (Pf/Mf)	/	/
Alternate Alkalinity Filtrate (P1/P2)	/	/
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS		
WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

JUL 27 1983

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
RETURNED														

EQUIPMENT

DESANDER	MUD CLEANER
DESILTER	DEGASSER
HI-SP SHAKER	CENTRIFUGE

DAILY COST

CUMULATIVE COST

	HOME PHONE	MOBILE PHONE	WHSE PHONE

ANY OPINION AND OR RECOMMENDATION EXPRESSED ORALLY OR WRITTEN HEREIN HAS BEEN PREPARED CAREFULLY AND MAY BE USED AT THE USER'S OBJECTS HOWEVER NO REPRESENTATION OR WARRANTY IS MADE BY HUGHES AS TO ACCURACY OR CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGES RESULTING FROM THE USE OF SAME

C-967

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Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO

REPORT FOR | REPORT FOR | SECTION TOWNSHIP RA

WELL NAME AND NO | FIELD OR BLOCK NO | County, Parish or Offshore area | STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE "	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT M DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME		PUMP MAKE MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER "	MUD TYPE		BBL MIN	GAL MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	F L	PIT	F L	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb cu ft) Sp G				
Funnel Viscosity (sec qt) API " °F				
Plastic Viscosity cP " °F				
Yield Point (lb 100 ft²)				
Gel Strength (lb 100 ft²) 10 sec 10 min				
Filtrate API (cm³ 30 min)				
API HTHP Filtrate (cm³ 30 min) " °F				
Cake Thickness (32nd in API HTHP)				
Solids Content (% by Vol) calculated retort				
Liquid Content (% by Vol) Oil Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb bbl equiv cm³ cm³ mud				
pH Strip Meter " °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf Mf)				
Alternate Alkalinity Filtrate (P1 P2)				
Chloride (mg L)				
Total Hardness as Calcium (mg L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
ENDING INVENTORY														
ORDERED TODAY														

EQUIPMENT

DESANDER	MUD CL
DESILTER	DEGASS
HI-SP SHAKER	CENTRI

DAILY COST

CUMULATIVE COST

ENGINEER | PHONE | MOBILE PHONE | WHSE PHONE

C-968

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DRILLING MUD REPORT NO.

DATE 19

DEPTH

SPUD DATE

PRESENT ACTIVITY

OPERATOR	CONTRACTOR	RIG NO
REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RANGE
WELL NAME AND NO	FIELD OR BLOCK NO / County, Parish or Offshore area	STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP #1 X IN / SIZE #2 X IN		ANNULAR VEL (FT/MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL STK	STK MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL MIN	GAL MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES	F.L. PIT	F.L. PIT
Sample From		
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb/cu ft) Sp G		
Funnel Viscosity (sec/qt) API @ °F		
Plastic Viscosity cP @ °F		
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec 10 min		
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min) @ °F		
Cake Thickness (32nd in) API HTHP		
Solids Content (% by Vol) calculated retort		
Liquid Content (% by Vol) Oil Water		
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud		
pH Strip Meter @ °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (P_f M_f)		
Alternate Alkalinity Filtrate (P1 P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

JUL 27

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
ORDERED TODAY														

EQUIPMENT

DESANDER | MUD CLEANER
DESILTER | DEGASSER
HI SP SHAKER | CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | HOME PHONE | MOBILE PHONE | WHSE PHONE

C-969

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P O Box 22753
Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 | DEPTH
SPUD DATE | PRESENT ACTIVITY

OPERATOR	CONTRACTOR	RIG NO
REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RA
WELL NAME AND NO	FIELD OR BLOCK NO / County Parish or Offshore area	STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP #1 X IN / SIZE #2 X IN		ANNULAR VEL (FT M DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	F L	PIT	F L	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb/cu ft) Sp G				
Funnel Viscosity (sec qt) API @ °F				
Plastic Viscosity cP @ °F				
Yield Point (lb/100 ft²)				
Gel Strength (lb/100 ft²) 10 sec/10 min				
Filtrate API (cm³/30 min)				
API HTHP Filtrate (cm³/30 min) @ °F				
Cake Thickness (32nd in. API/HTHP)				
Solids Content (% by Vol.) calculated retort				
Liquid Content (% by Vol) Oil/Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud				
pH Strip Meter @ °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf/Mf)				
Alternate Alkalinity Filtrate (P1/P2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

JUN 27 1983

PRODUCT INVENTORY															
STARTING INVENTORY															
RECEIVED															
USED LAST 24 HR															
CLOSING INVENTORY															
ORDERED TODAY															

EQUIPMENT

- DESANDER
- MUD CLEAN
- DESILTER
- DEGASSER
- HI-SP SHAKER
- CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE

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DRILLING MUD REPORT NO.

DATE 19

DEPTH

SPUD DATE

PRESENT ACTIVITY

OPERATOR

CONTRACTOR

RIG NO.

REPORT TO

REPORT FOR

SECTION, TOWNSHIP, RANGE

WELL NAME AND NO.

FIELD OR BLOCK NO.

County Parish or Offshore area

STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN		ANNULAR VEL (FT MIN)
						#2 X IN		DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL MIN	GAL MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES	F L	PIT	F L	PIT
Sample From				
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb/cu ft) SpG				
Funnel Viscosity (sec/qt) API # °F				
Plastic Viscosity cP # °F				
Yield Point (lb/100 ft²)				
Gel Strength (lb/100 ft²) 10 sec/10 min				
Filtrate API (cm³/30 min)				
API HTHP Filtrate (cm³/30 min) # °F				
Cake Thickness (32nd in) API/HTHP				
Solids Content (% by Vol) calculated retort				
Liquid Content (% by Vol) Oil/Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud				
pH Strip Meter # °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf/Mf)				
Alternate Alkalinity Filtrate (P1/P2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
ORDERED TODAY														

EQUIPMENT

DESANDER	MUD CLEANER
DESILTER	DEGASSER
HI SP SHAKER	CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE

NOTICE: ANY OPINION AND DATA CONTAINED HEREIN ARE BASED ON ASSUMPTIONS AND MAY BE USED AT THE USER'S OWN RISK. HOWEVER NO REPRESENTATION IS MADE AS TO THE CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGE RESULTING FROM THE USE

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Houston, Texas 77227
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DRILLING MUD REPORT NO.

DATE 19 | DEPTH
SPUD DATE | PRESENT ACTIVITY

OPERATOR	CONTRACTOR	RIG NO.
REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RAN
WELL NAME AND NO.	FIELD OR BLOCK NO. / County, Parish or Offshore area	STATE, PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT/MI DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF. %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	FL	PIT	FL	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb/cu ft) Sp G				
Funnel Viscosity (sec/qt) API @ °F				
Plastic Viscosity cP @ °F				
Yield Point (lb/100 ft²)				
Gel Strength (lb/100 ft²) 10 sec/10 min				
Filtrate API (cm³/30 min)				
API HTHP Filtrate (cm³/30 min) @ °F				
Cake Thickness (32nd in. API HTHP)				
Solids Content (% by Vol.) calculated retort				
Liquid Content (% by Vol.) Oil/Water				
Sand Content (% by Vol.)				
Methylene Blue Capacity, lb/bbl equiv cm³/cm³ mud				
pH Strip Meter @ °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf/Mf)				
Alternate Alkalinity Filtrate (P1/P2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
ORDERED TODAY														

EQUIPMENT

DESANDER	MUD CLEANE
DESILTER	DEGASSER
HI-SP SHAKER	CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER	HOME PHONE		WHSE PHONE

NOTICE: ANY OPINION AND OR RECOMMENDATION EXPRESSED ORALLY ... ARE CAREFULLY AND MAY BE USED IF THE USER SO ELECTS. HOWEVER, NO REPRESENTATIONS OR WARRANTY IS MADE BY ... CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGES RESULTING FROM THE USE OF ...

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10777 N W Freeway Suite 700
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Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 5-27 19 | DEPTH 5571

SPUD DATE | PRESENT ACTIVITY Drlg

OPERATOR Murphy | CONTRACTOR | RIG NO 3

REPORT FOR | REPORT FOR | SECTION, TOWNSHIP, RANGE

WELL NAME AND NO | FIELD OR BLOCK NO | County, Parish or Offshore area | STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE	JET SIZE	SURFACE	HOLE 310	PITS	PUMP #1 SIZE	X IN	ANNULAR VEL (FT/MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER @	MUD TYPE		BBL/MIN 7.9	GAL/MIN 331	TOTAL CIRC TIME (MIN) 90±

MUD PROPERTIES

	F.L.	PIT	F.L.	PIT
Sample From				
Time Sample Taken	11:00 AM			
Flowline Temperature °F	—			
Depth (ft)	5571			
Weight (ppg) (lb/cu ft) Sp G	8.7+			
Funnel Viscosity (sec/qt) API @ °F	32			
Plastic Viscosity cP @ °F	5			
Yield Point (lb/100 ft²)	8			
Gel Strength (lb/100 ft²) 10 sec, 10 min	4/10			
Filtrate API (cm³/30 min.)	N.C.	(52H)		
API HTHP Filtrate (cm³/30 min) @ °F	—			
Cake Thickness (32nd in. API/HTHP)	3+			
Solids Content (% by Vol.) calculated retort				
Liquid Content (% by Vol.) Oil/Water				
Sand Content (% by Vol.)	.75			
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud	—			
pH Strip Meter @ °F	8.0			
Alkalinity Mud (Pm)	—			
Alkalinity Filtrate (Pf/Mf)	.03/.3			
Alternate Alkalinity Filtrate (P1/P2)	—			
Chloride (mg/L)	1700			
Total Hardness as Calcium (mg/L)	200			
LCM	4 #/bbl			

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
8.6-8.8	30-32	N.C.

RECOMMENDED TOUR TREATMENT

Pre Mix
1) Fresh Water
2) 4 sk Soda Ash
3) Gel for 30-32 Vis
4) 5-6 sk Polis
5) Lime for pH - Vis
Water for 8.6-8.8 wt

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

Blend Polymer into system for 30-32 Vis. If hole tight or fill on connections stop this with Polymer as needed.

Last Appr. 200 Bbl @ 5402 5430

PRODUCT INVENTORY	Gel	Soda Ash	Lime	Caustic Soda											
STARTING INVENTORY	229	15	19	10											
RECEIVED															
USED LAST 24 HR	200	6	9		.75					4					
CLOSING INVENTORY	29	9	10	10											
ORDERED TODAY	125	10	40	10											

EQUIPMENT

☐ DESANDER ☐ MUD CLEANER
☐ DESILTER ☐ DEGASSER
☐ HI-SP SHAKER ☐ CENTRIFUGE

DAILY COST 2272.00

CUMULATIVE COST 3797.00

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
[illegible]	405 [illegible] 121	405 [illegible]	806 [illegible] 544

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10777 N. W. Freeway, Suite 700
P.O. Box 22753
Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 3-30 19 84 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO.

REPORT FOR | REPORT FOR | SECTION, TOWNSHIP, RAN

WELL NAME AND NO. | FIELD OR BLOCK NO. | County, Parish or Offshore area | STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT/MI DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME		PUMP MAKE MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER "	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES		
Sample From	F.L. PIT	F.L. PIT
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb/cu ft) SP/G		
Funnel Viscosity (sec/qt) API " °F		
Plastic Viscosity cP " °F		
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec/10 min		
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min) " °F		
Cake Thickness (32nd in. API/HTHP)		
Solids Content (% by Vol.) calculated retort		
Liquid Content (% by Vol.) Oil/Water		
Sand Content (% by Vol.)		
Methylene Blue Capacity, lb/bbl equiv. cm³/cm³ mud		
pH Strip Meter " °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (P_f/M_f)		
Alternate Alkalinity Filtrate (P1/P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY															
STARTING INVENTORY	79	9	10	10											
RECEIVED	12	10	40	10											
USED LAST 24 HR	39		7		5					4					
CLOSING INVENTORY	115	19	43	3											
ORDERED TODAY															

EQUIPMENT

DESANDER | MUD CLEANER
DESILTER | DEGASSER
HI-SP SHAKER | CENTRIFUGE

DAILY COST 305.00

CUMULATIVE COST 4162.00

ENGINEER | HOME PHONE | MOBILE PHONE | WHSE PHONE

NOTICE: ANY OPINION AND OR RECOMMENDATION ... HAS BEEN PREPARED CAREFULLY AND MAY BE USED BY THE USER SUBJECT HOWEVER TO REPRESENTATIONS ... CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY LOSS ...

C-974

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(713) 680-3823

DRILLING MUD REPORT NO.

DATE . . 19 | DEPTH
SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO
REPORT FOR | REPORT FOR | SECTION, TOWNSHIP, RANGE
WELL NAME AND NO | FIELD OR BLOCK NO | County, Parish or Offshore area | STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN. #2 X IN		ANNULAR VEL (FT/MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	FL	PIT	FL	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb/cu ft) Sp G				
Funnel Viscosity (sec qt) API @ °F				
Plastic Viscosity cP @ °F				
Yield Point (lb/100 ft²)				
Gel Strength (lb/100 ft²) 10 sec/10 min				
Filtrate API (cm³/30 min)				
API HTHP Filtrate (cm³/30 min) @ °F				
Cake Thickness (32nd in API HTHP)				
Solids Content (% by Vol.) calculated retort				
Liquid Content (% by Vol.) Oil/Water				
Sand Content (% by Vol.)				
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud				
pH Strip Meter @ °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (P_f/M_f)				
Alternate Alkalinity Filtrate (P1/P2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
ORDERED TODAY														

EQUIPMENT

☐ DESANDER ☐ MUD CLEANER
☐ DESILTER DEGASSER
☐ HI-SP SHAKER ☐ CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | HOME PHONE | MOBILE PHONE | WHSE PHONE

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(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19

DEPTH

SPUD DATE

PRESENT ACTIVITY

OPERATOR

CONTRACTOR

RIG NO.

REPORT FOR

REPORT FOR

SECTION, TOWNSHIP, R

WELL NAME AND NO

FIELD OR BLOCK NO

County Parish or Offshore area

STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT/M) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES	FL + PIT	FL PIT
Sample From		
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb/cu ft) Sp G		
Funnel Viscosity (sec/qt) API @ °F		
Plastic Viscosity cP @ °F		
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec/10 min		
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min) @ °F		
Cake Thickness (32nd in API/HTHP)		
Solids Content (% by Vol.) calculated / retort		
Liquid Content (% by Vol) Oil/Water		
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud		
pH Strip Meter @ °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (P_f/M_f)		
Alternate Alkalinity Filtrate (P1/P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY																
STARTING INVENTORY																
RECEIVED																
USED LAST 24 HR																
CLOSING INVENTORY																
ORDERED TODAY																

EQUIPMENT

DESANDER | MUD CLEAN
DESILTER | DEGASSER
HI-SP SHAKER | CENTRIFUG

DAILY COST

CUMULATIVE COST

ENGINEER | HOME PHONE | MOBILE PHONE | WHSE PHONE

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C-976

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Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR	CONTRACTOR	RIG NO
REPORT FOR	REPORT FOR	SECTION TOWNSHIP RANGE
WELL NAME AND NO	FIELD OR BLOCK NO	County, Parish or Offshore area / STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL STK	STK MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER "	MUD TYPE		BBL MIN	GAL MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

	F L	PIT	F L	PIT
Sample From				
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb cu ft) Sp G				
Funnel Viscosity (sec qt) API @ °F				
Plastic Viscosity cP @ °F				
Yield Point (lb 100 ft²)				
Gel Strength (lb 100 ft²) 10 sec 10 min				
Filtrate API (cm³/30 min)				
API HTHP Filtrate (cm³/30 min) @ °F				
Cake Thickness (32nd in. API HTHP)				
Solids Content (% by Vol) calculated retort				
Liquid Content (% by Vol) Oil/Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb/bbl equiv cm³ cm³ mud				
pH Strip Meter @ °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf/Mf)				
Alternate Alkalinity Filtrate (P1/P2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
ORDERED TODAY														

EQUIPMENT

- DESANDER
- MUD CLEANER
- DESILTER
- DEGASSER
- HI-SP SHAKER
- CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | HOME PHONE | MOBILE PHONE | WHSE PHONE

NOTICE ANY OPINION AND [illegible] CARE [illegible] AND MAY BE USED AT THE USER SOLE RISK HOWEVER NO REPRESENTATION [illegible] CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGE [illegible]

C-977

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(713) 680-3823

DRILLING MUD REPORT NO.

DATE 4-[illegible] 19[illegible] | DEPTH [illegible]
SPUD DATE [illegible] | PRESENT ACTIVITY [illegible]

OPERATOR [illegible] | CONTRACTOR [illegible] | RIG NO [illegible]

REPORT FOR | REPORT FOR [illegible] | SECTION, TOWNSHIP, RANGE [illegible]

WELL NAME AND NO [illegible] | FIELD OR BLOCK NO [illegible] | County, Parish or Offshore area [illegible] | STATE/PROVINCE [illegible]

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE [illegible]	TYPE	JET SIZE	SURFACE [illegible]	HOLE [illegible]	PITS [illegible]	PUMP SIZE #1 [illegible] X [illegible] IN; #2 [illegible] X [illegible] IN		ANNULAR VEL (FT/MIN) DP [illegible] DC [illegible]
DRILL PIPE SIZE [illegible]	TYPE	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME [illegible]		PUMP MAKE, MODEL [illegible]	ASSUMED EFF. [illegible] %	CIRCULATION PRESSURE (PSI) [illegible]
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL STK [illegible]	STK/MIN [illegible]	BOTTOMS UP (MIN) [illegible]
DRILL COLLAR SIZE [illegible]		LENGTH [illegible]	PRODUCTION OR LINER "	MUD TYPE [illegible]		BBL/MIN [illegible]	GAL/MIN [illegible]	TOTAL CIRC. TIME (MIN) [illegible]

MUD PROPERTIES	F.L. PIT	F.L. PIT
Sample From	[illegible]	
Time Sample Taken	[illegible]	
Flowline Temperature °F	—	
Depth (ft)	[illegible]	
Weight (ppg) (lb/cu.ft.) Sp.G.	[illegible]	
Funnel Viscosity (sec/qt) API " °F	[illegible]	
Plastic Viscosity cP " °F	[illegible]	
Yield Point (lb/100 ft²)	[illegible]	
Gel Strength (lb/100 ft²) 10 sec/10 min	[illegible]	
Filtrate API (cm³/30 min)	[illegible]	
API HTHP Filtrate (cm³/30 min) " °F	—	
Cake Thickness (32nd in. API/HTHP)	[illegible]	
Solids Content (% by Vol.) calculated retort	3.8	
Liquid Content (% by Vol.) Oil/Water	96.2	
Sand Content (% by Vol.)	[illegible]	
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud	—	
pH Strip Meter °F	[illegible]	
Alkalinity Mud (Pm)	—	
Alkalinity Filtrate (Pf/Mf)	[illegible]	
Alternate Alkalinity Filtrate (P1/P2)	—	
Chloride (mg/L)	[illegible]	
Total Hardness as Calcium (mg/L)	[illegible]	

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
[illegible]	[illegible]	[illegible]

RECOMMENDED TOUR TREATMENT

[illegible] | [illegible]
[illegible] | [illegible]
[illegible] | [illegible]
[illegible] | [illegible]

[illegible]

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

[illegible]

PRODUCT INVENTORY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
STARTING INVENTORY	[illegible]	[illegible]	[illegible]	[illegible]										
RECEIVED	[illegible]													
USED LAST 24 HR	[illegible]	[illegible]		[illegible]					4					
CLOSING INVENTORY	[illegible]	[illegible]	[illegible]	[illegible]										
ORDERED TODAY														

EQUIPMENT

- ☐ DESANDER
- ☐ MUD CLEANER
- ☐ DESILTER
- ☐ DEGASSER
- ☐ HI-SP SHAKER
- ☐ CENTRIFUGE

DAILY COST [illegible]

CUMULATIVE COST [illegible]

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
[illegible]	[illegible]	[illegible]	[illegible]

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C-978

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Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19

DEPTH

SPUD DATE

PRESENT ACTIVITY

OPERATOR

CONTRACTOR

RIG NO

REPORT FOR

REPORT FOR

SECTION, TOWNSHIP, RANGE

WELL NAME AND NO

FIELD OR BLOCK NO

County Parish or Offshore area

STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT/MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	TOTAL CIRCULATING VOLUME		PUMP MAKE MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER @	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	F L	PIT	F L	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb. cu ft.) Sp G				
Funnel Viscosity (sec/qt) API @ °F				
Plastic Viscosity cP @ °F				
Yield Point (lb/100 ft²)				
Gel Strength (lb/100 ft²) 10 sec 10 min				
Filtrate API (cm³/30 min)				
API HTHP Filtrate (cm³/30 min) @ °F				
Cake Thickness (32nd in. API/HTHP)				
Solids Content (% by Vol.) calculated retort				
Liquid Content (% by Vol) Oil/Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud				
pH Strip Meter @ °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf/Mf)				
Alternate Alkalinity Filtrate (P1/P2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY 32-34 | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
ORDERED TODAY														

EQUIPMENT

☐ DESANDER ☐ MUD CLEANER
☐ DESILTER ☐ DEGASSER
☐ HI-SP SHAKER ☐ CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | HOME PHONE | MOBILE PHONE | WHSE PHONE

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P O Box 22753
Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19

DEPTH

SPUD DATE

PRESENT ACTIVITY

OPERATOR

CONTRACTOR

RIG NO

REPORT FOR

REPORT FOR

SECTION TOWNSHIP, RA

WELL NAME AND NO

FIELD OR BLOCK NO

County, Parish or Offshore area

STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP #1 X IN SIZE #2 X IN		ANNULAR VEL (FT/M) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	FL PIT	FL PIT
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb cu ft) SpG		
Funnel Viscosity (sec qt) API # °F		
Plastic Viscosity cP # °F		
Yield Point (lb 100 ft²)		
Gel Strength (lb 100 ft²) 10 sec 10 min		
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min) # °F		
Cake Thickness (32nd in. API/HTHP)		
Solids Content (% by Vol.) calculated retort		
Liquid Content (% by Vol) Oil/Water		
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud		
pH Strip Meter # °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (Pf/Mf)		
Alternate Alkalinity Filtrate (P1/P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED.

PRODUCT INVENTORY															
STARTING INVENTORY															
RECEIVED															
USED LAST 24 HR															
CLOSING INVENTORY															
ORDERED TODAY															

EQUIPMENT

DESANDER | MUD CLEANI
DESILTER | DEGASSER
HI-SP SHAKER | CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | MOBILE PHONE | WHSE PHONE

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P.O Box 22753
Houston Texas 77227
(713) 680-3623

DRILLING MUD REPORT NO.

DATE 4-6 19 86 | DEPTH 8219

SPUD DATE 3-20-86 | PRESENT ACTIVITY Drlg

OPERATOR Nuecos | CONTRACTOR Patton | RIG NO 30

REPORT FOR | REPORT FOR Joe Nelson | SECTION, TOWNSHIP, RANGE 29

WELL NAME AND NO. Fee #1-29 | FIELD OR BLOCK NO Big Hill | County, Parish or Offshore area Webb | STATE/PROVINCE Texas

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE Tri	JET SIZE	SURFACE 9 5/8 @ 1500	HOLE 444	PITS 400	PUMP SIZE #1 X IN / #2 5 X 6 IN		ANNULAR VEL (FT/MIN) DP DC 319
DRILL PIPE SIZE 4	TYPE	LENGTH	INTERMEDIATE @	TOTAL CIRCULATING VOLUME 866		PUMP MAKE, MODEL	ASSUMED EFF 90 %	CIRCULATION PRESSURE (PSI) 1200
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	IN STORAGE	WEIGHT	BBL/STK 144	STK/MIN 52	BOTTOMS UP (MIN) 50 ±
DRILL COLLAR SIZE 6		LENGTH 479	PRODUCTION OR LINER @	MUD TYPE LSND		BBL/MIN 7.2	GAL/MIN 312	TOTAL CIRC TIME (MIN) 114 ±

MUD PROPERTIES

Sample From	F.L. PIT	F.L. PIT
Time Sample Taken	11:00 AM	
Flowline Temperature °F	—	
Depth (ft)	8219	
Weight (ppg) (lb/cu.ft) Sp G	8.9	
Funnel Viscosity (sec/qt) API @ °F	34	
Plastic Viscosity cP @ °F	4	
Yield Point (lb/100 ft²)	3	
Gel Strength (lb/100 ft²) 10 sec/10 min	4/9	/
Filtrate API (cm³/30 min)	24.0	
API HTHP Filtrate (cm³/30 min) @ °F	—	
Cake Thickness (32nd in. API/HTHP)	2+	/
Solids Content (% by Vol.) calculated retort	3.9	
Liquid Content (% by Vol.) Oil/Water	96.1	/
Sand Content (% by Vol.)	.15	
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud	—	
pH Strip Meter @ °F	9.0	
Alkalinity Mud (Pm)	—	
Alkalinity Filtrate (P_f/M_f)	.1/.25	/
Alternate Alkalinity Filtrate (P1/P2)	/	/
Chloride (mg/L)	4000	
Total Hardness as Calcium (mg/L)	40	

MUD PROPERTY SPECIFICATIONS

WEIGHT 8.8-9.9 | VISCOSITY 33-34 | FILTRATE <24 cc

RECOMMENDED TOUR TREATMENT

Gel with tospkts for 33-34 vis

Caustic 2 sk after each tour
Trouble Bent

Water for 8.8-9.9 wt

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

Trip for w.a collar

PRODUCT INVENTORY	Gel	Soda Ash	Lime	Caustic Flake											
STARTING INVENTORY	226	11	35	31											
RECEIVED															
USED LAST 24 HR	18			3	12					4					
CLOSING INVENTORY	208	11	35	21											
ORDERED TODAY															

JUN 27 1986

EQUIPMENT

☐ DESANDER ☐ MUD CLEANER
☐ DESILTER ☐ DEGASSER
☐ HI-SP SHAKER ☐ CENTRIFUGE

DAILY COST 3600

CUMULATIVE COST 10668

ENGINEER Jim Jewell | HOME PHONE 483-2[illegible] | MOBILE PHONE 483-2[illegible] | WHSE PHONE 686-[illegible]

NOTICE ANY OPINION AND OR RECOMMENDATION EXPRESSED ORALLY OR WRITTEN HEREIN HAS BEEN PREPARED CAREFULLY AND MAY BE USED IF THE USER SO ELECTS HOWEVER NO REPRESENTATION OR WARRANTY IS MADE BY OURSELVES OR OUR AGENTS AS TO ITS CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGES RESULTING FROM THE USE OF SAME

C-981

HUGHES DRILLING FLUIDS
10777 N. W. Freeway, Suite 700
P.O. Box 22753
Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 4-7 19[illegible] | DEPTH [illegible]
SPUD DATE [illegible] | PRESENT ACTIVITY [illegible]

OPERATOR	CONTRACTOR	RIG NO.
[illegible]	[illegible]	[illegible]

REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RA
	[illegible]	[illegible]

WELL NAME AND NO.	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE/PROVINCE
[illegible] #1-29	[illegible]	[illegible]	[illegible]

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE [illegible]	TYPE [illegible]	JET SIZE [illegible]	SURFACE 9 5/8 @ [illegible]	HOLE [illegible]	PITS [illegible]	PUMP SIZE #1 X IN. #2 5 X [illegible] IN.		ANNULAR VEL (FT/M DP [illegible] DC [illegible]
DRILL PIPE SIZE 4 1/2	TYPE XH	LENGTH	INTERMEDIATE @	TOTAL CIRCULATING VOLUME [illegible]		PUMP MAKE, MODEL [illegible]	ASSUMED EFF. [illegible] %	CIRCULATION PRESSURE (PSI) [illegible]
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	IN STORAGE	WEIGHT	BBL/STK [illegible]	STK/MIN 52	BOTTOMS UP (MIN) [illegible]
DRILL COLLAR SIZE [illegible]		LENGTH 479	PRODUCTION OR LINER @	MUD TYPE LSND		BBL/MIN 7.4	GAL/MIN 319	TOTAL CIRC TIME (MIN) [illegible]

MUD PROPERTIES

Sample From	F.L. ☑ PIT	F.L. ☐ PIT
Time Sample Taken	10:30 AM	
Flowline Temperature °F	—	
Depth (ft)	[illegible]	
Weight ☑ (ppg) (lb/cu.ft) Sp.G.	8.6	
Funnel Viscosity (sec/qt) API @ °F	32	
Plastic Viscosity cP @ °F	—	
Yield Point (lb/100 ft²)	11	
Gel Strength (lb/100 ft²) 10 sec/10 min	4/12	/
Filtrate API (cm³/30 min)	22.0	
API HTHP Filtrate (cm³/30 min) @ °F	—	
Cake Thickness (32nd in. API/HTHP)	2/	/
Solids Content (% by Vol.) ☐ calculated ☐ retort	4.5	
Liquid Content (% by Vol.) Oil/Water	/95.5	/
Sand Content (% by Vol.)	.2	
Methylene Blue Capacity ☐ lb/bbl equiv. ☐ cm³/cm³ mud	—	
pH ☐ Strip ☐ Meter @ °F	9.5	
Alkalinity Mud (Pm)	—	
Alkalinity Filtrate (P_f/M_f)	.2/.4	/
Alternate Alkalinity Filtrate (P1/P2)	—	/
Chloride (mg/L)	3600	
Total Hardness as Calcium (mg/L)	41	

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
8.7-8.9	33-34	< 4 API

RECOMMENDED TOUR TREATMENT

Gel for 33-34 Vis

Caustic & starch at [illegible] PH

Thin Clay Base

Water for 8.8-8.9 wt

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

[illegible]

PRODUCT INVENTORY	Gel	Soda Ash	Lime	Caustic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
STARTING INVENTORY	2[illegible]	11	35	27										
RECEIVED														
USED LAST 24 HR	3[illegible]			7						4				
CLOSING INVENTORY	12	11	35	24										
ORDERED TODAY														

EQUIPMENT

☐ DESANDER ☐ MUD CLEANER
☐ DESILTER ☐ DEGASSER
☐ HI-SP SHAKER ☐ CENTRIFUGE

DAILY COST 502.00

CUMULATIVE COST 11,110.00

ENGINEER	HOME PHONE	MOBILE PHONE	WISE PHONE
[illegible]	40[illegible] 1771	40[illegible] 1661 #7[illegible]	806 323 54[illegible]

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(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO

REPORT FOR | REPORT FOR | SECTION TOWNSHIP RANGE

WELL NAME AND NO | FIELD OR BLOCK NO | County, Parish or Offshore area | STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE "	HOLE	PITS	PUMP SIZE #1 X IN #2 X IN		ANNULAR VEL (FT MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER "	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES	FL PIT	FL PIT
Sample From		
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb cu ft) Sp G		
Funnel Viscosity (sec/qt) API " °F		
Plastic Viscosity cP " °F		
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec, 10 min		
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min) " °F		
Cake Thickness (32nd in API/HTHP)		
Solids Content (% by Vol) calculated retort		
Liquid Content (% by Vol) Oil/Water		
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud		
pH Strip Meter " °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (Pf/Mf)		
Alternate Alkalinity Filtrate (P1/P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY															
STARTING INVENTORY															
RECEIVED															
USED LAST 24 HR															
CLOSING INVENTORY															
ORDERED TODAY															

EQUIPMENT

☐ DESANDER ☐ MUD CLEANER
☐ DESILTER ☐ DEGASSER
☐ HI SP SHAKER ☐ CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | HOME PHONE | MOBILE PHONE | WHSE PHONE

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Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO.

REPORT FOR | REPORT FOR | SECTION, TOWNSHIP, RANGE

WELL NAME AND NO. | FIELD OR BLOCK NO. | County, Parish or Offshore area | STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN		ANNULAR VELOCITY MIN DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF. %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL STK	STK MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL MIN	GAL MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From		
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) lb/cu ft S.G.		
Funnel Viscosity sec/qt API °F		
Plastic Viscosity cP @ °F		
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec 10 min		
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min) °F		
Cake Thickness 32nd in. API HTHP		
Solids Content (% by Vol) calculated retort		
Liquid Content (% by Vol) Oil Water		
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv. cm³ cm³ mud		
pH Strip Meter @ °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (P_f M_f)		
Alternate Alkalinity Filtrate (P1 P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY													
STARTING INVENTORY													
RECEIVED													
USED LAST 24 HR													
CLOSING INVENTORY													
REQUIRED NEXT 24 HR													

EQUIPMENT

DESANDER	MUD CLEANER
DESILTER	DEGASSER
HI SP SHAKER	CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | MOBILE PHONE | HOME PHONE

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DRILLING MUD REPORT NO

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR	CONTRACTOR	RIG NO
REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RANGE
WELL NAME AND NO	FIELD OR BLOCK NO / County Parish or Offshore area	STATE PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL STK	STK MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL MIN	GAL MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	FL Pit	FL Pit
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb cu ft) SpG		
Funnel Viscosity (sec qt) API " °F		
Plastic Viscosity cP " °F		
Yield Point (lb 100 ft²)		
Gel Strength (lb 100 ft²) 10 sec 10 min		
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min) " °F		
Cake Thickness (32nd in. API, HTHP)		
Solids Content (% by Vol) calculated retort		
Liquid Content (% by Vol) Oil Water		
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud		
pH Strip Meter " °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (Pf Mf)		
Alternate Alkalinity Filtrate (P1/P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY															
STARTING INVENTORY															
RECEIVED															
USED LAST 24 HR															
CLOSING INVENTORY															
ORDERED TODAY															

EQUIPMENT

DESANDER | MUD CLEANER
DESILTER | DEGASSER
HI-SP SHAKER | CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE

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DRILLING MUD REPORT NO.

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR	CONTRACTOR	RIG NO
REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RA

WELL NAME AND NO	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN. #2 X IN		ANNULAR VEL. (FT/M) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	F L	PIT	F L	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb cu ft) Sp G				
Funnel Viscosity (sec qt) API @ °F				
Plastic Viscosity cP @ °F				
Yield Point (lb 100 ft²)				
Gel Strength (lb 100 ft²) 10 sec 10 min				
Filtrate API (cm³ 30 min)				
API HTHP Filtrate (cm³ 30 min) @ °F				
Cake Thickness (32nd in API HTHP)				
Solids Content (% by Vol) calculated retort				
Liquid Content (% by Vol) Oil/Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb/bbl equiv cm³ cm³ mud				
pH Strip Meter @ °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf/Mf)				
Alternate Alkalinity Filtrate (P1, P2)				
Chloride (mg L)				
Total Hardness as Calcium (mg L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
ORDERED TODAY														

EQUIPMENT

DESANDER	MUD CLEANE
DESILTER	DEGASSER
HI SP SHAKER	CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE

NOTICE: [illegible] EXPRESSED ORALLY OR WRITTEN HEREIN HAS BEEN PREPARED CAREFULLY AND MAY BE USED IF THE USER [illegible] AS TO ITS CORRECTNESS OR COMPLETENESS AND NO [illegible] FROM THE USE OF SAME

C-986

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(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO

REPORT FOR | REPORT FOR | SECTION TOWNSHIP, RANGE

WELL NAME AND NO | FIELD OR BLOCK NO | County, Parish or Offshore area | STATE/PROVINCE

DRILLING ASSEMBLY / CASING / MUD VOLUME (BBL) / CIRCULATION DATA

BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN	ANNULAR VEL (FT/MIN) DP / DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE/MODEL / ASSUMED EFF	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK / STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN / GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	F.L.	PIT	F.L.	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb/cu ft) Sp G				
Funnel Viscosity (sec/qt) API # °F				
Plastic Viscosity cP # °F				
Yield Point (lb/100 ft²)				
Gel Strength (lb/100 ft²) 10 sec/10 min				
Filtrate API (cm³/30 min)				
API HTHP Filtrate (cm³/30 min) # °F				
Cake Thickness (32nd in) API/HTHP				
Solids Content (% by Vol) calculated retort				
Liquid Content (% by Vol) Oil/Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud				
pH Strip Meter # °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf/Mf)				
Alternate Alkalinity Filtrate (P1/P2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY													
STARTING INVENTORY													
RECEIVED													
USED LAST 24 HR													
CLOSING INVENTORY													
ORDERED													

EQUIPMENT

DESANDER | MUD CLEANER
DESILTER | DEGASSER
HI SP SHAKER | CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | HOME PHONE | MOBILE PHONE | WORK PHONE

C-987

HUGHES DRILLING FLUIDS

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Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19

DEPTH

SPUD DATE

PRESENT ACTIVITY

OPERATOR

CONTRACTOR

RIG NO.

REPORT FOR

REPORT FOR

SECTION, TOWNSHIP, RA

WELL NAME AND NO.

FIELD OR BLOCK NO.

County, Parish or Offshore area

STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT/M DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	FL	PIT	FL	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight (ppg) (lb/cu ft) Sp G				
Funnel Viscosity (sec/qt) API @ °F				
Plastic Viscosity cP @ °F				
Yield Point (lb/100 ft²)				
Gel Strength (lb/100 ft²) 10 sec/10 min				
Filtrate API (cm³/30 min)				
API HTHP Filtrate (cm³/30 min) @ °F				
Cake Thickness (32nd in) API HTHP				
Solids Content (% by Vol) calculated retort				
Liquid Content (% by Vol) Oil/Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud				
pH Strip Meter @ °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (P_f/M_f)				
Alternate Alkalinity Filtrate (P1/P2)				
Chloride (mg/L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
CLOSING INVENTORY														
DELIVERED BY														

EQUIPMENT

DESANDER MUD CLEA
DESILTER DEGASSER
HI-SP SHAKER CENTRIFU

DAILY COST

CUMULATIVE COST

	HOME PHONE	MOBILE PHONE	WHSE PHONE

AND OR PRODUCT ... ORALLY ... ARE ... ANOMALIES ... THE USER ... NO REPRESENTATION ... MADE BY ... RELIABILITY ... ACCURACY OR COMPLETENESS OR ... AND ... WILL BE HELD ... FROM THE USE ... ARISING

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(713) 690-3823

DRILLING MUD REPORT NO.

DATE 19 | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR | CONTRACTOR | RIG NO

REPORT FOR | REPORT FOR | SECTION, TOWNSHIP, RANGE

WELL NAME AND NO | FIELD OR BLOCK NO | County, Parish or Offshore area | STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP #1 X IN SIZE #2 X IN		ANNULAR VEL (FT/MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF. %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES

Sample From	F L	PIT	F L	PIT
Time Sample Taken				
Flowline Temperature °F				
Depth (ft)				
Weight #/(ppg) (lb cu ft) Sp G				
Funnel Viscosity (sec qt) API @ °F				
Plastic Viscosity cP @ °F				
Yield Point (lb 100 ft²)				
Gel Strength (lb 100 ft²) 10 sec 10 min				
Filtrate API (cm³ 30 min)				
API HTHP Filtrate (cm³ 30 min) @ °F				
Cake Thickness (32nd in API HTHP)				
Solids Content (% by Vol) calculated retort				
Liquid Content (% by Vol) Oil/Water				
Sand Content (% by Vol)				
Methylene Blue Capacity lb bbl equiv cm³ cm³ mud				
pH Strip Meter @ °F				
Alkalinity Mud (Pm)				
Alkalinity Filtrate (Pf Mf)				
Alternate Alkalinity Filtrate (P1 P2)				
Chloride (mg L)				
Total Hardness as Calcium (mg/L)				

MUD PROPERTY SPECIFICATIONS

WEIGHT | VISCOSITY | FILTRATE

RECOMMENDED TOUR TREATMENT

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

PRODUCT INVENTORY														
STARTING INVENTORY														
RECEIVED														
USED LAST 24 HR														
ENDING INVENTORY														
ORDERED TODAY														

EQUIPMENT

DESANDER | MUD CLEANER
DESILTER | DEGASSER
HI-SP SHAKER | CENTRIFUGE

DAILY COST

CUMULATIVE COST

ENGINEER | HOME PHONE | MOBILE PHONE | WHSE PHONE

C-989

HUGHES DRILLING FLUIDS
10777 N. W. Freeway Suite 700
P.O. Box 22753
Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 .. | DEPTH

SPUD DATE | PRESENT ACTIVITY

OPERATOR: [illegible]

CONTRACTOR: [illegible]

RIG NO: 3

REPORT FOR

REPORT FOR: [illegible]

SECTION, TOWNSHIP, RA: [illegible]

WELL NAME AND NO.: [illegible] 129

FIELD OR BLOCK NO: [illegible]

County, Parish or Offshore area: [illegible]

STATE/PROVINCE: [illegible]

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE: 7 7/8	TYPE: J-22	JET SIZE: [illegible]	SURFACE: [illegible]	HOLE: 675	PITS: [illegible]	PUMP SIZE #1 X IN / #2 [illegible] X [illegible] IN		ANNULAR VEL (FT/M) DP [illegible] DC [illegible]
DRILL PIPE SIZE: 4 1/2	TYPE: [illegible]	LENGTH	INTERMEDIATE @	TOTAL CIRCULATING VOLUME: 1075		PUMP MAKE MODEL: [illegible]	ASSUMED EFF: 70 %	CIRCULATION PRESSURE (PSI): [illegible]
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	IN STORAGE	WEIGHT	BBL/STK: [illegible]	STK/MIN: [illegible]	BOTTOMS UP (MIN): 88
DRILL COLLAR SIZE: 6 1/2	LENGTH: 536	PRODUCTION OR LINER @	MUD TYPE: L.S.N.D.			BBL/MIN: [illegible]	GAL/MIN: 319	TOTAL CIRC. TIME (MIN): 14

MUD PROPERTIES

Sample From	F.L.	PIT	F.L.	PIT
Time Sample Taken	Noon			
Flowline Temperature °F	—			
Depth (ft)	10,561			
Weight ~~(ppg)~~ (lb/cu ft) Sp G	9.1			
Funnel Viscosity (sec/qt) API @ °F	36			
Plastic Viscosity cP @ °F	7			
Yield Point (lb/100 ft²)	11			
Gel Strength (lb/100 ft²) 10 sec/10 min	2/11		/	
Filtrate API (cm³/30 min.)	6.4			
API HTHP Filtrate (cm³/30 min) @ °F	—			
Cake Thickness (32nd in. API/HTHP)	2		/	
Solids Content (% by Vol) ~~Calculated~~ retort	5			
Liquid Content (% by Vol) Oil/Water	95		/	
Sand Content (% by Vol)	.25			
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud	—			
pH ~~Strip~~ Meter @ °F	8.0			
Alkalinity Mud (Pm)	—			
Alkalinity Filtrate (Pf/Mf)	.05/.3		/	
Alternate Alkalinity Filtrate (P1/P2)	—		/	
Chloride (mg/L)	1800			
Total Hardness as Calcium (mg/L)	20			

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9	35	20c

RECOMMENDED TOUR TREATMENT

Gel. Sx 35 u/s

Caustic 25# per Tour @ 3#/s

Water Sx 9.0 ppt

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

[illegible]

PRODUCT INVENTORY	Sell	Ash	Lime	Caust	SPA	Barit										
STARTING INVENTORY	61	5	35	35	10											
RECEIVED	160															
USED LAST 24 HR	91	2	0	7	0											
CLOSING INVENTORY	130	6	35	28	10											
ORDERED TODAY																

2

EQUIPMENT

- DESANDER
- MUD CLEA
- DESILTER
- DEGASSE
- HI-SP SHAKER
- CENTRIFU

DAILY COST: $814.[illegible]

CUMULATIVE COST: $16,421.[illegible]

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
Ken Baker	[illegible] 2540	[illegible]	333-5444

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P.O. Box 22753
Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 4.16 19.. DEPTH [illegible]
SPUD DATE 3-20 PRESENT ACTIVITY Drl

OPERATOR	CONTRACTOR	RIG NO.
Murex Co	[illegible]	3

REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RANGE
	[illegible]	29

WELL NAME AND NO.	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE-PROVINCE
Fee 1-29	[illegible]	[illegible]	Tx

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE J-22	JET SIZE 3/32	SURFACE 8 5/8 @ [illegible]	HOLE [illegible]	PITS 400	PUMP #1 SIZE X IN #2 6 X 15 IN		ANNULAR VEL (FT/MIN) DP 127 DC 319
DRILL PIPE SIZE 4 1/2	TYPE XH	LENGTH	INTERMEDIATE @	TOTAL CIRCULATING VOLUME 1097		PUMP MAKE, MODEL [illegible]	ASSUMED EFF 90 %	CIRCULATION PRESSURE (PSI) 1700
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	IN STORAGE	WEIGHT	BBL/STK 106	STK/MIN 52	BOTTOMS UP (MIN) 91
DRILL COLLAR SIZE 6 1/4		LENGTH 536	PRODUCTION OR LINER @	MUD TYPE L.S.N.D.		BBL/MIN [illegible]	GAL/MIN 319	TOTAL CIRC TIME (MIN) 144

MUD PROPERTIES

	PIT	F.L PIT
Sample From	PIT	
Time Sample Taken	12:30 pm	
Flowline Temperature °F	—	
Depth (ft)	10502	
Weight (ppg) (lb cu ft) Sp G	9.1	
Funnel Viscosity (sec/qt) API @ °F	37	
Plastic Viscosity cP @ °F	9	
Yield Point (lb/100 ft²)	6	
Gel Strength (lb/100 ft²) 10 sec/10 min.	8/12	/
Filtrate API (cm³/30 min)	19.8	
API HTHP Filtrate (cm³/30 min.) @ °F	—	
Cake Thickness (32nd in. API/HTHP)	2	/
Solids Content (% by Vol) calculated retort	5	
Liquid Content (% by Vol) Oil/Water	95	/
Sand Content (% by Vol.)	2	
Methylene Blue Capacity (lb/bbl equiv. cm³/cm³ mud)	—	
pH Strip Meter @ °F	8.8	
Alkalinity Mud (Pm)	—	
Alkalinity Filtrate (P_f/M_f)	.05/.3	/
Alternate Alkalinity Filtrate (P1/P2)	—	/
Chloride (mg/L)	1800	
Total Hardness as Calcium (mg/L)	40	

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9	35	-20cc

RECOMMENDED TOUR TREATMENT

Gel for 35 vis

Caustic 3sx } Each
Lime 1sx } Tour

Water for 9.0 wt.

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

TIMITS

Mix caustic @ 1½-2 hr/sx

PRODUCT INVENTORY	Gel	Sx Ash	Caustic	KCl	Disco	SPA	Lime								
STARTING INVENTORY	133	6	28	20	10	10	55								
RECEIVED	133		30												
USED LAST 24 HR	61	0	6	0	0	0	0								
CLOSING INVENTORY	205	6	52	20	0	0	55								
ORDERED TODAY															

EQUIPMENT

☐ DESANDER ☐ MUD CLEANER
☐ DESILTER ☐ DEGASSER
☐ HI-SP SHAKER ☐ CENTRIFUGE

DAILY COST $ 558.00

CUMULATIVE COST $ 16,979.00

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
Ken Baker	[illegible]	[illegible]	32[illegible] 5441

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P O Box 22753
Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 4-17 19 86 | DEPTH 1182
SPUD DATE 3-20 | PRESENT ACTIVITY D.L.

OPERATOR: Murexco
CONTRACTOR: F. Lee
RIG NO.: 3
REPORT FOR:
REPORT FOR: Joe Heffner
SECTION, TOWNSHIP, RAN: 29
WELL NAME AND NO: Fee 1-29
FIELD OR BLOCK NO: A-1
County, Parish or Offshore area: Wheeler
STATE/PROVINCE: Tx

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE T-22	JET SIZE 3/3	SURFACE 8 5/8" 352'	HOLE 115	PITS 400	PUMP SIZE #1 6 X 15 IN, #2		ANNULAR VEL (FT/MIN) DP 197 DC 71
DRILL PIPE SIZE 4 1/2	TYPE X H	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME 1115+		PUMP MAKE MODEL Gardner	ASSUMED EFF 80 %	CIRCULATION PRESSURE (PSI) 140
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL/STK .46	STK/MIN 52	BOTTOMS UP (MIN) 94
DRILL COLLAR SIZE 6 1/8		LENGTH 536	PRODUCTION OR LINER "	MUD TYPE L.S.N.D.		BBL/MIN 7.6	GAL/MIN 319	TOTAL CIRC TIME (MIN) 15

MUD PROPERTIES	FL PIT	FL PIT
Sample From		
Time Sample Taken	1100 hrs	
Flowline Temperature °F	—	
Depth (ft)	1182	
Weight (ppg) (lb cu ft.) Sp G	9.1	
Funnel Viscosity (sec/qt) API @ °F	37	
Plastic Viscosity cP @ °F	8	
Yield Point (lb/100 ft²)	6	
Gel Strength (lb/100 ft²) 10 sec/10 min	3/10	/
Filtrate API (cm³/30 min)	14	
API HTHP Filtrate (cm³/30 min) @ °F	—	
Cake Thickness (32nd in API/HTHP)	2 /	/
Solids Content (% by Vol) Calculated retort	5	
Liquid Content (% by Vol) Oil/Water	95 /	/
Sand Content (% by Vol)	.2	
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud	—	
pH Strip Meter @ °F	9.0	
Alkalinity Mud (Pm)	—	
Alkalinity Filtrate (Pf/Mf)	.17/.3	/
Alternate Alkalinity Filtrate (P1/P2)	— / —	/
Chloride (mg/L)	1200	
Total Hardness as Calcium (mg/L)	tr	

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.0	36-38	12cc

RECOMMENDED TOUR TREATMENT

Gel 36-38
Caustic 3sx
Lignite 3sx } Each Tour
SPA 1-5x
Water 5 9.0 wt

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

Mix: SPA @ 4-5 hrs/sx
Caustic @ 1½ 2 hrs/sx

THANKS

wt 9.0
VIS 36-38

PRODUCT INVENTORY	Gel	S. Ash	Lime	LIS	Desco	SPA	Caustic								
STARTING INVENTORY	205	6	35	20	10	10	52								
RECEIVED															
USED LAST 24 HR	70	0	0	2	0	0	6			2					
CLOSING INVENTORY	135	6	35	18	10	10	46								
ORDERED TODAY															

EQUIPMENT

DESANDER | MUD CLEANER
DESILTER | DEGASSER
HI-SP SHAKER | CENTRIFUGE

DAILY COST $ 644.60
CUMULATIVE COST $ 7623.00

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
Ron Baker	405-273-2314	324-178-155	323-5041

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Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19 86 | DEPTH 11228
SPUD DATE 5-20 | PRESENT ACTIVITY Drl

OPERATOR	CONTRACTOR	RIG NO
Murexco	U.S.	3

REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RANGE
	John Hoffman	29

WELL NAME AND NO	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE/PROVINCE
Fry 1-29	A-3	Wheeler	Tx

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE J-33	JET SIZE 7/13	SURFACE "	HOLE 718	PITS 400	PUMP SIZE #1 X IN; #2 6 x 15 IN		ANNULAR VEL. (FT/MIN) DP 177 DC 317
DRILL PIPE SIZE 4 1/2	TYPE XH	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME 1118±		PUMP MAKE, MODEL Idria	ASSUMED EFF 90 %	CIRCULATION PRESSURE (PSI) 1400
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL/STK 146	STK MIN 52	BOTTOMS UP (MIN) 97
DRILL COLLAR SIZE 6 1/8		LENGTH 536	PRODUCTION OR LINER "	MUD TYPE Chemical		BBL/MIN 7.6	GAL MIN 319	TOTAL CIRC TIME (MIN) 147

MUD PROPERTIES	PIT	F L PIT
Sample From	PIT	
Time Sample Taken	10:00 Am	
Flowline Temperature °F	—	
Depth (ft)	11228	
Weight (ppg) (lb/cu ft) Sp G	9.1	
Funnel Viscosity (sec/qt) API " °F	38	
Plastic Viscosity cP " °F	10	
Yield Point (lb/100 ft²)	16	
Gel Strength (lb 100 ft²) 10 sec. 10 min	5/12	/
Filtrate API (cm³/30 min)	19.4	
API HTHP Filtrate (cm³/30 min) " °F	—	
Cake Thickness (32nd in. API/HTHP)	2/	/
Solids Content (% by Vol.) calculated retort	5.3	
Liquid Content (% by Vol) Oil/Water	94.7	/
Sand Content (% by Vol)	.2	
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud	—	
pH Strip Meter " °F	9.0	
Alkalinity Mud (Pm)	—	
Alkalinity Filtrate (P_f M_f)	.15/.3	/
Alternate Alkalinity Filtrate (P1/P2)	—	/
Chloride (mg/L)	2000	
Total Hardness as Calcium (mg/L)	20	

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.0	38	12cc

RECOMMENDED TOUR TREATMENT

Gel 38 ppb
Caustic 3sx
Lignite 3sx } Each Tour
SPA 1sx
Water for 9.0#

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

Mix SPA & Lignite together over 4-5 hrs.

Thanks

PRODUCT INVENTORY	Gel	Ash	Lime	Lig	Dosol	SPA	Caust							
STARTING INVENTORY	135	6	35	18	10	10	46							
RECEIVED														
USED LAST 24 HR	5	0	0	5	0	2	2							
CLOSING INVENTORY	130	6	35	13	10	8	44							
ORDERED TODAY														

2

EQUIPMENT

DESANDER	MUD CLEANER
DESILTER	DEGASSER
HI-SP SHAKER	CENTRIFUGE

DAILY COST $ 554.00

CUMULATIVE COST $ 1877.00

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
Ron Baker	405-983-2344	383-4476 # 155	323-5441

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P.O. Box 22753
Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 19

DEPTH

SPUD DATE

PRESENT ACTIVITY

OPERATOR

CONTRACTOR

RIG NO

REPORT FOR

REPORT FOR

SECTION TOWNSHIP, RAN

WELL NAME AND NO

FIELD OR BLOCK NO

County, Parish or Offshore area

STATE/PROVINCE

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE	HOLE	PITS	PUMP SIZE #1 X IN / #2 X IN		ANNULAR VEL (FT MI DP / DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	TOTAL CIRCULATING VOLUME		PUMP MAKE, MODEL	ASSUMED EFF %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE	IN STORAGE	WEIGHT	BBL/STK	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER	MUD TYPE Chemical		BBL/MIN	GAL/MIN	TOTAL CIRC TIME (MIN)

MUD PROPERTIES		
Sample From		PIT / FL PIT
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb/cu ft) Sp G		
Funnel Viscosity (sec/qt) API	°F	
Plastic Viscosity cP	°F	
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec/10 min		
Filtrate API (cm³/30 min)		
API HTHP Filtrate (cm³/30 min)	°F	
Cake Thickness (32nd in. API/HTHP)		
Solids Content (% by Vol) calculated / retort		
Liquid Content (% by Vol) Oil/Water		
Sand Content (% by Vol)		
Methylene Blue Capacity lb/bbl equiv	cm³/cm³ mud	
pH Strip / Meter	°F	
Alkalinity Mud (Pm)		
Alkalinity Filtrate (Pf/Mf)		
Alternate Alkalinity Filtrate (P1/P2)		
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9	38-40	10c

RECOMMENDED TOUR TREATMENT

Gel to 38-40 vis
SPA - 2 sx
Lignite 3 sx
Caustic 2 sx
Drill 1 sx
Water for 9.0 wt

Each Tour over 8 hrs

REMARKS - GIVE OPERATION, DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

Trip for hole in pipe 11341'

PRODUCT INVENTORY	Bx	Ash	Lime	[illegible]	[illegible]	SPA	Caustic									
STARTING INVENTORY	130	6	35	13	10	8	44									
RECEIVED																
USED LAST 24 HR	20	0	0	8	0	3	7			2						
CLOSING INVENTORY	110	6	35	5	10	5	37									
ORDERED TODAY																

EQUIPMENT

DESANDER / MUD CLEANE
DESILTER / DEGASSER
HI-SP SHAKER / CENTRIFUGE

DAILY COST $ 1,136.00

CUMULATIVE COST $ 19,313.00

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
Ron Baker	[illegible]	[illegible]	[illegible]

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C-994

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10777 N W Freeway Suite 700
P O Box 22753
Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 4-[illegible] 19 86 | DEPTH 11715
SPUD DATE 3-23 | PRESENT ACTIVITY Drl

OPERATOR	CONTRACTOR	RIG NO
Murexco	Patton	3

REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RANGE
	John Hoffman	29

WELL NAME AND NO	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE/PROVINCE
Fee 1-29	A-2	Wheeler	Tx

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE J-33	JET SIZE 3/3	SURFACE 9 5/8 @ 3527	HOLE [illegible]	PITS 400	PUMP #1 X IN / SIZE #2 6 X 15 IN		ANNULAR VEL (FT/MIN) DP [illegible] DC 219
DRILL PIPE SIZE 4 1/2	TYPE X-H	LENGTH	INTERMEDIATE @	TOTAL CIRCULATING VOLUME 1155[illegible]		PUMP MAKE, MODEL Ideco	ASSUMED EFF 90 %	CIRCULATION PRESSURE (PSI) 1400
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	IN STORAGE	WEIGHT	BBL/STK 14	STK/MIN [illegible]	BOTTOMS UP (MIN) 99
DRILL COLLAR SIZE 6 1/8		LENGTH 536	PRODUCTION OR LINER @	MUD TYPE Chemical		BBL MIN [illegible]	GAL MIN 319	TOTAL CIRC TIME (MIN) 151

MUD PROPERTIES	FL PIT	FL PIT
Sample From	FL PIT	
Time Sample Taken	0100	
Flowline Temperature °F	—	
Depth (ft)	11715	
Weight (lb/gal) (lb cu ft) Sp G	9.2	
Funnel Viscosity (sec/qt) API @ °F	40	
Plastic Viscosity cP @ °F	13	
Yield Point (lb/100 ft²)	7	
Gel Strength (lb/100 ft²) 10 sec/10 min	4/8	/
Filtrate API (cm³/30 min)	9.7	
API HTHP Filtrate (cm³/30 min) @ °F	—	
Cake Thickness (32nd in. API/HTHP)	1	/
Solids Content (% by Vol.) Calculated / retort	5.8	
Liquid Content (% by Vol.) Oil/Water	94/2	/
Sand Content (% by Vol.)	.2	
Methylene Blue Capacity lb/bbl equiv. cm³/cm³ mud	—	
pH Strip / Meter @ °F	9.4	
Alkalinity Mud (Pm)	—	
Alkalinity Filtrate (P_f/M_f)	.2/.4	/
Alternate Alkalinity Filtrate (P1/P2)	—	/
Chloride (mg/L)	1800	
Total Hardness as Calcium (mg/L)	60	

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.0	38-40	8-10cc

RECOMMENDED TOUR TREATMENT

Gel - 30-40 vis
Caustic 3 sx
Lignite 3 sx
SPA 3 sx
Each Tour
Water to 9.0#
Dewo 1 sx Daily

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

Thanks

PRODUCT INVENTORY	Gel	SPA	Lime	Lig	Dewo	SPA	Caustic								
STARTING INVENTORY	110	6	35	5	10	5	35								
RECEIVED	115			30	10	15									
USED LAST 24 HR	150	0	0	8	4	6	9			2					
CLOSING INVENTORY	75	6	35	27	16	14	26								
ORDERED TODAY															

EQUIPMENT

☐ DESANDER ☐ MUD CLEANER
☐ DESILTER ☐ DEGASSER
☐ HI-SP SHAKER ☐ CENTRIFUGE

DAILY COST $ 2616.00
CUMULATIVE COST $ 21,929.00

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
Ron Baker	[illegible]	[illegible]	323-5441

NOTICE: ANY OPINION AND OR RECOMMENDATION EXPRESSED HEREIN IS BASED ON INFORMATION PREPARED CAREFULLY AND MAY BE USED AT THE USER SO ELECTS. HOWEVER, NO REPRESENTATION OR WARRANTY IS MADE AS TO THE ACCURACY OR AGENTS AS TO ITS CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGE RESULTING FROM THE USE THEREOF.

C-995

HUGHES DRILLING FLUIDS
10777 N W Freeway Suite 700
P O Box 22753
Houston Texas 77227
713 680-1823

DRILLING MUD REPORT NO.

DATE 3 21 1986 | DEPTH 11978
SPUD DATE 3-20 | PRESENT ACTIVITY Drl

OPERATOR	CONTRACTOR	RIG NO.
Murexco	[illegible]	3

REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RANGE
	Tom Hoffman	29

WELL NAME AND NO	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE/PROVINCE
Erye 1-29	A 3	Wheeler	Tx

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE J-33	JET SIZE 3/13	SURFACE 8 5/8 @ 3500	HOLE 766	PITS 400	PUMP SIZE #1 X IN / #2 6 X 15 IN.		ANNULAR VEL (FT/MIN) DP 147 DC 319
DRILL PIPE SIZE 4 1/2	TYPE XH	LENGTH	INTERMEDIATE @	TOTAL CIRCULATING VOLUME 1166		PUMP MAKE, MODEL Idreco	ASSUMED EFF 90 %	CIRCULATION PRESSURE (PSI) 1400
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE @	IN STORAGE	WEIGHT	BBL/STK 146	STK/MIN 52	BOTTOMS UP (MIN) 100
DRILL COLLAR SIZE 6 1/8		LENGTH 536	PRODUCTION OR LINER @	MUD TYPE Chemical		BBL/MIN 7.6	GAL/MIN 319	TOTAL CIRC TIME (MIN) 153

MUD PROPERTIES

	FL	PIT	FL	PIT
Sample From	FL	PIT		
Time Sample Taken	11:00 Am			
Flowline Temperature °F	—			
Depth (ft)	11978			
Weight (ppg) (lb/cu.ft.) Sp G	9.2+			
Funnel Viscosity (sec/qt) API °F	39			
Plastic Viscosity cP °F	12			
Yield Point (lb 100 ft²)	6			
Gel Strength (lb/100 ft²) 10 sec/10 min	4/7		/	
Filtrate API (cm³/30 min.)	9.2			
API HTHP Filtrate (cm³/30 min) °F	—			
Cake Thickness (32nd in. API/HTHP)	/		/	
Solids Content (% by Vol.) Calculated retort	6.0			
Liquid Content (% by Vol) Oil/Water	94/		/	
Sand Content (% by Vol)	.25			
Methylene Blue Capacity lb/bbl equiv. cm³ cm³ mud	—			
pH Strip Meter °F	9.4			
Alkalinity Mud (Pm)	—			
Alkalinity Filtrate (Pf/Mf)	.2/.4		/	
Alternate Alkalinity Filtrate (P1/P2)	—/—		/	
Chloride (mg/L)	2200			
Total Hardness as Calcium (mg/L)	40			

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9	40-42	8-10cc

RECOMMENDED TOUR TREATMENT

Gel. Fin 40-42 vis
Caustic 3sx
SPA 2sx
Lignite 2sx
Water Fin 9.0wt

Each Tour

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

wt 9.0
vis 40-42

Thanks

keep pits gated & clean as possible

PRODUCT INVENTORY	Bal	Ash	Lime	[illegible]	[illegible]	Sipf	Caustic								
STARTING INVENTORY	75	6	35	27	16	14	26								
RECEIVED	140					10	30								
USED LAST 24 HR	45	0	0	4	0	5	7			2					
CLOSING INVENTORY	170	6	35	23	16	19	49								
ORDERED TODAY															

EQUIPMENT

DESANDER | MUD CLEANER
DESILTER | DEGASSER
HI-SP SHAKER | CENTRIFUGE

DAILY COST $ 1558.00

CUMULATIVE COST $ 23,487.00

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE. PHONE
Ron Baker	405-923-2344	323-6478 # 155	323-5541

NOTICE ANY OPINION AND OR RECOMMENDATION EXPRESSED ORALLY OR WRITTEN HEREIN HAS BEEN PREPARED CAREFULLY AND MAY BE USED IF THE USER SO ELECTS HOWEVER NO REPRESENTATIVE OR WARRANTY IS MADE BY OURSELVES OR OUR AGENTS AS TO ITS CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGES RESULTING FROM THE USE OF SAME

HUGHES DRILLING FLUIDS
10777 N W Freeway Suite 700
P O Box 22753
Houston Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 4 - 2 19 | DEPTH 12319
SPUD DATE | PRESENT ACTIVITY D-L

OPERATOR	CONTRACTOR	RIG NO
Mapco	[illegible]	3

REPORT FOR	REPORT FOR	SECTION, TOWNSHIP, RANGE
	Jim [illegible]	29

WELL NAME AND NO	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE/PROVINCE
[illegible] 1-29	[illegible]	Wheeler	Tx

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE J-33	JET SIZE 3/32	SURFACE 9-5/8 @ 5207	HOLE 788	PITS 400	PUMP #1 X IN SIZE #2 6 x 15 IN		ANNULAR VEL (FT/MIN) DP 317 DC 319
DRILL PIPE SIZE 4 1/2	TYPE XH	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME 1188		PUMP MAKE, MODEL Idco	ASSUMED EFF 90 %	CIRCULATION PRESSURE (PSI) 1400
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL/STK 7.6	STK/MIN 52	BOTTOMS UP (MIN) 103
DRILL COLLAR SIZE 6 1/4		LENGTH 536	PRODUCTION OR LINER "	MUD TYPE Chemical		BBL/MIN 7.6	GAL/MIN 319	TOTAL CIRC TIME (MIN) 156

MUD PROPERTIES

	F.L. PIT	F.L. PIT
Sample From		
Time Sample Taken	1:30 PM	
Flowline Temperature °F		
Depth (ft)	12319	
Weight ~~(ppg)~~ (lb cu ft) Sp G	9.3+	
Funnel Viscosity (sec/qt) API @ °F	38	
Plastic Viscosity cP @ °F	10	
Yield Point (lb/100 ft²)	6	
Gel Strength (lb/100 ft²) 10 sec/10 min	3/7	/
Filtrate API (cm³/30 min)	9.6	
API HTHP Filtrate (cm³/30 min) @ °F		
Cake Thickness (32nd in API/HTHP)	/	/
Solids Content (% by Vol.) ✓ calculated retort	6.8	
Liquid Content (% by Vol.) Oil/Water	93 /	/
Sand Content (% by Vol)	.25	
Methylene Blue Capacity lb/bbl equiv cm³/cm³ mud		
pH ~~Strip~~ Meter @ °F	9.0	
Alkalinity Mud (Pm)		
Alkalinity Filtrate (P_f/M_f)	.15/.4	/
Alternate Alkalinity Filtrate (P1/P2)	/	/
Chloride (mg/L)	2400	
Total Hardness as Calcium (mg/L)	80	

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.0-9.1	48-52	8 cc

RECOMMENDED TOUR TREATMENT

Gel-Lim 48-52 vis, 55 to T.D.
Caustic 3 sx
Lignite 3 sx } Each Tour
SPA - 3 sx
Water for 9.0-9.1 wt

REMARKS - GIVE OPERATION, DEPTH AND NAME OF ANY PROBLEMS ENCOUNTERED

Ease vis to 55 sec/qt to T.D.

THANKS

PRODUCT INVENTORY	Salt	Sl Hi Lime	Lig	Desh	Gel	Caustic									
STARTING INVENTORY	110	6	35	23	16	19	47								
RECEIVED															
USED LAST 24 HR	75	1	0	5	1	4	9			2					
CLOSING INVENTORY	35	5	35	18	5	15	40								
ORDERED TODAY															

EQUIPMENT

DESANDER	MUD CLEANER
DESILTER	DEGASSER
HI-SP SHAKER	CENTRIFUGE

DAILY COST $ 1695.00
CUMULATIVE COST $ 25,182.00

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
Tom Baker	405 [illegible]-2344	325-0472 [illegible]	323-5041

NOTICE: ANY OPINION AND OR RECOMMENDATION EXPRESSED ORALLY OR WRITTEN HEREIN HAS BEEN PREPARED CAREFULLY AND MAY BE USED IF THE USER SO ELECTS. HOWEVER NO REPRESENTATION OR WARRANTY IS MADE BY OURSELVES OR OUR AGENTS AS TO ITS CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGES RESULTING FROM THE USE OF SAME.

HUGHES DRILLING FLUIDS
10777 N W Freeway Suite 700
P O Box 22753
Houston, Texas 77227
(713) 680-3823

DRILLING MUD REPORT NO.

DATE 4-23 19 86 | DEPTH 12,500
SPUD DATE 3-20 | PRESENT ACTIVITY Logs

OPERATOR	CONTRACTOR	RIG NO
Murexco	Pokes	3

REPORT FOR	REPORT FOR	SECTION TOWNSHIP, RA
	Texas Hydrocarbons	29

WELL NAME AND NO	FIELD OR BLOCK NO	County, Parish or Offshore area	STATE/PROVINCE
Fee 1-29	[illegible]	Wheeler	Tx

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 7 7/8	TYPE J-22	JET SIZE 3/32	SURFACE 8 5/8 @ 2507	HOLE 738	PITS 400	PUMP #1 SIZE #2 6 X 15 IN	X IN	ANNULAR VEL (FT/M) DP 187 DC 31
DRILL PIPE SIZE 4 1/2	TYPE XH	LENGTH	INTERMEDIATE "	TOTAL CIRCULATING VOLUME 1138±		PUMP MAKE, MODEL Ideco	ASSUMED EFF 90 %	CIRCULATION PRESSURE (PSI) 400
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE "	IN STORAGE	WEIGHT	BBL/STK .142	STK/MIN 52	BOTTOMS UP (MIN) 103
DRILL COLLAR SIZE 6 1/2		LENGTH 536	PRODUCTION OR LINER "	MUD TYPE Chemical		BBL/MIN 7.6	GAL/MIN	TOTAL CIRC TIME (MIN) 15

MUD PROPERTIES

Sample From	F.L. PIT	F.L. PIT
Time Sample Taken		
Flowline Temperature °F		
Depth (ft)		
Weight (ppg) (lb/cu ft) Sp G		
Funnel Viscosity (sec/qt) API @ °F		
Plastic Viscosity cP @ °F		
Yield Point (lb/100 ft²)		
Gel Strength (lb/100 ft²) 10 sec/10 min	6 / 9	/
Filtrate API (cm³/30 min)	8	
API HTHP Filtrate (cm³/30 min) @ °F		
Cake Thickness (32nd in. API/HTHP)	2 / 2	/
Solids Content (% by Vol.): ☐ calculated ☐ retort		
Liquid Content (% by Vol.) Oil/Water	/	/
Sand Content (% by Vol.)		
Methylene Blue Capacity: lb/bbl equiv. cm³/cm³ mud		
pH ☐ Strip ☐ Meter @ °F		
Alkalinity Mud (Pm)		
Alkalinity Filtrate (Pf/Mf)	/	/
Alternate Alkalinity Filtrate (P1/P2)	/	/
Chloride (mg/L)		
Total Hardness as Calcium (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

RECOMMENDED TOUR TREATMENT

Water for 50 hrs while circ

REMARKS - GIVE OPERATION DEPTH AND NATURE OF ANY PROBLEMS ENCOUNTERED

Logs went to 12503, 1st run

Thanks

PRODUCT INVENTORY	Sel	S. Ash	Lime	Caustic	Ug	Dexo	SPA
STARTING INVENTORY	95	5	35	40	18	15	5
RECEIVED	140						
USED LAST 24 HR	110	0	0	3	3	0	3
CLOSING INVENTORY	125	5	35	37	15	15	12
ORDERED TODAY							

JUN 27 1986

2

EQUIPMENT

☐ DESANDER ☐ MUD CLEAN
☐ DESILTER ☐ DEGASSER
☐ HI-SP SHAKER ☐ CENTRIFUGE

DAILY COST $1354.00

CUMULATIVE COST $26,536

ENGINEER	HOME PHONE	MOBILE PHONE	WHSE PHONE
Ken Baker	[illegible]	[illegible]	303-5[illegible]41

NOTICE: ANY OPINION AND/OR RECOMMENDATION ORALLY OR VIA [illegible] HAS BEEN PREPARED CAREFULLY AND MAY BE USED IF THE SER SELECTS. HOWEVER, NO REPRESENTATION OR WARRANTY IS MADE BY HUGHES OR OUR AGENTS AS TO ITS CORRECTNESS OR COMPLETENESS AND NO LIABILITY IS ASSUMED FOR ANY DAMAGE [illegible] FROM THE USE OF SAME.

Sampling Report
Investigation of Chevron USA, Inc.'s
W. V. Lister No. 1 Gas Well Production Facility
Wheeler County, Texas
June 24, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of active Anadarko Basin production sites developed by the Texas Railroad Commission at the request of EPA. The list was transmitted via telephone to the EPA contractor on June 16, 1986. Randomization and site selection took place during the telephone conversation.

The EPA contractor had no interest in the manner the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites.

The Railroad Commission listed the possible sample sites by operator and specific location. For simplicity of selection, the list was transmitted as shown below. The list consisted of five Anadarko Basin production sites:

1. Chevron USA - Wheeler County
2. Cities Service Oil and Gas
3. Chevron USA - Hemphill County
4. Mobil Production Tex. & Mex.
5. Mobil - Hemphill County

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. The randomly-selected primary site was No. 1 on the above list (Chevron USA). No. 5 on the above list (Mobil Oil - Hemphill County) was selected as a back-up site in the event the primary site was inaccessible or inappropriate.

Further inquiry identified the primary sample site as Chevron USA Incorporated's W. V. Lister No. 1 Gas Well Production Facility in Wheeler County, Texas. The back-up site was not required.

Site Location

The location of the Chevron USA Lister production facility is approximately eighteen miles northeast of Shamrock, TX via highways 83 and 592 in Wheeler County. Figure 1 is a map indicating the production facility site. The full name and mailing address for Chevron USA is:

Chevron USA, Incorporated
P.O. Box 1462
Pampa, TX 79066-1462
Main Office Ph.: 806-665-1614
Main Office Contact: R.B. Eckerdt, Senior Production Foreman, Pampa Group

Attendees

Sampling at the Chevron USA Lister production site was performed by CENTEC Corporation personnel on June 24, 1986. Following is a list of people present at the time of sampling:

CENTEC Corp. (Sample Team):	Bill Lane, Technician Jamie McIntyre, Team Leader
State Representative:	Frank Groves, Geologist, Railroad Commission of Texas, Oil and Gas Division
Operator Representatives:	R.B. Eckerdt, Senior Production Foreman, Pampa Group
	J.T. Harris, Assistant Production Foreman
American Petroleum Institute Representative:	George Holliday, Contracted Observer

Site Description

The Chevron USA Lister production facility is located in a rural, flatland area. The climate at this site location is net evaporation. The soil is described as sandy loam. The site is located over the Hunton formation of the Anadarko basin.

The depth to the groundwater in the area is 15 feet. The nearest surface water is located 1/2-half mile from the site. The surface water is a creek that receives only rain water runoff so that it runs intermittently. There is one 40-foot drinking water well located 2,400 feet from the site.

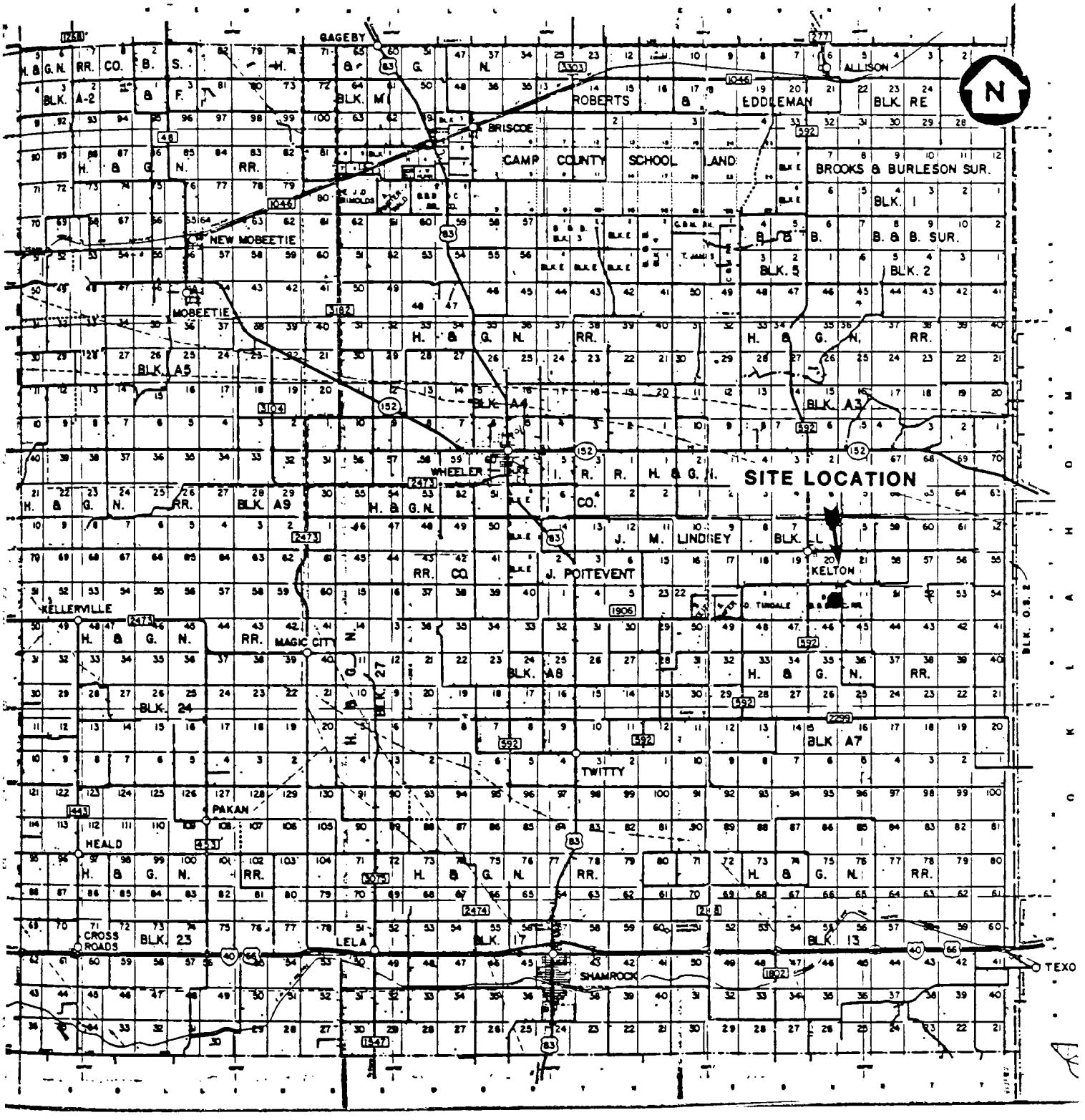


Figure 1. Location of Chevron, Inc.'s W. V. Lister #1 Gas Well Production Facility, Wheeler County, Texas

The site consists of one gas well, a series of gas processing units, two produced brine tanks, and one evaporation pit. Figure 2 is an approximate schematic diagram of the facility, indicating the directions in which photos were taken (Attachment A). The produced brine tanks had never been cleaned as of the time of sampling. These tanks are open to the atmosphere at the top (Photo 7), and are made of fiberglass. The brine tank that was sampled has been in use since 1974.

At the time of sampling, there was one producing gas well on the W. V. Lister lease. This well produced daily quantities of approximately 1 million standard cubic feet of natural gas, and 4 to 6 barrels of brine. The well depth is 20,965 feet.

The lined pit onsite was designed as an evaporation pit for produced brine. Brine is piped to the pit from the brine tanks such that the brine tanks usually remain one-fourth full (roughly 2,000 barrels). At the time of sampling, the depth of liquid in the pit was approximately 1 foot, and the depth of the sludge was 1/4 to 1/2 foot. The pit has a fiberglass liner that is 50-65 millimeters thick. The pit area is completely fenced in, as shown in Photos 1 and 3.

Disposal Practices

Produced brine is disposed of at the Chevron USA Lister production site by evaporation from open storage tanks and a pit designed for this purpose. Solids that collect in the pit are sometimes used to fill pot holes in roads located on the lease.

Permits

A copy of the evaporation pit permit is located in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005).

Sample Point Locations

At the Chevron USA Lister site, the produced fluid sample was collected from one of the brine tanks that feed the evaporation pit. Figure 2 indicates the sample point from which the fluid sample was taken.

Sampling Methods and Equipment

As shown in Photos 7 and 8, the fluid sample was obtained from the open top of the eastern brine tank. The depth of the brine in the tank was measured as 7 feet, 2 inches. Thief volumes were

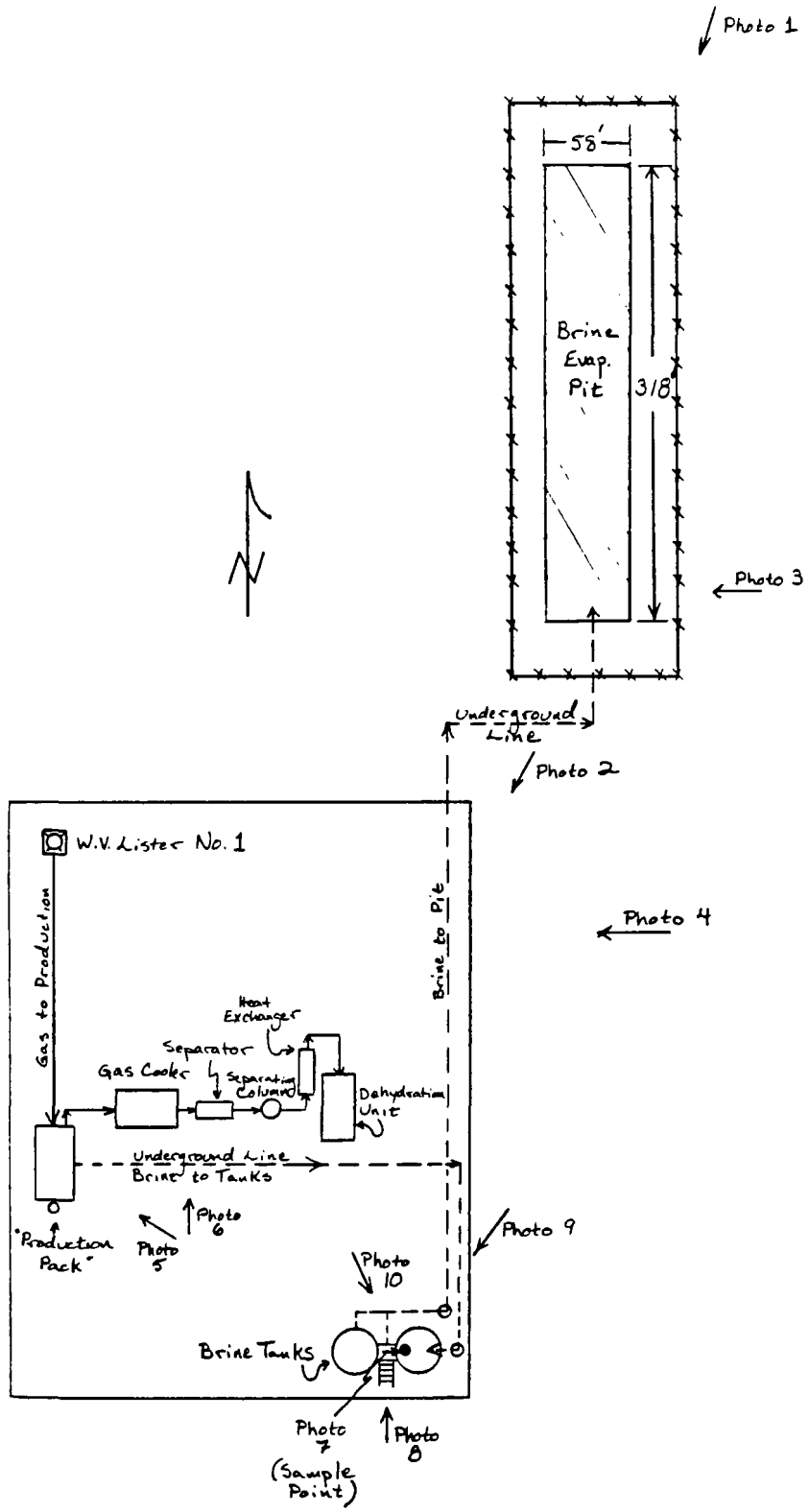


Figure 2. Schematic of Production Facility

taken at depths of 1, 3, 5, and 7 feet below the surface, and composited in a 5-gallon glass carboy (Photo 8).

Brine from the upper three depths was very clear and colorless, but brine from 7 feet below the surface was black and full of flaky particles. The operator suggested that this might be due to dust blowing into the top of the tank and settling to the bottom.

The pH of the produced fluid sample was tested onsite after sampling was completed. The pH was 7 for this sample.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

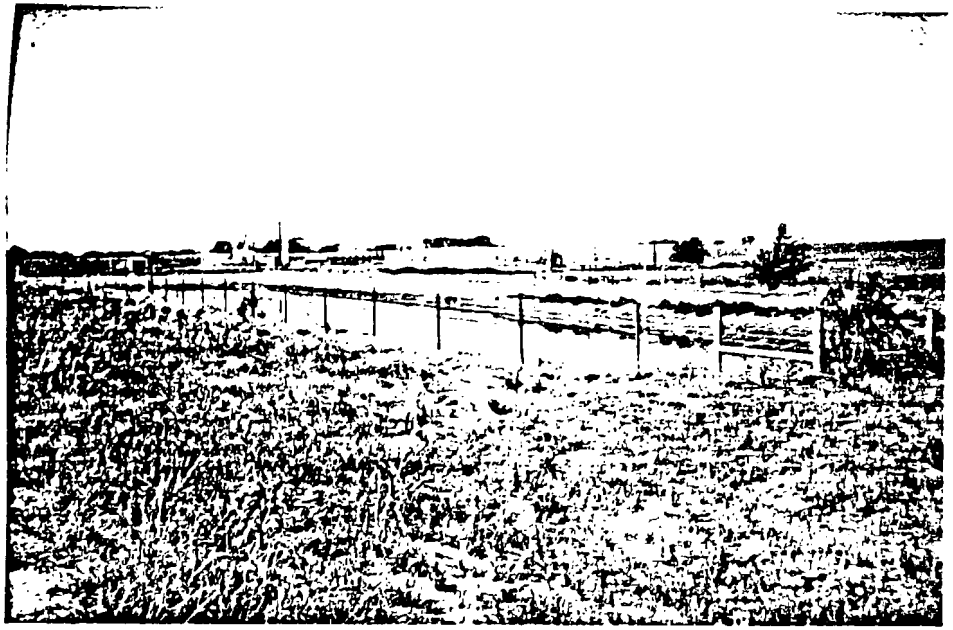


Photo 1. Southwesterly view of production site

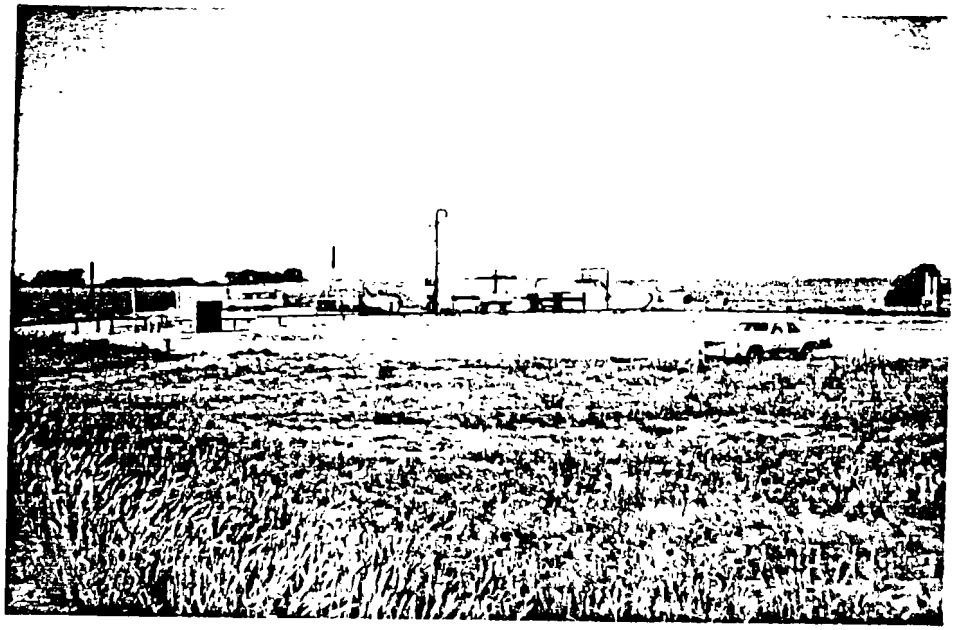


Photo 2. Southwesterly view of production site

Photo 3. South end of evaporation pit

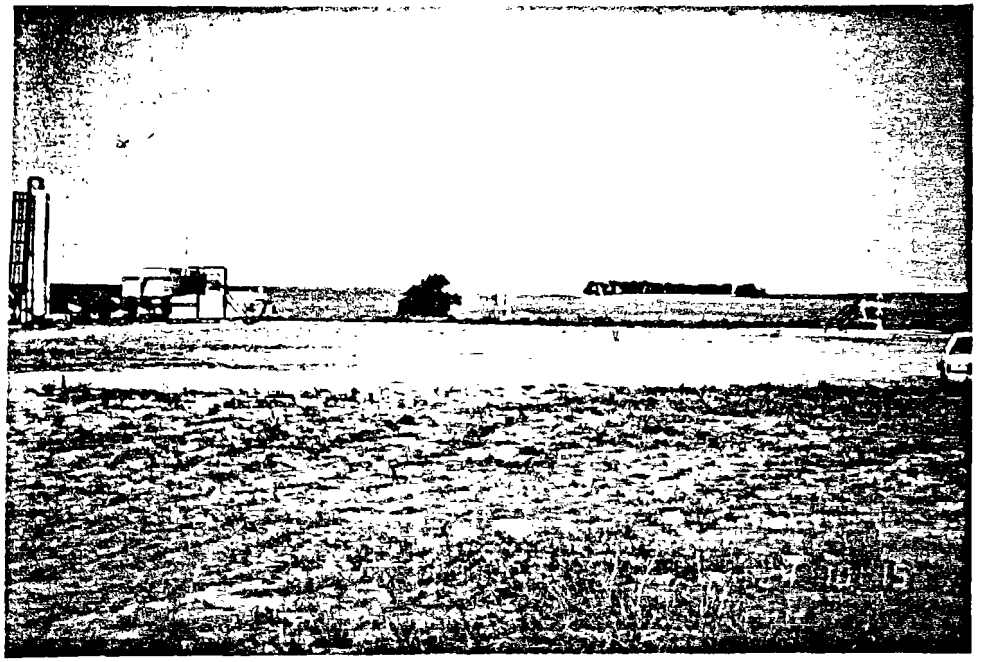


Photo 4. Westerly view of production unit (left) and well head (right)

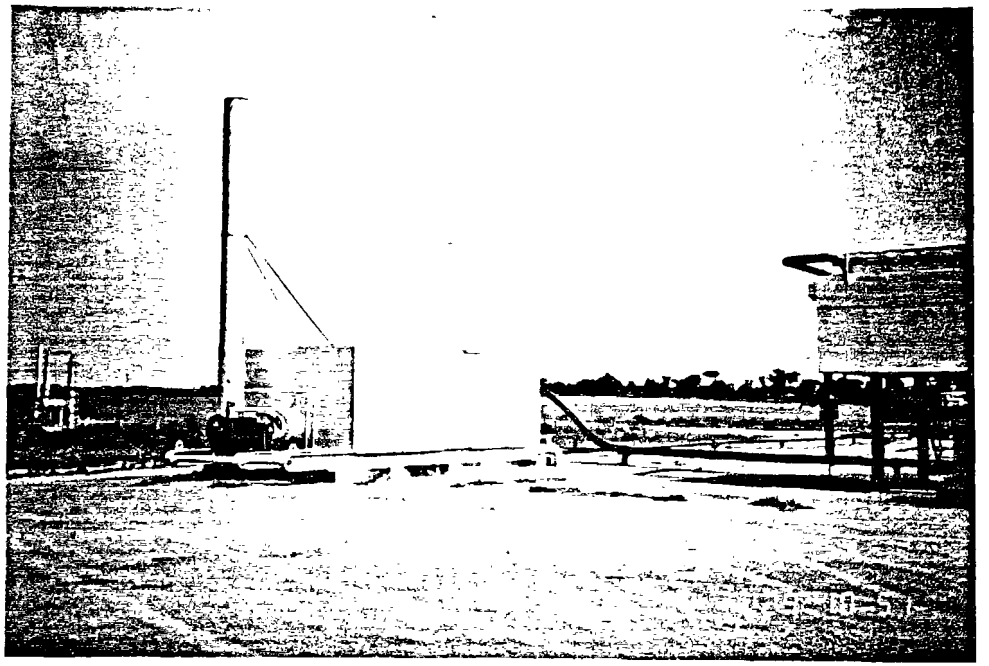
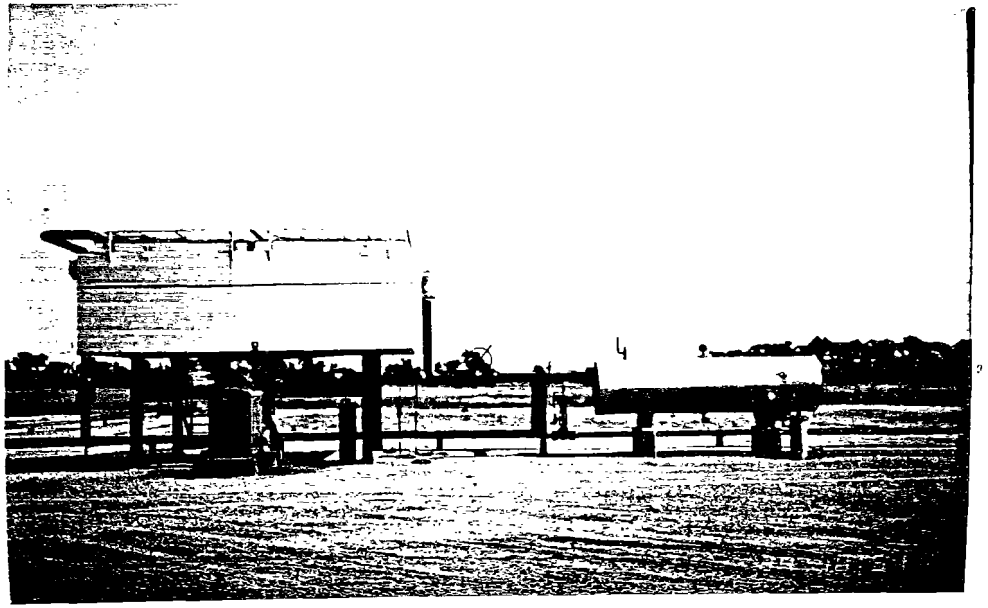


Photo 5. "Production pack"



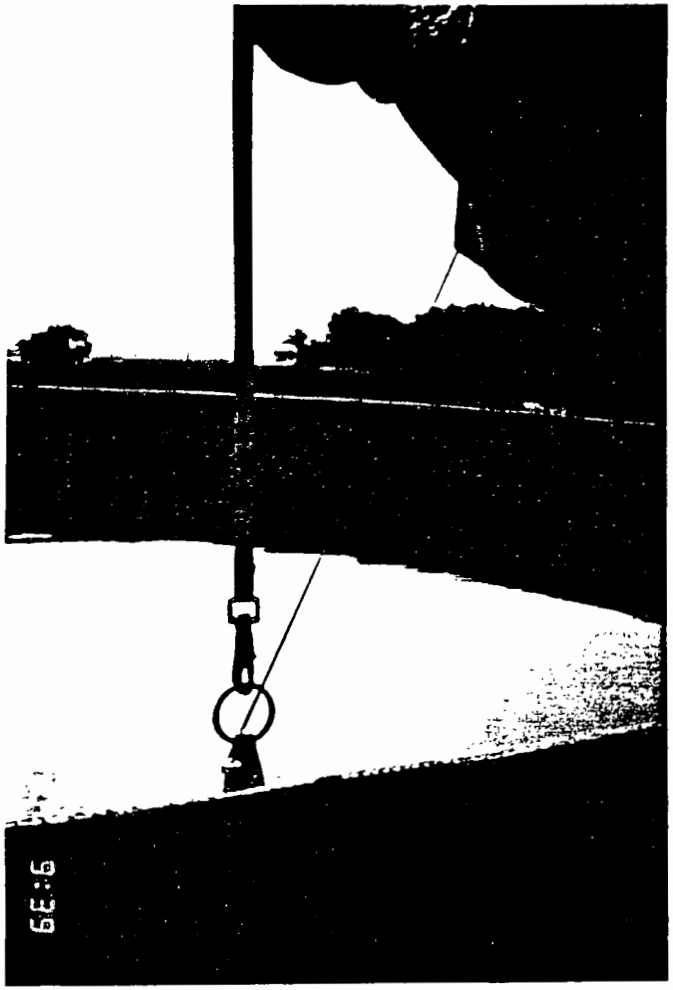


Photo 8. Sampled brine tank (right) and liquid composite (left of sampler)

Photo 7. Thief and gauging tape over top of brine tank (right)

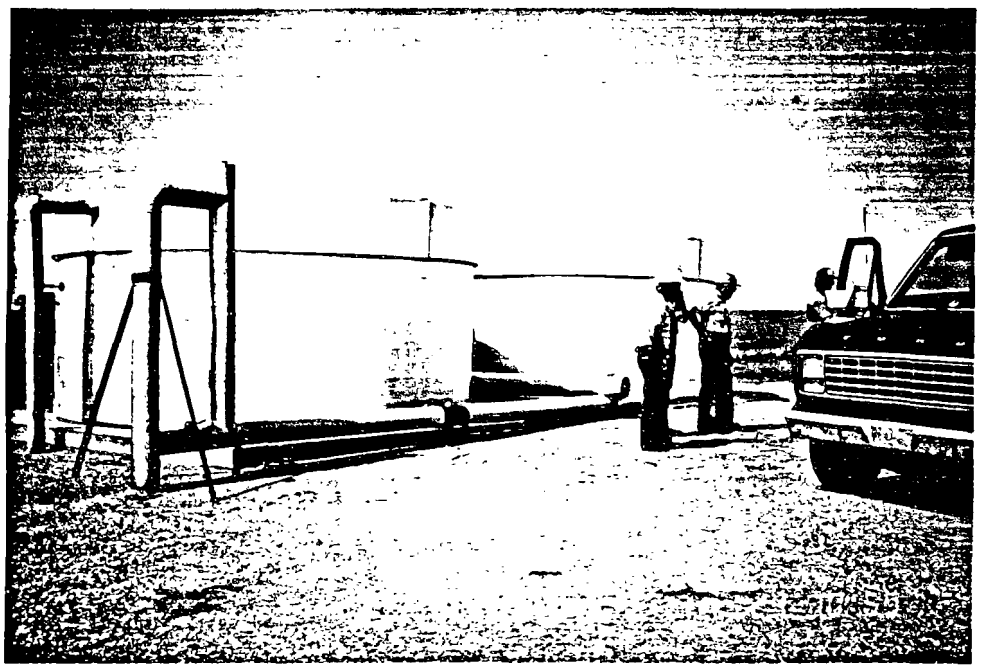


Photo 9. Southwesterly view of brine tanks

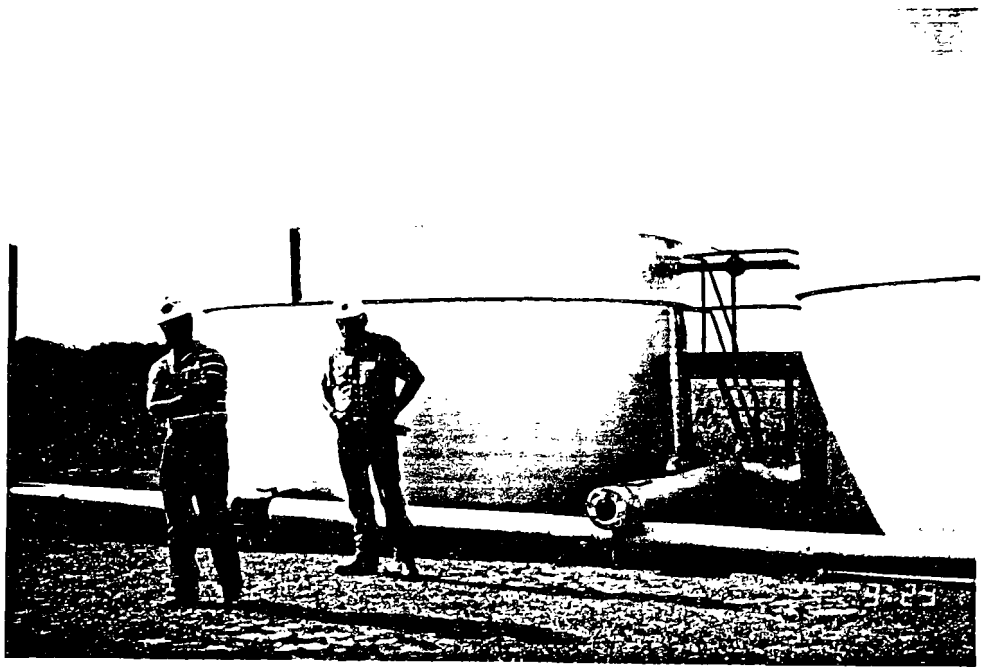


Photo 10. Southeasterly view of brine tanks

ATTACHMENT B: PERMITS

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

MES E. (JIM) NUGENT, Chairman
ICK WALLACE, Commissioner
ARK JOBE, Commissioner

JIM MORROW, P.E.
Director
JERRY W. MULLICAN
Director of Underground
Injection Control

01 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

PERMIT TO MAINTAIN AND USE A PIT

Pit Permit No. P004539

Chevron U.S.A. Inc.
P.O. Box 1660
Midland, Texas 79702

Based on information contained in your application (Form H-11) dated October 24, 1984, you are hereby authorized to maintain and use the pit designated herein:

Type of Pit: Saltwater Disposal Pit
Lister (057750) Lease, Well #1
1000 feet FNL and 1100 feet FEL of Section 2, B.B.B. & C. RR. Survey
Wheeler County, RRC District 10

Authority is granted to maintain and use the pit in accordance with Statewide Rule 8 and subject to the following conditions:

1. Use of the pit is limited to disposal of produced water from the Lister No. 1. No other oil field fluids or oil and gas wastes may be stored or disposed of in the pit.

2. The capacity of the pit may not exceed 12,000 barrels.

3. At least 2 feet of freeboard must be maintained between the fluid level in the pit and the top of the pit dikes.

4. The pit must be lined with a fiberglass liner with a thickness of at least 50 mils.

5. The liner must be installed in accordance with the liner manufacturer's specifications and sound engineering practices.

6. The pit must be equipped with a leak detection system to detect leaks in the liner.

7. If the leak detection system indicates liner failure, the District Office must be notified of that fact within 24 hours of detection of liner failure.

An Equal Opportunity Employer

8. If the leak detection system indicates liner failure, the liner must be inspected for deterioration and leaks within 10 days of detection of liner failure. After inspection, the liner must be replaced or repaired before resuming use of the pit.

9. The permittee must maintain a record of when the liner is inspected and the results of each inspection. This record must be maintained by the permittee for the life of the liner, and, upon request of the Commission, the record shall be filed with the Commission.

10. No oil may be allowed to accumulate on top of the water stored in the pit. Any oil on top of the water must be skimmed off.

11. Unless otherwise required by conditions of this permit, construction, use, and maintenance of the pit shall be in accordance with the information represented on the application (Form H-11) and attachments thereto.

12. A sign shall be posted at the pit which shall show the pit permit number in numerals at least one inch in height.

13. The pit must be dewatered, backfilled, and compacted within 120 days of final cessation of use of the pit. Final closure of the pit must be accomplished in such a manner that rainfall will not collect at the pit location after pit closure. Upon final closure, the District Office shall be notified in writing.

14. This permit is nontransferable without the consent of the Commission. Any request for permit transfer should be filed with the Director of Underground Injection Control.

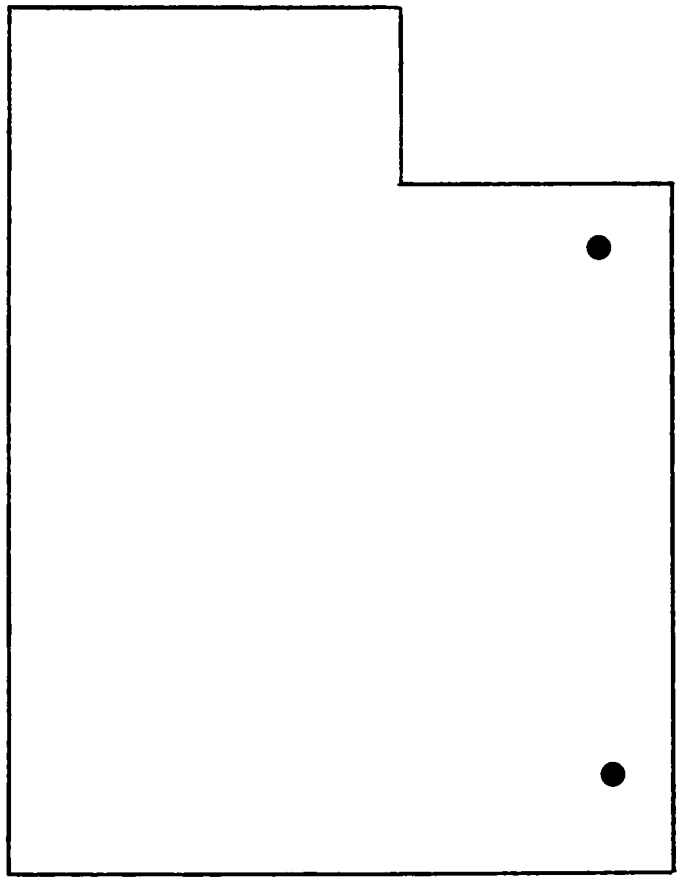
15. This permit does not authorize the discharge of any oil and gas wastes from the pit.

This authorization is granted subject to review and cancellation should investigation show that such authorization is being abused.

APPROVED AND ISSUED ON July 18, 1986.

Jerry W. Mullican, Director
Underground Injection Control

UTAH



Sampling Report
Investigation of Meridian Oil Company's
Navajo-Federal Well No. 23-4
San Juan County, Utah
June 29, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the Technical Report (EPA 530-SW-87-005), with the changes noted below. This site was originally planned to be selected randomly from a list of active Paradox Basin drill sites developed by the Utah Department of Natural Resources - Oil, Gas, and Mining Division at the request of EPA. The list was to be developed just prior to June 29, 1986, the scheduled sampling date. The short time frame was deemed necessary because of the uncertain progress of drilling in this area. It would be impossible to plan the sampling of an appropriate drill site more than a day or two in advance. Randomization and site selection were to take place a few days before sampling.

On June 25, 1986, the Department of Natural Resources notified the EPA contractor that it was unable to locate more than one drill site at or near completion for sampling. The single available appropriate site is considered a random sample because it was the only site known in the desired basin during the necessary time frame. No bias was introduced into the selection of this site. It was selected on the basis of availability. No information was available to indicate this site was an appropriate site for sampling.

The site was identified as Meridian Oil Company's Navajo-Federal No. 23-4 in the Paradox Basin. No problems were encountered arranging for sampling the Meridian drill site on June 29, 1986.

Site Location

Navajo-Federal Well No. 23-4 is located 6 miles east of Hatch Trading Post. Figure 1 is a map indicating the drilling site.

The site is operated by Meridian Oil Company, whose mailing address is:

PO Box 1855
Billings, MT 59103
Contact Name: Bill Brown

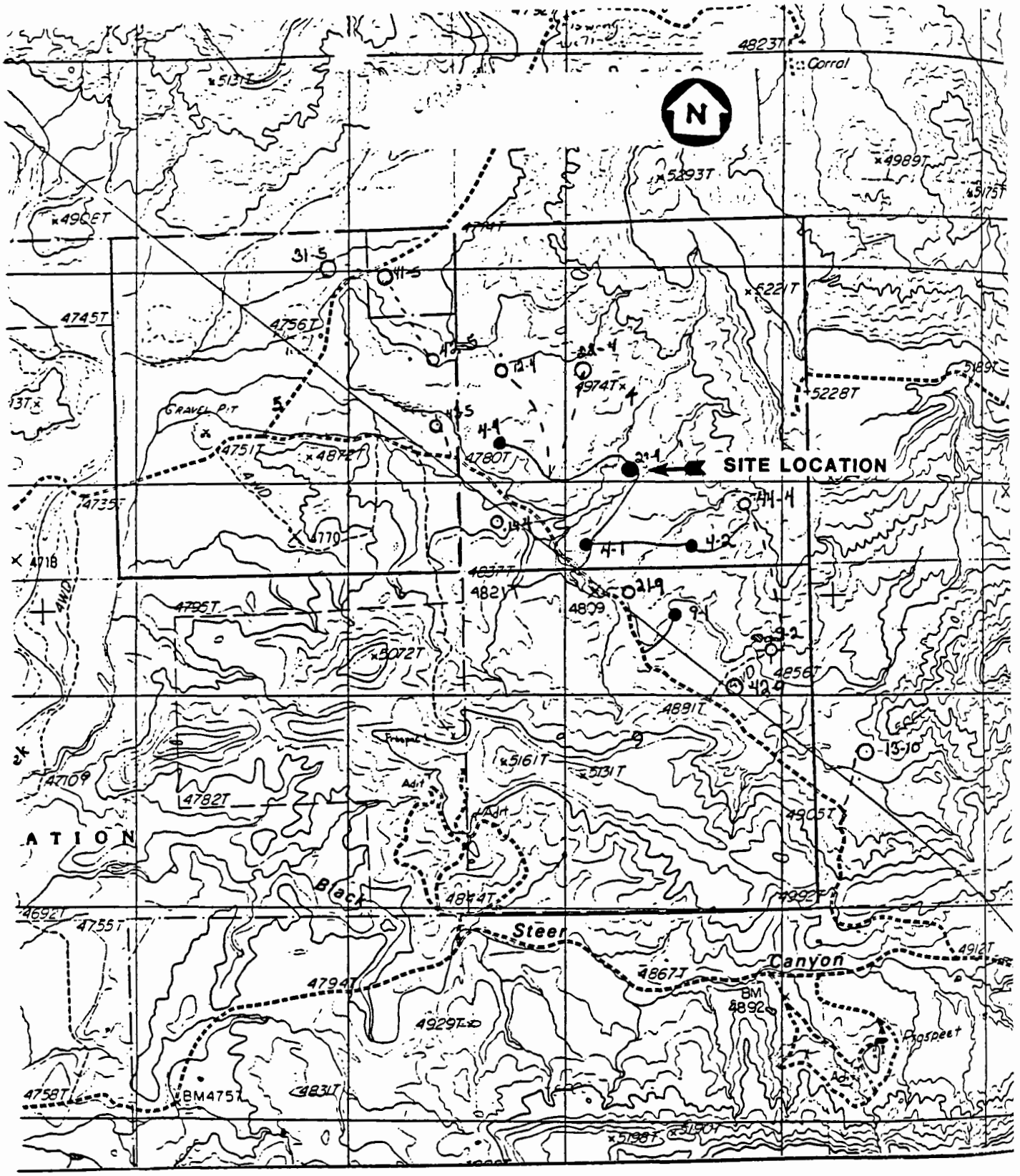


Figure 1. Location of Navajo-Federal Well #23-4, San Juan County, Utah

Attendees

Sampling of Navajo-Federal Well No. 23-4 was performed by CENTEC Corporation personnel on June 29, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Andy Procko, Engineering Manager, Acting Technician
State Representatives:	Dorothy Swindel, Utah Dept. of Natural Resources; Oil, Gas & Mining Division Dan Jarvis, Utah Dept. of Natural Resources; Oil, Gas & Mining Division
Operator Representative:	Monty Phillippi, Meridian Oil
American Petroleum Institute Representatives:	Maurice Jones, Contracted Observer Bob Zahray, Contracted Sample Team Member Shawn Hokanson, Contracted Sample Team Member

Site Description

Navajo-Federal Well No. 23-4 is located within the Paradox Basin in an area characterized as rural plateau. The depth to groundwater is over 100 feet, and the nearest surface water is over 2 miles distant. There are no drinking water wells within a 1-mile radius of the site. The soil in this area is sand. The climate at this site is net evaporation.

This site was a developmental oil drilling site. Drilling was being completed on the day of sampling. The well was at a depth of 5,600 feet. Drilling was accomplished with fresh water muds. The well was drilled on Federal land.

Figure 2 is a schematic diagram of the drilling site. One pit was constructed for the site. The exterior pit dimensions were 160 feet long by 100 feet wide. Interior pit dimensions were 150 feet long by 50 feet wide. The pit was constructed to be used as a reserve pit. There were no special pit construction requirements. Leak detection was not required. The pit was unlined and had no special preparation prior to use. The pit received drilling muds and trash. The pit area was fenced. The pit construction was below grade. Photos 1 and 2 (Attachment A) show the pit from the north side. Photos 3 and 4 show the pit from the south side. The pit was dry on the day of sampling. The

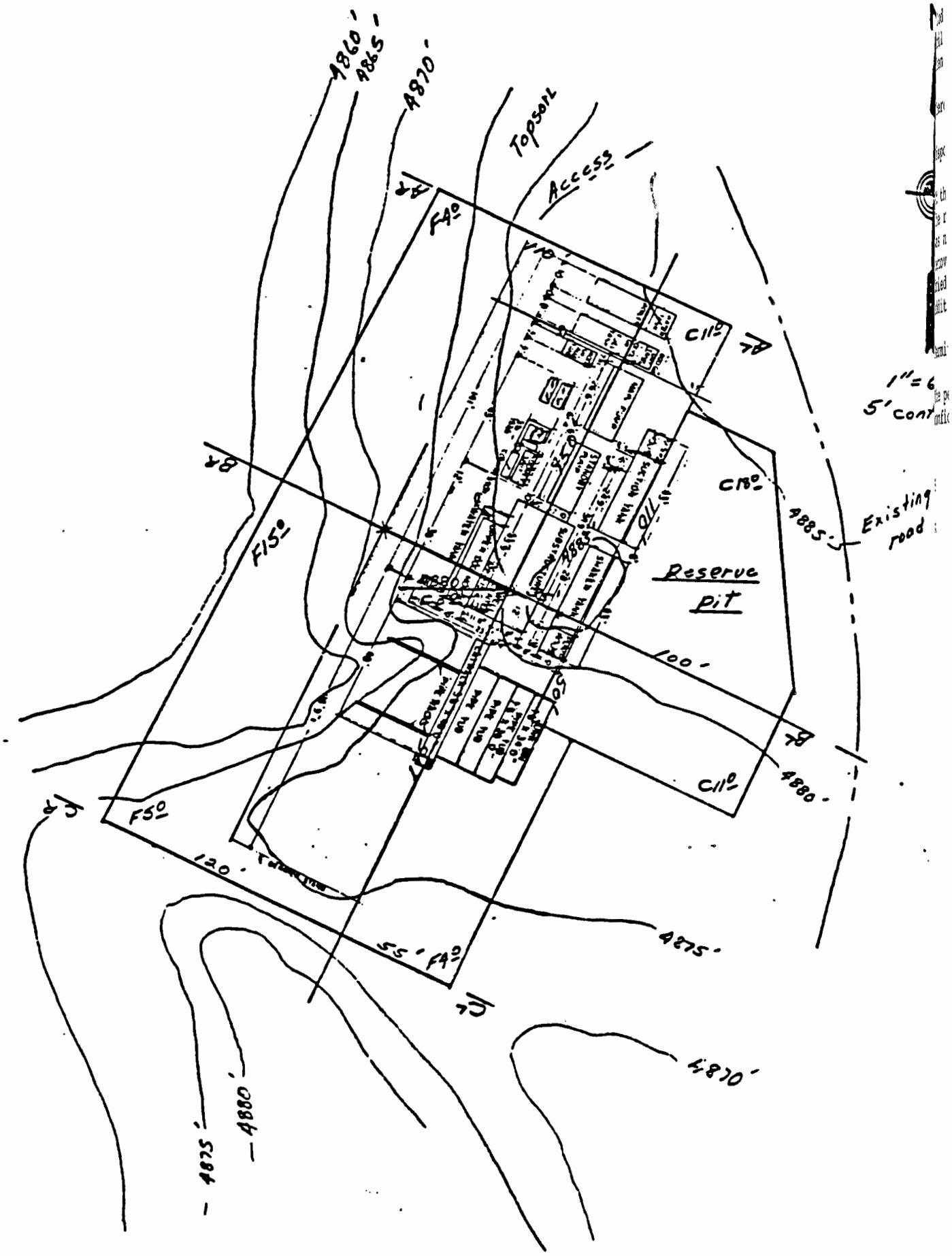


Figure 2. Schematic Diagram, Navajo-Federal Well No. 23-4
C-1020

sludge depth in the pit was 2 feet. The total volume of drilling fluids in the reserve pit was estimated to be less than 2,500 bbl.

There was no storage of diesel oil at this site.

Disposal Practices

At the conclusion, all remaining drilling fluids were placed in the reserve pit. There was no testing of pit contents. There was no treatment of pit contents. The pit fluids were not removed for final disposition. The liquid was evaporated. The dried pit solids were buried. The pit site was reclaimed by the addition of topsoil and reseeding.

Permits

The permit for this facility was submitted by the operator under confidential status to the Utah Natural Resources Department.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The sample collected at Navajo-Federal Well No. 23-4 consisted of one reserve pit sludge sample. Figure 3 shows the sampled pit and the location of the sample points. Four quadrants were established for sludge sampling. There was no discrepancy between measured and actual sample points.

Sampling Methods and Equipment

To collect samples from the reserve pit, the pit was measured to identify the four quadrants and to locate the center of each quadrant. The sludge was sampled with a Teflon-lined coring tube by wading into the pit at the designated locations.

Due to travel constraints, the samples were held overnight in refrigeration prior to shipment to the laboratories. The samples were shipped by courier to the overnight mail service, resulting in a 2-day interval between shipment and laboratory receipt.

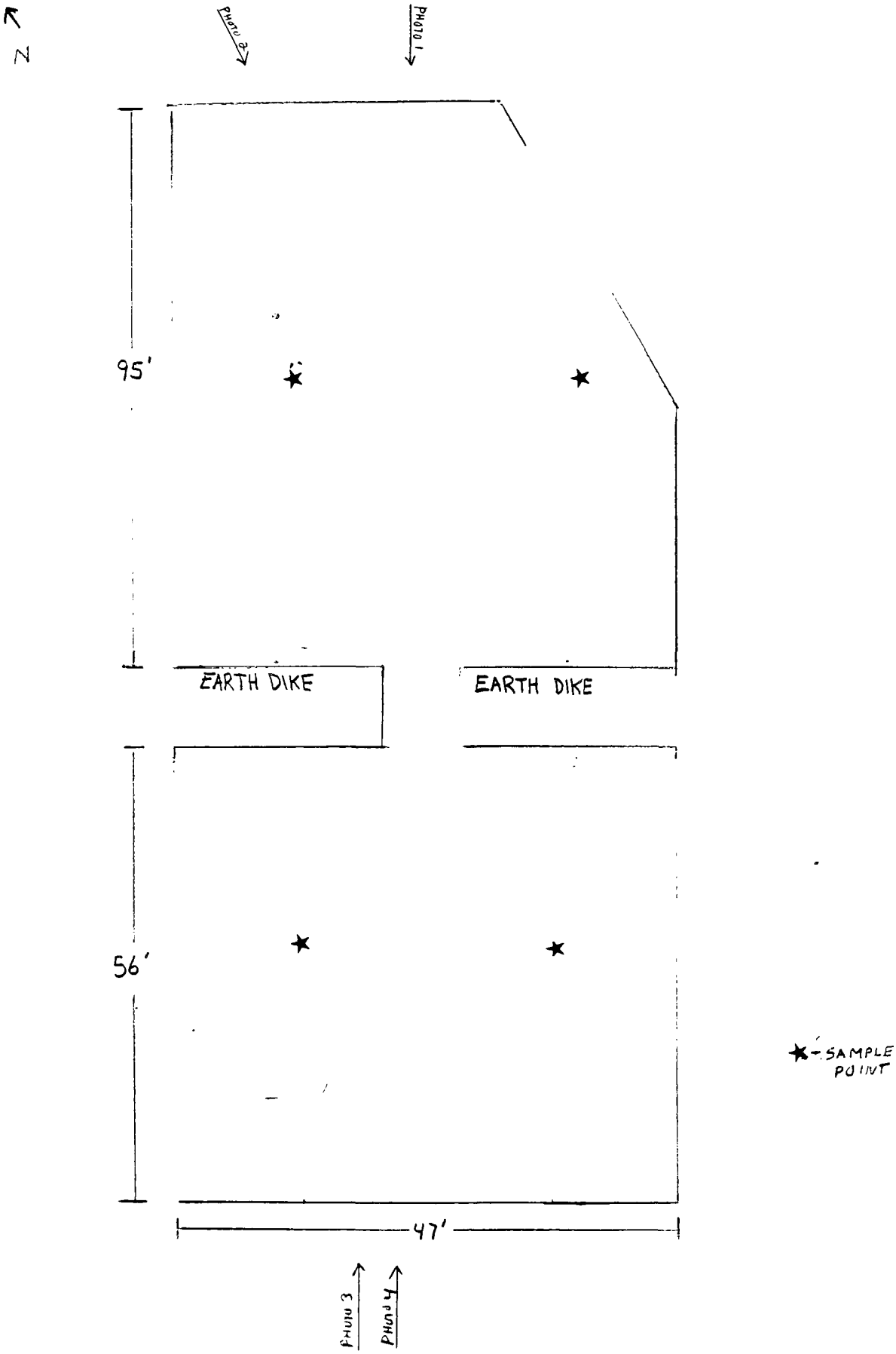


Figure 3. Reserve Pit for Navajo-Federal Well #23-4

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

Photo 1. Reserve pit, north side

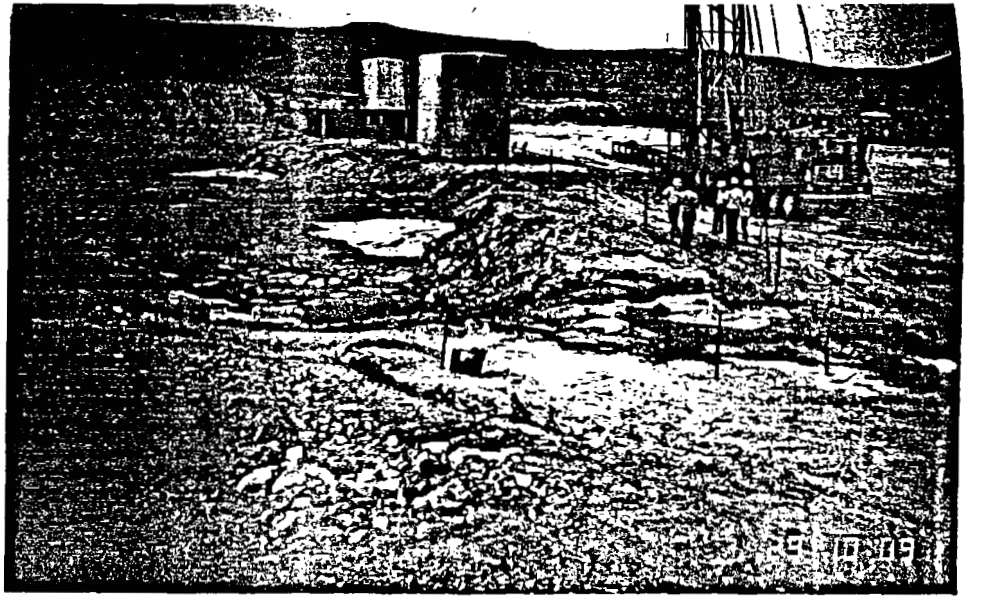


Photo 2. Reserve pit, north side

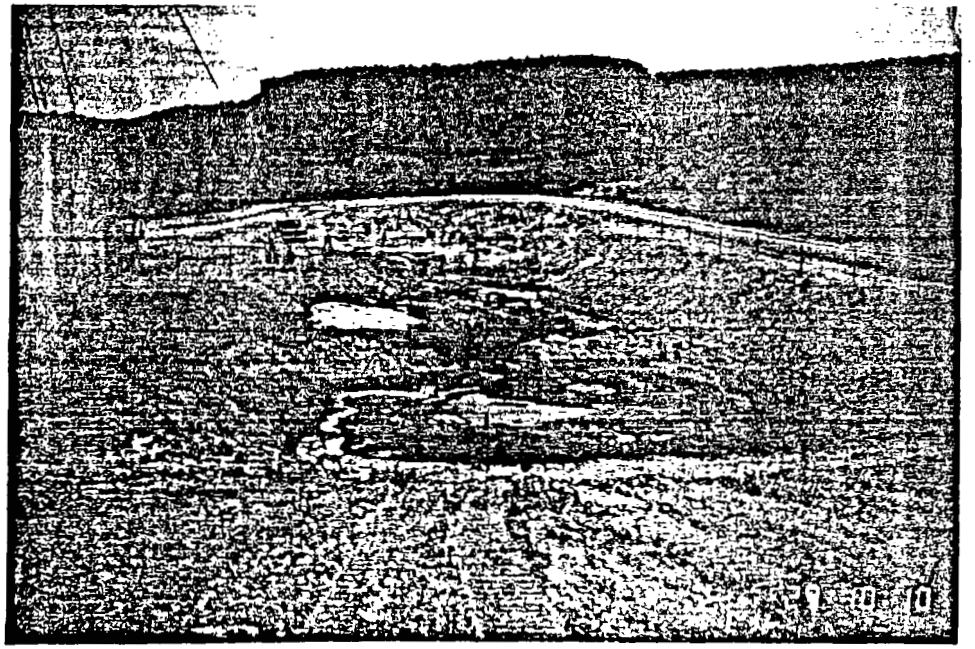


Photo 3. Reserve pit, south side

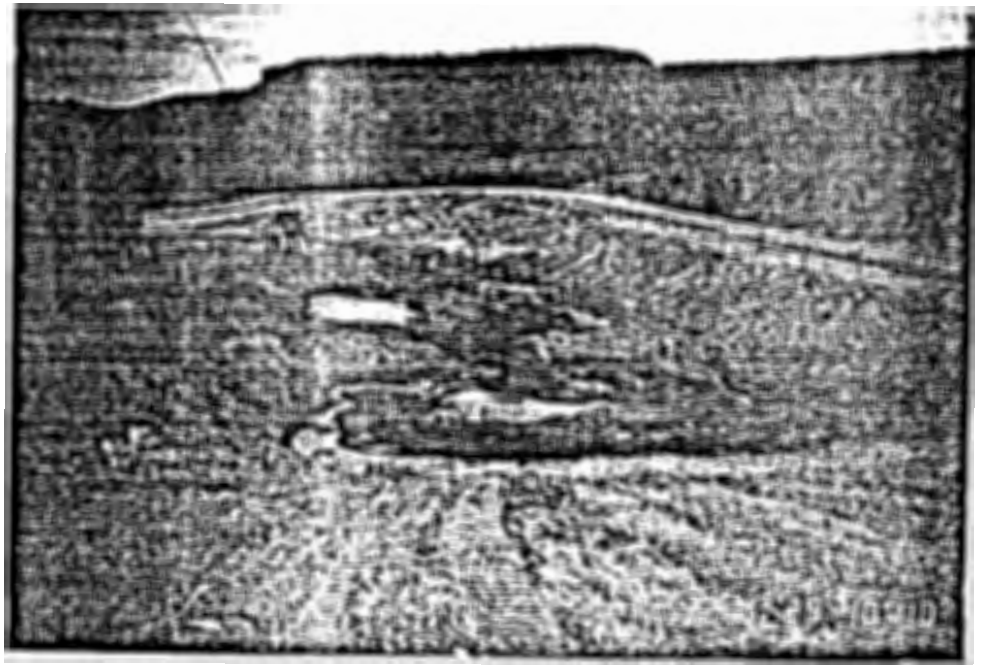


Photo 4. Reserve pit, south side

ATTACHMENT B: PERMITS

The facility drilling permit is being
held under Confidential Status by the Utah
Natural Resources Department until April, 1987.

Sampling Report
Investigation of Marathon Oil Company's
Tin Cup Mesa Well No. 1-25
San Juan County, Utah
June 30, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected from active Paradox Basin production sites accessible to the sampling team from a drill site being sampled by the EPA contractor nearby (see the trip report for Meridian Oil Company's Navajo-Federal 23-4 well). The Utah Department of Natural Resources - Oil, Gas, and Mining Division identified this site at the request of EPA. Site identification was transmitted via telephone to the EPA contractor on June 25, 1986.

No back-up site was selected. No problems were encountered arranging for sampling to be conducted June 30, 1986. No back-up site was required.

Site Location

Tin Cup Mesa Well No. 1-25 is located 6.5 miles northeast of Hatch Trading Post, Utah. Figure 1 is a map locating the production site.

The site is operated by Marathon Oil Company, whose mailing address is:

602 North Washington
Cortez, CO 81321
Contact Name: Jim Vangilder

Attendees

Sampling of Tin Cup Mesa Well No. 1-25 was performed by CENTEC Corporation personnel on June 30, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Andy Procko, Engineering Manager, Acting Technician
State Representatives:	Dorothy Swindel, Utah Dept. of Natural Resources; Oil, Gas, and Mining Division Dan Jarvis, Utah Dept. of Natural Resources; Oil, Gas, and Mining Division

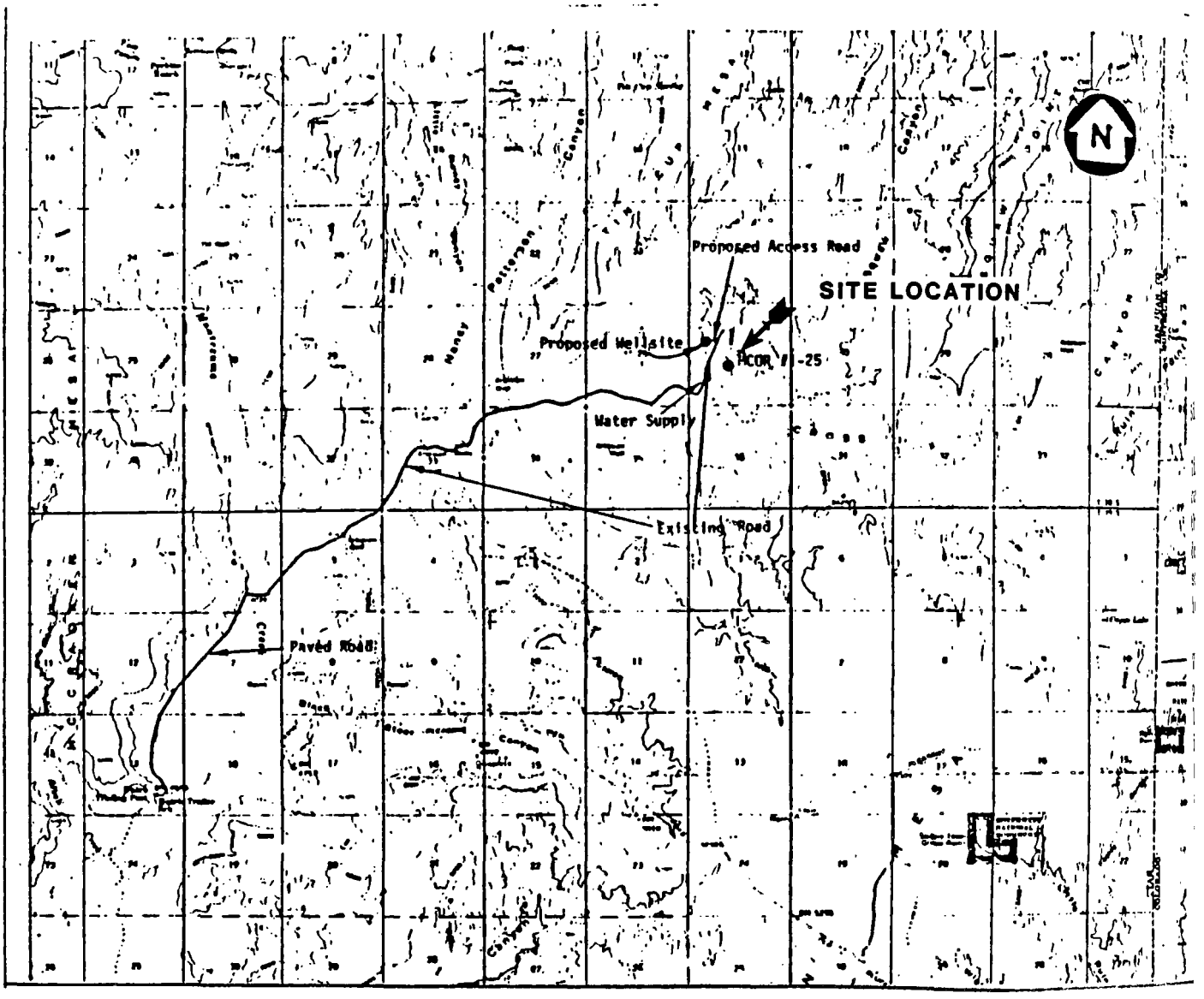


Figure 1. Location of Tin Cup Mesa Well #1-25, San Juan County, Utah

Operator Representatives:	Jim Vangilder, Production Foreman Bill Doyle, Marathon Oil
American Petroleum Institute Representatives:	Maurice Jones, Contracted Observer Bob Zahray, Contracted Sample Team Member Shawn Hokanson, Contracted Sample Team Member

Site Description

Tin Cup Mesa well No. 1-25 is located within the Paradox Basin in rural foothills; the depth to groundwater is over 100 feet, and the nearest surface water is over 2 miles away. There are no drinking water wells within a 1-mile radius of this site. The soil in this area is mostly rock. The climate at this site location is net evaporation.

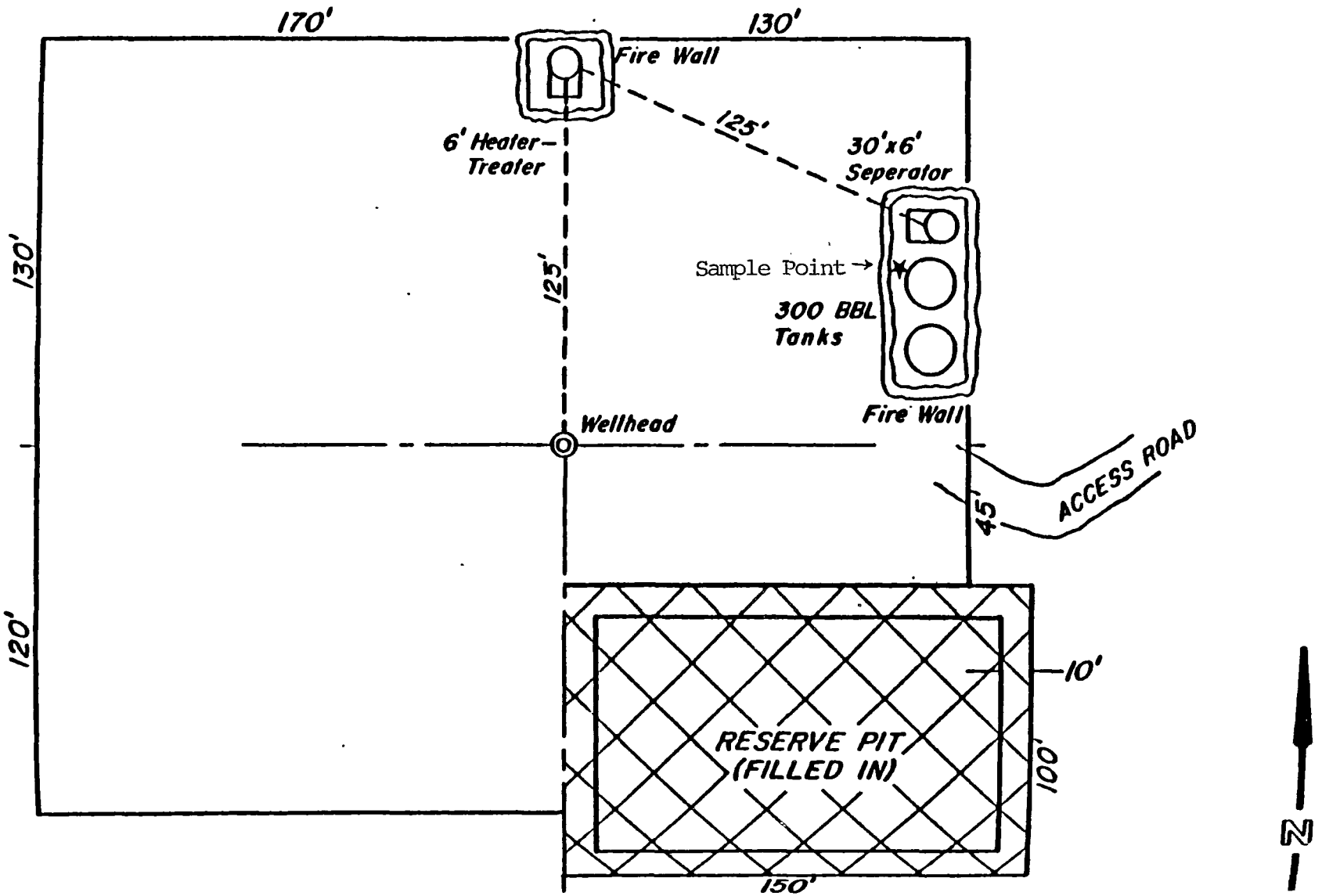
This site consists of actively producing oil wells with a production of 900 bbl/day. Daily production of produced water is 180 bbl/day. Production at this site is sweet. The well depth is 5400 feet. The well produces using water flooding. The lease for this well contains a total of four producing oil wells, one dry hole, and one shut-in well. Figure 2 is a schematic diagram of the production facility. The site around Well No. 1-25 consists of eight oil stock tanks, a heater treater, and two brine tanks. The tanks at this site are cleaned only when designated by site personnel. The emergency pit at the base of the brine tanks had never been used.

Disposal Practices

The produced water is disposed by reinjection for enhanced recovery. Well No. 1-25 had been drilled in 1981 as a producing oil well. In 1985, it was converted into a produced water injection well. Prior to injection of the water, biocide at the concentration of 1 gallon to every 6 barrels of water, is added. The cost of the biocide is $97/day.

Permits

Well No. 1-25 operates under Permit No. 43-037-30690. Attachment B contains a copy of the permit to convert the well into an injection well along with an injection report and the original drilling permit. Attachment C contains the drilling program, and surface plan for the well issued in 1981.


170'
130'
Fire Wall
125'
6' Heater-
Treater
30'x6'
Seperator
130'
125'
Sample Point →
300 BBL
Tanks
Fire Wall
Wellhead
ACCESS ROAD
45'
120'
10'
RESERVE PIT
(FILLED IN)
100'
150'
N

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The sample collected at Tin Cup Mesa Well No. 1-25 consisted of one liquid sample. The sample was collected at a sample port from one of the pumps that reinject the water from the brine tanks. Photos 1 and 2 (in Attachment A) show the sampling location.

Sampling Methods and Equipment

The sample bottles were filled directly from the sampling port of the reinjection pump. A test for pH of the produced water were conducted onsite after completion of the sampling. A pH value of 7 was obtained for the water.

Samples were shipped by courier to the overnight delivery services, resulting in a 2-day interval between sample shipment and arrival at the laboratories.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

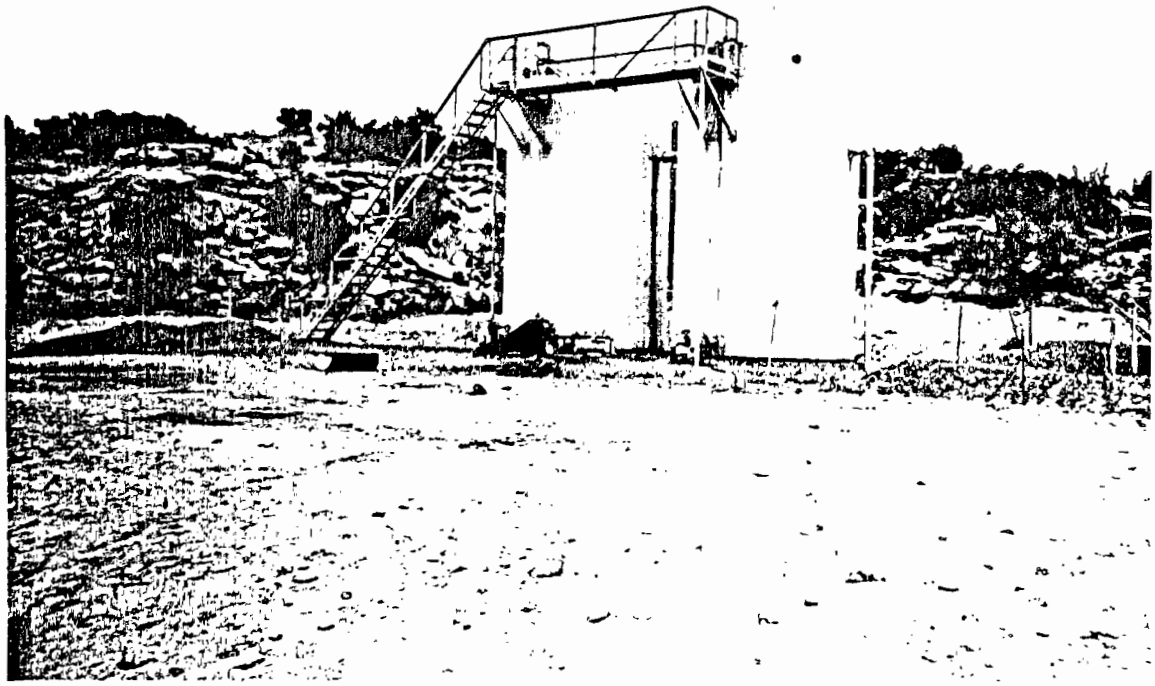


Photo 1. Sample collection location

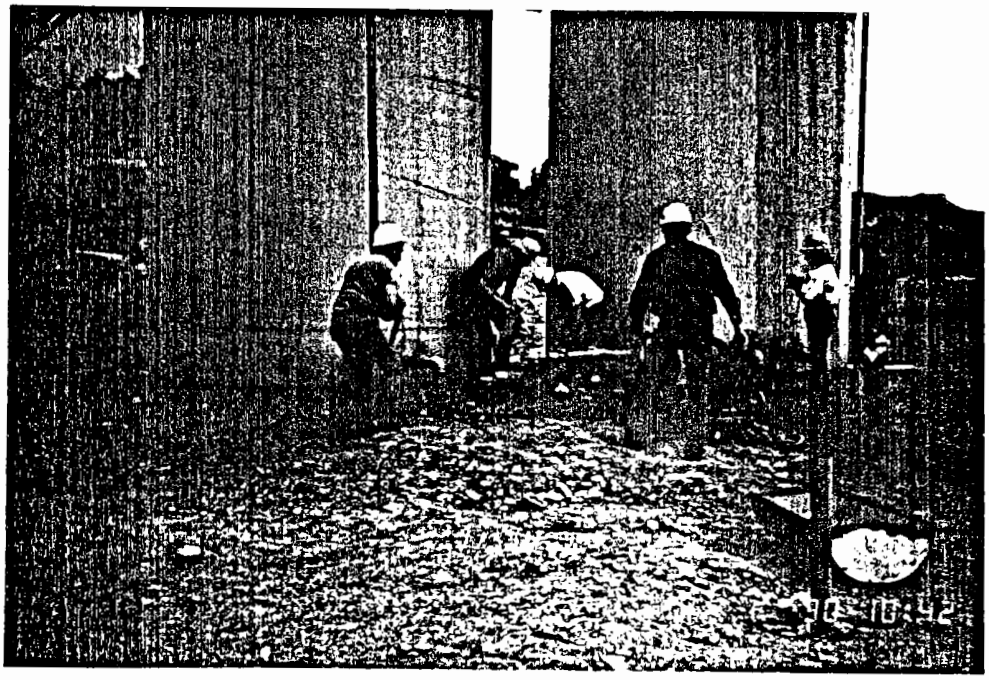


Photo 2. Sample collection

ATTACHMENT B: PERMITS

RECEIVED
Form OGC-3

JUN 17 1985

DIVISION OF OIL, GAS & MINING

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING

SUBMIT IN DUPLICATE*
(See other instructions on reverse side)

5

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☐ Other Injection

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other Convert to Injection

2. NAME OF OPERATOR: Marathon Oil Company

3. ADDRESS OF OPERATOR: P.O. Box 2659, Casper, Wyoming 82602

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface: SW NW 1950' FNL & 790' FWL
At top prod. interval reported below
At total depth

5. LEASE DESIGNATION AND SERIAL NO.: U-31928
6. IF INDIAN, ALLOTTEE OR TRIBE NAME:
7. UNIT AGREEMENT NAME: Tin Cup Mesa
8. FARM OR LEASE NAME: Tin Cup Mesa
9. WELL NO.: 1-25
10. FIELD AND POOL, OR WILDCAT: Tin Cup Mesa
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 25, T38S, R25E

14. PERMIT NO.	DATE ISSUED	12. COUNTY OR PARISH	13. STATE
43-037-30690	6-29-81	San Juan	Utah

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
7-18-81	8-15-81	Convert to Inj. 5-13-85	4985' GL, 4999' KB	----

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
5714'	5540'	----	0 →	5714'	----

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*
Previous Producing Interval - Ismay 5416'-5426'
Injection Interval thie Completion-5454'-5473' & 5434'-5438' Ismay

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN: No logs run for this injection conversion

27. WAS WELL CORED: 5 Cores

28. CASING RECORD (*Report all strings set in well*)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
9-5/8"	36#	1557'	12-1/4"	640 sx	None
7"	23# & 26#	5712'	8-3/4"	995 sx	None

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2-7/8"	5346'	5346'

31. PERFORATION RECORD (*Interval, size and number*)
Previous: 5416'-5426' 4 JSPF
This completion: 5454'-5473; 5434'-5438' 4 JSPF

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5416'-5426'	First-Acidized with 1500 gals. 15% HCL
5434'-5473'	Second-Acidized with 1200 gals. 15% HCL

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)
Injection 3-11-85	Injection	Injecting

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
5-9-85	24	----	→	----	----	667	----

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
Inj. 3300 PSIG	2650 PSIG	→	----	----	667	----

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*)

TEST WITNESSED BY: Jim VanGilder

35. LIST OF ATTACHMENTS

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED [signature] TITLE District Production Manager DATE June 10, 1985

C-1043

*(See Instructions and Spaces for Additional Data on Reverse Side)

FORM DOGM-UIC-2
(Rule I-5 (b) 2
(Revised 1982)

PLEASE TYPE OR USE BLACK INK ONLY

(To be filed within 30 days after drilling is completed)

U-31928
COUNTY LEASE NO.

DEPARTMENT OF NATURAL RESOURCES AND ENERGY

API NO. 43-037-30690

DIVISION OF OIL, GAS, AND MINING
Room 4241 State Office Building
Salt Lake City, Utah 84114

640 Acres
N
W
E
S
Locate Well Correctly and Outline Lease

COUNTY San Juan SEC. 25 TWP. 38S RGE. 25E
COMPANY OPERATING Marathon Oil Company
OFFICE ADDRESS P.O. Box 2659
TOWN Casper STATE ZIP WY 82602
FARM NAME Tin Cup Mesa WELL NO. 1-25
DRILLING STARTED 7-18 19 81 DRILLING FINISHED 8-15 19 81
DATE OF FIRST PRODUCTION 8-28-81 COMPLETED 1-26-83
WELL LOCATED NE ¼ SW ¼ NW ¼
690 FT. FROM SL OF ¼ SEC. & 790 FT. FROM WL OF ¼ SEC.
ELEVATION DERRICK FLOOR 4999' GROUND 4985'

RECEIVED
JUN 17 1985
DIVISION OF OIL GAS & MINING

TYPE COMPLETION
Single Zone Ismay
Multiple Zone
Comingled

LOCATION EXCEPTION

C-1044

OIL OR GAS ZONES

Name	From	To	Name	From	To
Ismay	5416'	5482'			

CASING & CEMENT

Casing Set				Csg. Test	Cement		
Size	Wgt.	Grade	Feet	Psi	Sax	Fillup	Top
9-5/8"	36	K-55	1557'	1500	640		Surface
7"	23&26	K-55	5712'	3000	995		1520' CBL

TOTAL DEPTH 5714' KB

PACKERS SET DEPTH After Injection Conversion Packer set at 5346' KB

COMPLETION & TEST DATA BY PRODUCING FORMATION

	1	2	3
FORMATION	Ismay		
SPACING & SPACING ORDER NO.	Unit Well		
CLASSIFICATION (DISPOSAL WELL, ENHANCED RECOVERY, LP GAS STORAGE)	Enhanced Recovery		
PERFORATED	5416'-5426'		
INTERVALS			
ACIDIZED?	Please See		
	Attachment		
FRACTURE TREATED?			

INITIAL TEST DATA

Date	1-26-83		
Oil, bbl./day	30		
Oil Gravity	45°		
Gas, Cu. Ft./day	53,000 CF	CF	CF
Gas-Oil Ratio Cu. Ft./Bbl.	1767		
Water-Bbl./day	37		
Pumping or Flowing	Pumping		
CHOKE SIZE	None		
FLOW TUBING PRESSURE	50 PSIG		

Pumping

A record of the formations drilled through, and pertinent remarks are presented on the reverse. (use reverse side)

Please Refer to Attachment

I, the undersigned, being first duly sworn upon oath, state that this well record is true, correct and complete according to the records of this office and to the best of my knowledge and belief.

Telephone (307) 577-1555 Doyle L. Jones District Production Mgr.
Name and title of representative of company

Subscribed and sworn before me this 12 day of June, 19 85

ATTACHMENT

FORMATION TOPS

Shinarump	2,276'
Moenkopi	2,339'
Cutler	2,384'
Honaker Trail	4,229'
Paradox	5,164'
U. Ismay	5,322'
Hovenweep	5,485'
L. Ismay	5,515'
Gothic Shale	5,565'
Desert Creek	5,573'
Chimney Rock	5,673'
Akah	5,695'

PRODUCTION TREATMENT

The Ismay Perforations 5416'-5426' were acidized with 1500 gallons of 15% HCL acid.

TREATMENT DURING INJECTION CONVERSION

The Ismay Formation was perforated at 5454'-5473' and 5434'-5438' with 4 JSPF.

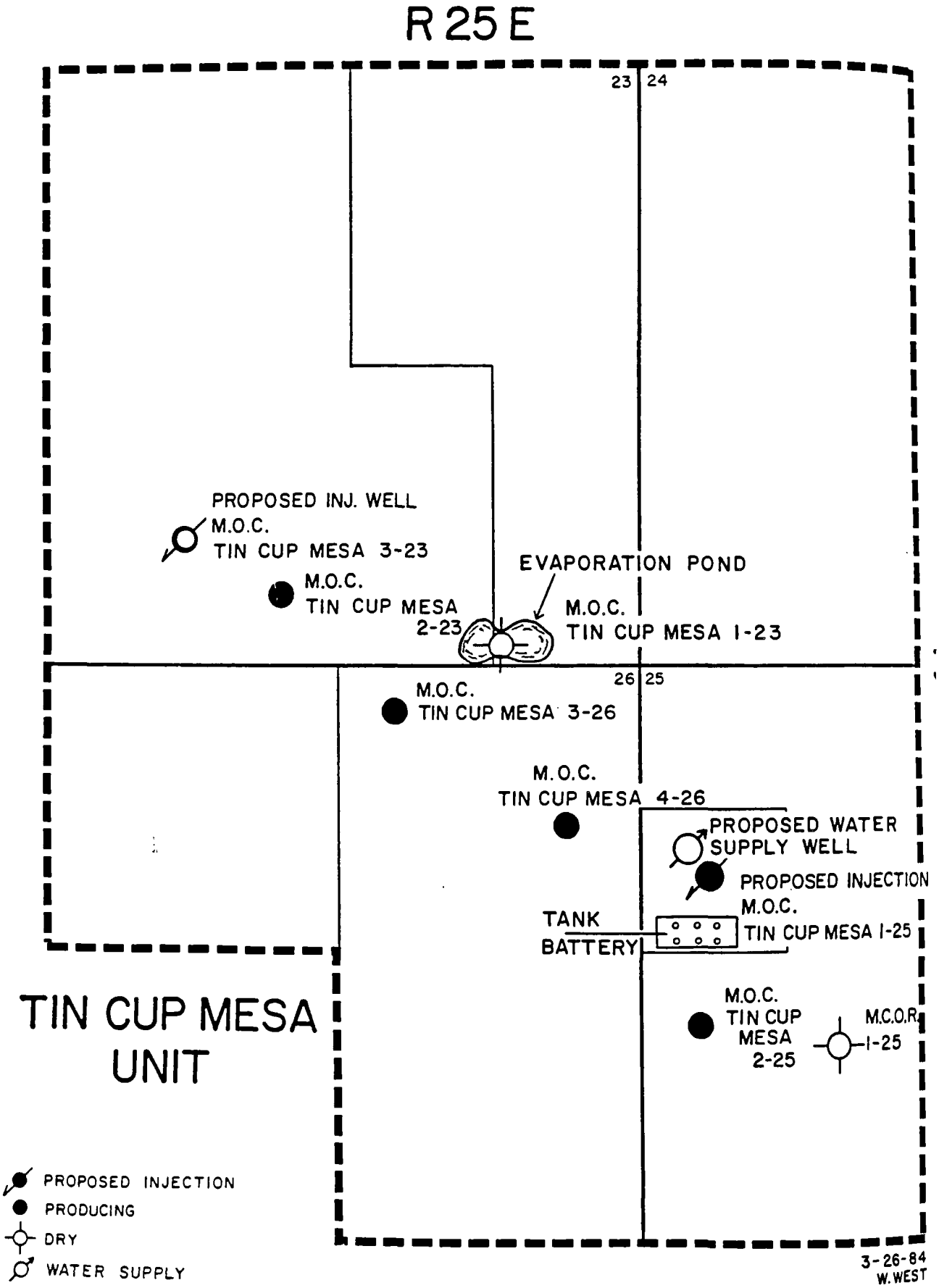
All perforations 5416'-5473' were then acidized with a total of 2700 gallons of 15% HCL acid.

2-7/8" tubing was landed in the packer set at 5346' KB.

RECEIVED

JUN 17 1985

DIVISION OF OIL
GAS & MINING


R 25 E
23
24
PROPOSED INJ. WELL
M.O.C.
TIN CUP MESA 3-23
M.O.C.
TIN CUP MESA
2-23
EVAPORATION POND
M.O.C.
TIN CUP MESA 1-23
26
25
M.O.C.
TIN CUP MESA 3-26
M.O.C.
TIN CUP MESA 4-26
PROPOSED WATER
SUPPLY WELL
PROPOSED INJECTION
M.O.C.
TIN CUP MESA 1-25
TANK
BATTERY
M.O.C.
TIN CUP
MESA
2-25
M.C.O.R.
1-25
TIN CUP MESA
UNIT
PROPOSED INJECTION
PRODUCING
DRY
WATER SUPPLY
3-26-84
W. WEST

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: U-31928

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: Tin Cup Mesa

9. WELL NO.: 1-25

10. FIELD AND POOL, OR WILDCAT: Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 25, T38S, R25E

1a. TYPE OF WORK: DRILL ☐ DEEPEN ☐ PLUG BACK ☐

b. TYPE OF WELL: OIL WELL [X] GAS WELL ☐ OTHER SINGLE ZONE ☐ MULTIPLE ZONE ☐

2. NAME OF OPERATOR: Marathon Oil Company

3. ADDRESS OF OPERATOR: P.O. Box 2659, Casper, Wyoming 82602

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 1950' FNL & 790' FWL SWNW
At proposed prod. zone:

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 6½ miles northeast of Hatah Trading Post, Utah

12. COUNTY OR PARISH: San Juan

13. STATE: Utah

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 790'

16. NO. OF ACRES IN LEASE: 760'

17. NO. OF ACRES ASSIGNED TO THIS WELL: 80

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: None

19. PROPOSED DEPTH: 5840' akah

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 4985' GL

22. APPROX. DATE WORK WILL START*: 1st Half of 1981

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
Please see Item #4 of 10 Point Program for complete Casing & Cementing Program				

Please see the following attachments:

1. Surveyor's Plat
2. Ten-Point Drilling Program
3. BOP Schematic
4. Thirteen-Point Surface Plan
5. Maps & Diagrams

RECEIVED
MAY 20 1981
DIVISION OF
OIL, GAS & MINING

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24. SIGNED: [signature] TITLE: District Operations Manager DATE: 2-3-81

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY: [signature] TITLE: Acting District Supervisor

CONDITIONS OF APPROVAL, IF ANY:

APPROVED BY THE STATE OF UTAH DIVISION OF OIL, GAS, AND MINING
DATE: 6-26-81
BY: [signature]

OPERATOR'S COPY

C-1047

*See Instructions On Reverse Side

ULATIONS
CHED

APPROVED FOR A PERIOD
NOT TO EXCEED 1 YEAR.

COMPANY MARATHON OIL COMPANY

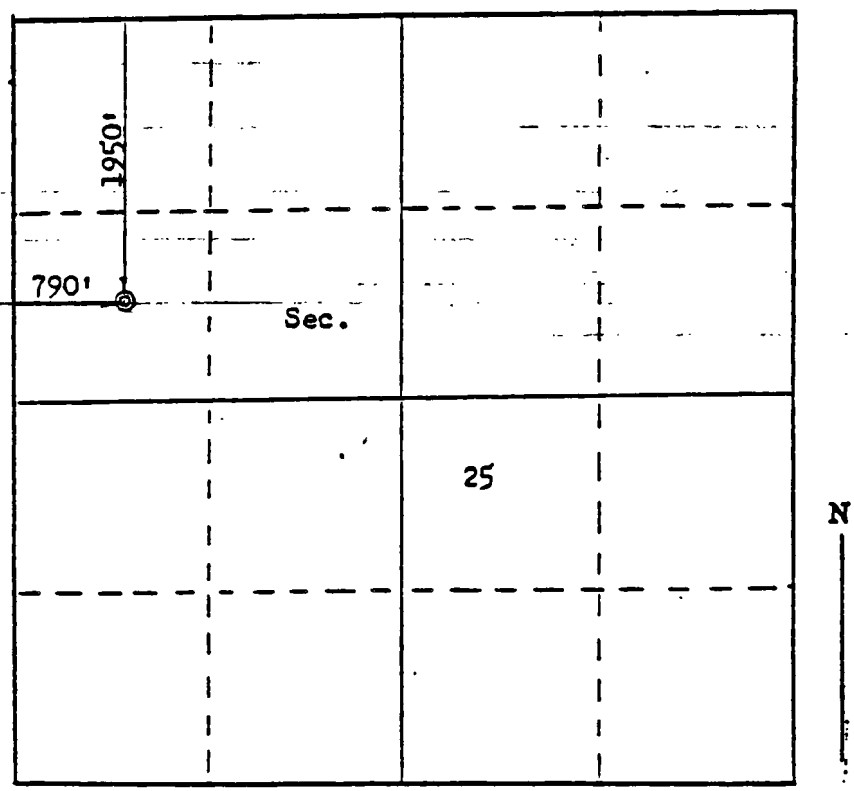
LEASE TIN CUP MESA WELL NO. 1-25

SEC. 25, T. 38S, R. 25E

SAN JUAN COUNTY, UTAH

LOCATION 1950'FNL 790'FWL

ELEVATION 4985 ungraded ground



SCALE—4 INCHES EQUALS 1 MILE

THIS IS TO CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTE OF ACTUAL SURVEYS MADE BY ME UNDER MY SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Fred B. Kerr Jr.

SEAL: Registered Land Surveyor.

#3950

SURVEYED November 10, 19 80

C-1048

FARMINGTON, N. M.

ATTACHMENT C:
DRILLING PROGRAM AND SURFACE USE PLANS

MARATHON OIL COMPANY

DRILLING OPERATIONS PLAN

DATE: January 28, 1981

WELL NAME: Tin Cup Mesa #1-25

LOCATION: 790' FWL & 1950' FNL, Sec. 25, T38S, R25E, San Juan Co., Utah

1. Geologic name of the surface formation:
   Jurassic Morrison Formation - Brushy Basin Shale Member

2. Estimated tops of important geological markers:

Formation	Depth	Datum	Formation	Depth	Datum
Carmel	779'	(+ 4,216')	Paradox	5,241'	(- 246')
Nauajo	805'	(+ 4,190')	Upper Ismay	5,398'	(- 403')
Kayenta	1,024'	(+ 3,971')	Hovenweep Shale	5,559'	(- 564')
Wingate	1,199'	(+ 3,796')	Lower Ismay	5,591'	(- 596')
Chinle	1,549'	(+ 3,446')	Gothic Shale	5,641'	(- 646')
Shinarump	2,353'	(+ 2,642')	Desert Creek	5,655'	(- 660')
Cutler	2,459'	(+ 2,536')	Chimney Rock Shale	5,743'	(- 748')
Honaker Trail	4,273'	(+ 722')	Akah	5,764'	(- 769')
			T.D.	5,840'	(- 845')

3. Estimated depths at which oil, water, gas or other mineral bearing formations are expected to be encountered:

Formation	Depth	Possible Content
Carmel	779'	Water
Navajo	805'	Water
Wingate	1,199'	Water
Dechelly	*	Brine
Paradox	5,241'	Brine
Upper Ismay	5,398'	Oil - Primary Objective
Lower Ismay	5,591'	Oil - Secondary Objective
Desert Creek	5,655'	Oil - Secondary Objective

4. The Proposed Casing Program:

Casing Design

CASING STRING	HOLE SIZE	INTERVAL	SECTION LENGTH	SIZE (OD)	WEIGHT, GRADE AND JOINT	NEW OR USED	MUD WEIGHT	1,000# TENSION LOAD	SF_t	SF_c	SF_b
Conductor	20"	0'-60'	60'	16"	Thinwall Steel	New	NA	NA	NA	NA	NA
Surface	12-¼"	0'-1,550'	1,550'	9-5/8"	36#, K55 STC	New	8.6.	55.8	7.58	2.73	5.25
Production	8-3/4"	0'-1,050'	1,050'	7"	26#, K55 STC	New	13.0	143	2.54	5.04	1.35
	8-3/4"	1,050'-3,900'	2,850'	7"	23#, K55 STC	New	13.0	116	2.66	1.14	1.26
	8-3/4"	3,900'-5,840'	1,940'	7"	26#, K55 STC	New	13.0	50	7.22	1.09	1.75

Cement Program: 9-5/8" Casing

Cement Volume: 1,550' x .3132 cu.ft./ft. x 2.0 excess = 970 cu. ft.
Lead Slurry: 1,000' calculated plus 100% excess - 340 sacks of high yield cement (BJ Lite, Halliburton Lite, etc.) containing 1/4 lb/SK cellophane flakes and 2% $CaCL_2$.
Slurry Yield: 1.84 cu.ft./SK
Slurry Density: 12.7 lb./gal
Water Requirement: 9.9 gal./SK

Tail Slurry: 550 ft. calculated plus 100% excess - 300 sacks of class "B" cement containing 1/4 lb./SK cellophane flakes and 2% $CaCL_2$.
Slurry Yield: 1.18 cu. ft./SK
Slurry Density: 15.6 lb./gal
Water Requirement: 5.2 gal./SK

Casing Equipment: Guide shoe, differential fill collar, 3 centralizers. WOC time will be a minimum of 6 hours. If float equipment holds, closed-in pressure after completion of cement job is not recommended.

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Cement Program: (Cont.)

7" Casing

1st Stage

Cement Volume: 2,840 ft. x .1503 cu. ft./ft. x 1.20 excess = 512 cu. ft.
Slurry: 2,840 ft. calculated plus 20% excess from logs - 434 sacks of Class "B" cement containing 0.8% fluid loss additive (D-19, Halacl 9, etc.)

2nd Stage

Cement Volume: 2,000 ft. x .1503 cu. ft./ft. x 1.2 excess = 360 cu. ft.
Slurry: 2,000' calculated (500' into 9-5/8" casing) plus 2.0% excess from logs - 235 sacks of high yield cement (BJ Lite, Halliburton Lite, etc.)

Casing Equipment: Locate stage collar 3,000'. A guide shoe, flapper type float collar, 1 cement basket, and 10 centralizers spaced over the bottom 800 ft. of hole will be used. If float holds, closed-in pressure after completion of cement job is not recommended. Set casing on slips as soon as possible following cement job.

Slurry Preflush: 1st and 2nd stage 20 bbls.

5. Pressure Control Equipment:

BOP equipment will include a double-ram type preventer with pipe and blind rams and a rotating head (API arrangement SRDA). All equipment will have a 3,000 psi or greater working pressure. Rams, valves, lines, choke manifold and casing will be tested to 200 psi for 5 min. and 1,000 psi for 5 minutes prior to drilling out from under 9-5/8" surface casing. After drilling casing shoe and 5 ft. of additional hole, a shoe test will be performed to 13.5 ppg equivalent mud weight or leakoff, whichever occurs first. The accumulator should be of a sufficient capacity to meet the following requirements:

1. Ability of immediate closure to all members of the stack without recharging.
2. A total of 50% of the original fluid should remain as a reserve after accumulator activation.
3. A minimum pressure of 1,200 psi is required to insure that the preventers remain closed.

Visual checks of the equipment will be made tourly. Function pipe rams daily and blind rams on trips.

6. Drilling Mud Program:

From	To	Type Mud	Weight	% Oil	Water Loss
0'	1550'	Spud	8.5- 9.0	0	No Control
1550'	Cutler (2500')	gel/water	8.5- 9.0	0	No Control
Cutler (2500')	Upper Ismay (5400')	gel/chemical	9.4-10.3	0	10.0-12.0c
Upper Ismay (5400')	T.D.	gel/chemical	as required	0	8.0- 9.0c

Mud weights should be kept to a minimum to maximize ROP and minimize lost circulation. However, the existence of water flows may necessitate an increase in mud weight while drilling. Sufficient barite should be on location prior to spud in order to increase mud weight to 12.5 if required. Lost circulation is expected in the upper hole before setting surface casing.

7. Auxillary Equipment Required:

A drilling rate recorder, calibrated to record drilling time for each one foot interval will be used.

The mud system will include a desander/desilter, gas buster or degasser. A manual choke will be used.

A kelly cock will be used and a full opening manual safety valve will be available on the rig floor.

A single shot drift indicator will be used.

Flow sensors and pit level monitors will be installed in the mud system.

Deviation Control:

From	To	Maximum Distance Between Surveys	Maximum Deviation From Vertical	Maximum Chang Per 100' of De
0'	1,550'	250'	1°	1°
1,550'	T.D.	500'	5°	1°

Slight deviation problems in general area.

8. Testing, Logging, Coring and Fracing Program:

Samples: 10 ft. interval from 1,550' to T.D.

Logging:
1. DI - SFL/GR - Surface to T.D.
2. RHC SONIC/GR - Surface to T.D.
3. FDC/CNL-GR From 4,000' to T.D.

Testing:
1. Upper Ismay
2. Lower Ismay
3. Desert Creek

Coring: Approximately 350 foot core to include Upper Ismay, Lower Ismay and Desert Creek

Fracing Program:

The productive intervals will be stimulated by acidizing with 2,000 gallons 28% HCl acid and if necessary will be acid fractured with 1,500 gallons 28% HCl acid.

Anticipated abnormal pressures or temperatures:

The Dechelly Mbr. of the Cutler FM., if penetrated, may contain overpressured saltwater requiring 11.0 - 12.3 ppg mud weight to control.

Maximum anticipated bottom hole pressure is approximately 2,500'.
Maximum anticipated bottom hole temperature is approximately 175°F.

The anticipated starting date and duration of operation:

Starting Date: 1st half 1981

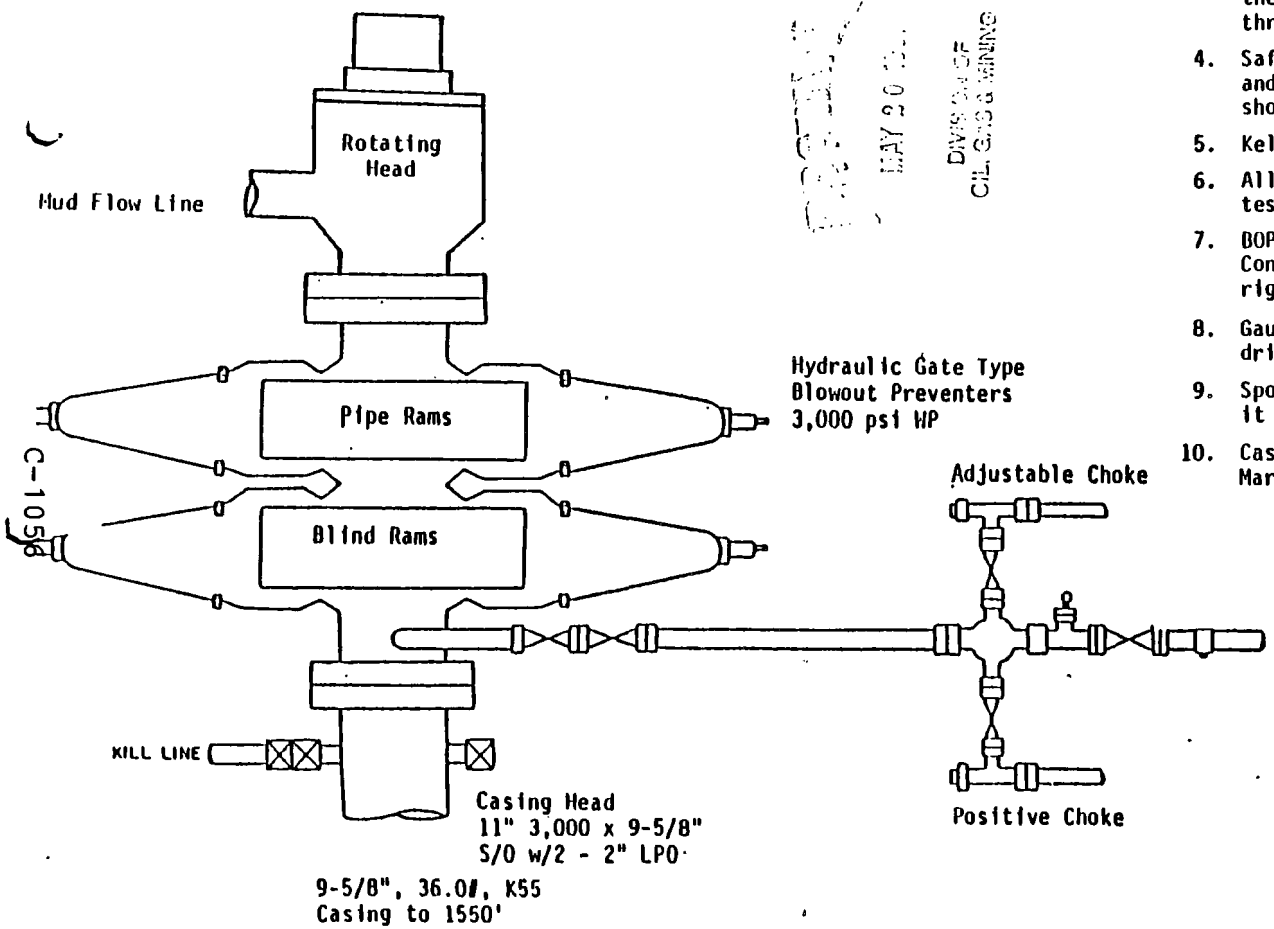
Duration: 30 days

Name M. L. E. Knight (by A. L. Brzozowski)

Title Drilling Superintendent (Asst. Dist. Engineer)

Date 1/27/81

Tin Cup Mesa #1-25
790' FWL, 1,950' FNL
Section 25, T38S, R25E
San Juan County, Utah



1. Blowout preventers, master valve, plug valve and all fittings must be in good condition. Use new API Seal Rings.
2. All fittings (gates, valves, etc.) to be of equivalent pressure rating as preventers. Valves to be flanged and at least 2" unless otherwise specified. Valves next to BOP to be plug type and nominal 3".
3. Equipment through which bit must pass shall be as large as the inside diameter of the casing that is being drilled through.
4. Safety valve must be available on rig floor at all times and with proper connections. The I.D. of safety valves should be as great as I.D. of tool joints on drill pipe.
5. Kelly safety valve installed, same working pressure as BOP's.
6. All lines and controls to preventers must be connected and tested before drilling out of surface pipe.
7. BOP's must be fluid operated, complete with accumulator. Controls may be either on floor or ground near steps from rig floor.
8. Gauge will be installed for testing but removed while drilling.
9. Spool not required, but when side outlet on BOP's is used, it must be below bottom ram.
10. Casinghead and casinghead fittings to be furnished by Marathon Oil Company.

MAY 20 ... DIVISION OF OIL, GAS & MINING

MARATHON OIL COMPANY
SURFACE USE & OPERATIONS PLAN

DATE: February 3, 1981

WELL NAME: Tin Cup Mesa #1-25

LOCATION: 1,950' FNL & 790' FWL, Section 25, T38S, R25E, San Juan County, Utah

#1 Existing Roads:

A. Proposed well site as staked. (Actual staking should include two each 200-foot directional reference stakes).

See survey plat.

B. Route and distance from nearest town and locatable reference point to where well access route leaves main road.

6-1/2 miles northeast of Hatch Trading Post, Utah.
See map diagram "A", color coded red.

C. Access road(s) to location color-coded or labeled.

See map diagram "A" color coded Green.

D. If exploratory well, all existing roads within a 3-mile radius (including type of surface, conditions, etc.).

See map diagram "A".

E. If development well, all existing roads within a 1-mile radius of well site.

Not applicable

F. Plans for improvement and/or maintenance of existing roads.

Blade and gravel where needed.

#2 Planned Access Roads:

Map showing all necessary access roads to be constructed or reconstructed, showing:

(1)	Width	16'
(2)	Maximum grades	0 - 9%
(3)	Turnouts	None required
(4)	Drainage design	Ditched and crowned, trailer ditches where needed.

(5) Location and size of culverts and brief description of any major cuts and fills.

None anticipated

(6) Surfacing material

Gravel

(7) Necessary gates, cattleguards, or fence cuts.

No cattle guards or fence cuts will be required.

(8) (New or reconstructed roads are to be center-line flagged at time of location staking).

All new access road is centerlined flagged with Hot Blue and Hot Orange flagging material. The access was walked 50' on each side by Archeologist from the University of Utah. See map diagram "A"

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#3 Location of Existing Wells:

Two-mile radius map if exploratory, or 1-mile radius map if development well, showing and identifying existing:

(1) Water wells None

(2) Abandoned wells None

(3) Temporary abandoned wells None

(4) Disposal wells None

(5) Drilling wells MCOR #1-25

(6) Producing wells None

(7) Shut-in wells None

(8) Injection wells None

(9) Monitoring or observation wells for other resources.

None

#4 Location of Existing and/or Proposed Facilities:

A. Within 1-mile radius of location show the following existing facilities owned or controlled by lessee/operator:

(1) Tank Batteries None

(2) Production Facilities None

(3) Gathering Lines None

(4) Gas Gathering Lines None

(5) Injection Lines (Indicate if any of the above lines are buried).

None

(6) Disposal Lines None

B. If new facilities are contemplated, in the event of production, show:

(1) Proposed location and attendant lines by flagging if off of well pad.
Adjacent to the access road and as close to the proposed drill site as possible, without setting on any fill.
See diagram "B".

(2) Dimensions of Facilities

See Diagram "B".

(3) Construction methods and materials:
Good engineering practices will be used in the construction of these facilities and materials will be obtained through local vendors and contractors.

B. If new facilities are contemplated, in the event of production, show: (cont'd)

(4) Protective measures and devices to protect livestock and wildlife.

Woven wire fences of the pit areas and flagging, if necessary.

C. Plans for rehabilitation of disturbed areas no longer needed for operations after construction completed.

Restoration of the drill site and tank battery areas will be reshaped to conform with the topography. The top soil will be redistributed at the proper time. The sites will be reseeded as per the recommended seed mixture.

#5 Location and Type of Water Supply:

A. Show location and type of water supply either on map or by written description.

A water hole will be made on the down stream side of Cross Creek. Approval was given by Jennifer Head, BLM, Monticello, Utah, to Walt West, MOC. See map Diagram "A", color coded blue.

B. State method of transporting water, and show any roads or pipelines needed.

Existing roads and access road will be used to haul water to location. See map Diagram "A", color coded blue.

C. If water well is to be drilled on lease, so state. (No APD for water well necessary, however, unless it will penetrate potential hydrocarbon horizons).

No water supply well will be drilled.

#6 Source of Construction Materials:

A. Show information either on map or by written description.

Construction materials will be native soil or purchased from a Jobber and hauled to the well site by same.

B. Identify if from Federal or Indian Land.

None

C. Describe where materials, such as sand, gravel, stone and soil material, are to be obtained and used.

Any needed materials will be purchased from a Jobber and hauled to the well site.

D. Show any needed access roads crossing Federal or Indian Lands under Item 2.

None

#7 Methods of handling Waste Disposal:

Describe methods and location of proposed containment and disposal of waste material, including:

(1)	Cuttings	Reserve Pit
(2)	Drilling fluids	Reserve Pit
(3)	Produced fluids (oil, water)	Swab Tanks

#10 Plans for Restoration of Surface: (cont'd)

(3) Prior to rig release, pits will be fenced and so maintained until cleanup.

The reserve pit will be fenced on 3 sides during drilling. At the completion of the drilling, all pits will be fenced on the one remaining side.

(4) If oil on pit, remove oil or install overhead flagging.

If there is oil on the reserve pit, it will be removed or flagged with overhead flagging.

(5) Timetable for commencement and completion of rehabilitation operations.

Depending upon climatic conditions, restoration should be completed from six months to one year after abandoning well.

#11 Other Information:

General Description of:

(1) Topography, soil characteristics, geologic features, flora and fau
Topo is sagebrush, scrub cedars, covered hills, occasionally diss
by drainage features.
Flora is sagebrush, wheat grass and short stubby native grasses.
Fauna is deer, rabbits, fox, small rodents, cattle and sheep.

(2) Other surface use activities and surface ownership of all involved lands.

The drill site and access road is owned by U. S. Government.
Attached are: Affidavit, Designation of Agent, Letter from MCOR.

(3) Proximity of water, occupied dwellings, archeological, historical or cultural sites. There is a recent (30-40 yrs) Hogan Type Sheepm shelter in ruins, 152' NW of the center stake. It was decided by Larval Casjens, Archeologist, Univeristy of Utah, and Walt West of MOC, not to disturb. There is no water or occupied dwellings in t
Archeological Clearance for the drill site and access road was giv

#12 Lessee's or Operator's Representative:

Mike E. Krugh
Marathon Oil Company
P.O. Box 2659
Casper, WY 82602
(307) 235-2511 Office (307)

#13 Certification: The following statement is to be incorporated in the plan and must be signed by the lessee's or operator's field representative who is identified in item No. 12 of the plan:

> I hereby certify that I, or persons under my direct supervision, have inspected the proposed drillsite and access route; that I am familiar with the conditions which presently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed herein will be performed by Marathon Oil Company and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved.

2-2-81 — Date
Michael E. Krugh — Name

Drilling Superintendent — Title

#7 Methods of Handling Waste Disposal: (cont'd)

(4) Sewage Porta Pot

(5) Garbage and other waste material (Trash pits will be completely contained with small mesh wire to prevent wind scattering trash before being burned or buried).

There will be a 10' x 10' burn pit on the drill site, and it will be fenced.

(6) Statement regarding proper cleanup of well site area when rig moves out.

At the completion of drilling, the site and surrounding area will be cleaned up and all burnable material will be put in the burn pit and burned. All foreign material will be buried.

#8 Ancillary Facilities:

Identify all proposed camps and airstrips on a map as to their location, area required and construction methods. (Camp center and airstrip center lines to be staked on the ground).

None planned.

#9 Wellsite Layout:

A plat (not less than 1" = 50') showing:

(1) Cross sections of drill pad with cuts and fills.

See Diagram "C".

(2) Location of mud tanks, reserve, burn and trash pits, pipe racks, living facilities and soil material stockpiles.

See Diagram "D".

(3) Rig orientation, parking areas and access roads.

See Diagram "D".

(4) Statement as to whether pits are to be lined or unlined. (Approval as used in this section means field approval of location. All necessary staking of facilities may be done at time of field inspection). A registered surveyor is not mandatory for such operations.

The reserve pit will not be lined and will be in the cut. See Diagram "C".

#10 Plans for Restoration of Surface:

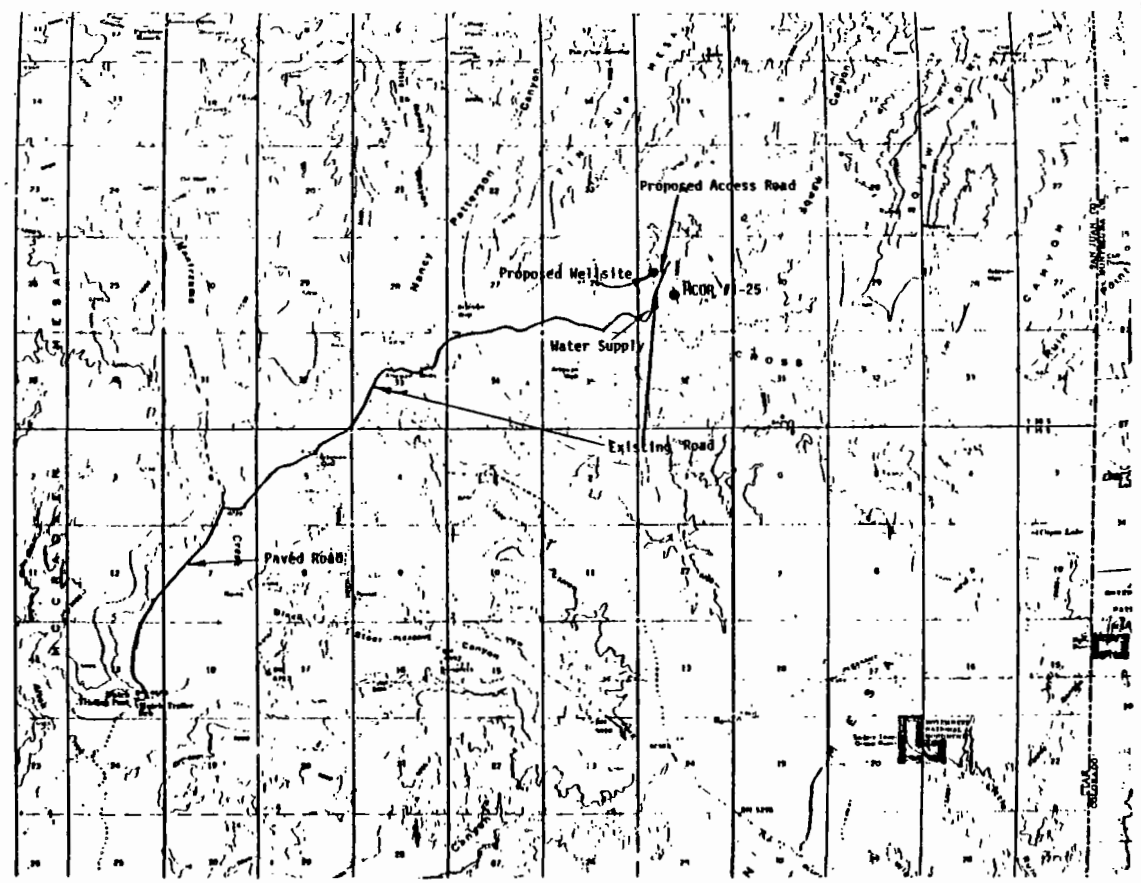
State restoration program upon completion of operations, including:

(1) Backfilling, leveling, contouring and waste disposal; segregation of spoils materials as needed.

The drill site will be cleaned and waste material will be put in the trash burn pit, which will be covered at the finish of the drilling operation. The reserve pit will be backfilled as soon as it is dry.

(2) Revegetation and rehabilitation - including access roads (normally per BLM recommendations).

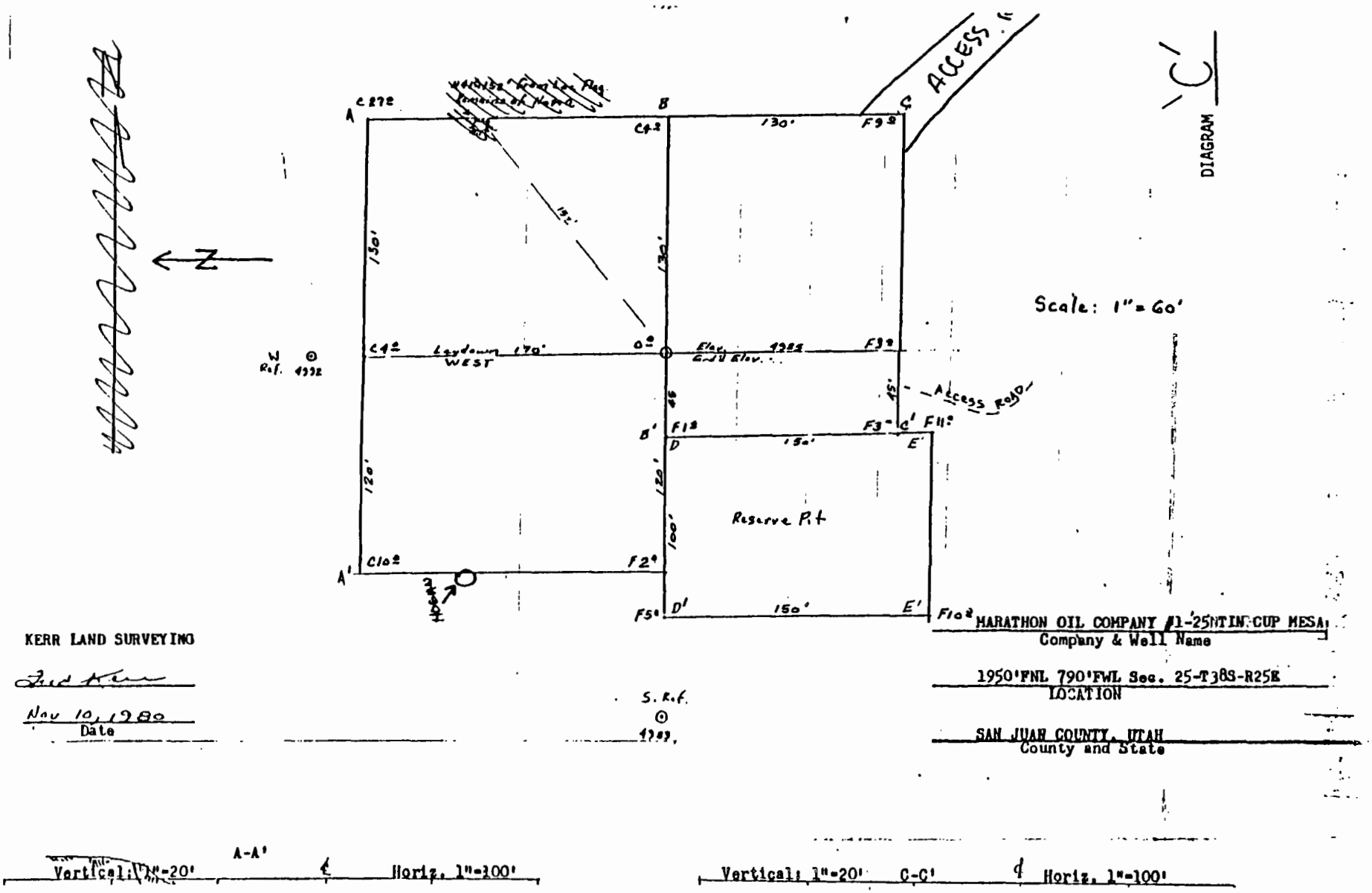
The top soil will be redistributed and at the proper season the seed mixture of BLM requirements will be drilled planted.



VICINITY MAP FOR
MARATHON OIL COMPANY #1-25 TIN CUP MESA
1950 FNL 790 FWL Sec. 25 T38S-R25E
SAN JUAN COUNTY, UTAH

Diagram 'A'

C-1062



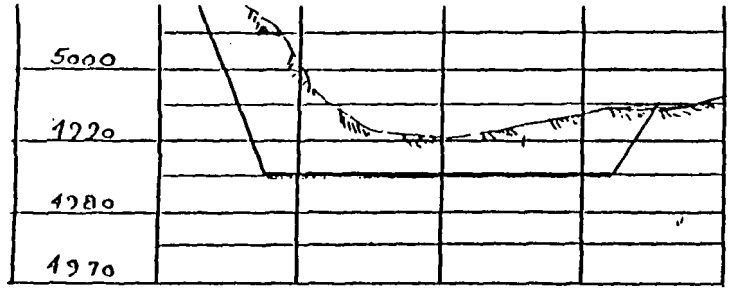
KERR LAND SURVEYING

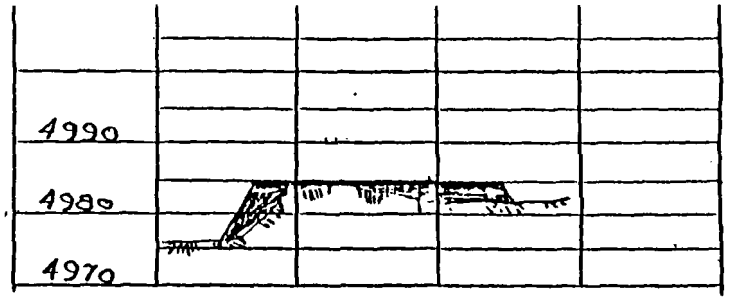
Nov 10, 1980
Date

MARATHON OIL COMPANY #1-25 MTN CUP MESA
Company & Well Name

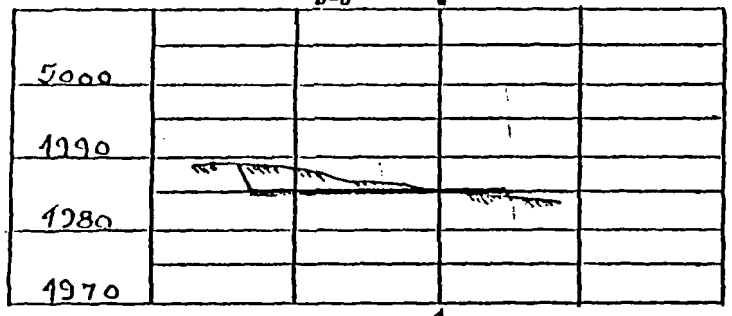
1950'FNL 790'FWL Sec. 25-T38S-R25E
LOCATION

SAN JUAN COUNTY, UTAH
County and State





B-B' ℄



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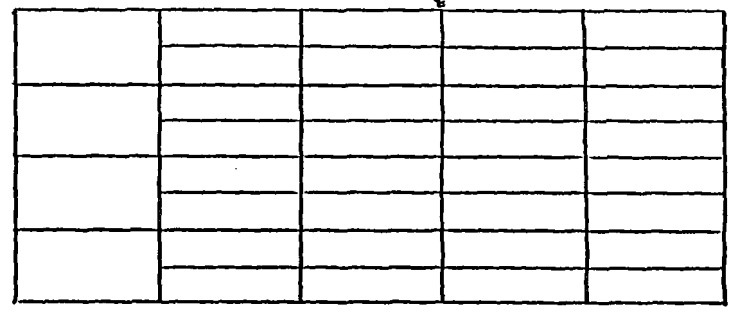
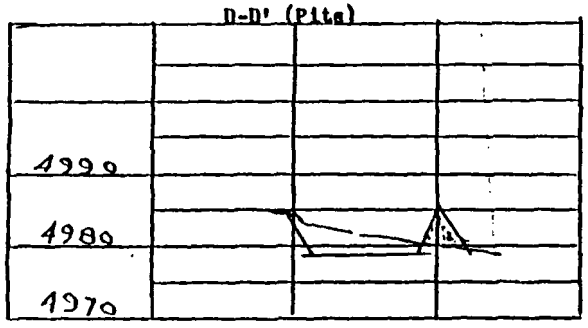
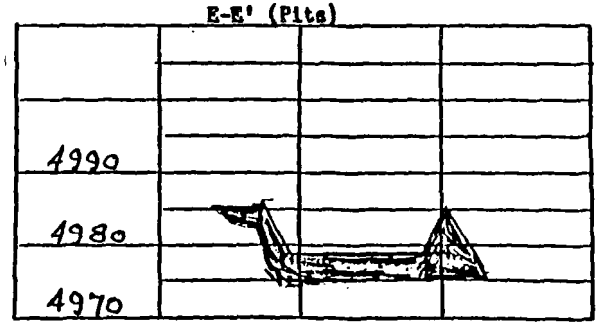


D-D' (Pits)



E-E' (Pits)



SCHEMATIC

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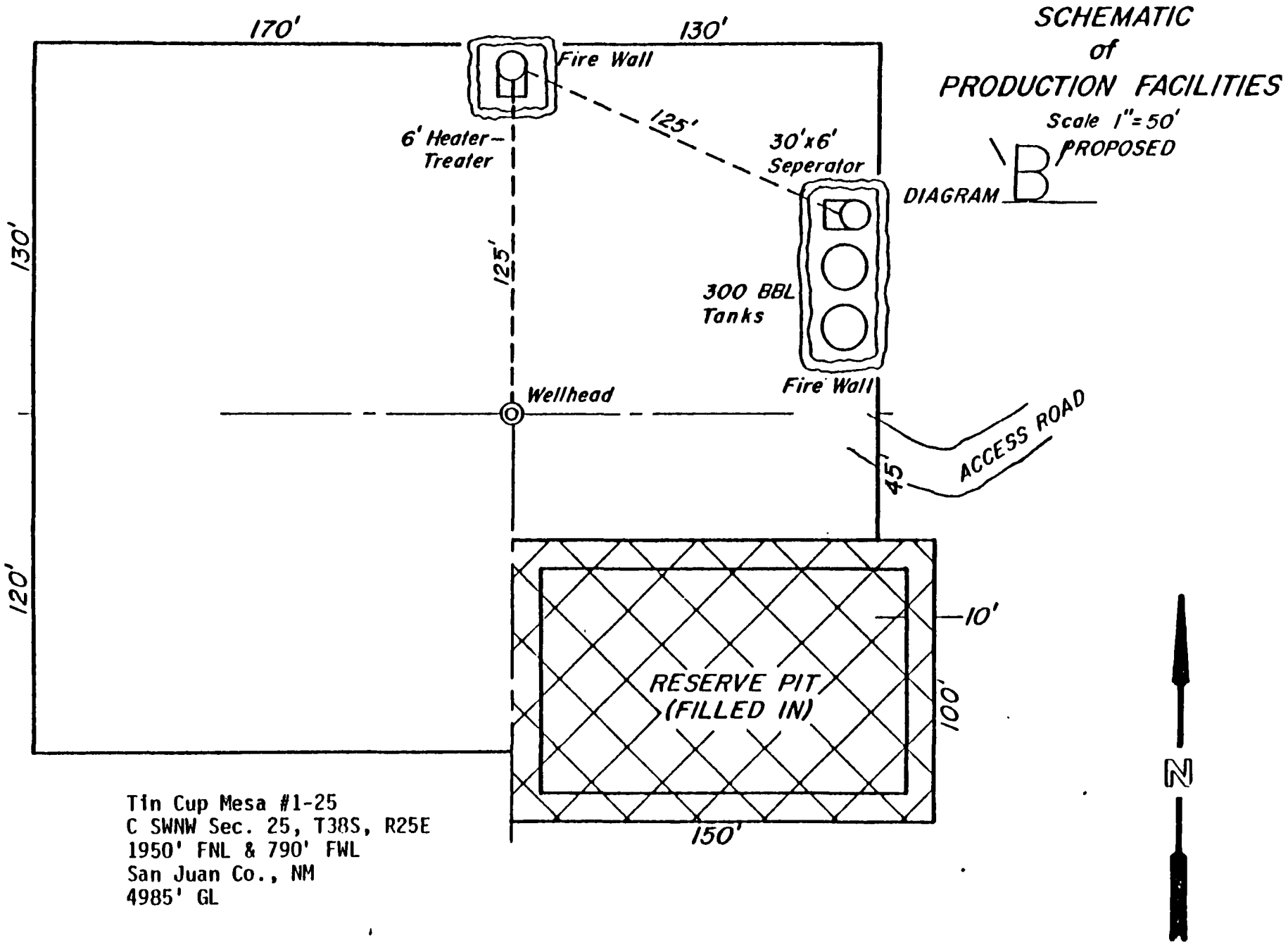
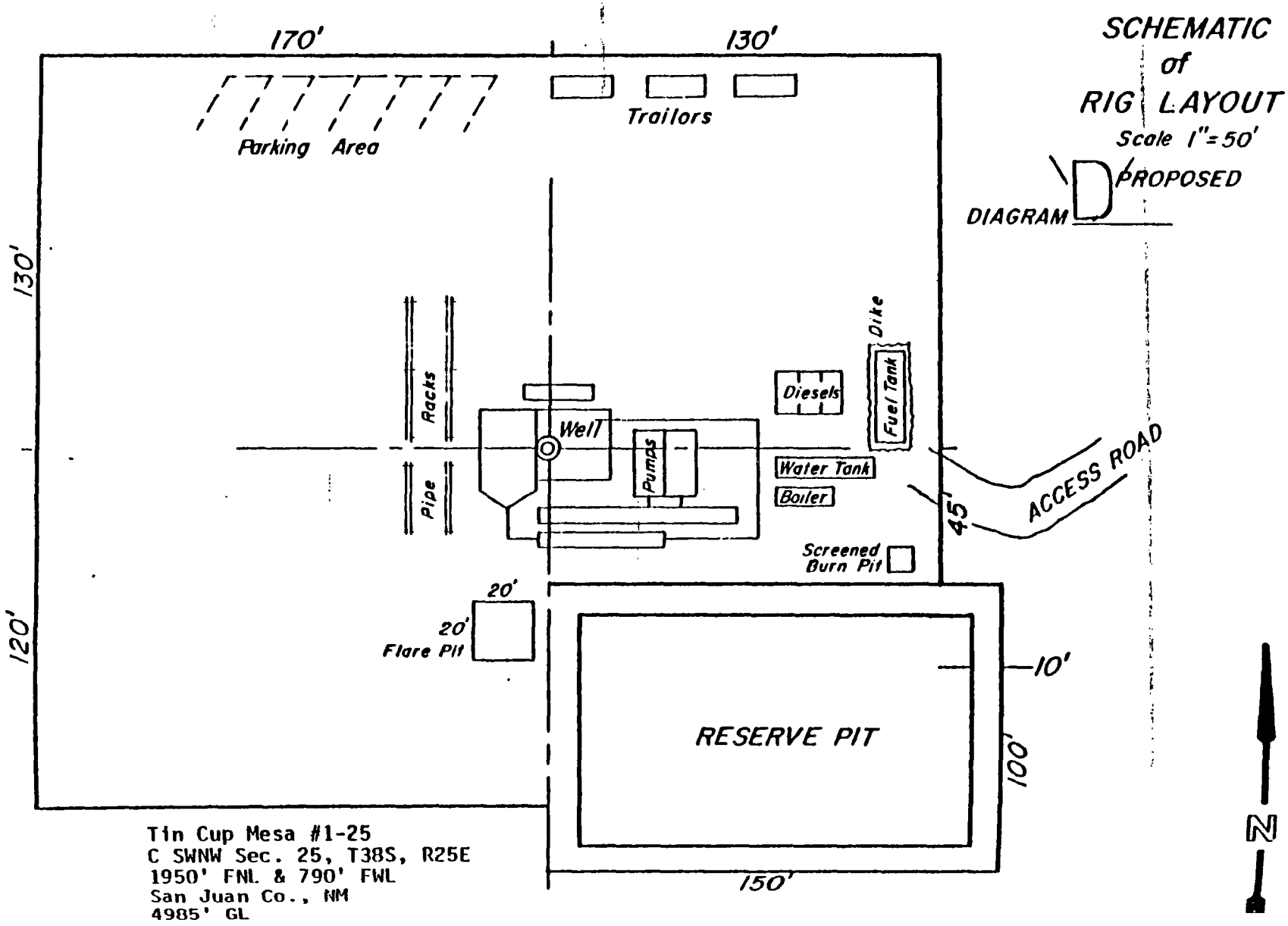


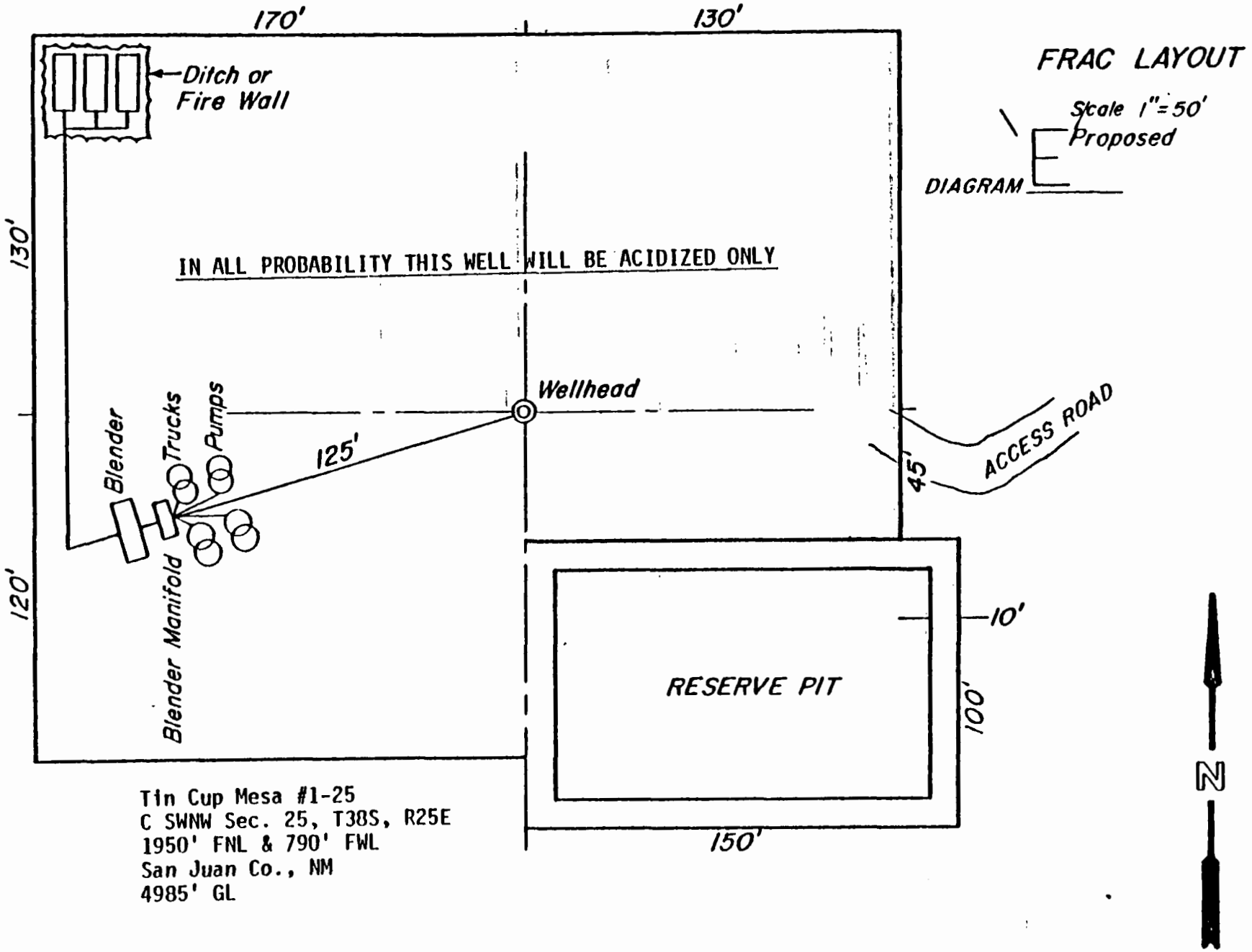
Tin Cup Mesa #1-25
C SWNW Sec. 25, T38S, R25E
1950' FNL & 790' FWL
San Juan Co., NM
4985' GL

C-1065



Tin Cup Mesa #1-25
C SWNW Sec. 25, T38S, R25E
1950' FNL & 790' FWL
San Juan Co., NM
4985' GL

C-1066



Tin Cup Mesa #1-25
C SWNW Sec. 25, T38S, R25E
1950' FNL & 790' FWL
San Juan Co., NM
4985' GL

C-1067

DESIGNATION OF AGENT

Supervisor, Oil and Gas Operations:

The undersigned is, on the records of the Geological Survey, Unit Operator under the Canyon Junction unit agreement, San Juan County, Utah (state), No. _____ approved _____ and hereby designates:

NAME: Marathon Oil Company

ADDRESS: Box 120, Casper, Wyoming 82602

as its agent, with full authority to act in its behalf in complying with the terms of the Unit Agreement and regulations applicable thereto and on whom the supervisor or his representative may serve written or oral instructions in securing compliance with the Oil and Gas Operating Regulations with respect to drilling, testing, and completing unit well No. _____ in the SW ¼ NW ¼ Sec. 25, T. 38S, R. 25E, _____, San Juan County, Utah.

It is understood that this designation of agent does not relieve the Unit Operator of responsibility for compliance with the terms of the unit agreement and the Oil and Gas Operating Regulations. It is also understood that this designation of agent does not constitute an assignment of any interest under the unit agreement or any lease committed thereto.

In case of default on the part of the designated agent, the Unit Operator will make full and prompt compliance with all regulations, lease terms, or orders of the Secretary of the Interior or his representative.

The Unit Operator agrees promptly to notify the oil and gas supervisor of any change in the designated agent.

This designation of agent is deemed to be temporary and in no manner a permanent arrangement.

This designation is given only to enable the agent herein designated to drill the above-specified unit well. Unless sooner terminated, this designation shall terminate when there is filed in the appropriate district office of the U. S. Geological Survey a completed file of all required Federal reports pertaining to subject well. It is also understood that this designation of agent is limited to field operations and does not cover administrative actions requiring specific authorization of the Unit Operator.

MCOR Oil and Gas Corporation
Unit Operator

By: W. James Saul
W. James Saul, Vice President

12-4-80

C-1068

AFFIDAVIT

STATE OF WYOMING)
) SS.
COUNTY OF NATRONA)

The undersigned, being first duly sworn on oath, deposes and says:

1. That affiant is over 21 years of age and in all respects legally competent to make this affidavit.

2. That affiant on the 22nd day of January, 1981, personally examined the following described lands in San Juan County, State of Utah, to-wit:

Township 38 South, Range 25 East, S. L. M.

Section 23: W½, W½SE¼
Section 25: SW¼NW¼
Section 26: E½

(Containing 760.00 acres, more or less.)

3. That affiant on said day made a reasonable effort, in connection with such examination, to ascertain whether any person or persons were in actual possession of or engaged in the working of the lands above described; that no person or persons were found to be in actual possession or engaged in the working of said lands or any part thereof; that, as a result of such examination, no evidence was found of any location monuments that could have been used in locating placer or lode mining claims; that no evidence was found of any mines or mining operations, open pits, diggings, shafts, holes or other evidence of mining claims, and no indications of the performance of assessment work on said lands; that no drilling well or wells for the purpose of producing any mineral was found on said land; and that affiant found no buildings on said lands, or structures, telephone lines, electric lines, pipe lines, railroads, or other improvements thereon, except the following:

Marathon Tin Cup Mesa well #1-25 is located 1950' from the north line and 790' from the west line of Section 25, T.38S., R.25E., S. L. M., San Juan County, Utah. The proposed well site can be reached by traveling from Hatch's Trading Post northeast on paved road for approximately two miles, thence on a gravel/dirt road through two wash crossings and two cattle guards in a northeasterly direction for approximately six miles to the west line of Section 25, thence turning a left or in a northerly direction continuing for approximately one-half mile to the well location.

The overall terrain is a mixture of high cliffs and rolling grassy canyons. There are numerous seismographic trails throughout the area. The hilly areas are covered with prairie grass, sagebrush and buck brush. There are several artesian wells in the area, some of which drain into shallow washes only a few inches deep. The SW corner survey marker of Section 26 was located, along with the marker common to Sections 26 and 35 mid point. A rock marker was found and is believed to be the SE corner survey marker of Section 25.

A well being drilled by MCOR Oil & Gas Corporation was located in the NE¼SW¼ of Section 25. A fence was found running on the west lines of Sections 26 and 23. There are no other fences, utility lines or improvements of any kind in the area. The survey markers were clearly marked with flags for purposes of locating the well site. No mining activity was apparent in this area. If any exists, they must be hidden or out of the area.

Steve Degenfelder
STEVE DEGENFELDER

~~Subscribed~~ and sworn to before me on this 26th day of Jan, 1981.

Constance T. Stark · Notary Public
County of Wyoming
My Commission Expires: March 7, 1984
C-1069

MCOR Oil and Gas Corporation
Equitable Building, Suite 410, 730 17th Street, Denver, Colorado 80202/Telephone (303) 893-5111

January 19, 1981

RECEIVED
MARATHON OIL CO.
JAN 22 1981
Casper District Land Dept.
Casper, Wyoming

Mr. James Youngflesh
Marathon Oil Compan-
P.O. Box 120
Casper, Wyoming 82602

Dear Jim:

Further to our recent telephone conversation this is to advise that we are at present using Hay Hot Oil owned by a Mr. Wright for our water on our #1-25 well in San Juan County, Utah. Mr. Wright is obtaining the water from the Cross Creek.

Also, your Right-of-Way request has been forwarded by this office to Wexpro in Salt Lake City, Utah. You should shortly be receiving this directly from them. Allow about another week and if you have not received the same from Wexpro, please advise.

Very truly yours,

MCOR Oil and Gas Corporation

Raymond S. Blunk
District Landman

RSB:dm

STIPULATIONS

Well sign should read:

Marathon Oil Company
U-31928
No. 1-28 Tin Cup Mesa
SWNW 25-38S-25E
San Juan County, Utah

This location may be potentially valuable for underground mining.

Please furnish resistivity, density, Gamma-Ray, or other appropriate electric logs covering all formations containing potentially valuable minerals subject to the Mineral Leasing Act of 1920 to:

U. S. Geological Survey
Mining Branch
2040 Administrative Bldg.
1745 W. 1700 South
Salt Lake City UT 84104

STIPULATIONS

Well sign should read:

Marathon Oil Company
U-31928
No. 1-25 Tin Cup Mesa
SWNW 25-38S-25E
San Juan County, Utah

***NOTE: Items crossed out either do not apply or are already covered in the operator's SUP.

Construction:

1. The operator or his contractor will contact the San Juan Resource Area Office in Monticello, Utah (phone (801) 587-2201) 48 hours prior to beginning any work on public land.

2. The archaeological site (Navajo hogan) on the west edge of the location will be fenced and avoided during construction, rehabilitatio and production operations. All employees working in the area will be informed by the operator that they will be subject to prosecution if they are caught disturbing archaeological sites or picking up artifacts. If subsurface cultural material is exposed during construction, work in that spot will stop immediately and the San Juan Resource Area Office will be contacted.

3. Existing access will be used per our pre-drill discussion. Improvement to the seismic trail will be limited to a total disturbed width of 18 feet including slope cuts, waterbars, drainage ditches and running surface. The location of new construction will follow the seismic trail. Sandy areas along the access road will be stabilized with water.

   Surface disturbance and vehicular travel will be limited to the approved location and approved access route. Any additional area needed must be approved in advance.

   Surfacing material will not be placed on the access road or location without prior BLM approval.

4. The location will be laid out and constructed as discussed during the pre-drill conference and as indicated on the attached sheet.

5. Trees and brush removed from the location will be stockpiled on the north edge of the pad.

6. The top six to eight inches of soil material will be removed from the location and stockpiled separate from the trees on the west edge of the drill pad for use during reclamation. Topsoil along the access will be reserved in place.

7. A trash pit will be constructed near the mud tanks with steep sides and dug at least six to eight feet into solid undisturbed material. Trash will not be disposed of in the reserve pit. The trash pit will be totally enclosed with a fine mesh wire before the rig moves onto the location.

8. An inspection of the reserve pit will be made by USGS and/or BLM after the pit is constructed to determine if lining will be necessary.

9. The reserve pit fence will be kept in good repair while the pit is drying.

10. A burning permit will be required before burning trash between May 1 and October 31. This can be acquired by contacting the State Fire Warden, John Baker at (801) 587-2201.

11. The dirt contractor will be furnished with a copy of these stipulations and a copy of the operator's Surface Use Plan prior to any work.

Rehabilitation

1. Immediately on completion of drilling, the location and surrounding are will be cleared of all debris resulting form the operation. All foreign material will be disposed of in the trash pit.

2. The operator or his contractor will contact the San Juan Resource Area BLM Office in Monticello, Utah (phone (801) 587-2201) 48 hours prior to starting rehabilitation work that involves earthmoving equipment and upon completion of restoration measures.

3. Before any dirt work to restore the location takes place, the reserve pit must be completely dry and any trash it contains must be removed to the trash pit. The trash pit will not be filled in until recontouring work begins and will remain fenced until that time.

4. All distrubed areas will be recontoured to blend with the natural topography as discussed during the pre-drill conference.

5. The stockpiled topsoil will be evenly distributed over the disturbed area.

6. All disturbed areas will be scarified with the contour to a depth of four to six inches.

7. Seed will be drilled during the fall months with the following seed prescription.

   3 lbs/acre Indian ricegrass (Oryzopis hymenoides)
   2 lbs/acre Fourwing saltbush (Atriplex canescens)
   1 lbs/acre Cliffrose (Cowania mexicana)
   2 lbs/acre Alkalai sacaton (Sporobolus airoides

8. After seeding is complete the stockpiled trees will be scattered evenly over the disturbed areas and walked down with a dozer. The access will be blocked to prevent future use.

9. Water bars will be constructed as directed by BLM to control erosion.

10. The dirt contractor will be furnished with a copy of these stipulati and a copy of the operator's Surface Use Plan prior to any work.

Production

1. The operator will notify the San Juan Resource Area BLM Office in Monticello, Utah (phone (801) 587-2201) if the well is determined to be a commercial producer.

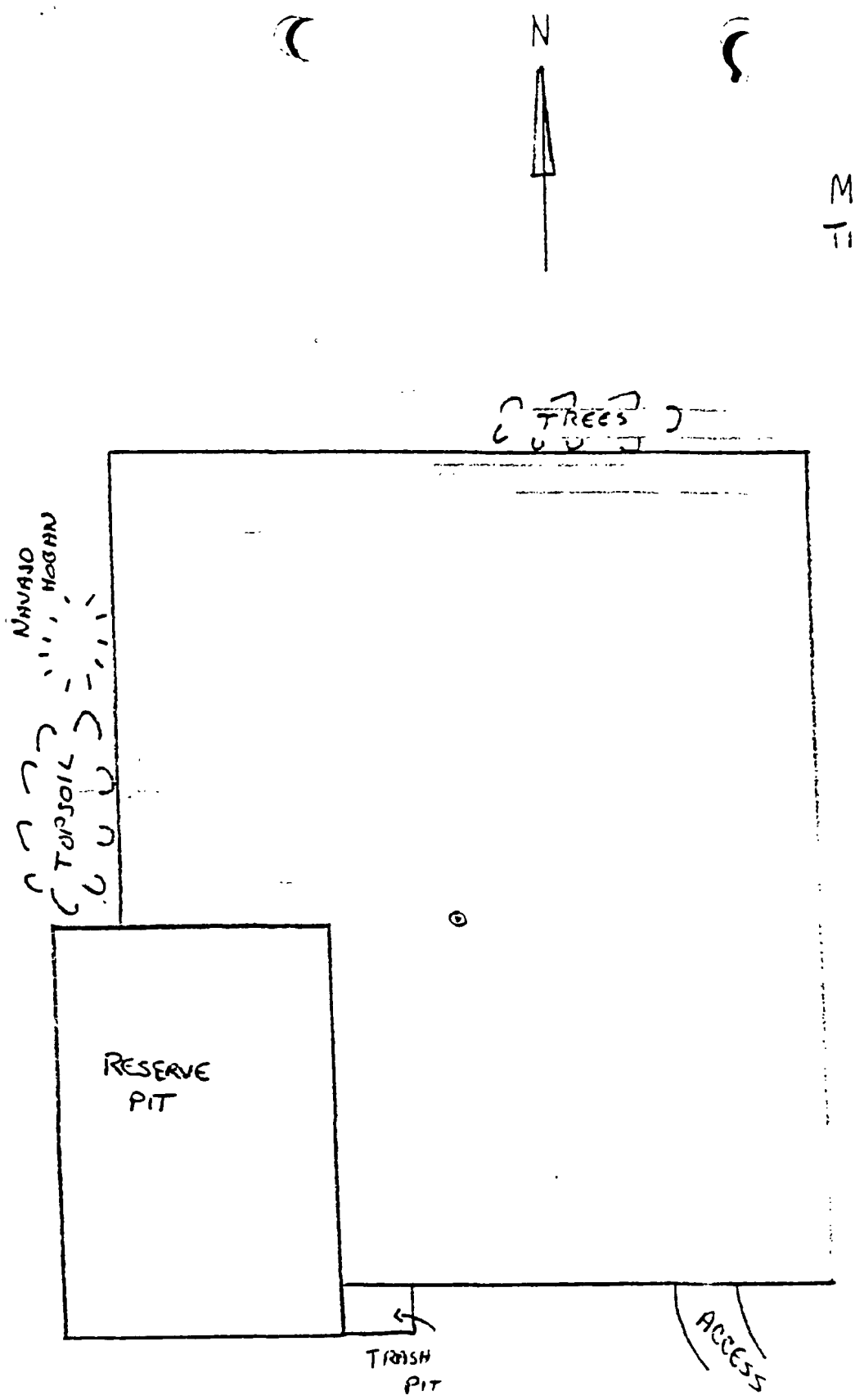
2. The reserve pit and that portion of the location and access road not needed for production or production facilities shall be reclaimed in the methods described in the rehabilitation section. Enough topsoil should be retained to reclaim the remainder of the location as a future date. The remaining stockpile of topsoil shall be seeded in place using the prescribed seeding mixture.

3. All above-ground production facilities will be painted a neutral color to be approved by the BLM.

4. The dirt contractor will be furnished with a copy of these stipulatio and a copy of the operator's Surface Use Plan prior to any work.

5. The access shall be upgraded to the following specifications:

   To be determined if production is obtained.


N
MARATHON
TIN CUP MESA 1-25
TREES
NAVAJO HOGAN
TOPSOIL
RESERVE PIT
TRASH PIT
ACCESS

Sampling Report
Investigation of Wexpro Company's Island Unit No. 27
Uintah County, Utah
July 2, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005), with the changes noted below. This site was originally planned to be selected randomly from a list of active Uinta Basin drill sites developed by the Utah Department of Natural Resources - Oil, Gas, and Mining Division at the request of EPA. The list was to be developed just prior to July 2, 1986, the scheduled sampling date. The short time frame was deemed necessary because of the uncertain progress of drilling in this area. It would be impossible to plan the sampling of an appropriate drill site more than a day or two in advance. Randomization and site selection were to take place a few days before sampling.

On June 20, 1986, the Department of Natural Resources notified the EPA contractor that it was unable to locate more than one drill site at or near completion for sampling. The single available appropriate site is considered a random sample because it was the only site known in the desired basin during the necessary time frame. No bias was introduced into the selection of this site. It was selected on the basis of availability. No information was available to indicate this site was an appropriate site for sampling.

The site was identified as Wexpro's The Island Unit No. 27 in the Uinta Basin. No problems were encountered arranging for sampling the Wexpro drill site on July 2, 1986.

Site Location

Wexpro Company's Island Unit No. 27 is located 15 miles southwest of Ouray, Utah. Figure 1 is a map indicating the drilling site.

The site is operated by Wexpro Company, whose mailing address and telephone number are:

PO Box 458
Rock Springs, WY 82902
Contact Name: Lee Martin
307-382-9791

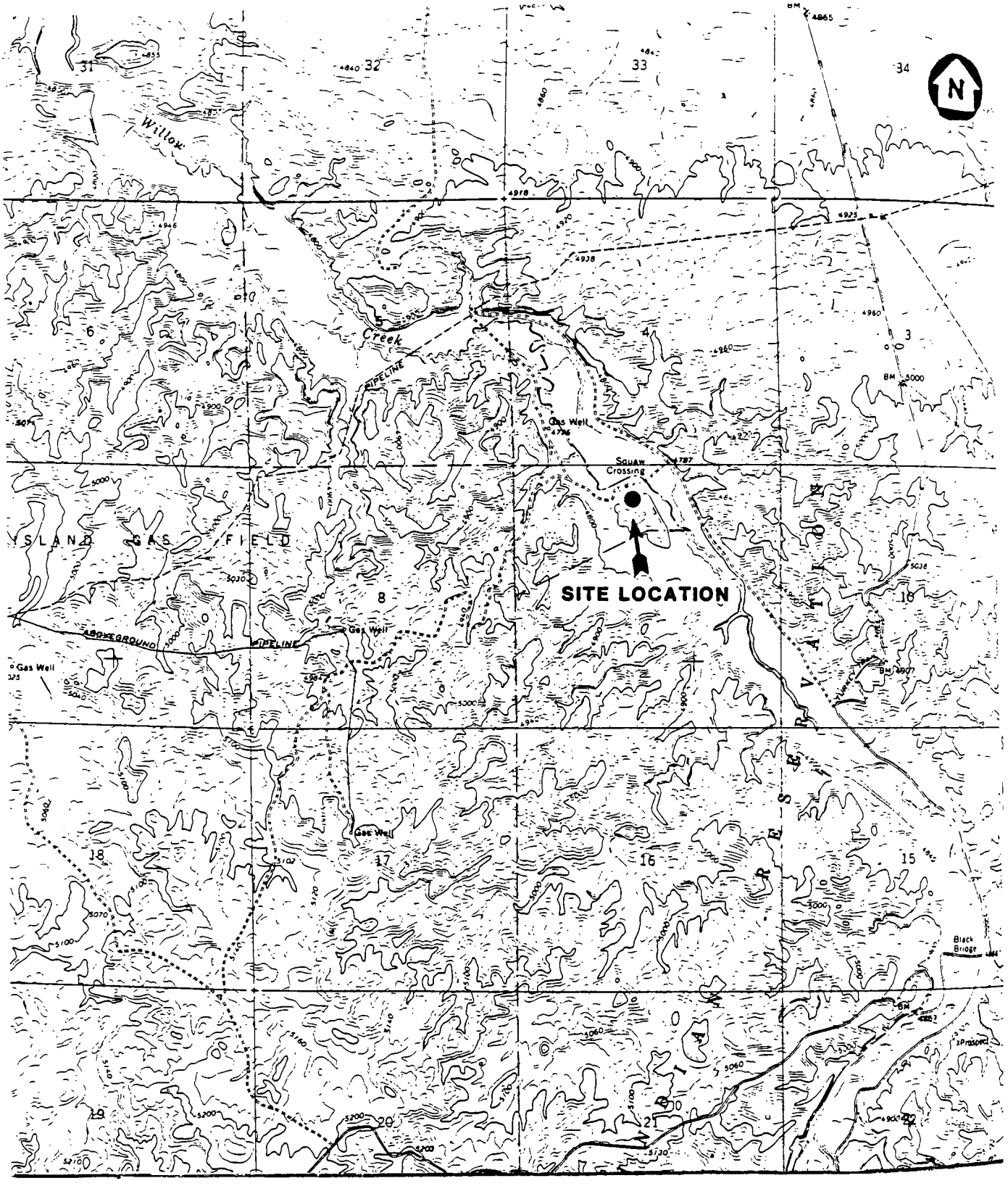


Figure 1. Location of Wexpro Island Unit #27, Uintah County, Utah

Attendees

Sampling of Wexpro Company's Island Unit No. 27 was performed by CENTEC Corporation personnel on July 2, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Andy Procko, Engineering Manager, Acting Technician
State Representatives:	Carol Kubly, Utah Dept. of Natural Resources; Oil, Gas & Mining Division Dan Jarvis, Utah Dept. of Natural Resources; Oil, Gas & Mining Division
Operator Representative:	No representative on location
American Petroleum Institute Representatives:	Maurice Jones, Contracted Observer Bob Zahray, Contracted Sample Team Member Shawn Hokanson, Contracted Sample Team Member

Site Description

Wexpro Company's Island Unit No. 27 is located within the Uinta Basin in an area of rural flatland. The nearest surface water is less than 1/2-mile away. There are no drinking water wells within a 1/2-mile radius of the site. The soil in this area is sand and clay. The climate at this site is net evaporation.

This site was a developmental gas drilling site. The well was completed on June 28, 1986 at a depth of 6,600 feet. Drilling was accomplished with gel chemical water based mud. No biocides were used in drilling. Fracturing was used as the completion process.

Figure 2 is a schematic diagram of the drilling site. One pit was constructed for the site. The pit dimensions were 122 feet long and 99 feet wide. The pit was constructed to be used as a reserve pit. There were no special pit construction requirements. Leak detection was not required. The pit was lined with a plastic liner of 2 mil thickness. The liner was not UV or puncture resistant. The pit received drilling muds, fresh water, completion fluids, and trash. The fluids were piped into the pit from drilling operations. The pit area was fenced. The pit construction was below grade. The sludge depth in the pit was 1/2 foot. The liquid level in the pit was 5 feet. Photo 1 (Attachment A) shows the well head at the site. Photo 2 shows the well head and the heater treater. Photo 3 shows the entire

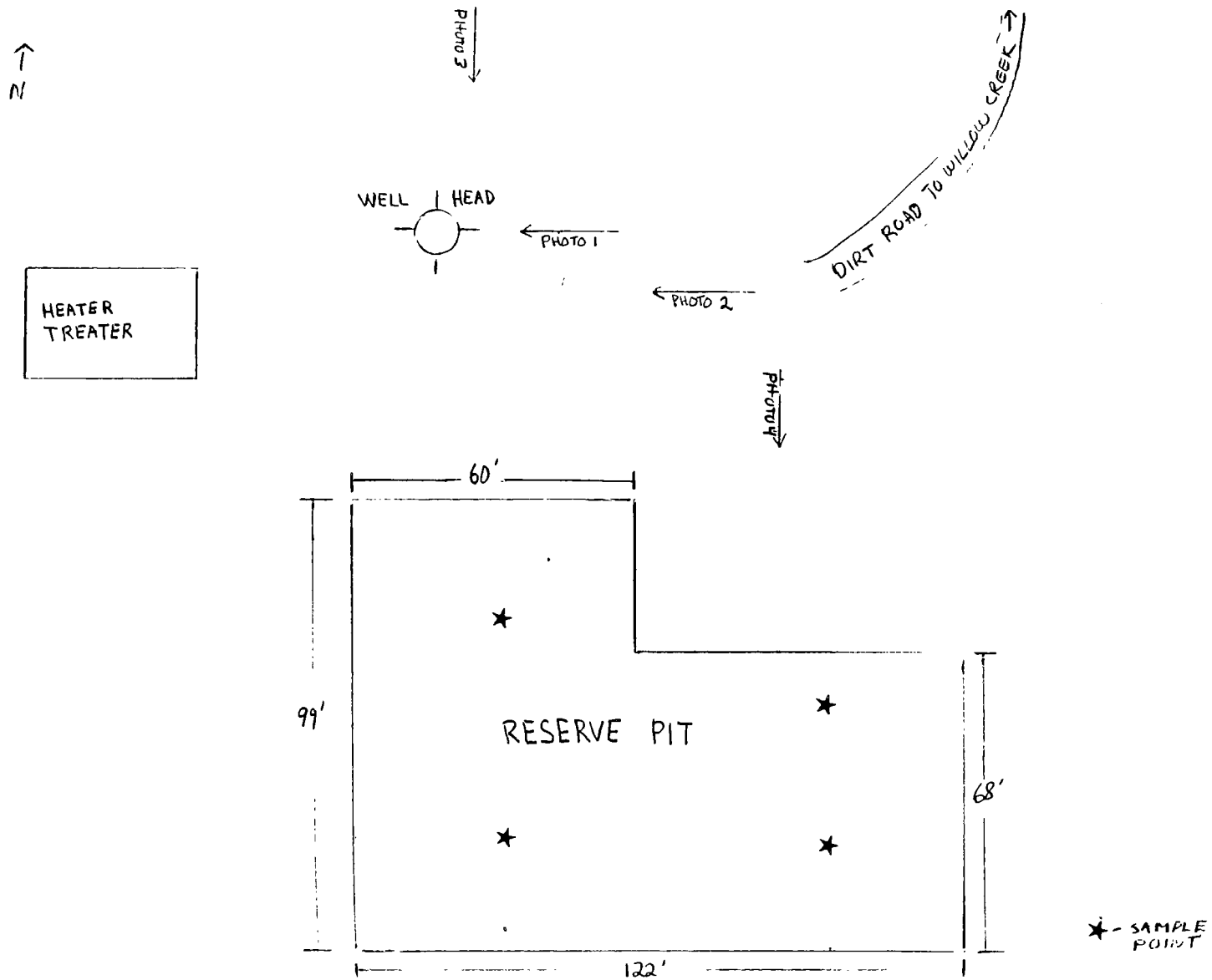


Figure 2. Schematic Diagram of Wexpro Company's Island Unit 27

site (well head, heater treater, and reserve pit). Photo 4 is a closeup of the reserve pit.

Disposal Practices

At the conclusion of drilling, all remaining drilling fluids were placed in the reserve pit. There was no testing of pit contents, nor was there treatment of pit contents. The pit fluids were not removed for final disposition. The liquid was evaporated. The dried pit solids were buried. The pit site was reclaimed by the addition of stockpiled topsoil and reseeding.

Permits

The well was drilled on Federal land. The permit for this facility is No. 43-047-31703 issued by the Bureau of Land Management on March 18, 1986. A copy of the permit and the drilling program are included in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The samples collected at Wexpro Company's Island Unit No. 27 consisted of one reserve pit supernatant sample and one pit sludge sample. Figure 2 shows the sampled pit and the location of the sample points. Four quadrants were established for supernatant and sludge sampling. Sample points were accessed by boat. There were no discrepancies between the actual and measured sample points.

Sampling Methods and Equipment

To collect samples from the reserve pit, the pit was measured to identify the four quadrants and to locate the center of each quadrant. The supernatant was collected from the boat with a liquid sampling thief. For sludge sampling, the coring tube was not used due to concern that the pit liner might be punctured. The sludge was sampled from the boat with a Ponar dredge.

The pit supernatant was tested onsite for pH after sampling was completed. Test results gave a pH value of 6. Due to time and travel constraints, the collected samples were held overnight in refrigeration prior to shipment.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

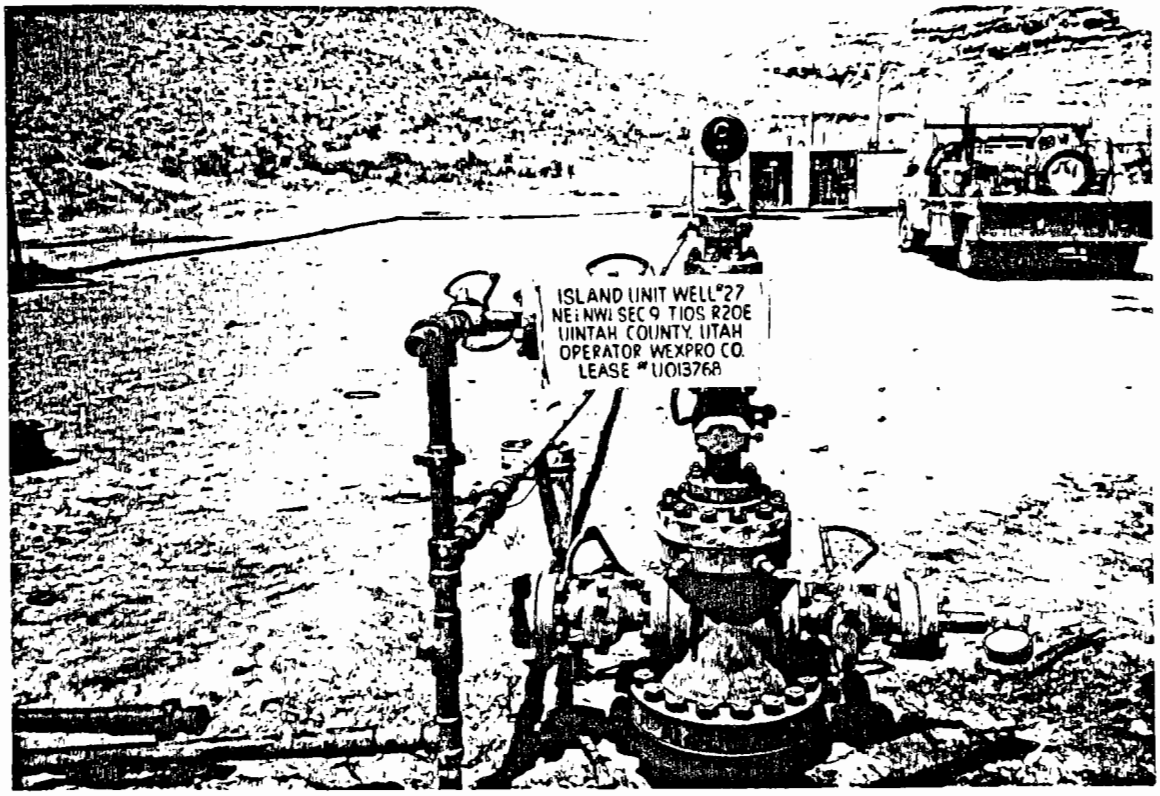


Photo 1. Well head

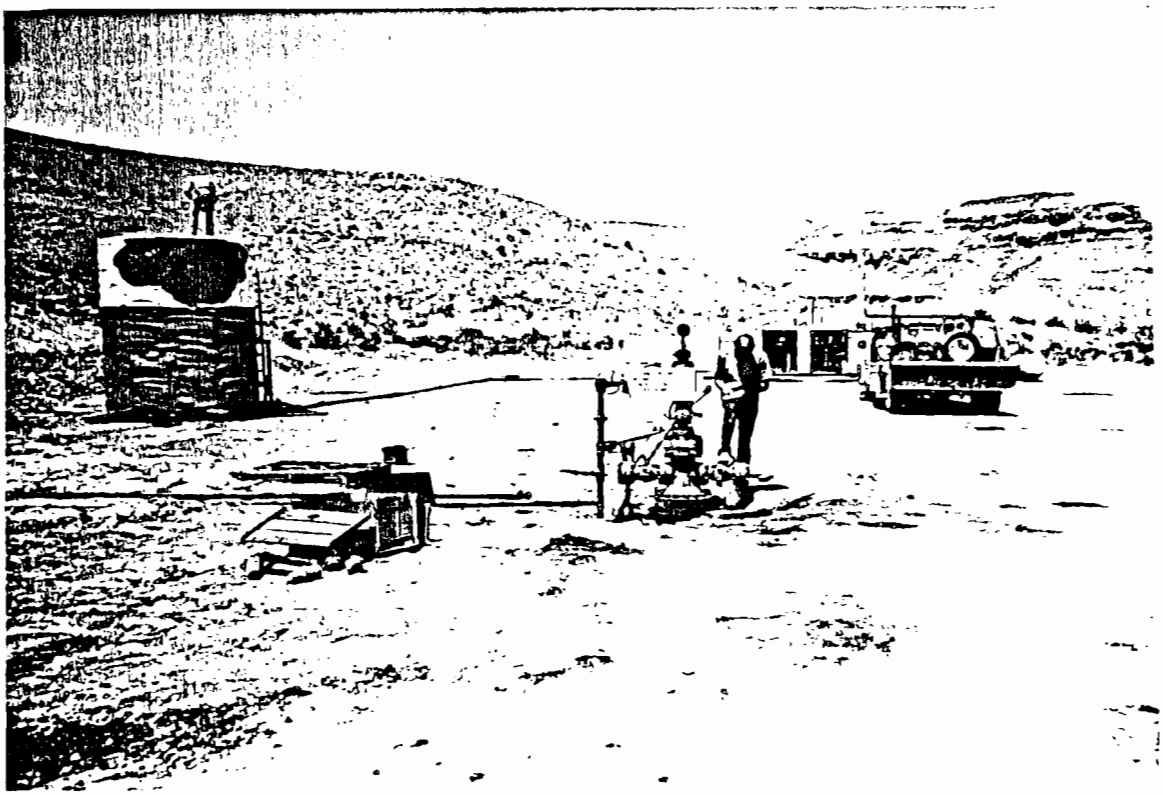


Photo 2. Well head and heater treater

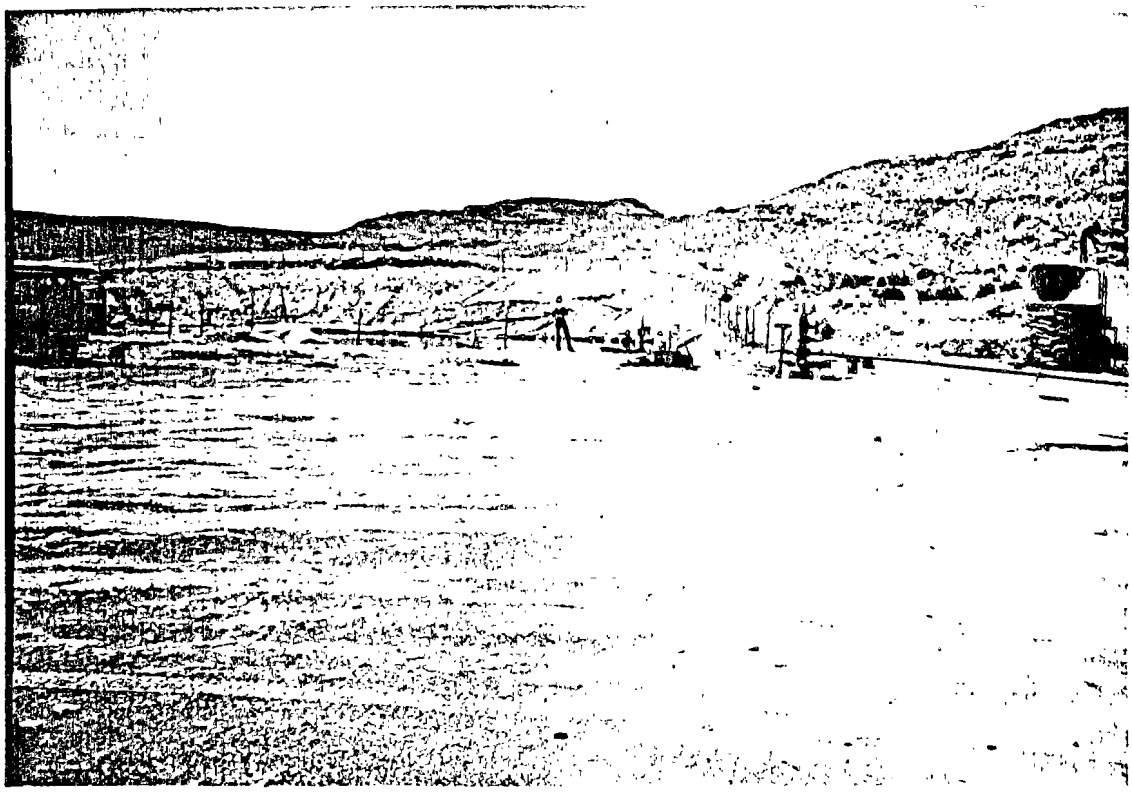


Photo 3. Reserve pit, well head, and heater treater

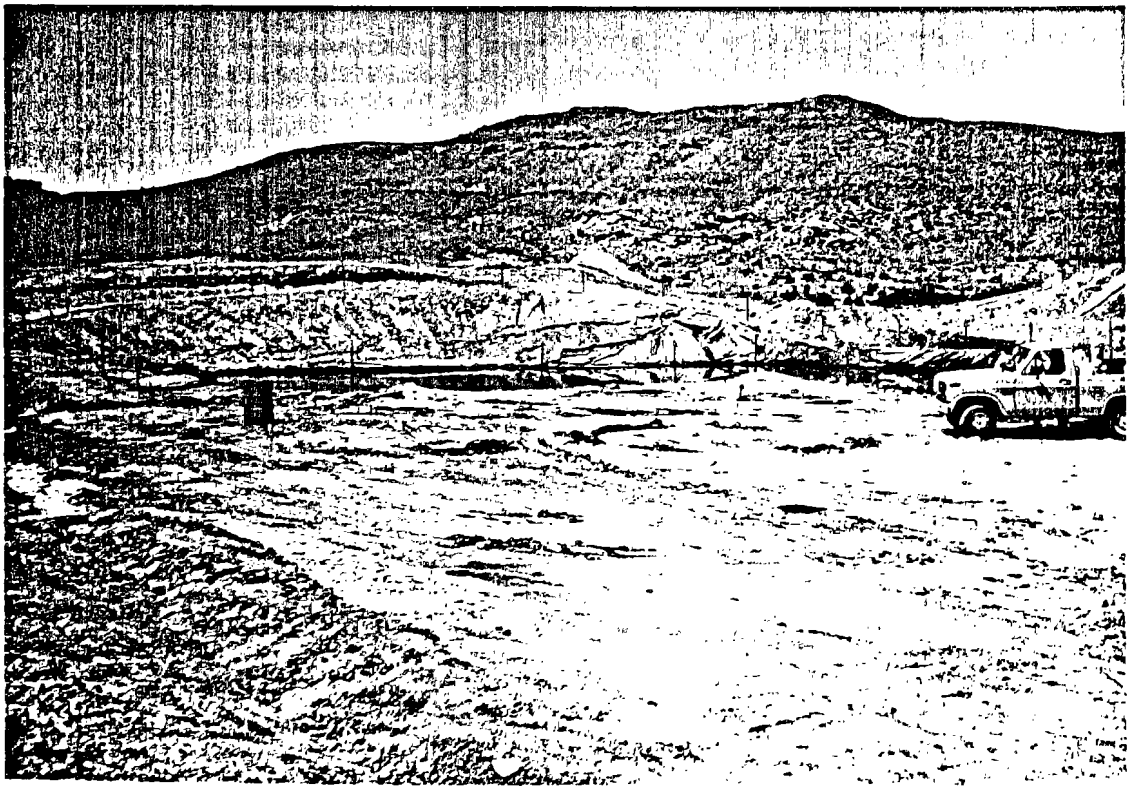


Photo 4. Reserve pit

ATTACHMENT B: PERMITS

Form 3160-4
(November 1983)
(formerly 9-330)

CORRECTED 7-9-86

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN DUPLICATE (See other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0137
Expires August 31, 1985

07150

RECEIVED
JUL 11 1986
DIVISION OF
OIL, GAS & MINING

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ DRY ☐ OTHER

1b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other

2. NAME OF OPERATOR: Wexpro Company

3. ADDRESS OF OPERATOR: P. O. Box 458, Rock Springs, Wyoming 82902

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: NE NW 1800' FWL, 845' FNL
At top prod. interval reported below
At total depth

5. LEASE DESIGNATION AND SERIAL NO.: U-013768
6. IF INDIAN, ALLOTTEE OR TRIBE NAME: ---
7. UNIT AGREEMENT NAME: Island
8. FARM OR LEASE NAME: Unit
9. WELL NO.: 27
10. FIELD AND POOL, OR WILDCAT: Island
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: 9-10S-20E

14. PERMIT NO.	DATE ISSUED	12. COUNTY OR PARISH	13. STATE
43-047-31703	3-18-86	Uintah	Utah

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
5-1-86	5-13-86	7-2-86	GR 4784' KB 4798.75'	

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
6600	6496		→	Yes	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 6266-6276', 6052-6062', 5892-5918', 5480-5505'

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN: FDC-CNL, DL, NGR, CBL-GR

27. WAS WELL CORED: No

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
9-5/8	36	314.09	12-1/4	310 sacks Class H	None
5	18	6599.32	7-7/8	640 sacks High Fill	None
				260 sacks 50-50 Pozmix	

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2-3/8	6228.79	

31. PERFORATION RECORD (Interval, size and number)
6266-6276' KBM 4 SPF .4" holes
6052-6062' KBM 4 SPF .4" holes
5892-5918' KBM 2 SPF .4" holes
5480-5505' KBM 2 SPF .4" holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
6266-6276	56,780 gal gel, 134,000# 16/30 mesh
6052-6062	59,000 gal gel, 125,000# 16/30 mesh
5892-5918	97,150 gal gel, 200,000# 16/30 mesh
5480-5505	97,480 gal gel, 200,000# 16/30 mesh

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
Awaiting Facil.	Flowing	Shut-in

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
7/2-3/86	23	48/64	→	0	511	72	--

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
320	800	→	0	533	75	---

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.): Vented

TEST WITNESSED BY: M. R. Sliger

35. LIST OF ATTACHMENTS

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED [signature] TITLE Director Pet. Eng. DATE July 3, 1986

*(See Instructions and Spaces for Additional Data on Reverse Side)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Form 3160-3
(November 1983)
(formerly 9-331C)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-01
Expires August 31, 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL N: U-013768

6. IF INDIAN, ALLOTTEE OR TRIBE NA: —

7. UNIT AGREEMENT NAME: Island

8. FARM OR LEASE NAME: Unit

9. WELL NO.: 27

10. FIELD AND POOL, OR WILDCAT: ~~Island~~ NAT. BUTT.

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: 9-10S-20E

1a. TYPE OF WORK: DRILL ☒ DEEPEN ☐ PLUG BACK ☐

b. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ OTHER SINGLE ZONE ☐ MULTIPLE ZONE ☐

2. NAME OF OPERATOR: Wexpro Company

3. ADDRESS OF OPERATOR: P. O. Box 458, Rock Springs, Wyoming 82902

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: NE NW 1800' FWL, 845' FNL
At proposed prod. zone:

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: Approximately 15 miles south and west of Ouray, Utah

12. COUNTY OR PARISH: Uintah

13. STATE: Utah

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 845'

16. NO. OF ACRES IN LEASE: 520

17. NO. OF ACRES ASSIGNED TO THIS WELL: NA

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: 2893'

19. PROPOSED DEPTH: 6,600' Wasatch

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): GR 4784'

22. APPROX. DATE WORK WILL START: March 1, 1986

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
12-1/4	9-5/8	36	300'	165 Sacks Regular Type G with additives
7-7/8	5-1/2	17	6,600'	50-50 Pozmix with additives

See attached drilling plan.

APPROVED BY THE STATE OF UTAH DIVISION OF OIL, GAS, AND MINING
DATE: 3-18-86
BY: John R. Baza
WELL SPACING: 203

RECEIVED
FEB 10 1986
DIVISION OF OIL, GAS & MINING

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED R. J. Maser TITLE Drilling Superintendent DATE 2-7-86

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

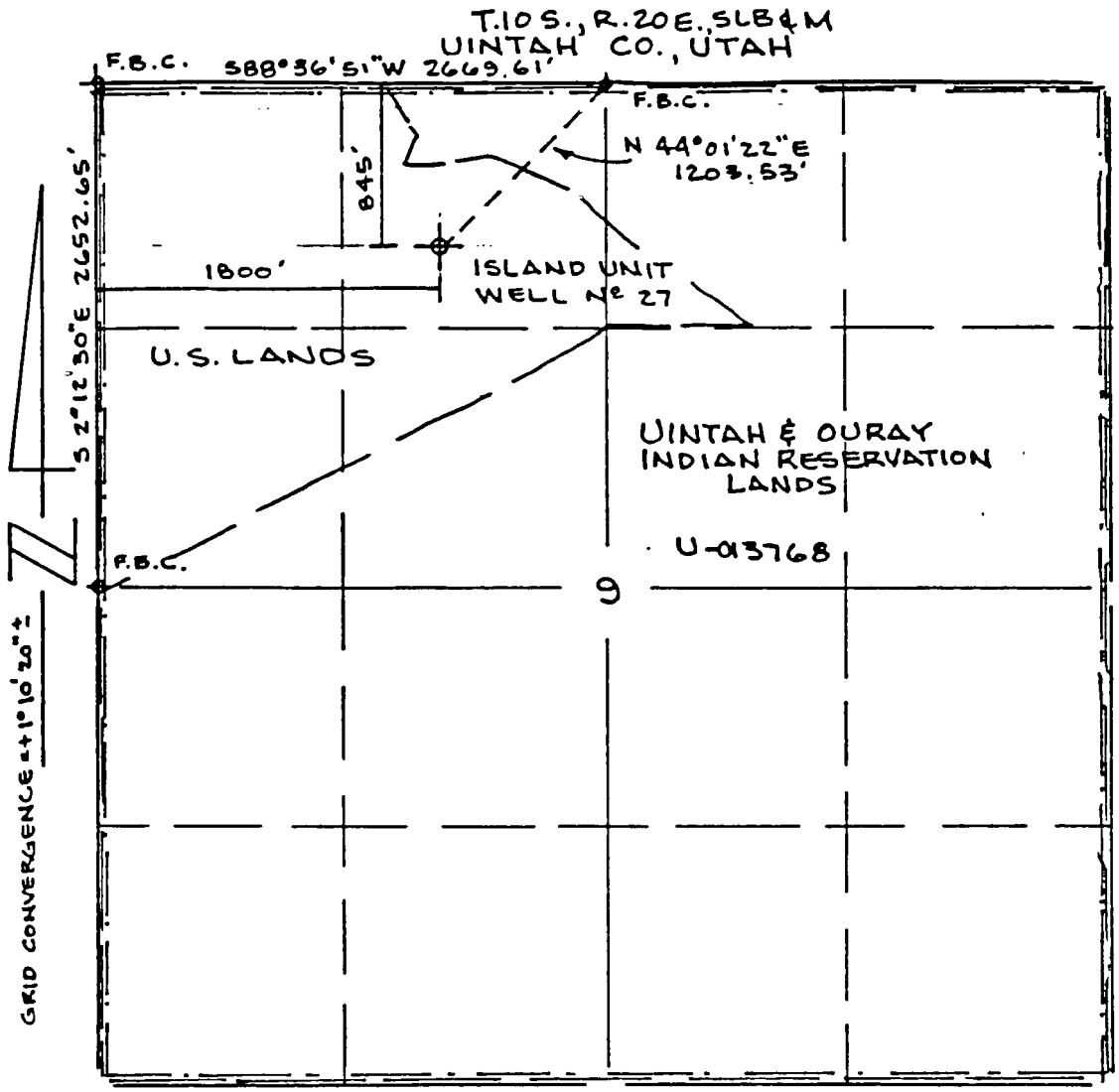
APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

C-1090

*See Instructions On Reverse Side

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the



All bearings reported herein referred to the Utah coordinate system, central zone, as determined by solar observation and convergence adjustment. All reported distances are surface distances.

NOTE:

LOCATION PLAN
SCALE 1" = 1000'

0 500' 1000' 2000'

LEGEND

- SURFACE OWNER BOUNDARY
- MINERAL LEASE BOUNDARY
- ℄ WELL LOCATION
- FD. BRASS CAP
- FD. STONE

NOTE: FOR SURFACE INFORMATION (ROADS, TOPO, DRAINAGE, ETC.) SEE AREA MAP.

THIS IS TO CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

2/7/86

LARRY G. BODYFELT, UTAH REG. L.S. Nº 6389

REGISTERED LAND SURVEYOR No. 6389 LARRY G. BODYFELT STATE OF UTAH

ENGINEERING RECORD		CERTIFIED WELL LOCATION PLAT FOR ISLAND UNIT WELL Nº 27	
SURVEYED: F.H. & M.K.K.	FIELD: ISLAND		
BASIS OF BEARING: SOLAR OBSERVATION			
SURFACE OWNER: UINTAH & OURAY INDIAN RES. LANDS			
MINERAL LEASE: U-013768			
LOCATION: NE 1/4 NW 1/4 SEC. 9, T.10S., R.20E., S.L.B&M 1800' FWL 845' FNL			
COUNTY: UINTAH	STATE: UTAH	DRAWN: 2-6-86 CRW	SCALE: 1" = 1000'
ELEVATION AS GRADED: 4784 FROM MAP SPOT. SET CONTROL POINT.		CHECKED:	DRWG. NO. M-25082
		APPROVED: 2/7/86	

Fig 3

DRILLING PLAN
Wexpro Company
Island Unit Well No. 27
Uintah County, Utah

1 & 2. SURFACE FORMATION, ESTIMATED TOPS AND WATER, OIL, GAS OR MINERAL BEARING FORMATIONS:

Uintah	-	Surface
Green River	-	1,140'
Birds Nest Aquifer	-	2,045'
Wasatch Tongue	-	4,120', gas or oil
Green River Tongue	-	4,465', gas or oil
Wasatch	-	4,610', gas
Chapita Wells Zone	-	5,430', objective, gas
Total Depth	-	6,600'

All fresh water and prospectively valuable minerals (as described by BLM at onsite) encountered during drilling, will be recorded by depth and adequately protected. All oil and gas shows will be tested to determined commercial potential.

3. PRESSURE CONTROL EQUIPMENT: (See attached diagram) Operator's minimum specifications for pressure control equipment requires an 11-inch 3000 psi double gate hydraulically operated blowout preventer and an 11-inch 3000 psi annular preventer. Ram-type preventers will be tested to 2000 psi and annular preventers will be tested to 1500 psi for 15 minutes using professional testing company. NOTE: The surface casing will be pressure tested to a minimum of 1000 psi; or one psi per foot; or 70 percent of the internal yield of the casing, whichever is applicable. BOP's will be checked daily as to mechanical operating condition and will be tested after each string of casing is run. All ram type preventers will have hand wheels which will be operative at the time the preventers are installed.

BOP systems will be consistent with API RP53. Pressure tests will be conducted before drilling out from under casing strings which have been set and cemented in place. Blowout preventer controls will be installed prior to drilling the surface casing plug and will remain in use until the well is completed or abandoned. Preventers will be inspected and operated at least daily to ensure good mechanical working order, and this inspection will be recorded on the daily drilling report. Preventers will be pressure tested before drilling casing cement plugs.

The District Office will be notified, with sufficient lead time, in order to have a BLM representative on location during pressure testing.

4. CASING PROGRAM:

Footage	Size	Grade	Wt.	Condition	Thread	Cement
300	9-5/8	K-55	36	New	8 rd ST&C	165 sacks Regular Type G with 3% calcium chloride and 1/4-pound flocele/sack; cement will be brought to surface.
6600	5-1/2	K-55	17	New	8 rd LT&C	Cement top will be brought 1000 feet from surface with 50-50 Pozmix with 8% gel, 0.2% Halad-24, 10% salt, 5 pounds gilsonite/sack and 1/4-pound flocele/sack, plus 1000 feet 50-50 Pozmix with 2% gel, 0.6% Halad-24, 10% salt and 1/4-pound flocele/sack

AUXILIARY EQUIPMENT:

a) Manually operated kelly cock
b) No floats at bit
c) Monitoring of mud system will be visual
d) Full opening floor valve manually operated

The District Office will be notified, with sufficient lead time, in order to have a BLM representative on location while running all casing strings and cementing.

5. MUD PROGRAM: A gel chemical water base mud will be used from surface casing to total depth.

Sufficient mud materials to maintain mud properties, control lost circulation and to contain blowout will be available at the wellsite.

No chromate additives will be used in the mud system on Federal and Indian lands without prior BLM approval to ensure adequate protection of fresh water aquifers.

6. LOGGING: DLL-SFL-GR from surface casing to total depth
BHC-Sonic with Caliper from surface casing to total depth
CNL-FDC-GR over zones of interest

TESTING: None.

CORING: None.

Daily drilling and completion reports shall be submitted to the Bureau of Land Management, Vernal, Utah on a weekly basis.

Whether the well is completed as a dry hole or as a producer, "Well Completion and Recompletion Report and Log" (Form 3160-4) will be submitted not later than 30 days after

completion of the well or after completion of operations bei performed, in accordance with 43 CFR 3164. Two copies of al logs, core descriptions, core analyses, well-test data, geologic summaries, sample description, and all other survey or data obtained and compiled during the drilling, workover, and/or completion operations, will be filed with Form 3160-4 Samples (cuttings, fluids, and/or gases) will be submitted when requested by the authorized officer (AO).

7. ABNORMAL PRESSURE AND TEMPERATURE: No abnormal pressures ar expected; a BHT of 150°F. and a BHP of 3370 psi are anticipated.

8. ANTICIPATED STARTING DATE: March 1, 1986

DURATION OF OPERATION: 12 days drilling

No location will be constructed or moved, no well will be plugged, and no drilling or workover equipment will be remov from a well to be placed in a suspended status without prior approval of the AO. If operations are to be suspended, prio approval of the AO will be obtained and notification given before resumption of operations.

The spud date will be reported orally to the AO within 48 hours after spudding. If the spudding occurs on a weekend or holiday, the report will be submitted on the following regula work day. The oral report will be followed up with a Sundry Notice.

In accordance with Onshore Oil and Gas Order No. 1, this well will be reported on Form 3160-6 "Monthly Report of Operations", starting with the month in which operations commence and continue each month until the well is physically plugged and abandoned. This report will be filed with the Vernal BLM District Office, 170 South 500 East, Vernal, Utah 84078.

Immediate Report: Spills, blowouts, fires, leaks, accidents, or any other unusual occurrences shall be promptly reported i accordance with the requirements of NTL-3A or its revision.

If a replacement rig is contemplated for completion operations, a "Sundry Notice" (Form 3160-5) to that effect will be filed, for prior approval of the AO, and all conditions of this approval plan are applicable during all operations conducted with the replacement rig.

Should the well be successfully completed for production, the AO will be notified when the well is placed in a producing status. Such notification will be sent by telegram or other written communication, not later than five days following the date on which the well is placed on production.

Pursuant to NTL-2B, with the approval of the District Engineer, produced water may be temporarily disposed of into unlined pits for a period of up to 90 days. During the period so authorized, an application for approval of the permanent disposal method, along with the required water analysis and other information, will be submitted to the District Engineer.

Pursuant to NTL-4A, lessees or operators are authorized to vent/flare gas during initial well evaluation tests, not exceeding a priod of 30 days or the production of 50 MMCF of gas, whichever occurs first. An application will be filed with the District Engineer and approval received, for any venting/flaring of gas beyond the initial 30 day or authorized test period.

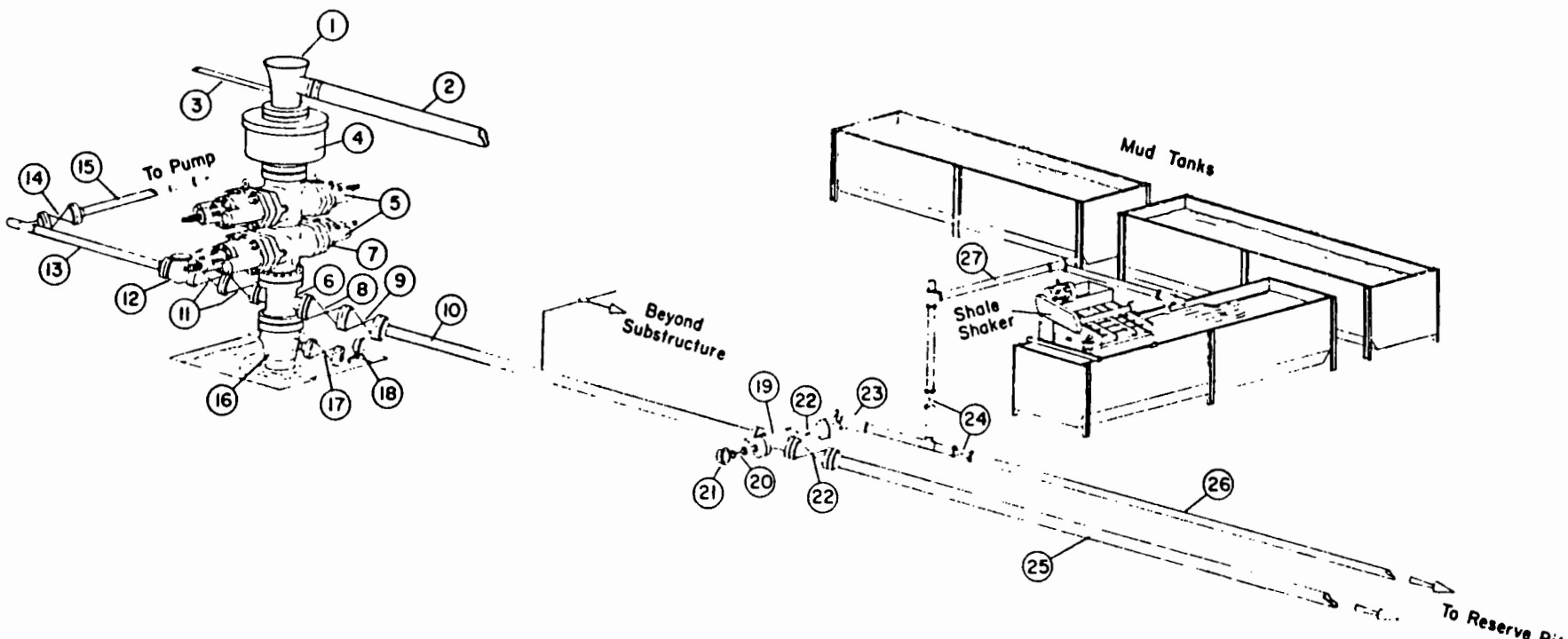
A schematic facilities diagram as required by 43 CFR 3162.7-2, 3162.7-3, and 3162.7-4 shall be submitted to the appropriate District Office within 30 days of installation or first production, whichever occurs first. All site security regulations as specified in 43 CFR 3162.7 shall be adhered to. All product lines entering and leaving hydrocarbon storage tanks will be effectively sealed in accordance with 43 CFR 3162.7-4.

A first production conference will be scheduled within 15 days after receipt of the first production notice.

No well abandonment operations will be commenced without the prior approval of the AO. In the case of newly drilled dry holes or failures, and in emergency situations, oral approval will be obtained from the SO. A "Subsequent Report of Abandonment" Form 3160-5, will be filed with the AO within 30 days following completion of the well for abandonment. This report will indicate where plugs were placed and the current status of surface restoration. Final abandonment will not be approved until the surface reclamation work required by the approved APD or approved abandonment notice has been completed to the satisfaction of the AO or his representative, or the appropriate Surface Managing Agency.

Pursuant to Onshore Oil and Gas Order No. 1, lessees and operators have the responsibility to see that their exploration, development, production, and construction operations are conducted in a manner which conforms with applicable Federal laws and regulations and with State and local laws and regulations to the extent that such State and local laws are applicable to operations on Federal or Indian lands.

CELSIUS/WEXPRO
3000 psi BLOWOUT PREVENTION EQUIPMENT



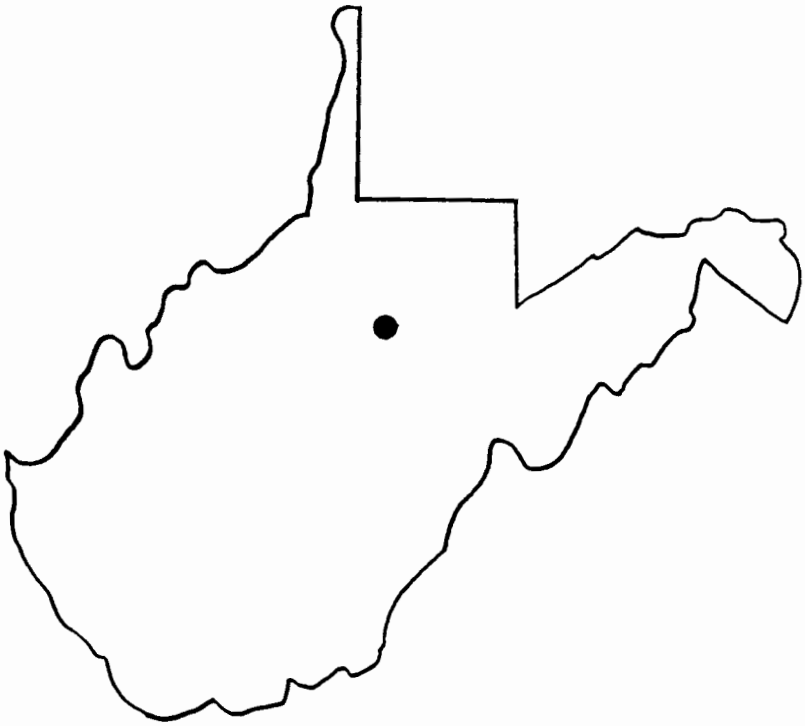
STANDARD STACK REQUIREMENTS

№	ITEM	NOMINAL	ID	TYPE	FURNISHED BY	
					OPER.	CONTR.
1	Drilling Nipple (Rotating Head when air drilling)					
2	Flowline					
3	Fill up Line (eliminated for air drilling)	2"				
4	Annular Preventer			Hydril Cameron Shaffer		
5	Two Single or One dual Hydril oper rams.			U.ORC, F.LWS, R.F		
6	Drilling spool with 3" and 2" outlets			Forged		
7	As Alternate to (6) Run & Kill and Choke lines from outlets in this ram					
8	Gate Valve		3-1/8			
9	Valve-hydraulically operated (Gate)		3-1/8			
10	Choke Line	3"				
11	Gate Valves		2-1/16			
12	Check Valve		2-1/16			
13	Kill Line	2"				
14	Gate Valve		2-1/16			
15	Kill Line to Pumps	2"				
16	Casing Head					
17	Valve Gate ____ Plug ____		1-13/16			
18	Compound Pressure Cage					
	Wear Bushing					

STANDARD CHOKE AND KILL REQUIREMENTS

Nº	ITEM	NOMINAL	ID	TYPE	FURNISHED BY	
					OPER.	CONTR.
19	Cross 3" X 3" 3" X 2"					
20	Gate Valve		1-13/16			
21	Compound Pressure Gage					
22	Gate Valves		3-1/8			
23	Choke Cam H-2 or equilivent	3"	2"			
24	Gate Valves		3-1/8"			
25	Line	3"				
26	Line	3"				
27	Line	3"				

WEST VIRGINIA



Sampling Report
Investigation of Scott Oil Company's
Garvin Lease Well No. S-614
Jane Lew, West Virginia
August 19, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of Appalachian Basin drill sites developed by the West Virginia Department of Natural Resources Division of Oil and Gas, at the request of EPA. The list was transmitted via telephone to the EPA contractor on August 11, 1986. Randomization and selection took place during the telephone conversation.

The EPA contractor had no interest in the manner the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites.

The Division of Oil and Gas listed the possible sample sites by permit number at their preference, as shown below. The list consisted of twelve drilling sites in the Appalachian Basin:

1. 17-3489
2. 17-3458
3. 17-3483
4. 17-3504
5. 21-4429
6. 21-1774
7. 39-4329
8. 39-4330
9. 39-4331
10. 41-3712
11. 41-3728
12. 41-3730

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. The randomly-selected primary site was No. 1 on the above list (permit no. 17-3489). No. 10 on the above list (permit no. 41-3712) was selected as a back-up site in the event the primary site was inaccessible or inappropriate.

Further inquiry identified the primary sample site as an inappropriate site. The site had been drilled, but fracturing would not be completed by the scheduled date for sampling. Thus, the back-up site was investigated.

The back-up site was identified as Scott Oil Company's Garvin Lease Well No. S-614, at Jane Lew, West Virginia. No problems were encountered in arranging sampling for August 19, 1986.

A second back-up site was randomly selected (permit no. 17-3504). The site was identified as Consolidated Natural Gas Operating Company's drill site in Doddridge County. The back-up site was not required.

Site Location

The Garvin Lease Well No. S-614 is located approximately one-tenth of a mile east of the intersection of Highway 79 and County Road 8 in Jane Lew, West Virginia. Figure 1 is a map indicating the drilling site. The full name and mailing address for Scott Oil is:

Scott Oil Company
P.O. Box 112
Salem, WV 26426
Main Office Contact: John T. Haskins
Vice President
Phone: 304-623-9600

Attendees

Sampling at the Exxon site was performed by CENTEC Corporation personnel on August 19, 1986. Following is a list of people present at the time of sampling:

CENTEC Corp. (Sample Team):	Jim Kourmadas, Technician Jamie McIntyre, Team Leader
EPA Representatives:	Susan de Nagy, Office of Water, Project Officer Truett DeGeare, Chief, Special Wastes Branch Dan Derkics, Chief, Large Volumes Section
State Representatives:	Ted Streit, Deputy Director, Division of Oil and Gas John Johnston, Director, Division of Oil and Gas Roger Steward, Chief Inspector, Division of Oil and Gas Steve Casey, Inspector, Division of Oil and Gas Mike Underwood, Inspector, Division of Oil and Gas

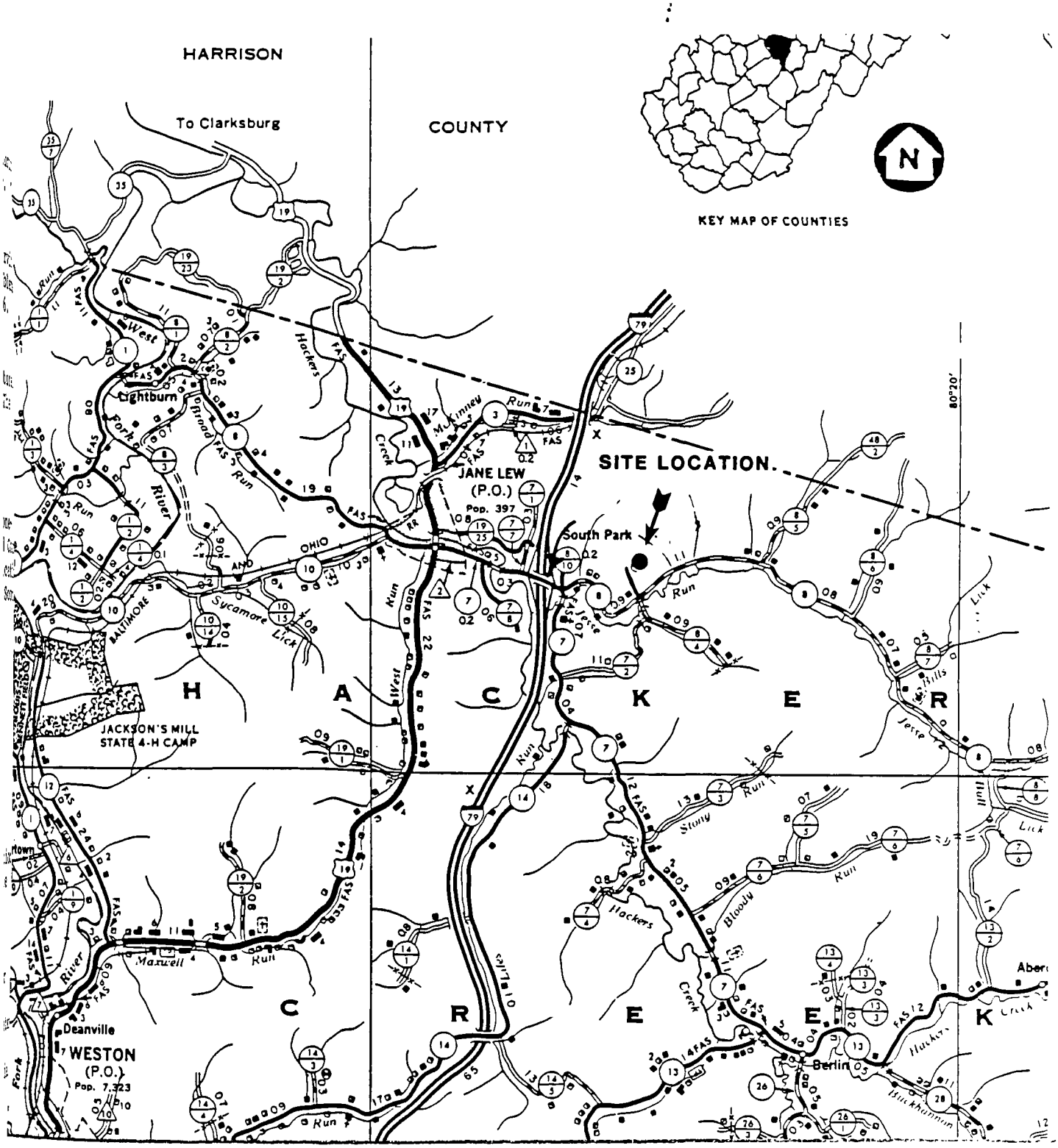


Figure 1. Location of Scott Oil Company's Garvin Lease Well #S-614, Jane Lew, West Virginia

Operator Representative:	John Haskins, Vice President
American Petroleum Institute Representatives:	George Holliday, Contracted Observer Alan Willson, Contracted Sample Team Member Kyle Hodges, Contracted Sample Team Member
Other Observers:	Rex Bruford (and wife), Executive Secretary of the West Va. Oil and Natural Gas Association Richard Cook, Consolidated Gas Joe Petty, Union Oil Dave Flannery, Attorney, Robinson and McElwee Fred Kolb, Kolb Enterprises

Site Description

The Garvin Lease site is located in a rural, mountainous area. The climate at this site location is net precipitation. The soil is described as clay. The site is located over the Benson formation of the Appalachian basin. Figure 2 is a survey of the exact location of the hole.

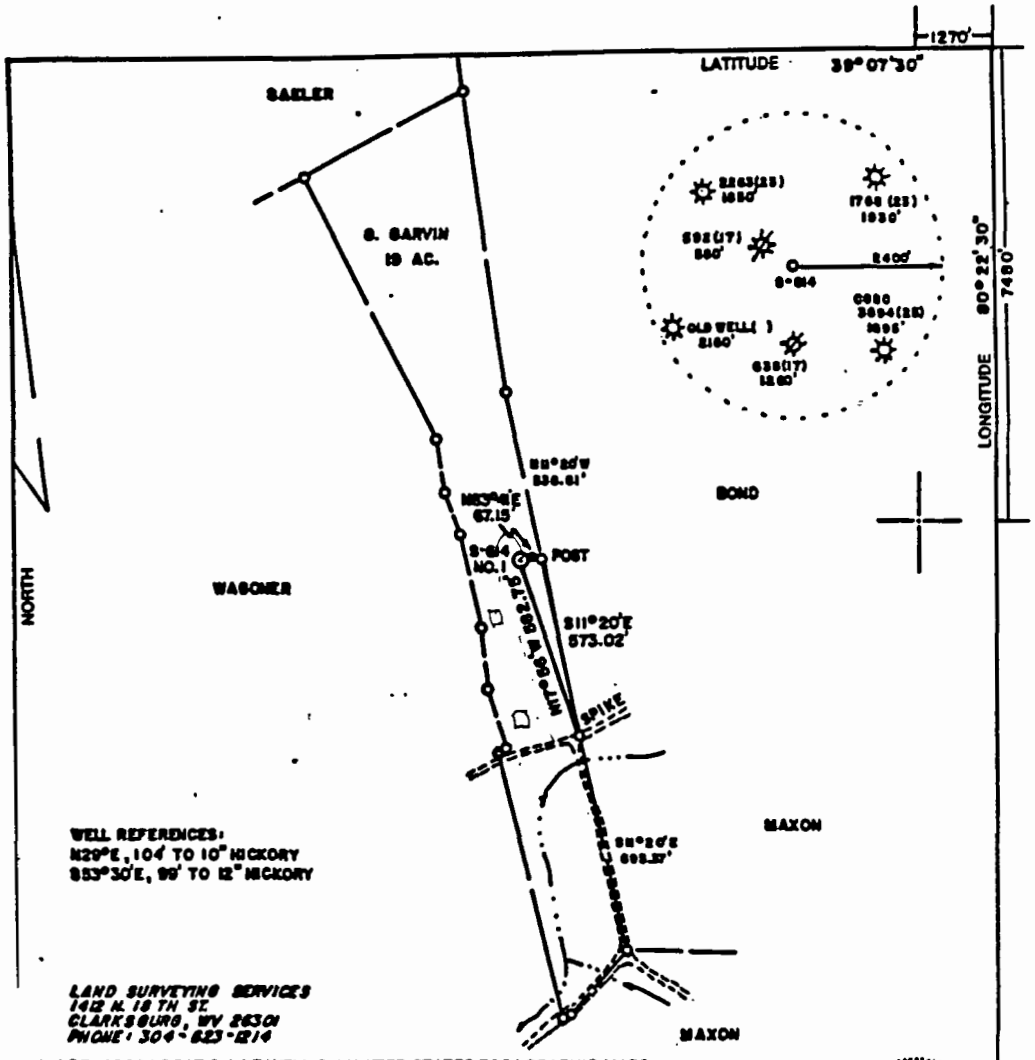
The depth to the groundwater in the area is over 100 feet. The nearest surface water is a stream located less than 1/2 mile from the site. There are two drinking water wells located within a 1/4-mile radius of the site, and two drinking water wells between 1/4 and 1/2 mile from the site.

At the time of sampling, the site consisted of one gas well, one completion fluids tank, and one reserve pit. The well had been drilled but was not in production at the time of sampling. The drill rig had been removed from the site. Figure 3 is an approximate schematic diagram of the site, indicating the directions in which photos were taken (Attachment A).

This site was a developmental oil drilling site. The well was completed at 5,867 feet. Drilling began on July 26, 1986 and the well was completed August 8, 1986.

Drilling was accomplished using air rotary drilling. The Benson formation was fractured in the well with fresh water stored onsite in a tank. The tank was empty at the time of sampling, and is shown in Photo 5 to the far right.

One unlined pit was constructed onsite to provide temporary storage of drill cuttings, fresh water, and produced brine. The operator stated that there was 80 percent fresh water to 20



FILE NO. _____
DRAWING NO. _____
SCALE 1" = 400'
MINIMUM DEGREE OF ACCURACY 1 in 200
PROVEN SOURCE OF ELEVATION TOP OF KNOB 2800'S.
OF LOCATION ELEV. = 1209'

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENERGY.
(SIGNED) _____
R.P.E. _____ L.L.S. 674
STEPHEN D. LOSH

PLACE SEAL HERE

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
OIL AND GAS DIVISION

DATE MAY 06, 19 86
OPERATOR'S WELL NO. S-614
API WELL NO. GARVIN NO. 1
47 - 041 - 3712
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS,") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1084' WATER SHED JESSE RUN
DISTRICT HACKERS CREEK COUNTY LEWIS
QUADRANGLE WESTON 7.5 min.
SURFACE OWNER Sylvia L. GODFREY ACREAGE 19
OIL & GAS ROYALTY OWNER GEORGE GARVIN LEASE ACREAGE 19
LEASE NO. 1935
PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE ___ PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE IN WELL (SPECIFY) _____
PLUG AND ABANDON ___ CLEAN OUT AND REPLUG ___
TARGET FORMATION ELK/BENSON/BAYARD ESTIMATED DEPTH 3400'
WELL OPERATOR SCOTT OIL COMPANY DESIGNATED AGENT DARREL WRIGHT
ADDRESS P.O. BOX 112 ADDRESS P.O. BOX 112
SALEM, WV 26426 SALEM, WV 26426

COUNTY NAME
PERMIT

Figure 2. Survey of Well Location
(size of copy has been reduced)

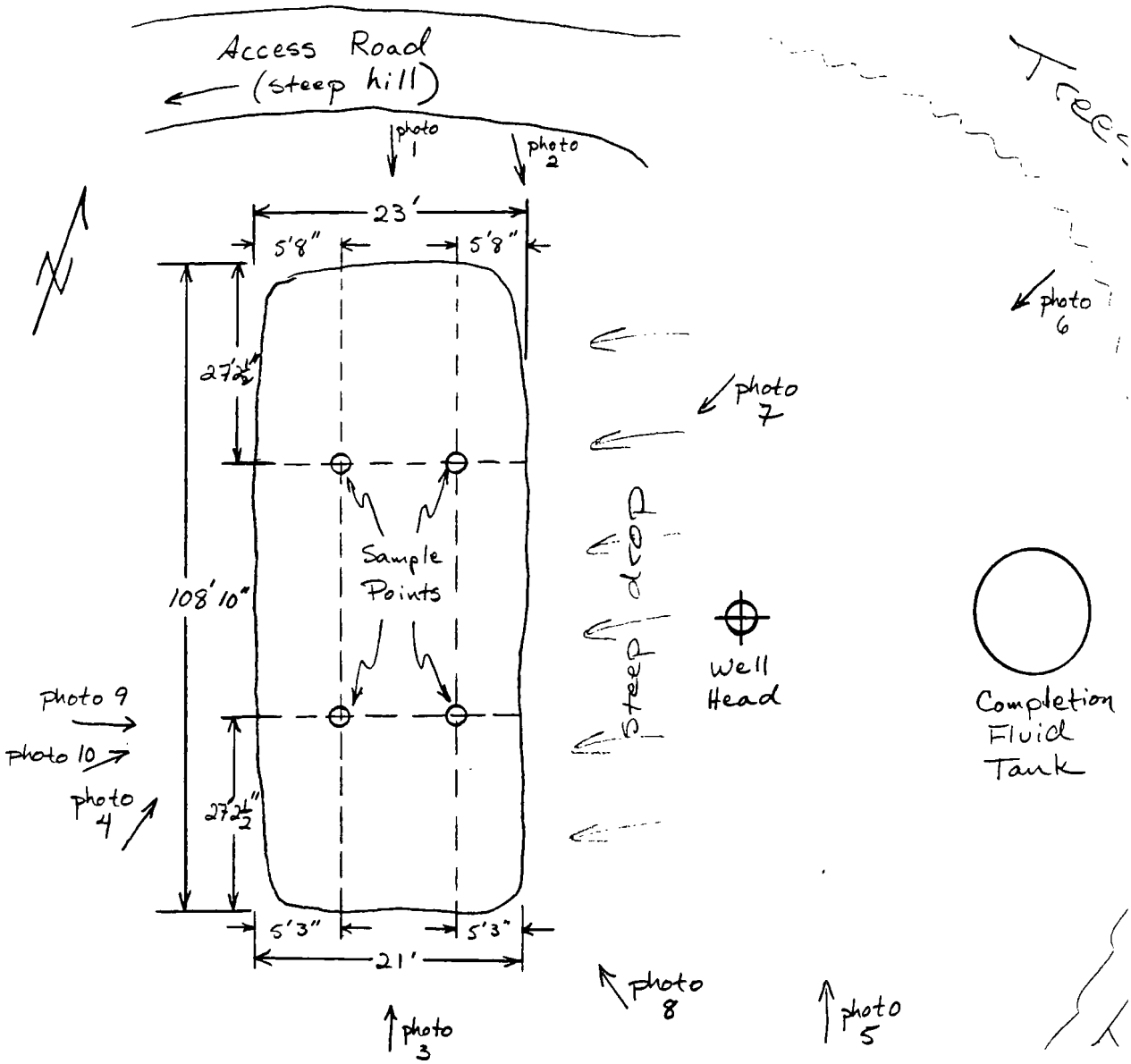


Figure 3. Schematic Diagram of Drilling Site

percent brine in the pit. The pit contents were piped from the drilling operation. The pit was in use between July 26 and August 8, 1986.

The pit was constructed both above and below grade due to an upward slope from southwest to northeast. Photo 1 shows the difference between the southwest and northeast sides of the pit.

The pit had been treated prior to sampling. Treatment included pH adjustment with lime (to a pH of 11.3), aeration and mixing of the entire pit contents. Treatments occurred after drilling and after completion. Field and laboratory tests were performed on the pit contents before and after treatment, and included the following analyses; pH, dissolved oxygen, chloride, iron, manganese, specific conductivity, total suspended solids, and total organic carbon. Figure 4 is a copy of a laboratory report on a sample taken from the pit on August 14, 1986, 5 days before the CENTEC team sampled the pit.

At the time of sampling, the average depth of the fluid in the pit was 1-1/2 feet. The average depth of the sludge was 4 feet. The liquid appeared clear with a greenish tint, shown in Photo 11, and the sludge had the consistency of pudding.

Disposal Practices

The liquid in the pit was to be land applied, although the specific land destination was not identified by the operator. The solids would remain in the pit, and the pit would be backfilled. The area would be restored to nearly its original state, including revegetation.

Permits

Copies of the drilling permit and the Construction and Reclamation Plan submitted by Scott Oil Company for Garvin Lease Well No. S-614 are located in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005).

Sample Point Locations

At the Garvin Lease site, the samples were defined as the supernatant and solid contents of the waste material in the reserve pit. Figure 4 indicates the location of the sample points from which the pit samples were composited.

RELIANCE LABORATORIES, INC. ORIGINAL DOCUMENT

304/842-5285

WATER • WASTE WATER • SOILS • COAL • HAZARDOUS WASTE • AIR • ORE

P.O. BOX 625
BENEDUM INDUSTRIAL PARK
BRIDGEPORT, WV 26330

August 14, 1986

SCOTT OIL COMPANY
P. O. Box 112
Salem, WV 26426

Sample I.D.: Garvin
Lab. Number: W-26664-86

pH SM 423*	11.71	(Std. Units)
Iron SM 315 A, 315 B*	1.19	mg/l
Manganese SM 319 A, 319 B*	0.20	mg/l
Chloride SM 407 A, 407 C*	1980	mg/l
Specific Conductivity SM 205*	5000	umhos/cm
Total Suspended Solids SM 209 C*	78	mg/l
Total Settleable Solids SM 209 F*	0.1	ml/l
Total Organic Carbon SM 505*	105.0	mg/l

Date Sampled: August 12, 1986
Date Sample Received: August 12, 1986
Date Sample Analyzed: August 12, 1986
Analyst: B. Plemons

Approval _____
William F. Kirk, Jr.

* Method Code Standard Methods 15th Ed: US EPA Methods 600/4-79-020, Rev. 83.

Figure 4. Laboratory Report on Reserve Pit Sample

Sampling Methods and Equipment

To collect samples from the reserve pit, the pit was measured to identify the four quadrants shown in Figure 3, and to locate the center of each quadrant. The measured points were marked by placing stakes along the sides of the pit to facilitate locating sample points.

The sample points were accessed by boat. The boat was pulled to the measured sample points via three ropes, as shown in Photos 7 through 10. Observers volunteered to assist with the ropes.

The first sample to be collected was the liquid composite. Photo 9 shows the sample team taking a thief sample. Care was taken not to allow silt from the sludge layer under the liquid to enter the thief. The liquid from each sample point was composited in a 5-gallon carboy.

The reserve pit was then sampled for sludge. The coring device was used to sample the sludge with a 5-foot extension rod attached. The device sank into the sludge such that 1 foot of the rod remained above the liquid surface. Since the total length of the rod and coring device is 6 feet, 8 inches and assuming the average liquid depth to be 1-1/2 feet, the depth of the sludge was determined to be 4 feet, 2 inches. The coring device was nearly full each time it was retrieved from the sludge, suggesting that the pit contents were approximately homogenous. Four 1-quart core samples were taken at each quadrant, and were composited in a steel bucket. The total volume was approximately 4 gallons.

Tests for the pH and free chlorine content of the pit samples were conducted onsite after sampling was completed. The pH of both pit samples was 9. The free chlorine content of the liquid was less than 0.2 ppm (the lowest detectable level).

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

Photo 1. Southeasterly view of reserve pit

Photo 2. Drill pad (left) and reserve pit (right)

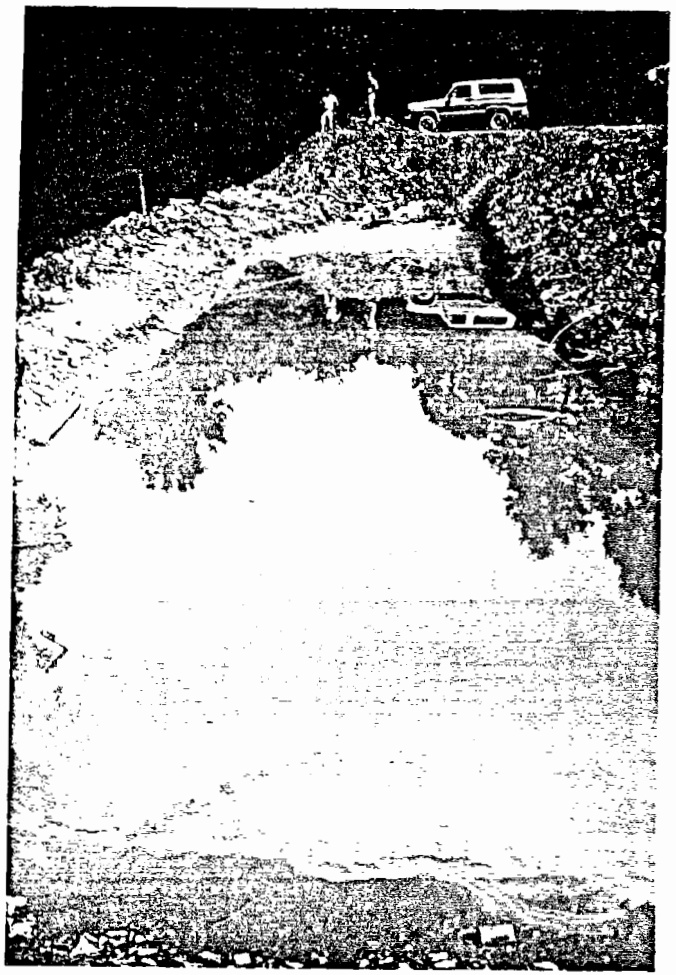


Photo 3. Northwesterly view of reserve pit

Photo 4. Northerly view across reserve pit

Photo 5. Northwesterly view across drill pad (well head just left of center)

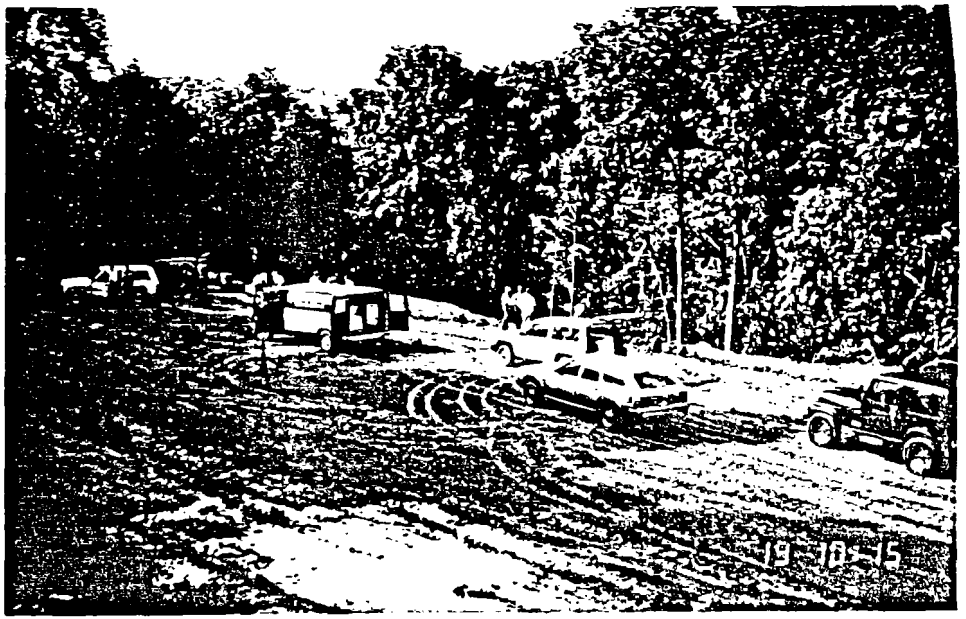


Photo 6. Southerly view of drill pad

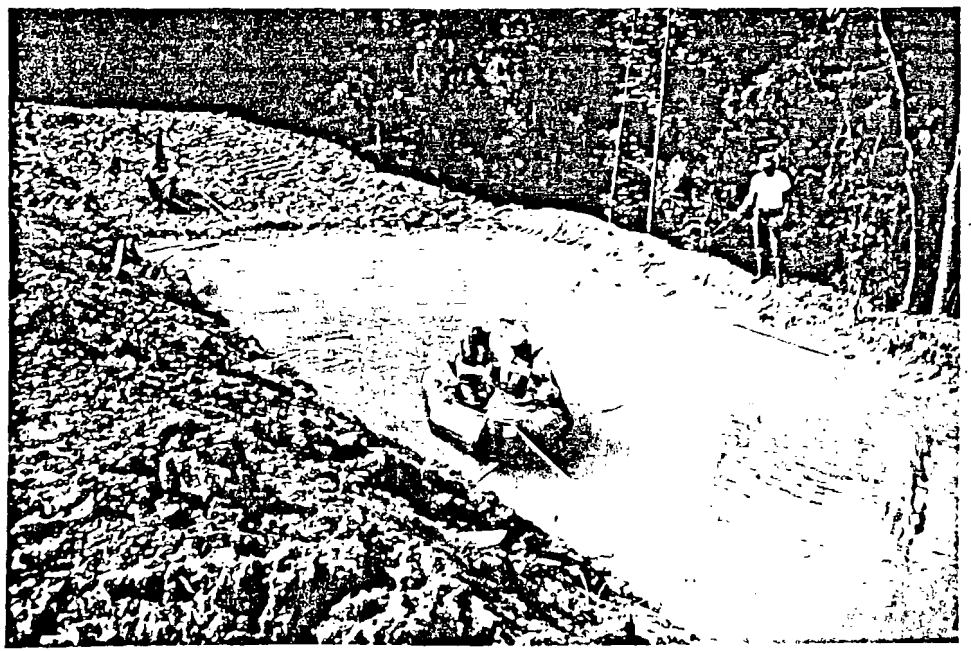


Photo 7. Sampling reserve pit

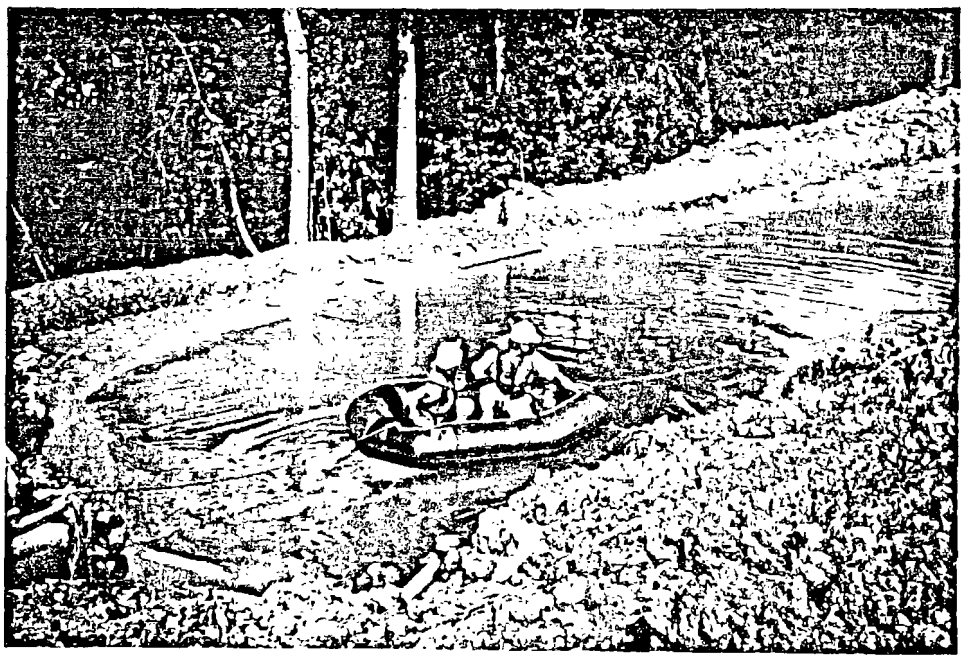


Photo 8. Sampling reserve pit

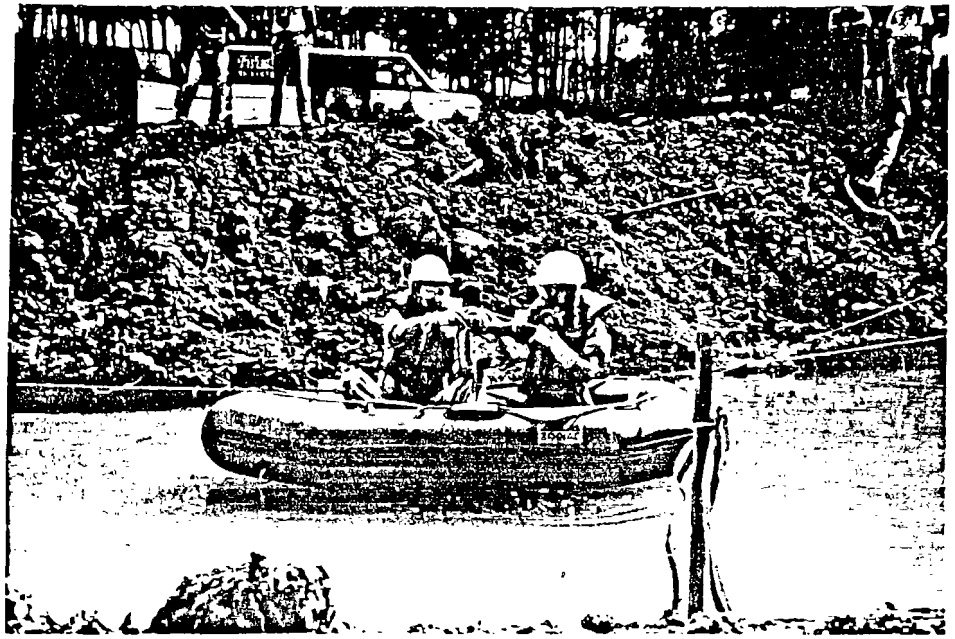


Photo 9. Liquid sampling with thief

Photo 10. Liquid sampling with thief

ATTACHMENT B: PERMITS

FORM WW-2(B) PERMIT COPY
(Obverse)
7/85

1) Date: _____, 19____
2) Operator's Well No. S-614 George Garvin #1
3) API Well No. 47 -041-3712
State County Permit

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY, OIL AND GAS DIVISION
APPLICATION FOR A WELL WORK PERMIT

4) WELL TYPE: A Oil ____ / Gas X /
B (If "Gas", Production X / Underground storage ____ / Deep ____ / Shallow X /

5) LOCATION: Elevation: 1084 Watershed: Jessie Run
District: Hackers Creek 4 County: Lewis Quadrangle: Weston 7.5 669

6) WELL OPERATOR Scott Oil Co. CODE 4315
Address P. O. Box 112
Salem, WV 26426

7) DESIGNATED AGENT Darrel Wright
Address P. O. Box 112
Salem, WV 26426

8) OIL & GAS INSPECTOR TO BE NOTIFIED
Name Stephen Casey
Address Route 2
Jane Lew, WV

9) DRILLING CONTRACTOR:
Name
Address

10) PROPOSED WELL WORK: Drill X / Drill deeper ____ / Redrill ____ / Stimulate X /
Plug off old formation ____ / Perforate new formation ____ /
Other physical change in well (specify) ____

11) GEOLOGICAL TARGET FORMATION Elk/Benson/Bayard
12) Estimated depth of completed well, 5400 feet
13) Approximate trata depths: Fresh, ≈504 feet; salt, ≈1264 feet.
14) Approximate coal seam depths: ≈551 Is coal being mined in the area? Yes ____ / No X /

15) CASING AND TUBING PROGRAM

CASING OR TUBING TYPE	SPECIFICATIONS Size	Grade	Weight per ft.	New	Used	FOOTAGE INTERVALS For drilling	Left in well	CEMENT FILL-UP OR SACKS (Cubic feet)	PACKERS
Conductor	11 3/4					30'			Kinds
Fresh water									
Coal									Sizes
Intermediate	8 5/8						650'	to surface	Per Rule 15.05
Production	4 1/2						5400'	300 sks	Depths set
Tubing									
Liners									Perforations: Top Bottom

OFFICE USE ONLY
DRILLING PERMIT

Permit number 47-041-3712 May 30 1986
Date

This permit covering the well operator and well location shown below is evidence of permission granted to drill in accordance with the pertinent legal requirements subject to the conditions contained herein and on the reverse hereof. Notification must be given to the District Oil and Gas Inspector, (Refer to No. 8) Prior to the construction of roads, locations and pits for any permitted work. In addition, the well operator or his contractor shall notify the proper district oil and gas inspector 24 hours before actual permitted work has commenced.)

The permitted work is as described in the Notice and Application, plat, and reclamation plan, subject to any modifications and conditions specified on the reverse hereof.

Permit expires May 30, 1988 unless well work is commenced prior to that date and prosecuted with due diligence.

Bond:	Agent:	Plat:	Casing	Fee	WPCP	S&E	Other
	AB	KS	KS	538	KS	KS	

NOTE: Keep one copy of this permit posted at the drilling location.

Director, Division of Oil and Gas
Permit

C-1719

See the reverse side of the APPLICANT'S COPY for instructions to the well operator.

RECEIVED
MAY 27 1986
DIVISION OF OIL & GAS
DEPARTMENT OF ENERGY

WW-9

Rec'd. (WF-SCD)
MAY 13 1986

DATE 5/7/86
WELL NO. S-614
API NO. 047 - 041 - 3712

State of West Virginia
Department of ENERGY
Oil and Gas Division

CONSTRUCTION AND RECLAMATION PLAN

COMPANY NAME Scott Oil Company
Address P.O. Box 112, Salem, WVA
Telephone 623-9600
LANDOWNER Kenneth Godfrey

DESIGNATED AGENT Darrel Wright
Address P.O. Box 112, Salem, WVA.
Telephone 623-9600
SOIL CONS. DISTRICT West Fork

Revegetation to be carried out by Scott Oil Co. (Agent)

This plan has been reviewed by West Fork SCD. All corrections and additions become a part of this plan: 5/21/86 (Date)

(SCD Agent)

ACCESS ROAD		LOCATION	
Structure Drainage Ditch with Rip Rapped outlet on upper side of road cuts	(A)	Structure Diversion Ditch	(1)
Spacing		Material Earthen	
Page Ref. Manual 2-12		Page Ref. Manual 2-12	
Structure Cross Drain	(B)	Structure Sedimant Barrier	(2)
Spacing 45'-50' apart with riprapped outlets		Material Hay or Straw bales (staked	
Page Ref. Manual 2-17		Page Ref. Manual 2-16	
Structure Culvert (15" min) (Accord. to O&G Manual) (At natural drains)	(C)	Structure	(3)
Spacing with riprapped outlets		Material	
Page Ref. Manual 2-7		Page Ref. Manual	

All structures should be inspected regularly and repaired if necessary. All commercial timber is to be cut and stacked and all brush and small timber to be cut and removed from the site before dirt work begins.

REVEGETATION

Treatment Area I	Treatment Area II
Lime According to pH test Tons/acre or correct to pH 6.5	Lime According to pH test Tons/acre or correct to pH 6.5
Fertilizer 600 lbs/acre (10-20-20 or equivalent)	Fertilizer 600 lbs/acre (10-20-20 or equivalent)
Mulch Hay or Straw 2 Tons/acre	Mulch Hay or Straw 2 Tons/acre
Seed* Ky 31 Fescue 35 lbs/acre	Seed* Ky 31 Fescue 35 lbs/acre
Birdsfoot Trefoil 15 lbs/acre	Birdsfoot Trefoil 10 lbs/acre
Domestic Rye 70 lbs/acre	Domestic Rye 10 lbs/acre

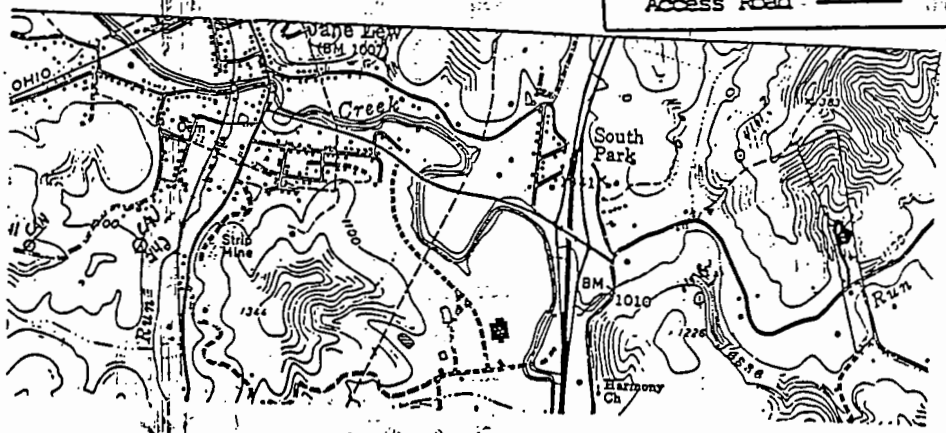
**Inoculate all legumes such as vetch, trefoil and clovers with the proper bacterium. Inoculate with 3X recommended amount.*

PLAN PREPARED BY D Edward Arnold
ADDRESS P.O. Box 112
Salem, W.VA
PHONE NO. 623-9600

NOTES: Please request landowner cooperation to protect new seedling for one growing season. Attach separate sheets as necessary for comments.

ATTACH OR PHOTOCOPY SECTION OF INVOLVED TOPOGRAPHIC MAP.
QUADRANGLE Weston 7½'

LEGEND
Well Site ⊕
Access Road ———

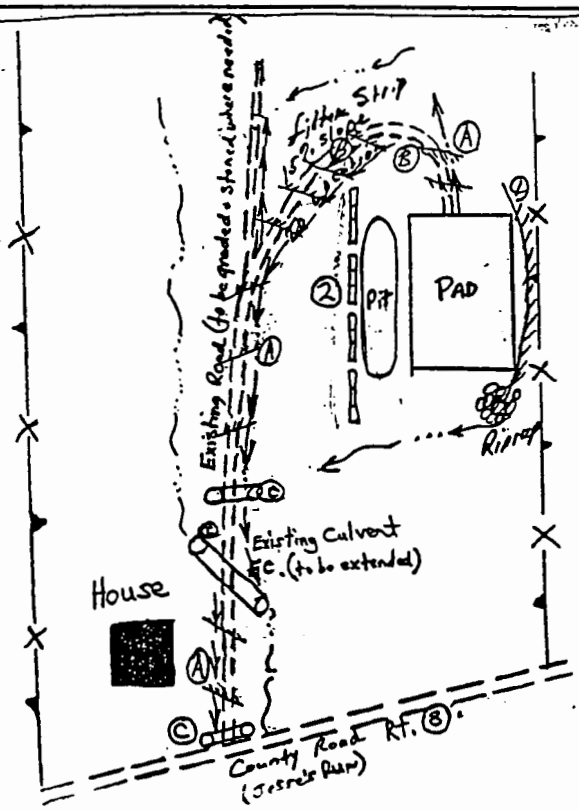


WELL SITE PLAN

Sketch to include well location, existing access road, roads to be constructed, wellsite drilling pits and necessary structures numbered or lettered to correspond with the first part of this plan. Include all natural drainage.

LEGEND

Property boundary	Diversion
Road	Spring
Existing fence	Wet spot
Planned fence	Building
Stream	Drain pipe
Open ditch	Waterway

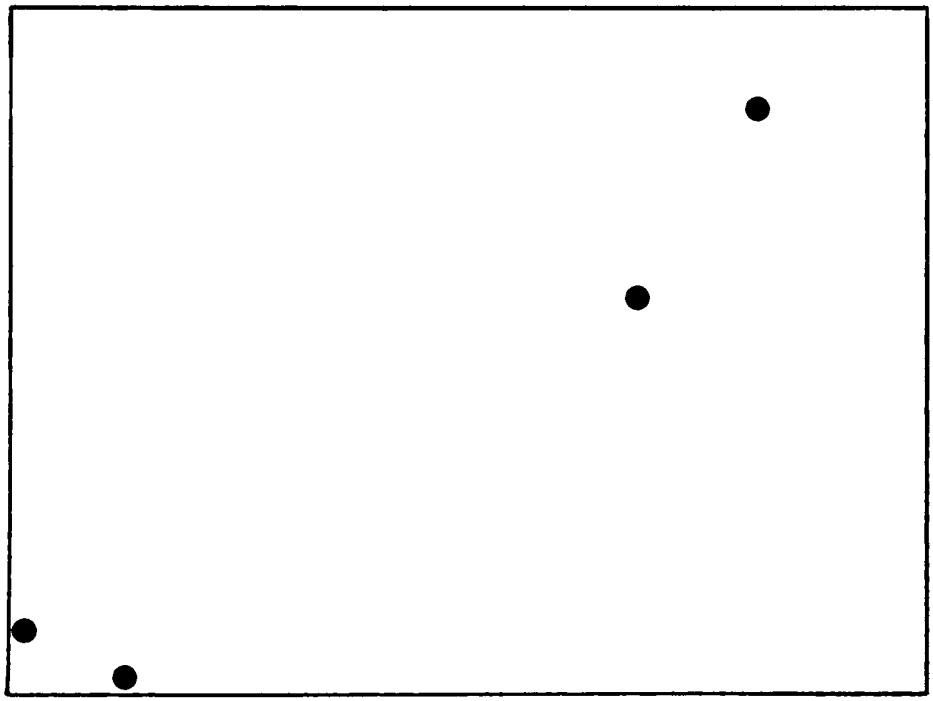


Location is on wooded flat. Usable timber will be cut & stacked. Topsoil will be stockpiled for use in revegetation. Rock will be used on road where necessary.

A filter strip of undisturbed natural vegetation will remain between all construction and natural water courses.

Sediment barriers of straw bales will be placed in areas where needed to control sediment runoff.

WYOMING



Sampling Report
Investigation of Diamond Shamrock
Exploration Company's Myers State Well No. 41-16
Gillette, Wyoming
July 13, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). Although EPA worked with the Department of Environmental Quality and the Oil and Gas Conservation Commission to identify appropriate drill sites prior to the public meeting scheduled for July 11, 1986, no list of sites was forthcoming.

The list of possible sample sites was presented to EPA by the Oil and Gas Conservation Commission at a public meeting held in Casper, Wyoming, on July 11, 1986. Attendees included representatives from EPA, Wyoming Department of Environmental Quality, Wyoming Oil and Gas Conservation Commission, oil and gas companies, and the public. EPA requested identification of a number of drill sites at or very near completion during July 13-14, 1986, in the Powder River Basin for site selection purposes. The Wyoming Oil and Gas Commission identified the only site: Cities Service Oil and Gas Corporation H.D.U. Well No. 5346. Diamond Shamrock Exploration Company volunteered a second possible site, their Myers State Well No. 41-16, near Gillette, Wyoming. Since no other sites could be identified by meeting attendees, EPA conducted a coin toss to determine which site would be selected.

Cities Service Oil and Gas Corporation H.D.U. Well No. 5346 was selected as the primary site. Diamond Shamrock Exploration Company's Myers State Well No. 41-16 was selected as the back-up site in case the primary site proved inaccessible or inappropriate.

The Department of Environmental Quality and the EPA conducted a presurvey of the primary site on July 12, 1986. Although the reserve pit was intact, the site was disqualified as an invalid drill site. Well No. 5346 had been completed approximately 4 months earlier. The site was not considered newly completed.

No problems were encountered arranging for sampling to be conducted at the back-up site (Diamond Shamrock Exploration Company's Myers State Well No. 41-16) on July 13, 1986.

Site Location

Myers State Well No. 41-16 is located approximately 4 miles south of Gillette, Wyoming. Figure 1 is a map indicating the well site.

The site is operated by Diamond Shamrock Exploration Co., whose mailing address and telephone number are:

PO Box 2530
Miles, WY 82644
307-266-1882
Contact Name: Odell Williams

Attendees

Sampling of Myers State Well No. 41-16 was performed by CENTEC Corporation personnel on July 13, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Dewayne Buskey, Technician
EPA Representative:	Susan de Nagy, Office of Water, Project Officer
State Representatives:	E. J. Fanning, WY Dept. of Environmental Quality Tom McCall, WY Oil & Gas Conservation Commission
Operator Representative:	Odell Williams, Drilling Foreman
American Petroleum Institute Representatives:	Maurice Jones, Contracted Observer David Havis, Contracted Observer Alan Wilson, Contracted Sample Team Member Earl Hinsley, Contracted Sample Team Member

Site Description

Myers State Well No. 41-16 is located in the Powder River Basin, in an area characterized as rural foothills. The depth to groundwater is unknown, and the nearest surface water is over 2 miles away. There are no drinking water wells within a 1-mile radius of the site. The soil in this area is loam. The climate at this site is net evaporation.

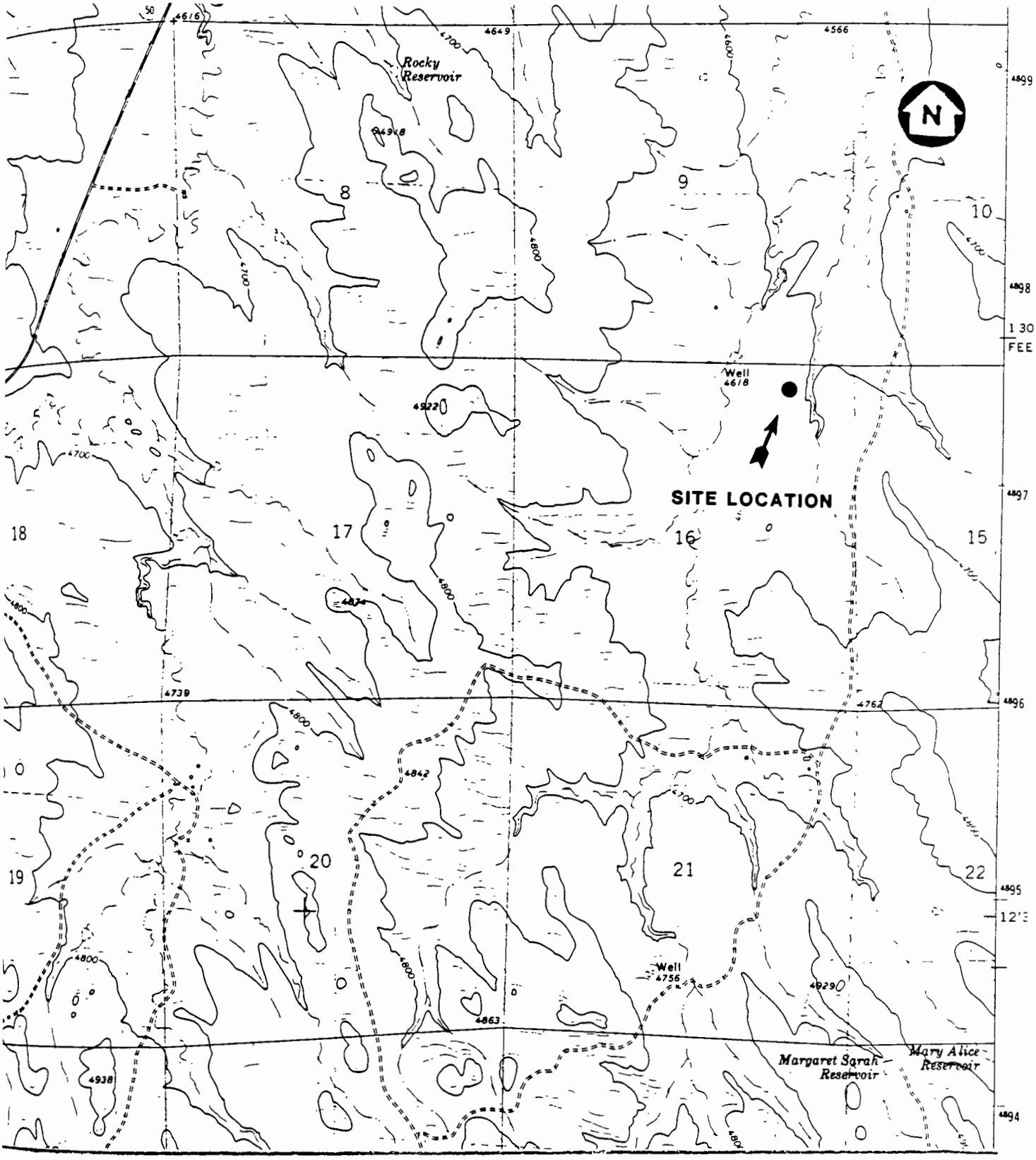


Figure 1. Location of Myers State Well #41-16, Gillette, Wyoming

This site was an exploratory oil drilling site. The well began drilling on June 24, 1986. On the day of sampling, the well was at the completion depth of 10,571 feet. Drilling was accomplished with freshwater muds and low-solid, non-dispersed muds. The low-solid, non-dispersed muds consisted of gel, soda ash, Biotrol, CFLA, caustic, ASP-700, salt gel, salo dust, cedar, driscose, and starch paper. Chloride content of the mud on the day prior to sampling was 33,000 ppm; pH was 9; hardness was 160 ppm. Drilling was performed by Cyclone Drilling.

Figure 2 is a schematic diagram of the drilling site. One pit (a reserve pit) was constructed for the site. The pit was constructed below grade. The pit was unlined and had no special preparation prior to use. The total cost of pit construction was $6,000. The pit was square in shape, with each side measuring 84 feet. The pit received drilling muds, deck drainage, fresh water, and waste diesel oil. The pit area was fenced. Diversion ditches were required. Photos 1-3 (in Attachment A) show the reserve pit. Photos 4 and 5 show the pit and the drilling rig. Photo 6 shows the mud recirculator on the rig.

A mud recirculation system was used at this site. The total system volume on the sampling day was 1,235 bbl mud recirculated; this consisted of 885 bbl calculated hole volume and 350 bbl in steel mud tanks. The fluids were piped from drilling operations into the pit. The supernatant depth in the reserve pit was 2-3 feet. The total volume of drilling fluids in the reserve pit was estimated at 15,000 bbl.

A total of 300 bbl of diesel oil was stored in tanks at this facility. Approximately 10-20 gallons of waste engine oil was generated. The waste oil was disposed by placing it in the reserve pit.

Disposal Practices

At the completion of drilling, all cuttings were placed in the reserve pit. There was no testing of pit contents. There was no treatment of pit contents. The pit contents were not moved for final disposition. The fluids were evaporated. The dried pit solids were buried. The pit site was to be reclaimed by adding topsoil and reseeding. According to company representatives, records specific to drilling waste normally are not kept unless wastes are removed from the reserve pit. Associated records would be contained in detailed well files.

Permits

The site was operating under Permit No. 49-005-17074 issued on June 16, 1986 by the WY Oil & Gas Conservation Commission. A copy of this permit is included in Attachment B.

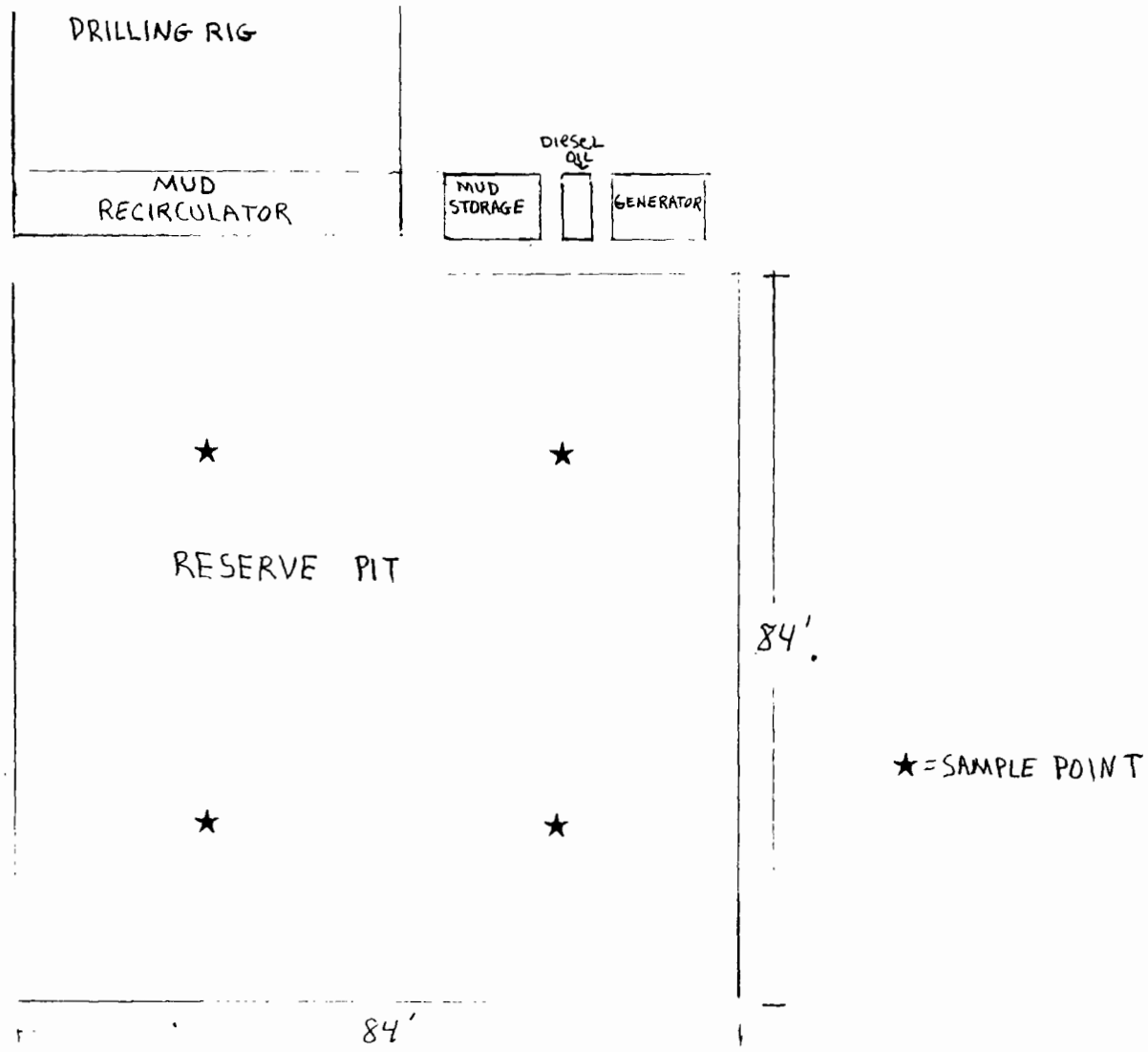


Figure 2. Schematic Diagram of Myers State Well No. 41-16

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The samples collected at Myers State Well No. 41-16 consisted of one supernatant and one sludge sample. Figure 2 shows the sampled pit and the location of the sample points. Supernatant and sludge were collected in the reserve pit. Four quadrants were established for supernatant and sludge sampling. Sample points were accessed by boat. There were no discrepancies between the actual and measured sample point.

Sampling Methods and Equipment

To collect samples, the reserve pit was measured to identify four quadrants and to locate the center of each quadrant. The supernatant was collected from the boat using a sampling thief. Sludge was collected from the boat using a Ponar dredge.

The pit supernatant was tested onsite for pH and free chlorine content after the completion of sampling. Supernatant pH was measured at 8. Free chlorine was measured at less than the lowest detectable level of 0.2 ppm. Due to time constraints, the samples collected were held in refrigeration overnight and shipped to the laboratories on July 14, 1986.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

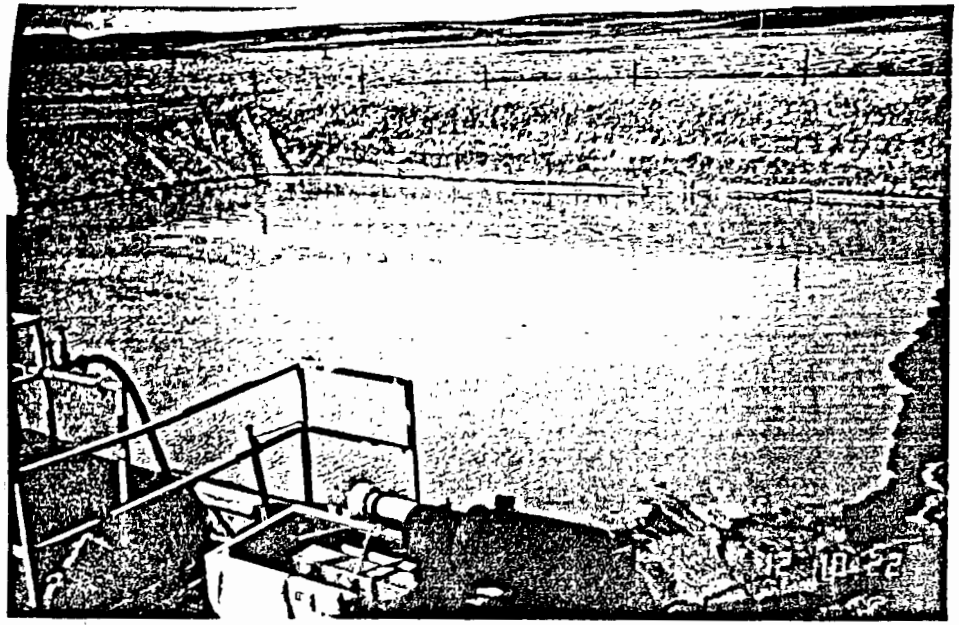


Photo 1. Reserve pit

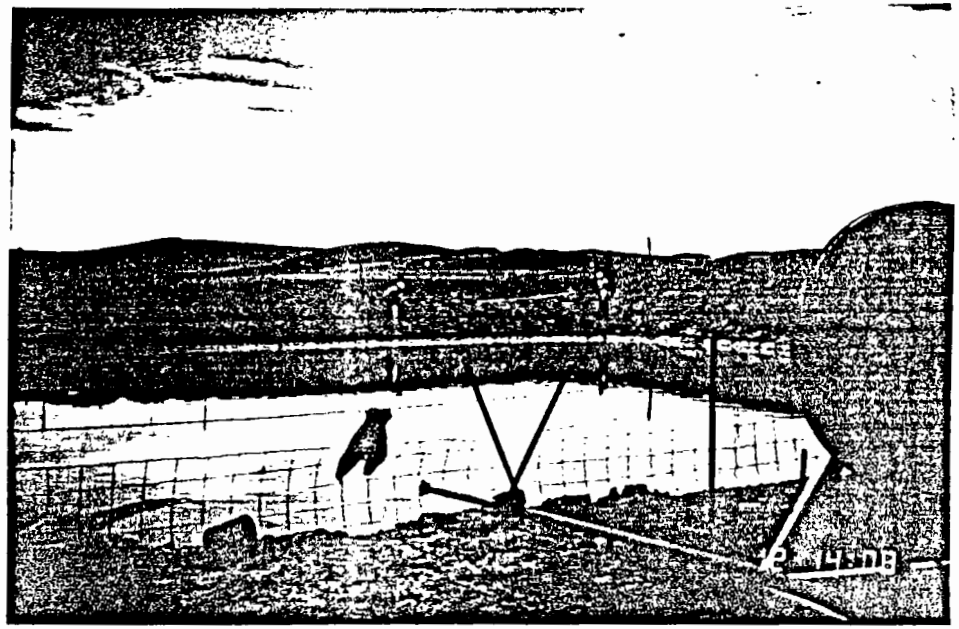


Photo 2. Reserve pit

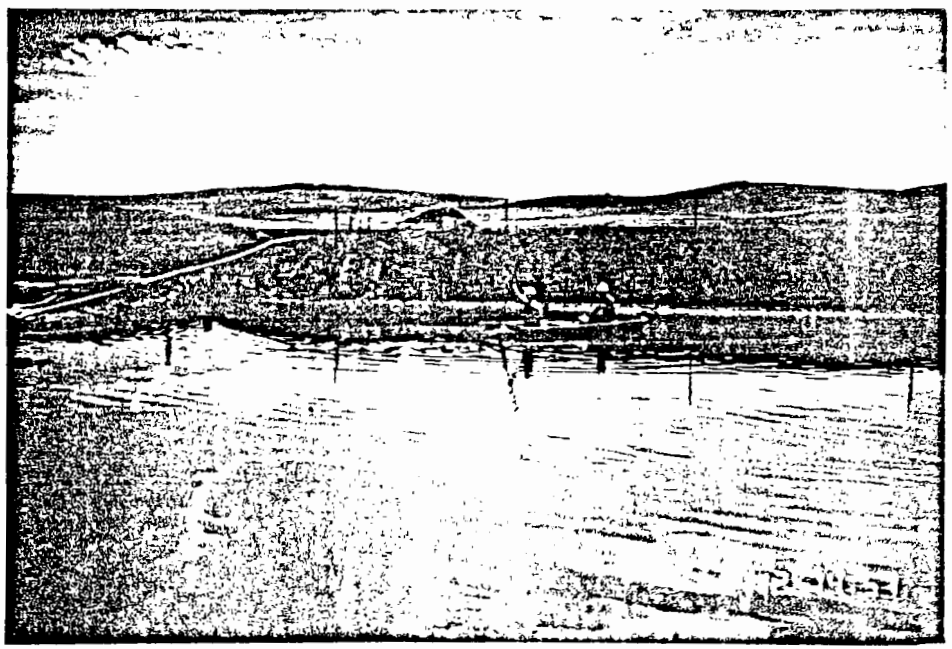


Photo 3. Reserve pit

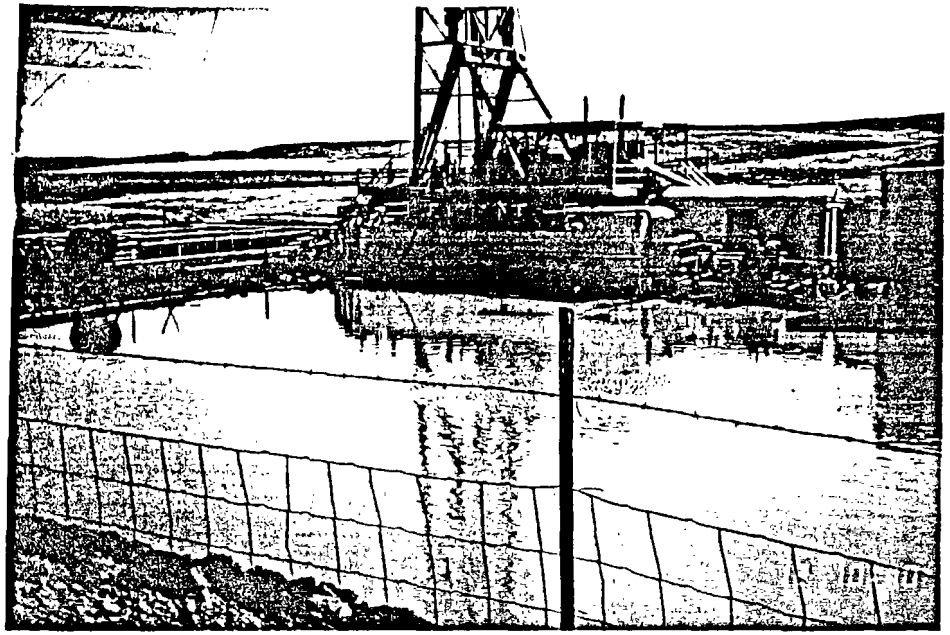
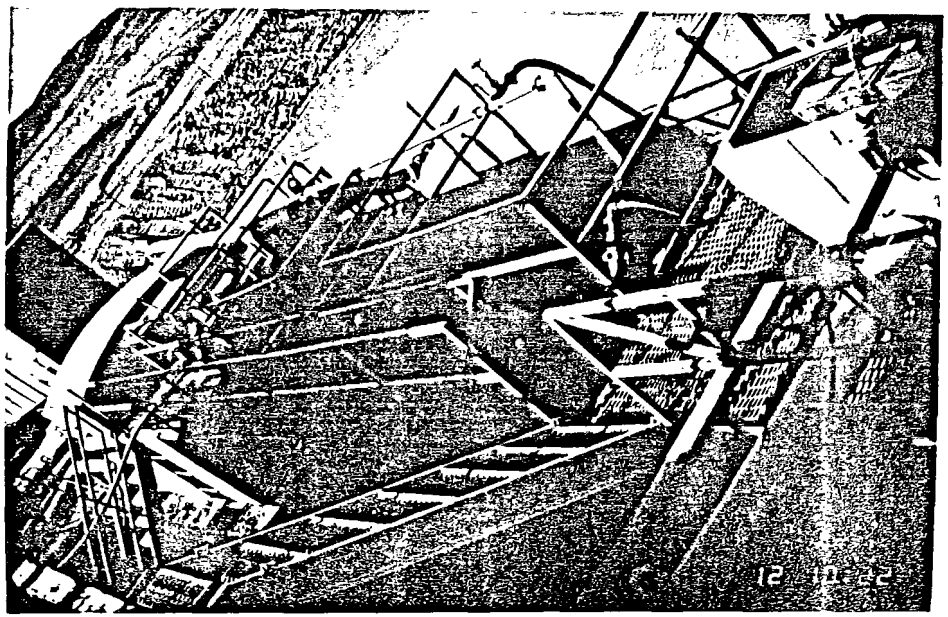


Photo 4. Reserve pit and drilling rig

Photo 5. Reserve pit and generator



ATTACHMENT B: PERMITS

Form 1
January, 1966

STATE OF WYOMING
OIL AND GAS CONSERVATION COMMISSION
Office of State Oil and Gas Supervisor
P. O. Box 2640
Casper, Wyoming 82601

FEB 13 1986

1. **APPLICATION FOR PERMIT TO:** (Submit in Duplicate, Triplicate on State Lands)

DRILL [XX] DEEPEN [ ] PLUG BACK [ ]

OIL WELL [XX] GAS WELL [ ] OTHER SINGLE ZONE [ ] MULTIPLE ZONE [ ]

5. State Lease No. 78-301
6. Unit Agreement
7. Farm or Lease Name: Myers State
8. Well No. 41-16
9. Reservoir: Minnelusa
10. Field Name: Wildcat
11. Section, Township and Range: Sec. 16, T49N, R72W

2. OPERATOR: Diamond Shamrock Exploration Company
3. ADDRESS: P.O. Box 2530, Mills, Wyoming 82644
4. LOCATION. Show quarter-quarter description and footage measurements.
At surface: 682' FNL 790' FEL NE/NE
At proposed prod. zone

12. County: Campbell 13. State: Wyoming

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 2 miles south of Gillette, Wyoming

15. DISTANCE IN FEET FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE (Also to nearest drlg. unit line, if any): 682'
16. No. of acres in lease: 640
17. No. of wells on this 40-acre tract, including this well, completed in or drilling to same reservoir(s)
18. DISTANCE IN FEET FROM PROPOSED LOCATION TO NEAREST DRILLING, COMPLETED OR APPLIED FOR WELL ON THIS LEASE
19. Proposed depth: 10,600'
20. Rotary or cable tools: Rotary

21. Elevations Derrick Floor | Rotary Kelly Bushing | Rotary Table | Ground: 4,604' | Other
22. Approx. date work will start: February 15, 1986

23. IF LEASE PURCHASED WITH ANY WELLS DRILLED, FROM WHOM PURCHASED (Name and Address)

24. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	NEW OR SECOND HAND	DEPTH (MD)	SACKS OF CEMENT
12¼"	9 5/8"	36#	New	1,000'	Circ. to surface
7 7/8"	5½"	15.5#, 17#, 20#	New	10,600'	400 sxs.

DESCRIBE PROPOSED OPERATIONS:
If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. Give blowout preventer program, if any.
If proposal is to directionally drill or deepen, give pertinent data on subsurface locations and measured and true vertical depth.

RECEIVED
FEB 4 1986
WYOMING OIL & GAS CONSERVATION COMMISSION

PROPOSED PORGRAM: Refer to enclosed 9 Point Program.

25. SIGNED: Jim M. Robinski TITLE: Sr. Environment & Regulation Engineer DATE: 2-3-86

26. KIND AND STATUS OF BOND

(This space for State office use)

PERMIT NO. _____ DATE _____

APPROVAL DATE FEB 11 1986
COPY (Original Signed)

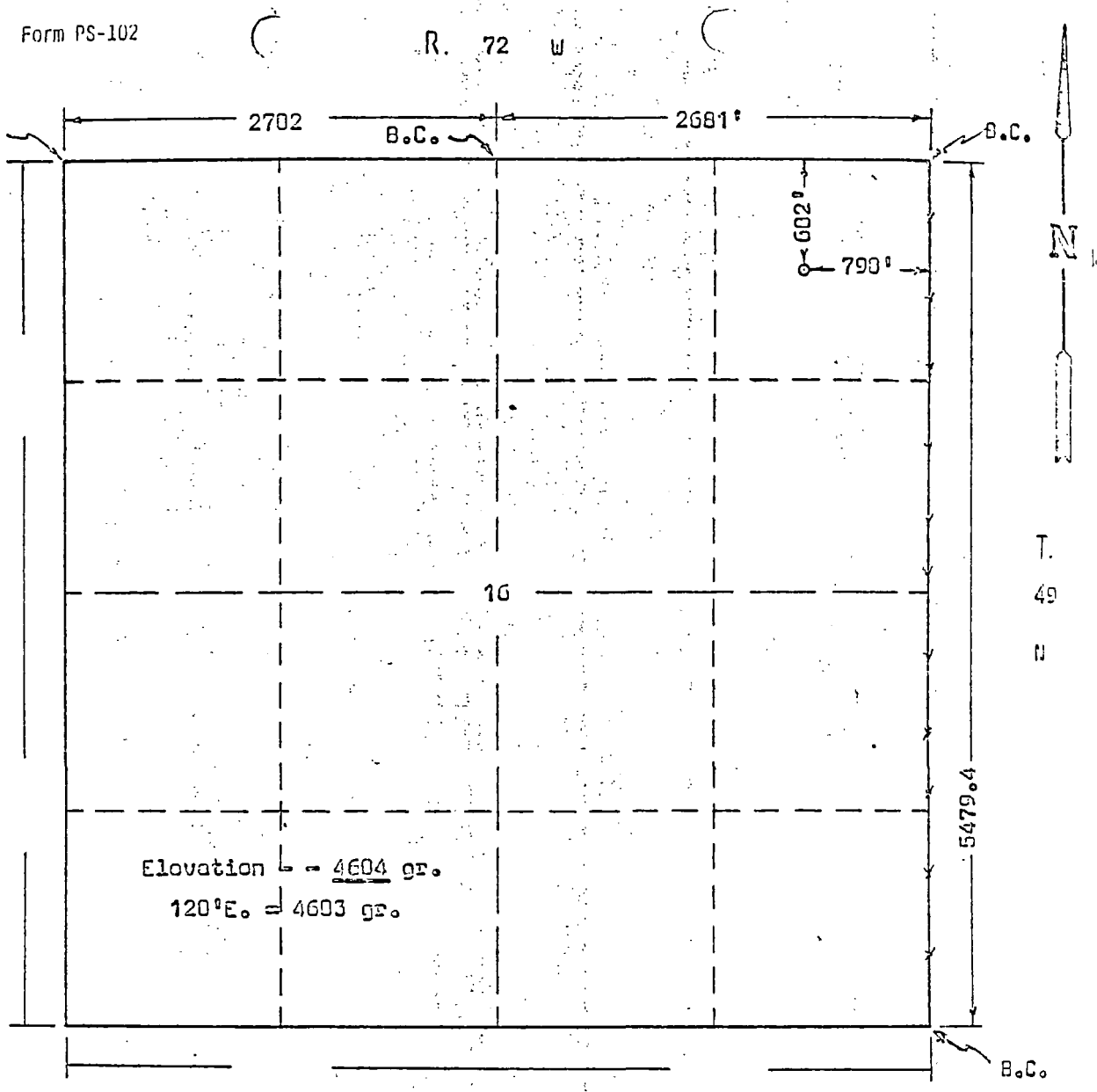
APPROVED BY Donald B. Basko
State Oil and Gas Supervisor

Approvals sent _____ 196_____

C-1137

CONDITIONS OF APPROVAL, IF ANY:

Form PS-102



Scale: 1"=1000'

Powers Elevation of Denver, Colorado has in accordance with a request from Mr. Pachulski for Diamond Shamrock Exploration Company determined the location of #41-16 Myers-State to be 682FN & 790FE Section 16, Township 49 N. Range 72 W. of the Sixth Principal Meridian, Campbell County, Wyoming

I hereby certify that this plat is an accurate representation of a correct survey showing the location of #41-16 Myers-State

Date: 1-24-86

T. Nelson

Licensed Land Surveyor No. 387
State of Wyoming

C-1138

MYERS STATE 41-16
NE/NE Sec. 16, T49N, R72W
Campbell County, Wyoming

1. ESTIMATED FORMATION TOPS

FORMATION	DEPTH
Fort Union	Surface
Lance	2,998'
Fox Hills	4,443'
Niobrara	7,225'
Mowry	8,512'
Muddy	8,694'
Dakota	8,876'
Morrison	9,042'
Sundance	9,156'
Spearfish	9,421'
Goose Egg	9,984'
Forelle	10,238'
Minnekahta	10,295'
Opeche	10,317'
Minnelusa	10,337'
T.D.	10,600'

2. ESTIMATED DEPTHS OF WATER, OIL, GAS OR MINERALS

Oil: Oil is anticipated in the Minnelusa formation.

Gas: Gas is expected in conjunction with oil production in the Minnelusa formation.

Water: Ground water is anticipated to approximately 250'. Some brackish water sands could possibly exist below this level; however, the hydrostatic head of the drilling fluid will safely contain these waters within their formations.

3. PROPOSED CASING PROGRAM

Size	Grade	Wt./Ft.	Condition	Depth Set
9 5/8"	K-55	36#	New	1,000'
5½"	K-55 & N-80	15.5#, 17#, 20#	New	10,600'

4. PRESSURE CONTROL EQUIPMENT

A. Refer to Diagram A.

B. Minimum pressure ratings on any and all B.O.P. or related control equipment will be 3,000#/in.

C. B.O.P. stack will be pressure tested to 1,000#/in. prior to drilling out of surface casing. The stack will then be checked on each trip to insure workability.

5. TYPE AND CHARACTERISTICS OF PROPOSED CIRCULATING MUD

Water to 9,500' - 10,500'. Low solids non-dispersed to T.D.

If conditions necessitate mud-up may be before 9,500'.

Max. Wt.	9.3
Vis.	55
WL	10 cc

Enough mud and chemical material will be kept on location to maintain these characteristics.

6. AUXILIARY EQUIPMENT

1. Upper or lower kelly cock.
2. No floats will be used.
3. Visual monitoring of mud pits.
4. One full opening stabbing valve on floor at all times.

7. EVALUATION PROCEDURES

1. Drill Stem Tests: To be determined by on-site geologist.
2. Coring: To be determined by on-site geologist.
3. Logging: IES, Dual Induction and Gamma Ray.

8. ABNORMAL DRILLING CONDITIONS

1. Abnormal Pressure: None anticipated.

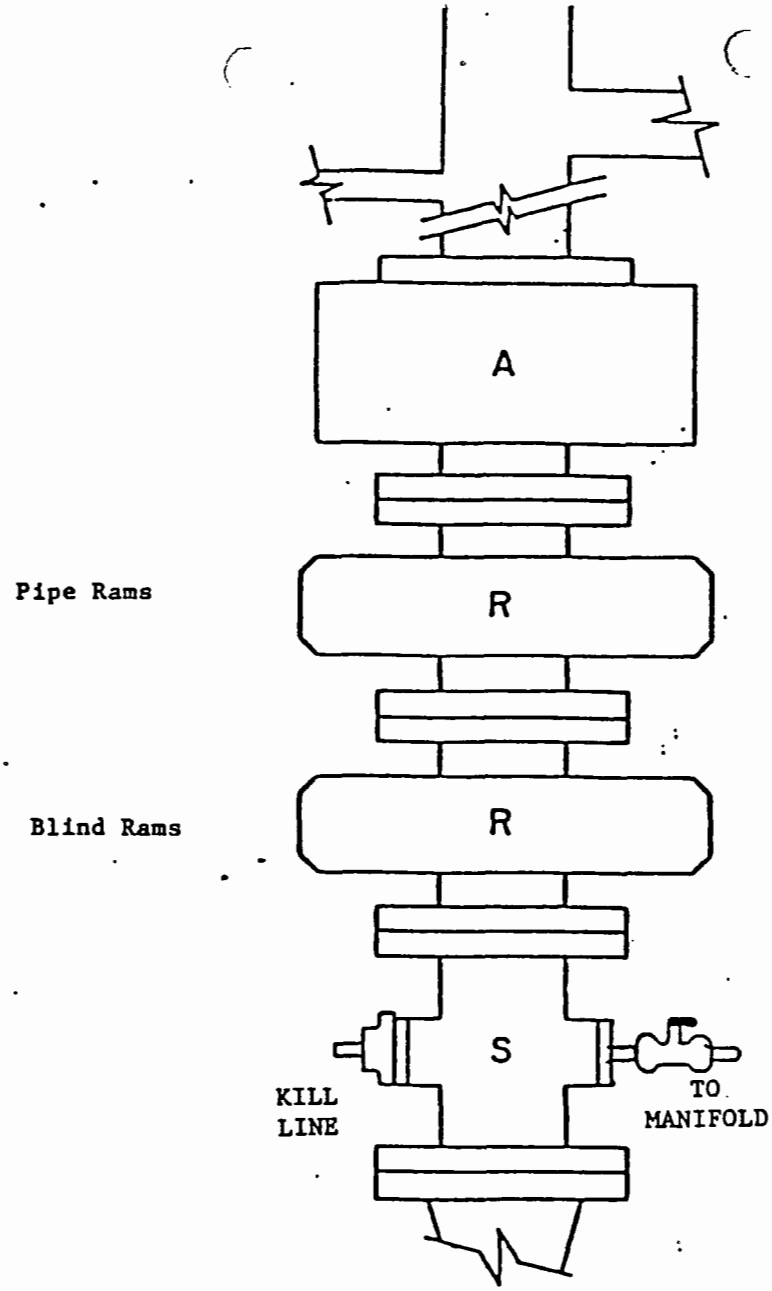
2. Abnormal Temperatures: None anticipated.

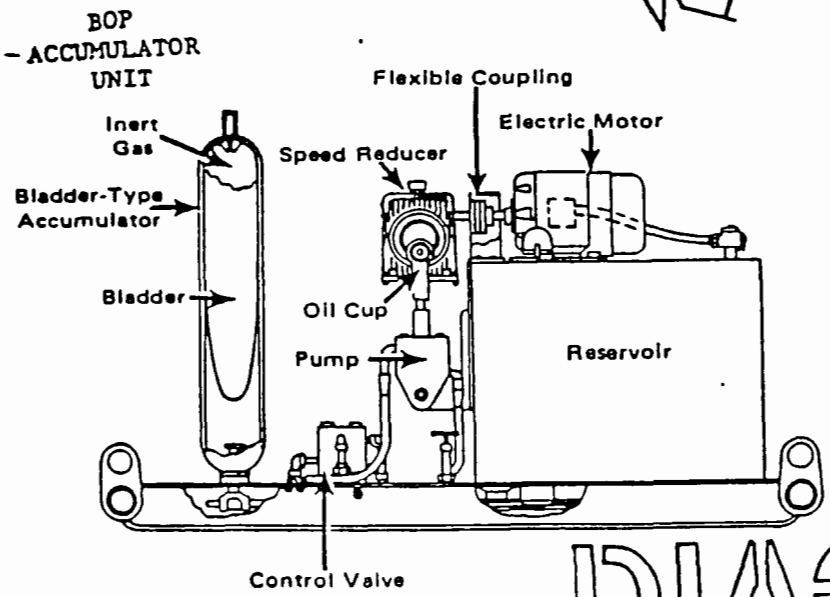
3. Hydrogen Sulfide: None anticipated.

9. ANTICIPATED STARTING DATE AND DURATION

We anticipate commencing operations by February 15, 1986, or as soon as governmental approval is obtained. The anticipated duration of drilling and completion operations is approximately six (6) weeks.

3000 BOP





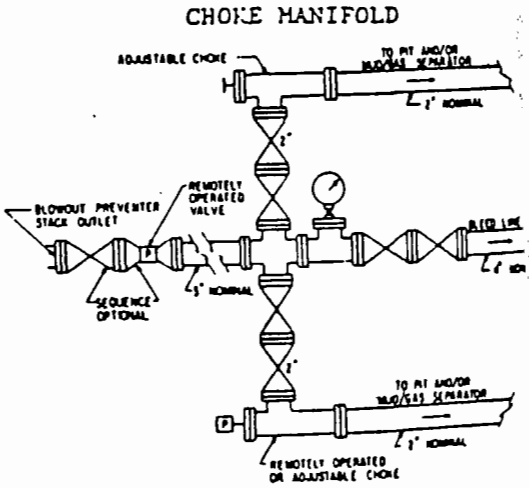


DIAGRAM-A

C-1143

49-005-28740

STATE OF WYOMING
OFFICE OF
OIL AND GAS CONSERVATION COMMISSION

№ 17074

DATE June 16 1986

RECEIVED FROM Jim Pachulski (Diamond Shamrock) $25.00

TWENTY-FIVE AND NO/100 DOLLARS

Well Permit Fee Covering Well No. 41-16 Myers State

Located ____ ¼ NE ¼ NE ¼ Sec. 16 T. 49 R. 72 Field Ensar

STATE OIL AND GAS SUPERVISOR

BY Ramona Aldridge

FORM 14 B
(JULY 1, 1984)

STATE OF WYOMING
OIL AND GAS CONSERVATION COMMISSION
P.O. Box 2640
Casper, Wyoming 82602

(SUBMIT IN DUPLICA

RECEIVED
FEB 24 1986

FEDERAL FORMS MAY BE SUBMITTED IN LIEU OF FORM 14
IF ALL INFORMATION REQUIRED HEREON IS INCLUDED

APPLICATION FOR PERMIT TO USE AND CONSTRUCT EARTHEN PIT FOR TEMPORARY USE OR FOR RESERVE PIT

1. CHECK ONE: NEW PIT [XX] EXISTING PIT [ ] RESERVE PIT [ ]

2. NAME OF OPERATOR: Diamond Shamrock Exploration Company — PHONE NO.: 307-266-1882

3. ADDRESS OF OPERATOR: P. O. Box 2530, Mills, Wyoming 82644

4. LEASE NAME: Myers State 41-16 — 5. GROUND ELEVATION: 4,604'

6. LOCATION (QQ SEC. T.R.): NE/NE, Sec. 16, T49N, R72W — 7. COUNTY: Campbell — 8. API WELL NUMBER*:

9. WATER ANALYSIS — TESTS MUST BE MADE IN ACCORDANCE WITH STANDARD METHODS — ATTACH FULL COPY OF ANALYSIS(ES) TO THIS FORM
METHOD OF WATER SAMPLE COLLECTION
LABORATORY PROVIDED RECEPTICAL [ ] OTHER _____
DATE WATER SAMPLE WAS TAKEN IN THE FIELD _____

10. MUD PROGRAM (IF APPLICABLE)
Water to approximately 10,000'. Low solids non-dispersed to T.D.

11. ANTICIPATED TIME PERIOD PIT WILL BE IN USE.
February 15, 1986 through drilling and completion operations.

12. SIZE OF PIT: LENGTH 125 FT. WIDTH 125 FT. DEPTH 10 FT. FREEBOARD 2 FT.

13. CAPACITY 17,000 BBLS.

14. ORIGIN OF PIT CONTENT (FORMATION IF PRODUCTION PIT).
Drilling fluids.

15. FINAL DISPOSAL OF PIT CONTENT:
EVAPORATION XX
HAULED _____ (PIT LOCATION)
DISPOSAL WELL _____ (WELL NO. AND LOCATION)

16. MAXIMUM FLUID LEVEL ABOVE AVG. GROUND LEVEL _____ FT.

17. DRAINAGE DISTANCE IN FEET TO CLOSEST FRESH POND, STREAM OR LAKE
Tributary of Donkey Creek NAME 300 FT.

18. SUBSOIL TYPE
Sandy loam.

19. TYPE OF SEALING MATERIAL (Including specifications and Method of Application)
If soil is pourous a coating of bentonite will be applied.

*Number Assigned Well On APD For Reserve Pit: (If Unassigned, Commission Will Provide)
Number Assigned To Well Or One Of The Wells Which Produces Water Going Into Temporary Pit.

(CONTINUED ON REVERSE SID

FORM 14 B CONTINUED

20. ADDITIONAL INFORMATION (By attachment include a plan view of the location, a topo map of sufficient size and detail to determine the surface drainage system complete with all natural waterways and irrigation systems, (if appropriate), and other information as may be specifically required by the Commission)

Refer to Topographic map.

21.
I HEREBY CERTIFY THAT THE FOREGOING IS TRUE AND CORRECT

SIGNED [signature] TITLE Sr. Environment & Regulation Eng. DATE 1-27-86

THIS SPACE FOR COMMISSION USE

APPROVED BY [signature] TITLE Pet. Eng. DATE 2-13-86

CONDITIONS OF APPROVAL, IF ANY:

NO ADDITIVES OR MATERIALS WHICH WILL CONTAMINATE SURFACE OR SUBSURFACE WATER WILL BE PRESENT IN THE PIT. ANY ADDITIVES OR MATERIALS WHICH ARE NOT DESCRIBED IN MUD PROGRAM SHALL BE SUBMITTED AT THE TIME OF COMPLETION OF DRILLING ACTIVITIES.

Sampling Report
Investigation of Amoco Production Company's LACT No. 4
Midwest, Wyoming
July 14, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). This site was selected randomly from a list of active Powder River Basin production sites developed by the Department of Environmental Quality at the request of EPA. The list was transmitted via telephone to the EPA contractor on July 11, 1986. Site selection from this list took place during the telephone conversation.

The Department of Environmental Quality preferred to list the possible sample sites as shown below. The EPA contractor had no interest in the manner the particular sites were listed (by site name, location, operator, permit number, API number, etc.) as long as the site could be identified in detail upon selection. Thus, the EPA contractor had minimal information which kept to a minimum the amount of bias. No other information was known about the sites on the list at the time of selection. Detailed information was obtained only after selection of primary and back-up sites. The list consisted of five production sites in northeast Wyoming:

	Operator	Permit Number
1.	Amoco	WYO-0002798
2.	Amoco	WYO-0002828
3.	Amoco	WYO-0002836
4.	Amoco	WYO-0002879
5.	Amoco	WYO-0002887
6.	Amoco	WYO-0002909
7.	Amoco	WYO-30384
8.	Conoco	WYO-30868
9.	MCOR	WYO-30264
10.	Terra	WYO-2445
11.	Terra	WYO-2453
12.	Terra	WYO-2348

As indicated above, the EPA contractor assigned numbers to the members of the list as they were transmitted. A random number table was used to select the primary and back-up sample sites. No. 2 on the above list (Amoco WYO-0002828) was selected as the primary sample site. No. 9 on the above list (MCOR WYO-30264) was selected as the back-up site in case the primary site proved inaccessible or inappropriate.

Further inquiry indicated the primary site was Amoco Production Company's LACT No. 4 near Midwest, Wyoming. No problems were encountered arranging for sampling to be conducted July 14, 1986. The back-up site was not required.

Site Location

Amoco Production Company's LACT No. 4 is located about 3 miles northwest of Midwest, WY along Highway 87. Figure 1 is a map indicating the site.

The site is operated by Amoco Production Co., whose mailing address and telephone number are:

PO Box 2570
Casper, WY 82601
307-261-3355
Contact Name: Wayne Peterson

Attendees

Sampling of Amoco LACT No. 4 was performed by CENTEC Corporation personnel on July 14, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Dewayne Buskey, Technician
State Representatives:	E. J. Fanning, WY Dept. of Environmental Quality Tom McCall, WY Oil & Gas Conservation Commission
Operator Representative:	Wayne Peterson, District Foreman
American Petroleum Institute Representatives:	Maurice Jones, Contracted Observer David Havis, Contracted Observer Alan Wilson, Contracted Sample Team Member Earl Hinsley, Contracted Sample Team Member

Site Description

Amoco Production Company's LACT No. 4 is located within the Powder River Basin in rural foothills; the depth to groundwater over 100 feet, and the nearest surface water less than 1/2 mile away. There are no drinking water wells within a 1-mile radius of this site. The soil in this area is shale. The climate at this site location is net evaporation.

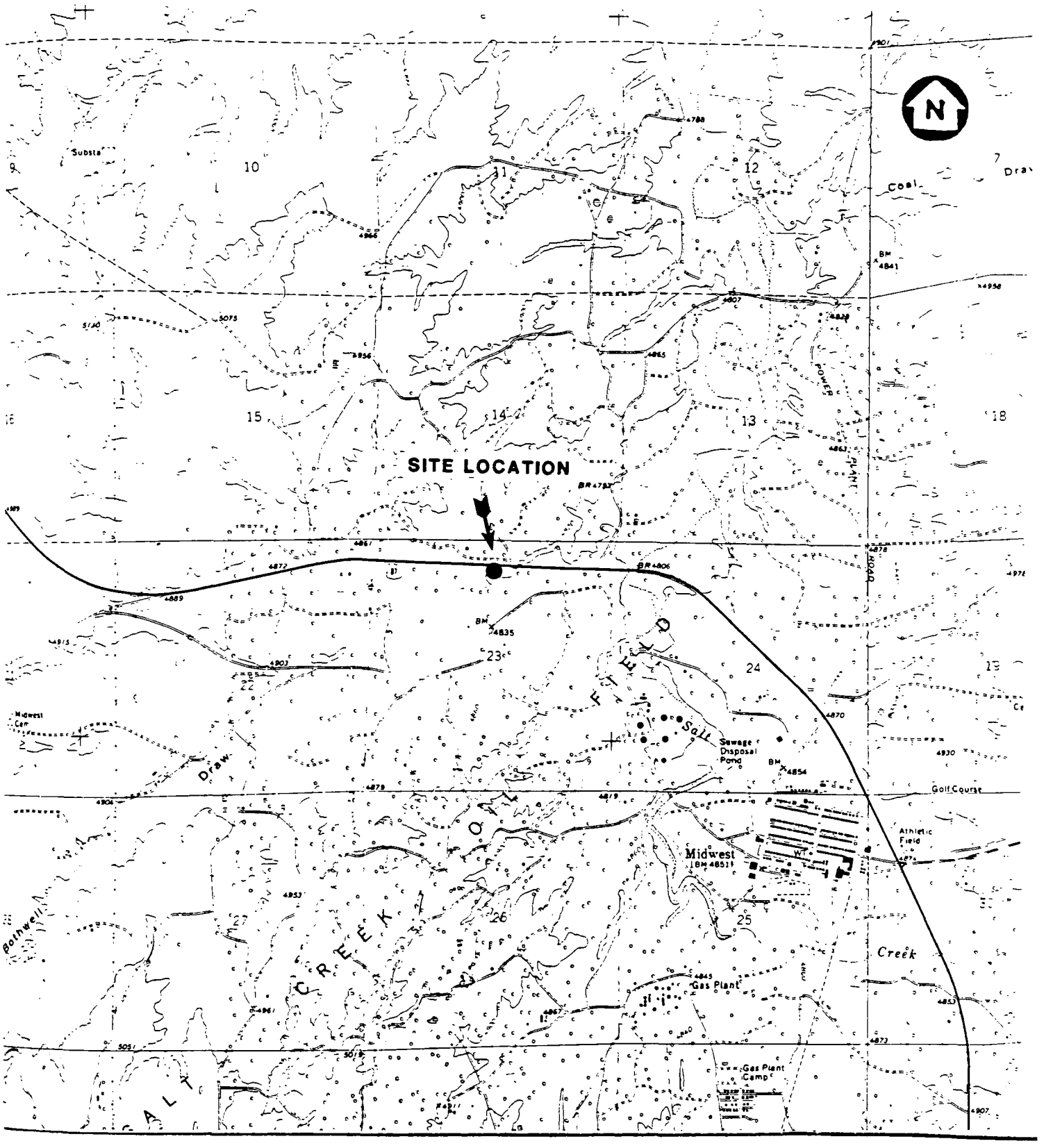


Figure 1. Location of AMOCO LACT #4, Midwest, Wyoming

This site was an oil water separation facility, and is one of seven production batteries in the Salt Creek Oil Field. Figure 2 is a facility diagram. The facility receives produced waters and treats them for enhanced oil recovery. The water is then discharged into the Bothwell Draw. Approximately 120,000 barrels of water per day are discharged. The produced water comes from approximately 150 wells. Figure 3 is an analysis of the water discharge performed on May 12, 1986.

Oil-water separation is achieved by oil skimming. The water flows through a series of four skimming pits. Effluent from the final pit is discharged. Photo 1 (in Attachment A) shows the tank facility and the first two oil skimming pits. Photos 2-6 show the four skimming pits. Photos 7 and 8 show the final discharge point into the Bothwell Draw. No sludge from drilling sites is stored or treated at this site.

Representatives from EPA and the Wyoming Department of Environmental Quality performed a reconnaissance of LACT No. 4 on July 12, 1986. During the visit, the oil skimmers at the pits were cleaned of all oily residue, as shown in Photo 9.

Permits

The facility operates under NPDES Permit No. WY-0002828. A copy of this permit is in Attachment B. Specifics on facility operation is in Attachment B. The permit contains discharge limitations and monitoring requirements for total dissolved solids, oil and grease, chlorides, sulfates, and pH. See permit for specific numerical limitations.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The samples collected at Amoco LACT No. 4 represent an upstream production sample and a production discharge sample. The production discharge sample was collected at the NPDES discharge point, as shown in Photo 7. The upstream production sample was taken at one of the treatment pits from a pipeline that removed water from oil tanks, as shown in Photo 6.

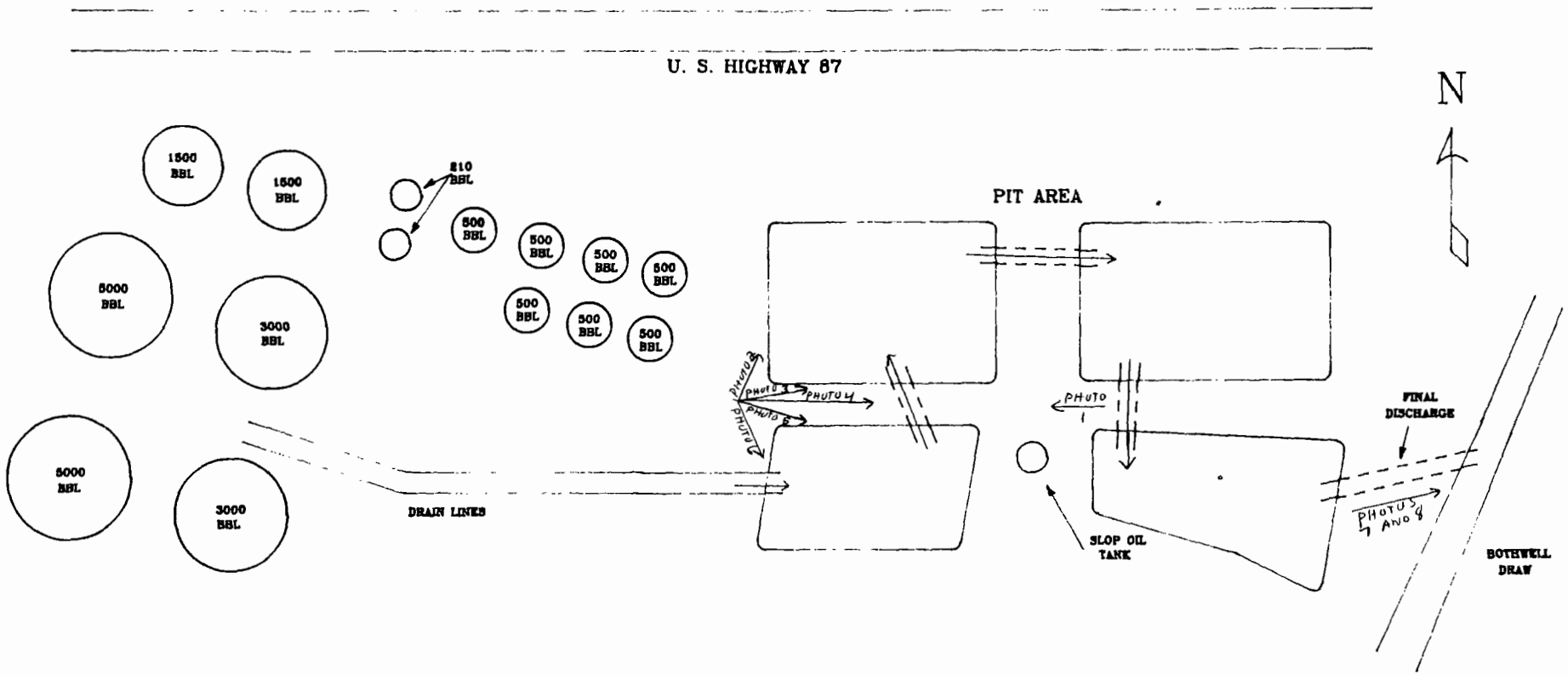


Figure 2. Schematic Diagram, Amoco Production Co.'s LACT No. 4, Midwest, Wyoming

WAMCO LAB

P. O. Box 2953 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Amoco Production

Sample type Waters

DATE May 12, 1986
Date Rec'd 5/2/86
W. O. No. 6179

Analysis in Milligrams per Liter except where Noted
Limits of Detection are Noted Following Less Than Mark (<)

Sample No.	1	2	3	4
Sample Descr.	Lact 1 0002798	Lact 4 0002828	Lact 5 0002836	Lact 10 0002875
Total Dissolved Solids	3140	3715	3257	2948
Sulfate (SO4)	195	276	105	164
Chloride (Cl)	1000	1150	1000	950
pH, Units	8.48	8.10	8.52	8
Oil & Grease & Sulfur (O&G&S)	17.5	6.2	18.1	20
Sulfur (S-%)	43.2	-	57.2	52
Oil & Grease Only (O&G)	10.6	6.2	7.7	9

Sample No.	5	6	8
Sample Descr.	Lact 11 0002887	Lact 13 0002909	Lease 46 0002941
Total Dissolved Solids	5773	3306	3480
Sulfate (SO4)	553	179	1460
Chloride (Cl)	2600	1250	680
pH, Units	8.14	8.52	7.84
Oil & Grease & Sulfur (O&G&S)	32.0	19.4	0.2
Sulfur (S-%)	77.2	3.5	-
Oil & Grease Only (O&G)	7.3	9.9	0.2

Figure 3. Laboratory Analysis Report, Amoco Production

Sampling Methods and Equipment

The NPDES discharge point consisted of three pipes feeding into the Bothwell Draw. The liquid production effluent sample was collected using a stainless steel bucket and a rope to catch the water from the pipes.

The upstream production sample was collected using a stainless steel bucket. The produced water was tested onsite for pH and free chlorine content at the conclusion of sampling. A pH value of 8 was recorded. Free chlorine content was less than the lowest detectable level of 0.2 ppm.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

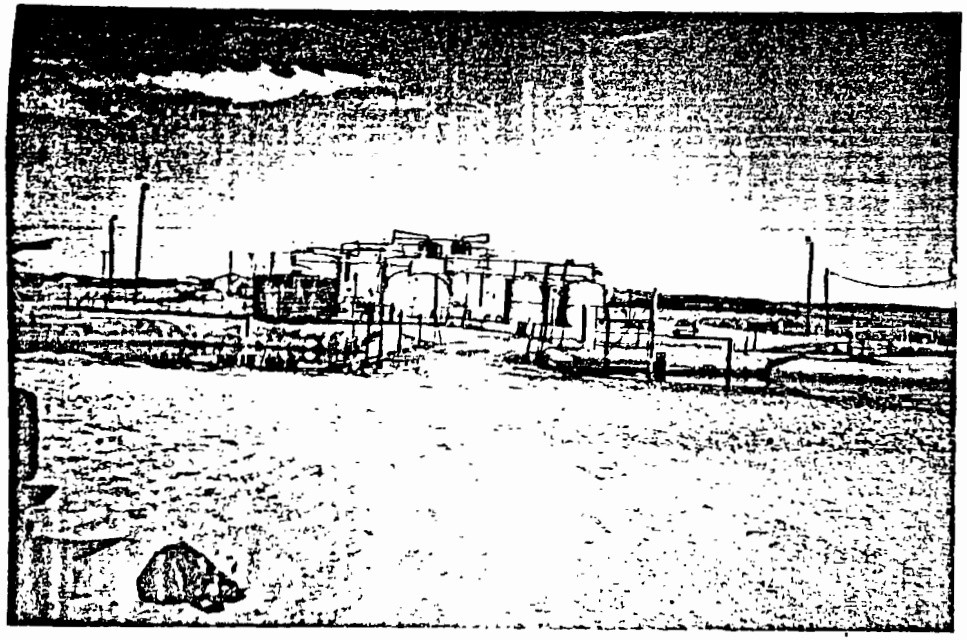


Photo 1. Shipping tanks and skim ponds

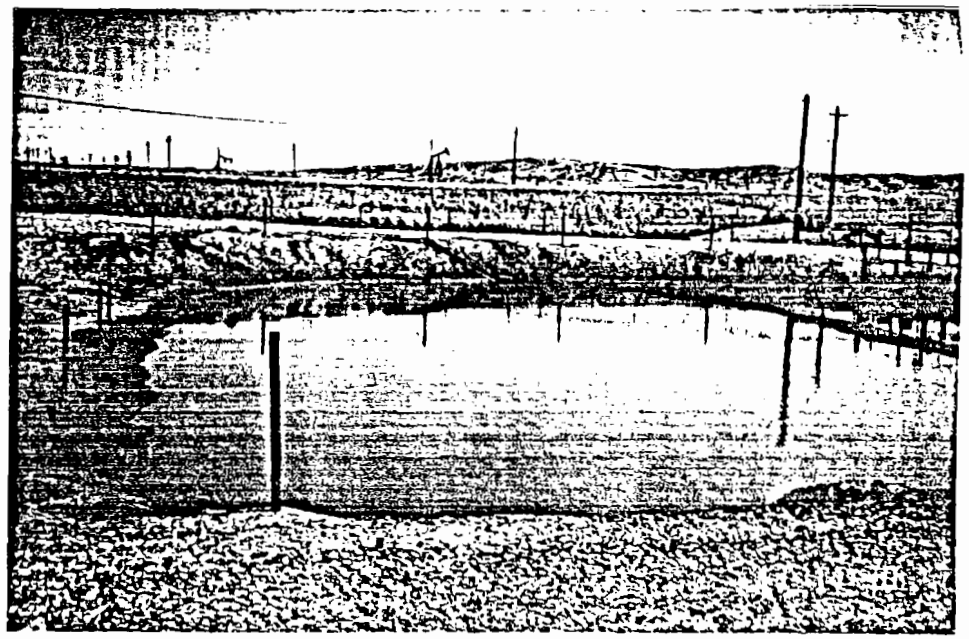


Photo 2. Skim ponds

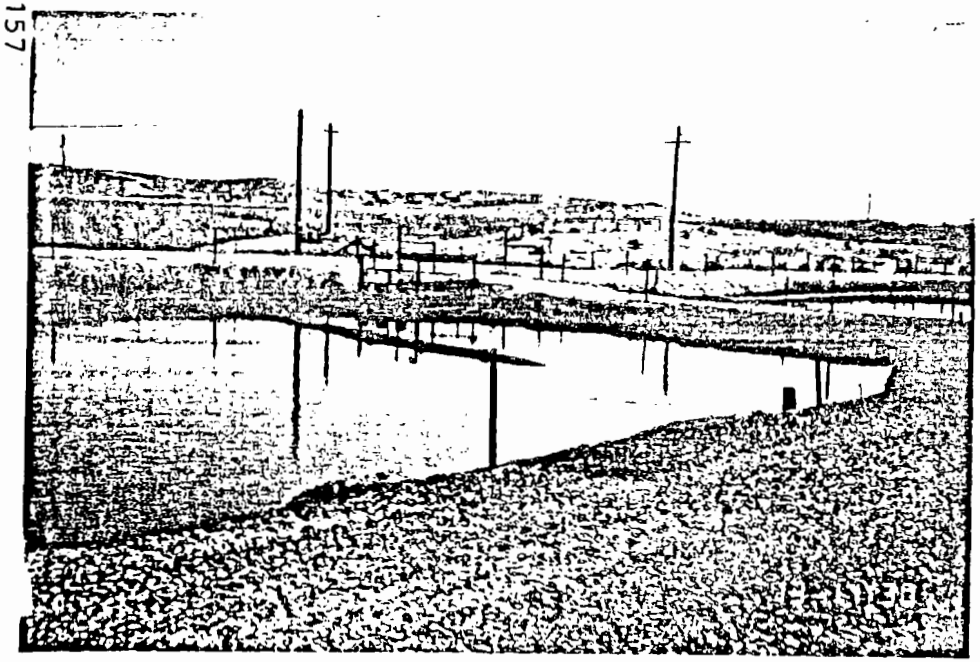


Photo 3. Skim ponds

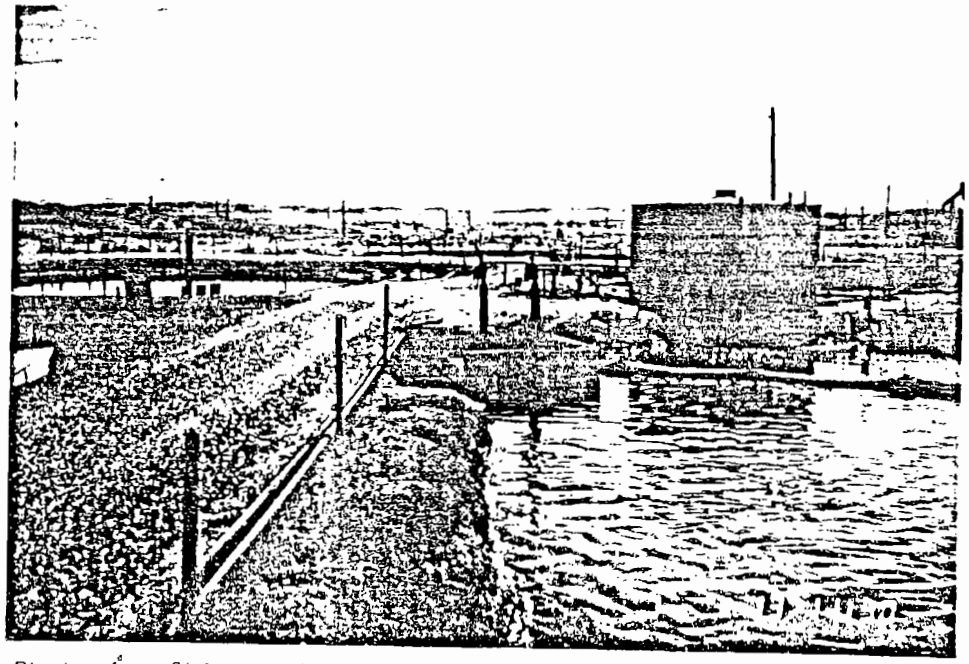


Photo 4. Skim ponds

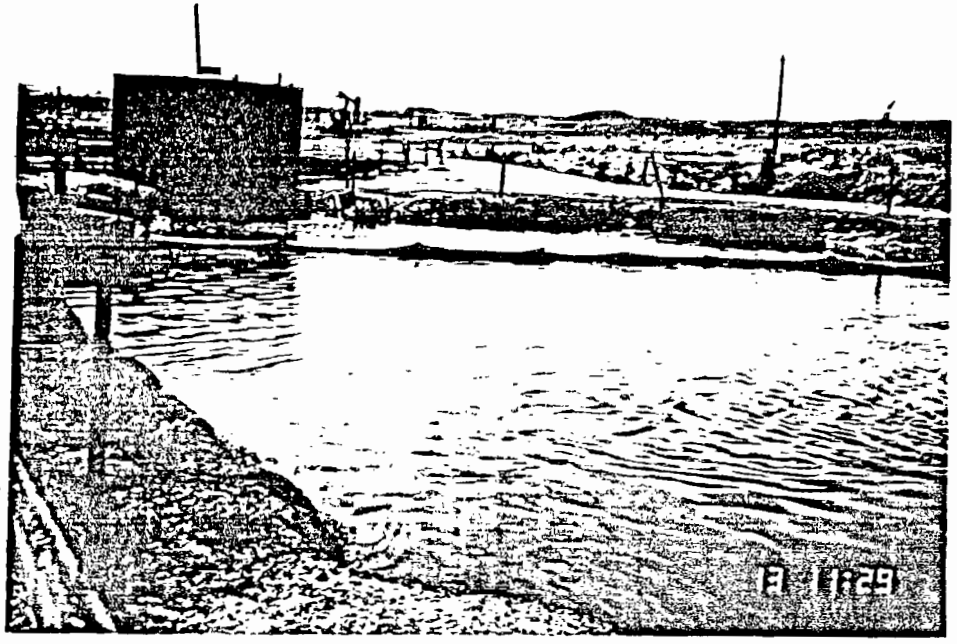


Photo 5. Skim ponds

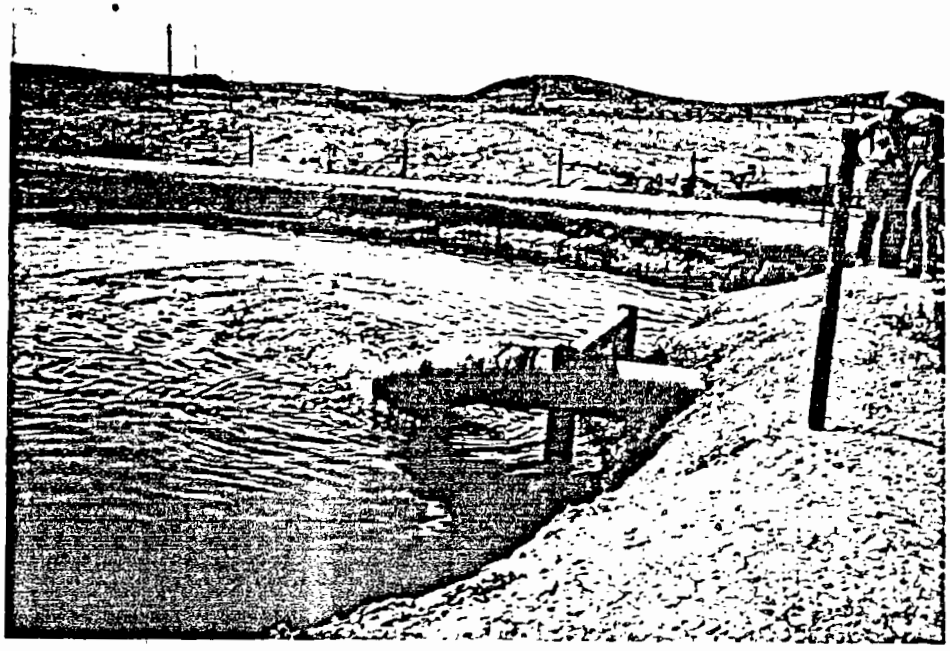


Photo 6. Skim ponds

Photo 7. NPDES discharge point

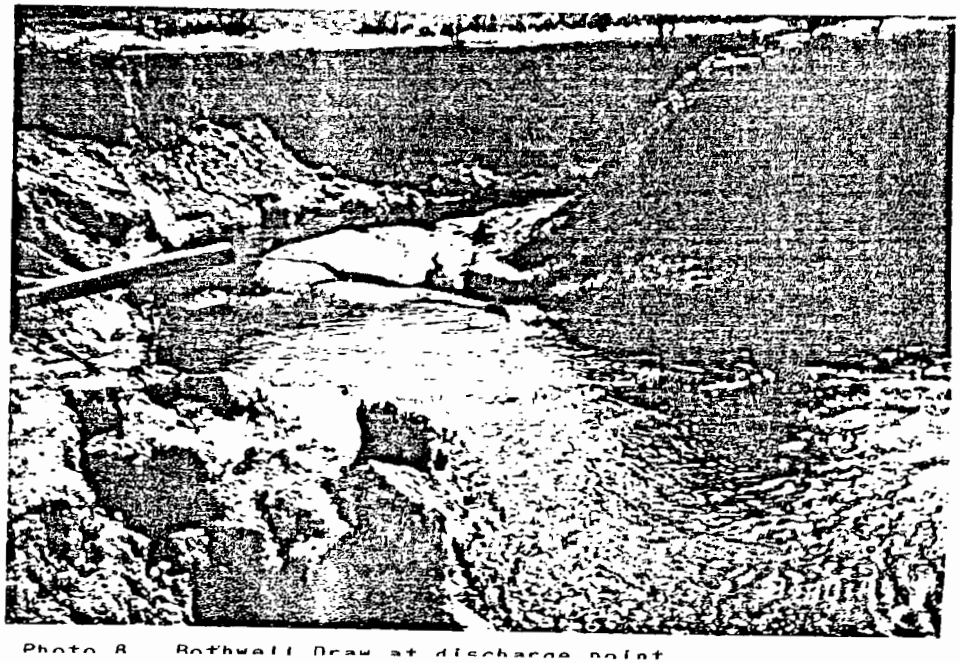


Photo 8. Bothwell Draw at discharge point

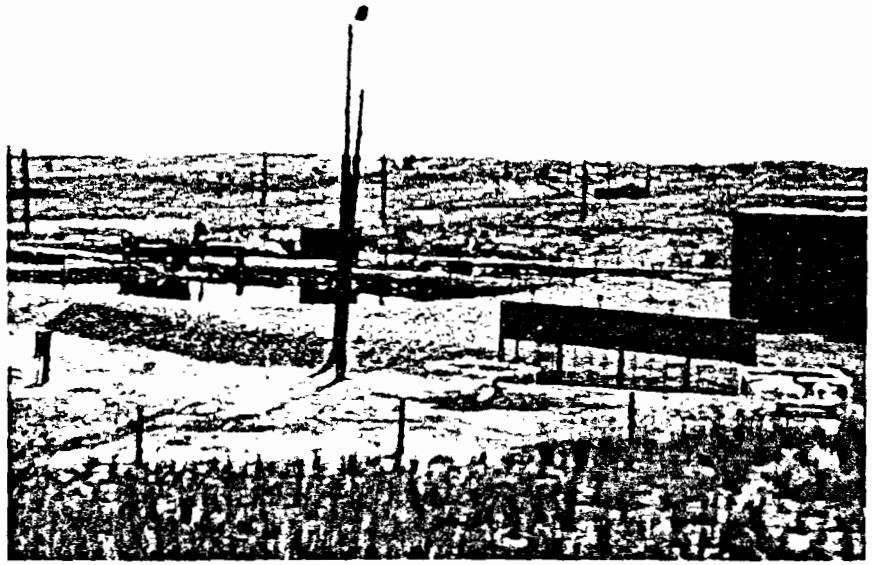


Photo 9. Cleaning of oil skim ponds

ATTACHMENT B: PERMITS

Permit No.: Wy-0002828

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 466 et. seq.,) (hereinafter referred to as "the Act"), and the Wyoming Environmental Quality Act (W.S. 35-11-101 through 1104, specifically 301(a)(i); Laws 1973, ch. 250, Section 1),

Amoco Production Company

is authorized to discharge from a facility located in the

Salt Creek Field, L.A.C.T. #4 SE1/4, Section 23, T40N, R79W, Natrona County, Wyoming

to receiving waters named

Bothwell Draw

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II and III hereof.

This permit shall become effective on January 1, 1986.

This permit and the authorization to discharge shall expire at midnight, December 31, 1990.

REGISTERED PROFESSIONAL ENGINEER
WILLIAM L. GARLAND
P.E. # 1479
STATE OF WYOMING

Administrator - Water Quality Division — December 26, 1985 Date

Director - Department of Environmental Quality — December 26, 1985 Date

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning January 1, 1986 and lasting through December 31, 1990, the permittee is authorized to discharge from outfall(s) serial number(s) 001.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations	
	mg/l Daily Max	mg/l Instantaneous Max
Flow - MGD	N/A	N/A
Total Dissolved Solids	N/A	5000
Oil and Grease	N/A	10
Chlorides	N/A	2000
Sulfates	N/A	3000

The pH shall not be less than 6.5 standard units nor greater than 8.5 standard units in any single grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Monitoring Requirements

Parameter	Measurement Frequency	Sample Type
Flow - MGD	Every 6 months	Instantaneous
Total Dissolved Solids	Every 6 months	Grab
Oil and Grease	Quarterly	Grab
Chlorides	Every 6 months	Grab
Sulfates	Every 6 months	Grab
pH	Every 6 months	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At the outfall of the final treatment unit and prior to admixture with diluent waters.

B. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to and approval by, the permit issuing authority.

2. Reporting

Monitoring results obtained during the previous 6 month(s) shall be summarized and reported on a Discharge Monitoring Report Form, postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on July 28, 1986. Duplicate signed copies of these and all other reports required herein, shall be submitted to the Regional Administrator and the State at the following addresses:

U.S. Environmental Protection Agency
One Denver Place
999 18th Street, Suite 1300
Denver, Colorado 80202-2413
Attention: Enforcement-Permits
Telephone: (303) 837-4901

Wyoming Department of Environmental Quality/Water Quality Division
Herschler Building
122 West 25th Street
Cheyenne, Wyoming 82002
Telephone: (307) 777-7781

If no discharge occurs during the reporting period, "no discharge" shall be reported. If discharge is intermittent during the reporting period, sampling shall be done while the facility is discharging.

3. Definitions

a. The "daily average" discharge means the total discharge by weight determined by the arithmetic mean (geometric mean in the case of the fecal coliform parameter) of a minimum of three (3) samples taken on three (3) separate days during a calendar month.

b. The "daily maximum" shall be determined by the analysis of a properly preserved composite sample composed of a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow at the time of sampling.

c. The "daily maximum" concentration shall be determined by the analysis of a properly preserved composite sample composed of a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow at the time of sampling.

d. The "instantaneous maximum" concentration shall be determined by the analysis of a single properly preserved grab sample.

4. Test Procedures

Test procedures for the analysis of pollutants, collection of samples, sample containers, sample preservation, and holding times, shall conform to regulations published pursuant to Section 304(h) of the Federal Water Pollution Control Act.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form. Such increased frequency shall also be indicated.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the State water pollution control agency.

8. Facility Identification

All facilities discharging produced water shall be clearly identified with an all-weather sign posted at a visually prominent location. This sign shall, as a minimum, convey the following information:

a. The name of the company, corporation, person or persons who hold(s) the discharge permit; and

b. The name of the facility (lease, tank battery number, etc.) as identified by the discharge permit.

PART II

A. MANAGEMENT REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases or process modifications which will result in new, different or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. Bypassing

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of

this permit. The permittee shall promptly notify the Regional Administrator and the State in writing of each such diversion or bypass.

6. Removed Substances

Solids, sludges, filter backwash or other pollutants removed in the course of treatment or control of wastewaters or intake waters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. In accordance with the Schedule of Compliance contained in Part I, provide an alternative power source sufficient to operate the wastewater control facilities;

or, if such alternative power source is not in existence and no date for its implementation appears in Part I,

b. Take such precautions as are necessary to maintain and operate the facility under his control in a manner that will minimize upsets and insure stable operation until power is restored.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the head of the State water pollution control agency, the Regional Administrator and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State water pollution control agency.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be

available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

d. If necessary to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2) and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

(1) Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

(2) Controls any pollutant not limited in the permit.

5. Toxic Pollutants

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "Bypassing" (Part II, A-5) and "Power Failures" (Part II, A-7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties established pursuant to any applicable State law or regulation.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART III

A. OTHER REQUIREMENTS

1. Flow Measurement

At the request of the Director of the Wyoming Department of Environmental Quality, the permittee must be able to show proof of the accuracy of any flow measuring device used in obtaining data submitted in the monitoring report. The flow measuring device must indicate values within ten (10) percent of the actual flow being measured.

2. 208(b) Plans

This permit may be modified, suspended or revoked to comply with the provisions of any 208(b) plan certified by the Governor of the State of Wyoming.

Sampling Report
Investigation of Waste, Incorporated's
Lawrence Brown Disposal Lagoon
Uinta County, Wyoming
July 15, 1986

SITE INFORMATION

Site Selection

EPA specifically selected the Waste Inc.'s Lawrence Brown Disposal Lagoon facility to obtain technical information and analytical data regarding the regional practice of using centralized pits for disposal of wastes from multiple oil and/or gas sources. More detailed information about the rationale for selection of centralized disposal pits is contained in Appendix B of the EPA Technical Report (EPA 530-SW-87-005).

EPA worked cooperatively with the Wyoming Department of Environmental Quality to identify and select the Waste Inc.'s Lawrence Brown Disposal Lagoon. No problems were encountered arranging for sampling to be conducted on July 15, 1986.

Site Location

Lawrence Brown Disposal Lagoon is located 5 miles from Woodroff Narrows Reservoir, north of Evanston. Figure 1 is a map indicating the disposal site.

The site is operated by Waste, Incorporated, whose mailing address and telephone number are:

PO Box 133
Evanston, WY 82930
307-789-3533
Contact Name: Rayo Barker

Attendees

Sampling of Lawrence Brown Disposal Lagoon was performed by CENTEC Corporation personnel on July 15, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Dewayne Buskey, Technician
State Representative:	E. J. Fanning, WY Dept. of Environmental Quality
Operator Representative:	Gary Ellingford, President, Waste, Inc.

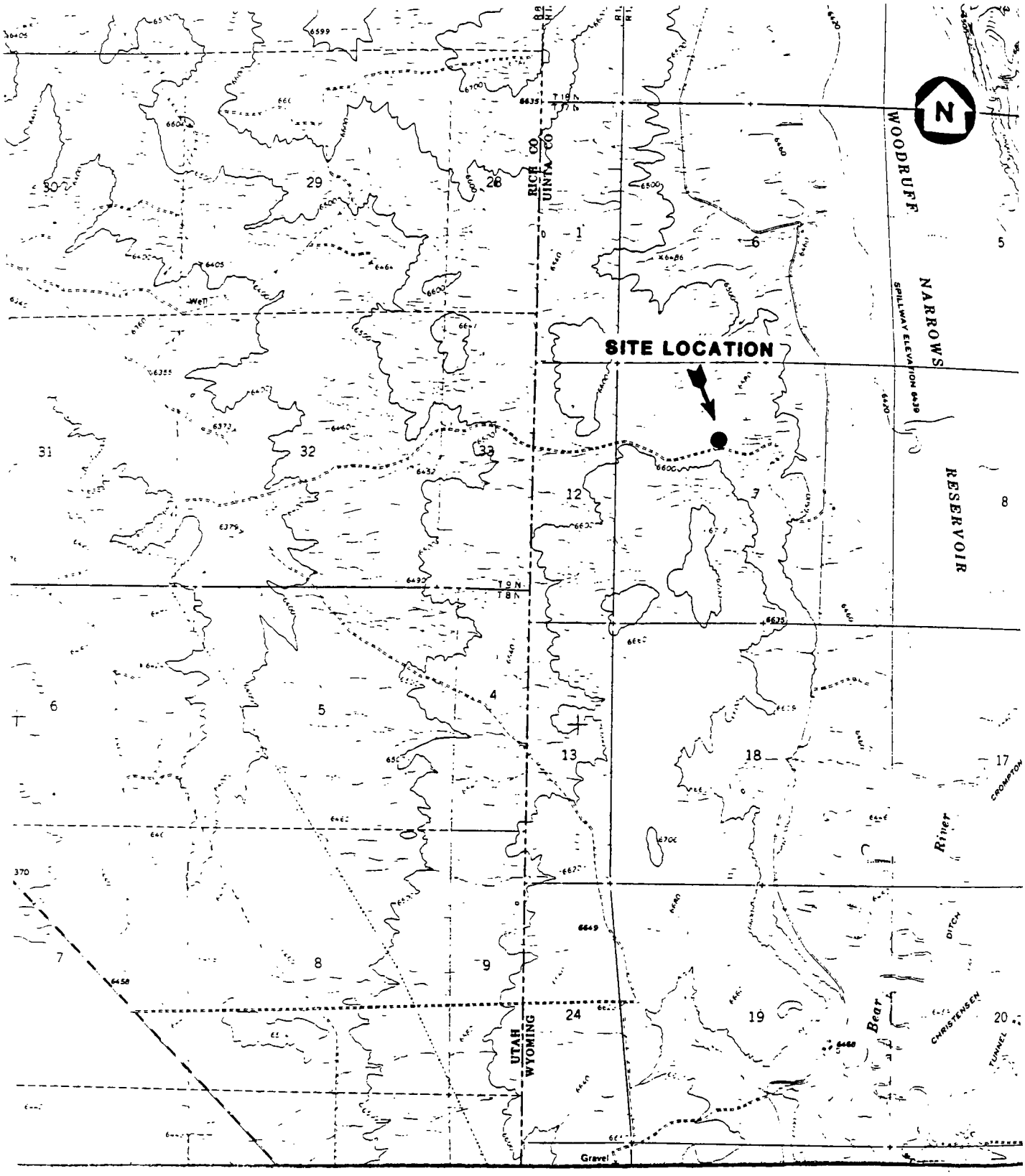


Figure 1. Location of Lawrence Brown Disposal Lagoon, Uinta County, Wyoming

American Petroleum
Institute Representatives: Alan Wilson, Contracted Sample Team Member
Earl Hinsley, Contracted Sample Team Member
David Havis, Contracted Observer

Site Description

Lawrence Brown Disposal Lagoon is located in a rural foothill area; the depth to groundwater is 30 feet, and the nearest surface water is less than 1/2 mile away. There are no drinking water wells within a 1-mile radius of the site. The soil in this area is dense clay. The climate at this site is net evaporation.

This site is a central pit facility for mud and brine. Figure 2 is a schematic diagram of the disposal site. Three separate pits have been constructed for the site. The pits are constructed 50 percent above grade and 50 percent below grade. The pits are lined--one with a polyliner and two with clay. Leak detection monitoring is required. Each pit had a series of drains with gravel inside designed to catch any leakage if the pit liner is punctured. The pits receive a variety of materials including fresh water, produced water, drilling mud, trash, waste oil, and sewage. These fluids are trucked to the facility. The individual pits are not fenced; however, the entire site has a fence around the property line.

Only one pit was sampled. The cost to build this pit was $230,000. Consultant costs were $23,000. This pit measures 400 feet by 400 feet. On the day of sampling, the liquid level in the pit was 3 feet. The sludge depth was about 1 inch except for the dumping area where the depth was 0.5-1 foot. The facility had no plans to treat any of the pits. When the pits are to be closed, the fluids will be evaporated and the dried solids buried. The site will be reclaimed by the addition of topsoil followed by reseeding. Photos 1-5 (Attachment A) show the pit that was sampled. Photos 6-11 show the other two pits at the site.

Permits

Each pit at the facility has a separate permit issued by the Wyoming Department of Environmental Quality (Permit Nos. 82-140, 83-82, and 84-547R). The pit selected for sampling operates under Permit No. 84-547R. A copy of this permit is shown in Attachment B.

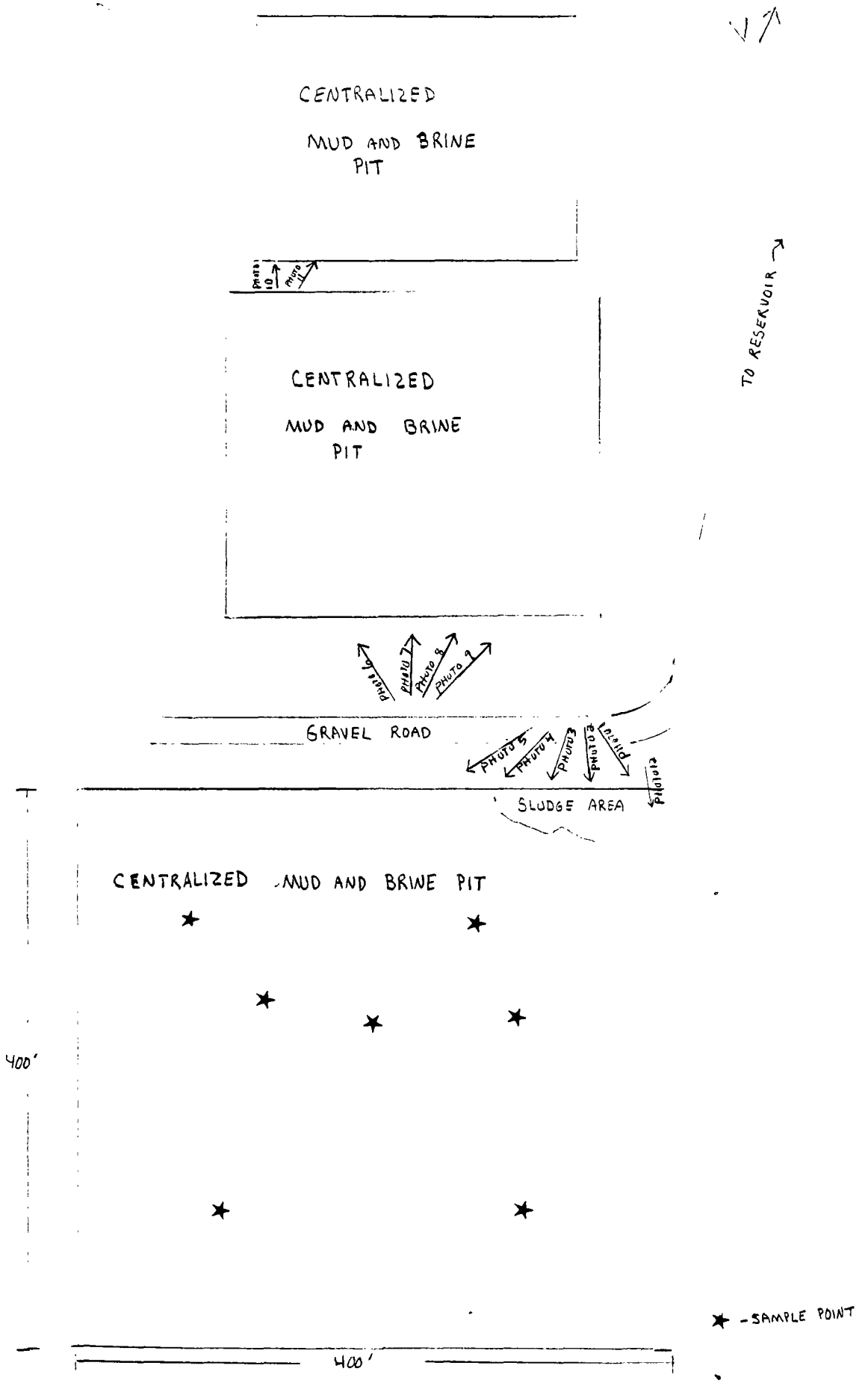


Figure 2. Lawrence Brown Disposal Lagoon Site
Schematic Diagram
C-1176

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The samples collected at Lawrence Brown Disposal Lagoon consisted of one supernatant sample and one sludge sample. Figure 2 shows the sampling locations within the pit. The sampled pit was chosen because it was the only pit at the facility that was still receiving fluids at the time of sampling. The other two pits had not received fluids since October 1985.

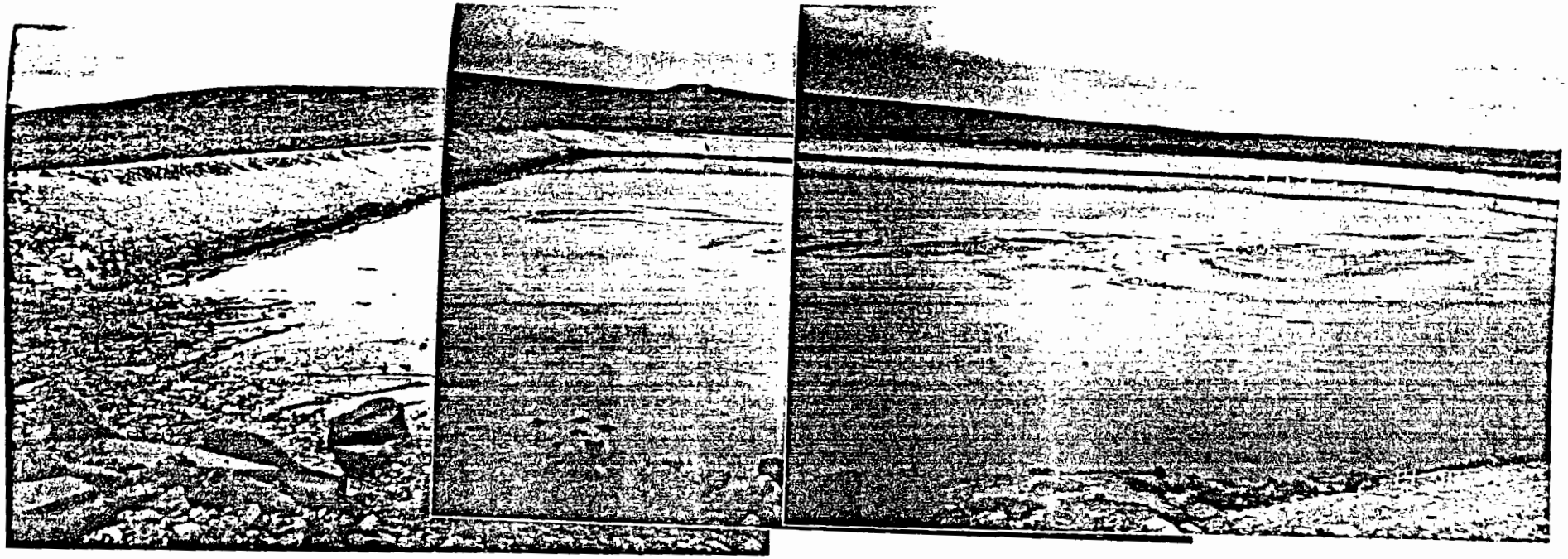
Sampling Methods and Equipment

The pit was measured to identify four quadrants and the center of each quadrant. The liquid sample was collected from the boat using the sampling thief. Weather conditions on the day of sampling (40 mph winds) prevented the liquid collection at the four precise quadrant locations as defined in sampling protocols. Two established quadrants were sampled at midpoint. The remaining sample was collected from various points in the other two quadrants.

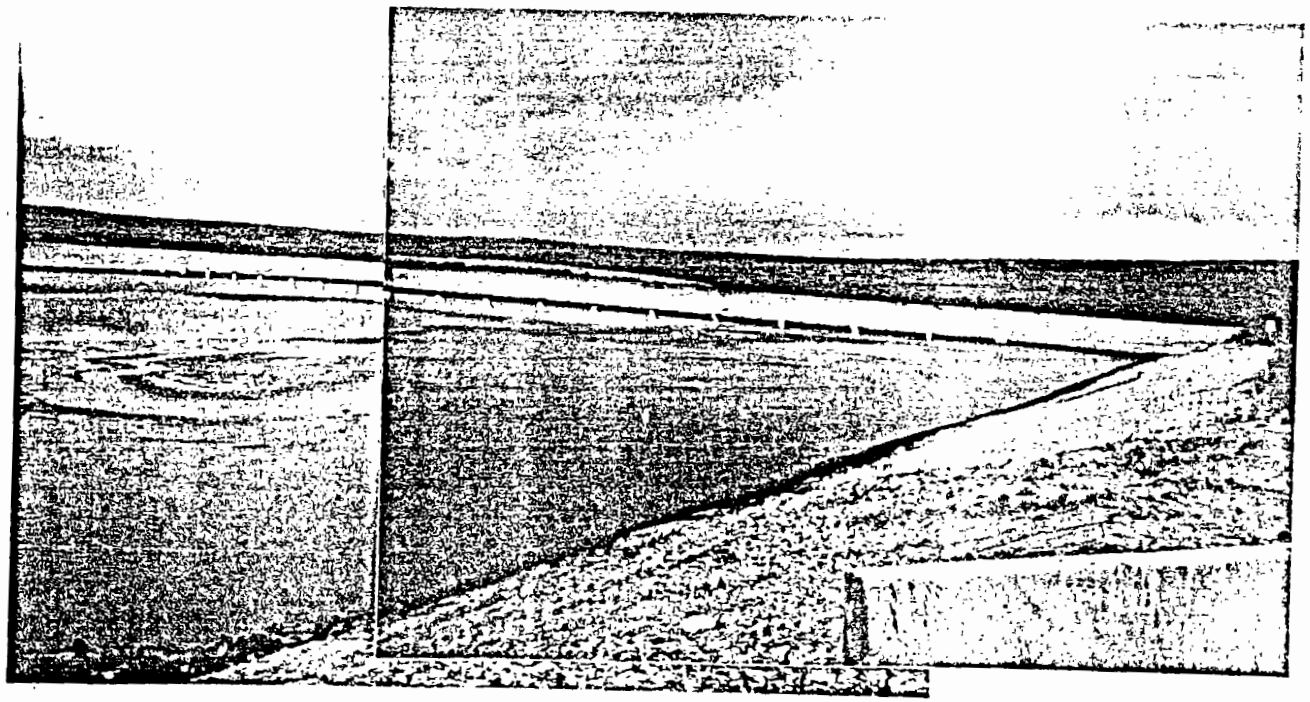
The sludge sample was collected using a stainless steel spoon and bucket from the northeast pit corner. This was the location of truck unloading into the pit, and nearly all sludge was located at this corner. Photo 12 shows this corner of the pit. The sample was not collected with the coring tube or the dredge at the request of the onsite representative for fear that the pit liner would be punctured.

The lagoon supernatant was tested onsite for pH and free chlorine after the completion of sampling. Test results gave a pH value of 6. Free chlorine was less than the lowest detectable level of 0.2 ppm.

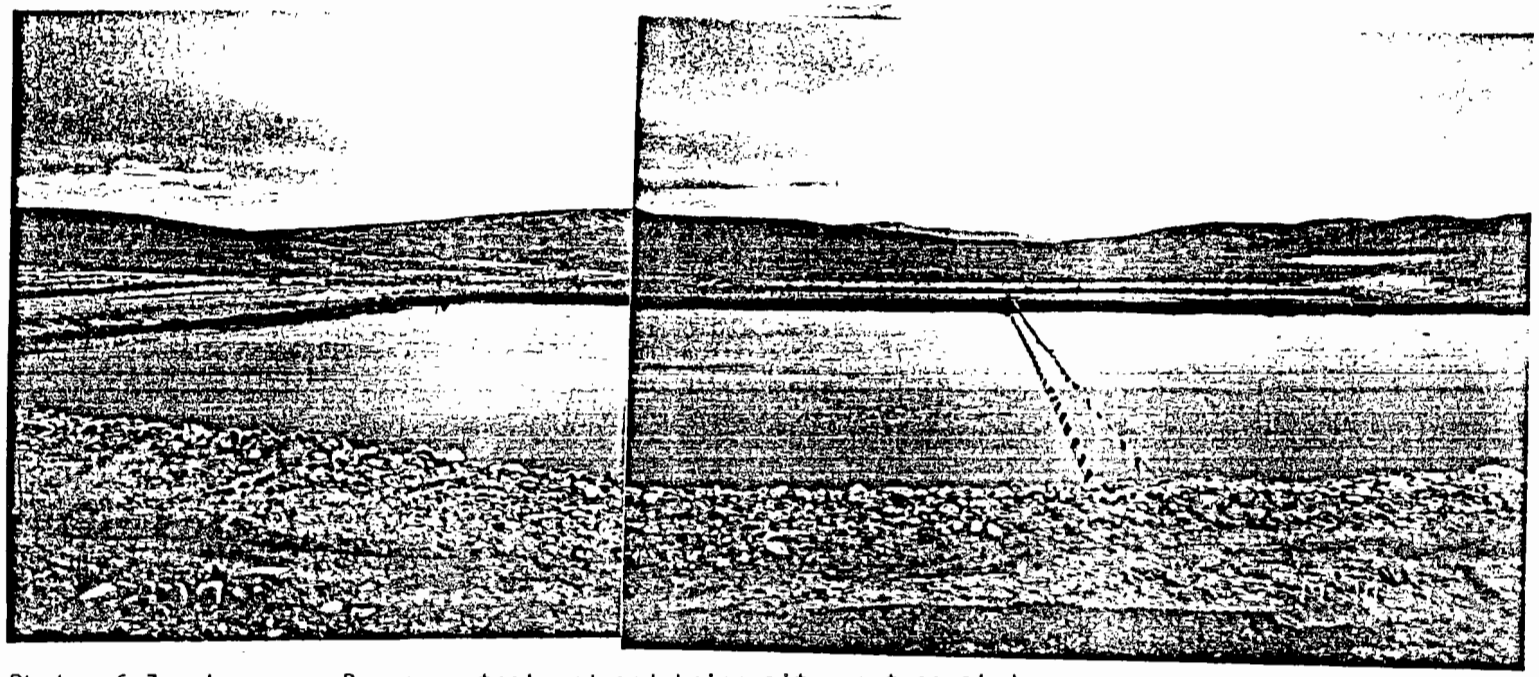
ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES



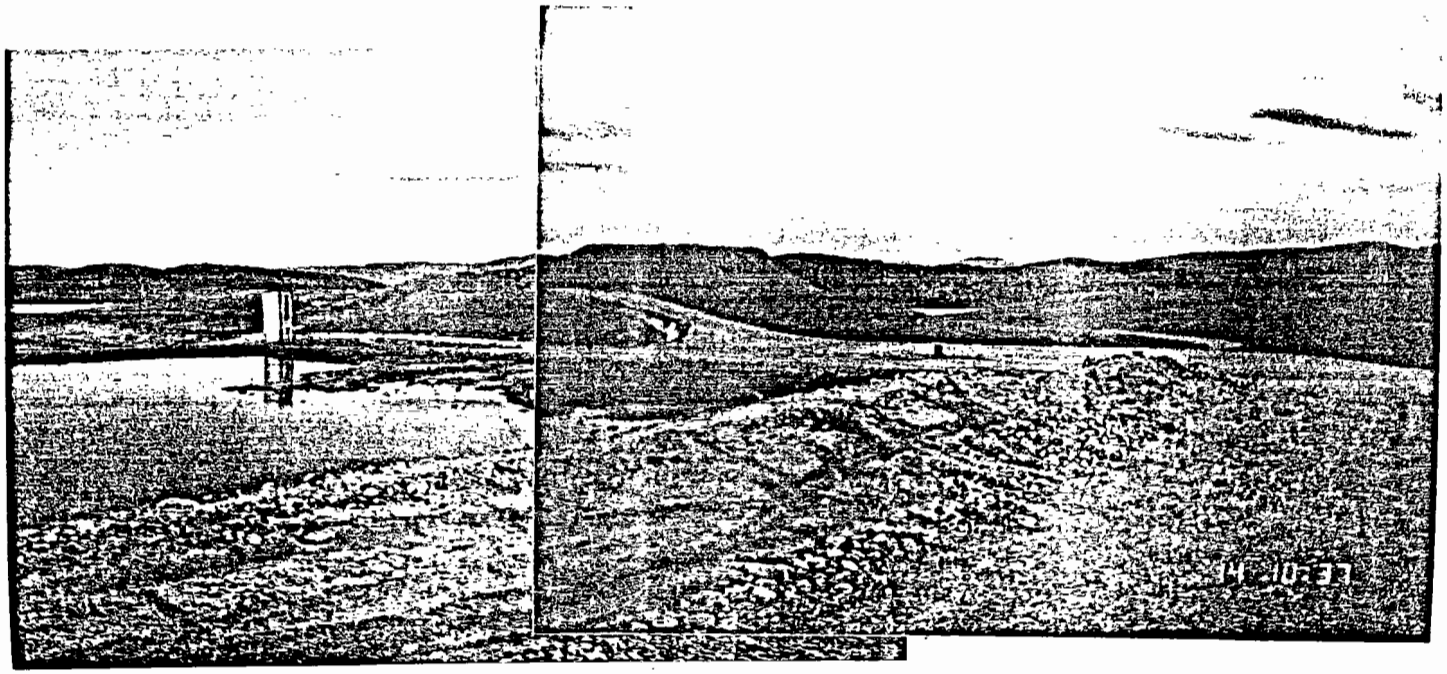
Photos 1,2,3. Sampled central mud and brine pit

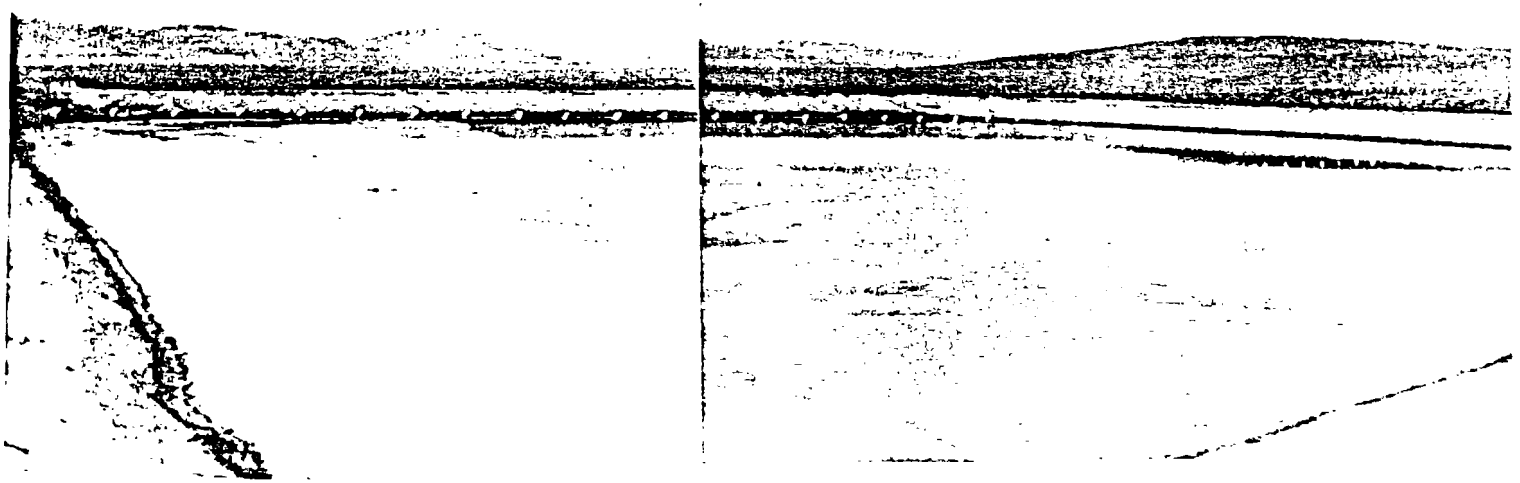


Photos 4,5. Sampled central mud and brine pit



Photos 6,7. Lawrence Brown central mud and brine pit - not sampled





Photos 10,11. Lawrence Brown central mud and brine pit - not sampled

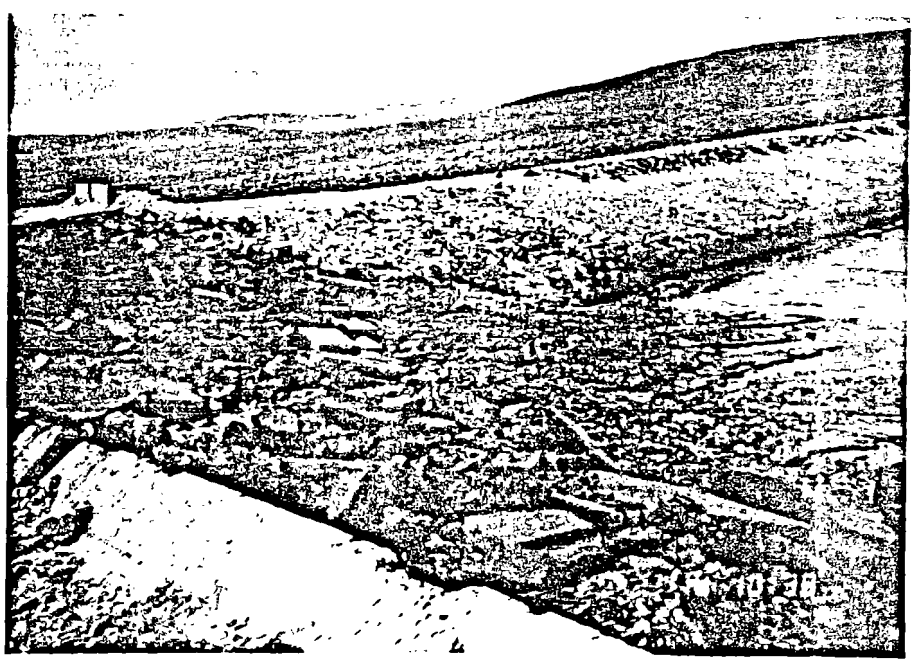


Photo 12. Sludge sample point location

ATTACHMENT B: PERMITS

PERMIT TO CONSTRUCT

/xx/ New

/ / Renewal

/ / Modified

Permit No. 84-547R

Lawrence Brown Disposal Lagoon
(Name of Facility)

This permit hereby authorizes the applicant (name and address):

Waste, Inc.
P.O. Box 133
Evanston, WY 82930

to construct, install, or modify a synthetically lined pond for disposal of petroleum industry sludges and wastewater facility according to the procedures and conditions of the application No. 84-547R. The facility is located in Sec. 7, T17N, R120W in the County of Uinta, in the State of Wyoming. This permit shall be effective for a period of two (2) years (five (5) years maximum) from the date of issuance of this permit.

The issuance of this permit provides that the Department of Environmental Quality has evaluated and determined that the application meets minimum applicable construction and design standards. The compliance with construction standards and the operation and maintenance of the facility to meet the applicant's engineer's design are the responsibility of the applicant, owner, or operator.

The authority to construct granted by this permit does not mean or imply that the Wyoming Department of Environmental Quality guarantees or insures that the permitted facility, when constructed, will meet applicable discharge permit conditions or other effluent or operational requirements.

Nothing in this permit constitutes an endorsement of the construction or the design of the facility described herein. This permit indicates only that standards of design and construction required by the Environmental Quality Act have been met. The State assumes no liability for, and does not in any way guarantee the performance of, the permittee in the exercise of its activities allowed under this permit. The Permittee understands that it is solely responsible to any third parties for any liability arising from the construction or operation of the facility described herein. By the issuance of this permit, the State does not in any way waive its sovereign immunity.

The permittee shall allow authorized representatives from the Department of Environmental Quality, Water Quality Division, upon the presentation of credentials and dur-

ing working hours, to have access to inspect the facilities, at the above location, for the purpose of compliance with the provisions of this construction permit.

The permittee shall notify representatives from the Department of Environmental Quality, Water Quality Division the day construction commences and give an estimate of completion of the project. The authorized representative in your area can be contacted at the following address: District Engineer, State of Wyoming, Department of Environmental Quality, Water Quality Division, 210 Lincoln, Lander, Wyoming 82520; telephone, 332-3144.

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties established pursuant to any applicable State law or regulation.

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

AUTHORIZED BY:

REGISTERED PROFESSIONAL ENGINEER
WILLIAM L. GARLAND
P.E. # 1479
STATE OF WYOMING

Administrator
Water Quality Division

May 20, 1985
Date of Issuance

REGISTERED PROFESSIONAL ENGINEER
ROBERT E. SUNDIN
NO. 285
STATE OF WYOMING

Director
Dept. of Environmental Quality

This permit <u>does not</u> supercede the requirements for obtaining any permit from local agencies.

Sampling Report
Investigation of Sun Exploration and Production Company's
Luckey Ditch Fed B Well No. 4
Uinta County, Wyoming
July 16, 1986

SITE INFORMATION

Site Selection

This site was randomly selected by EPA as described in the sampling strategy document in Appendix B of the EPA Technical Report (EPA 530-SW-87-005). Although EPA worked with the Department of Environmental Quality and the Oil and Gas Conservation Commission to identify appropriate drill sites prior to the public meeting scheduled for July 11, 1986, no list of sites was forthcoming.

The list of possible sample sites was presented to EPA by the Oil and Gas Conservation Commission at a public meeting held in Casper, Wyoming, on July 11, 1986. Attendees included representatives from EPA, Wyoming Department of Environmental Quality, Wyoming Oil and Gas Conservation Commission, oil and gas companies, and the public. EPA requested identification of a number of drill sites at or very near completion during July 16-17, 1986, in the Evanston, Wyoming area for site selection purposes. The Wyoming Oil and Gas Commission identified the only site: Sun Exploration and Development Company's Luckey Ditch Fed B Well No. 4. Since no other sites could be identified by meeting attendees, the Luckey Ditch site was selected.

The site operator and telephone number were relayed to the EPA contractor July 15, 1986. Repeated attempts to contact the rig were unsuccessful. Thus, further information regarding the site was not available to the sampling team prior to the sampling date, July 16, 1986.

Site Location

Luckey Ditch Fed B Well No. 4 is located about 20 miles southeast of Mountain View, Wyoming. Figure 1 is a map indicating the well site.

The site is operated by Sun Exploration and Production Co., whose mailing address and telephone number are:

PO Box 5940
Denver, CO 80217
303-696-3500
Contact Name: Bill Brawley

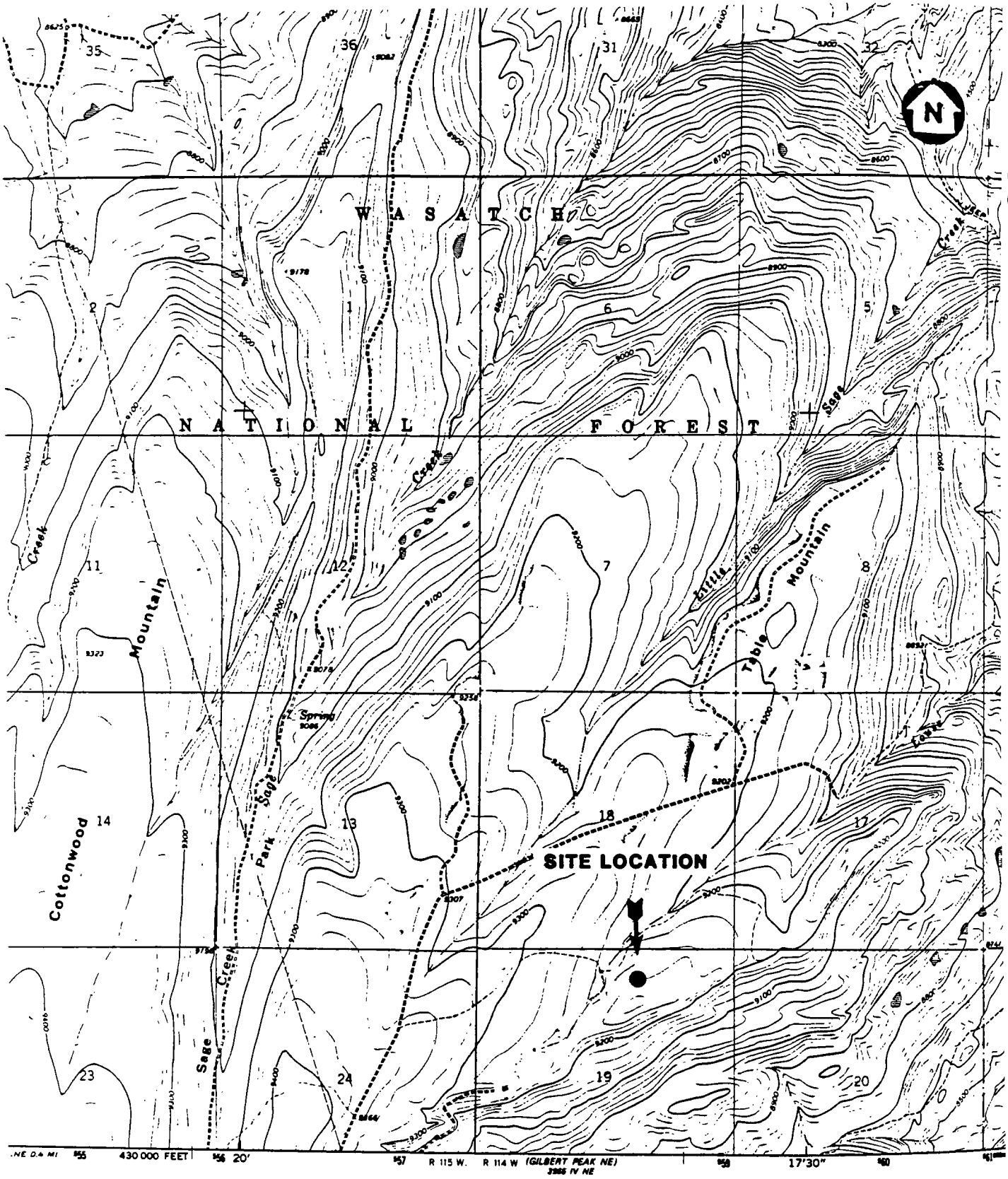


Figure 1. Location of Luckey Ditch Fed B Well #4, Uinta County, Wyoming

Attendees

Sampling of Luckey Ditch Fed B Well No. 4 was performed by CENTEC Corporation personnel on July 16, 1986. The following is a list of people present at the time of sampling:

CENTEC Corp. (sample team):	Bruce Hoskins, Team Leader Dewayne Buskey, Technician
State Representatives:	E. J. Fanning, WY Dept. of Environmental Quality Tom McCall, WY Oil and Gas Conservation Commission
Operator Representatives:	Ron Coats, Specialist Drilling Foreman Bert Bates, Jr., Regional Environmental Coordinator
American Petroleum Institute Representatives:	Alan Wilson, Contracted Sample Team Member Earl Hinsley, Contracted Sample Team Member David Havis, Contracted Observer

Site Description

Luckey Ditch Fed B Well No. 4 is located in a rural mountainous area. The depth to groundwater is over 100 feet, and the nearest surface water is over 2 miles away. There are no drinking water wells within a 1-mile radius of the site. The soil in this area is rock and clay. The climate at this site is net evaporation.

This site was a developmental gas drilling site. The well drilling began on July 7, 1986, with an estimated completion date of September 15, 1986. On the day of sampling, the well was at a depth of 3,519 feet. The final completion depth was planned at 15,900 feet. Drilling was accomplished with low-solid non-dispersed muds. Three hundred pounds of biocide Dowicide G were used on July 24, 1986, to control bacterial growth during the initial phase of drilling.

Figure 2 is a schematic diagram of the drilling site. Two separate pits were constructed for the site: a reserve pit and a mud recirculation pit. The pits were constructed below grade. Each pit measured 163 feet in length by 83 feet in width. Both pits were lined with natural clay. The total cost of pit construction was $6,000. The pits received drilling muds, fresh water, and motor oil. The pit area was fenced. Diversion ditches were required. Photos 1 and 2 (Attachment A) show the two mud pits and the mud recirculator. Photo 3 shows the drilling rig. Photos 4 and 5 show the operation trailers.

WATER TANK
TRAILER
TRAILER
TRAILER
TRAILER
TRAILER
DIESEL OIL TANKS
N
DRILLING RIG
MUD STORAGE BLDG
MUD RECIRCULATION UNIT
RECIRCULATED MUD PIT
RESERVE PIT
PHOTO 1
PHOTO 3
PHOTO 4

A mud recirculation system was used at this site. The two-pit system was designed so that the first pit would receive all muds and fluids. Cuttings would remain in the first pit. Supernatant and reusable drilling mud would flow into the second pit. There, the muds were removed from the pit bottom and reused. The supernatant remained in the second pit giving it an iron orange color. The fluids were piped from drilling operations into the pit. The sludge depth in the reserve pit was 1-2 feet. There was no discrete liquid surface in the reserve pit. There was a liquid depth of 1 foot in the recirculation pit. The total volume of drilling fluids in the reserve pit was estimated to be between 2,500 and 5,000 bbl.

A total of 800 bbl of diesel oil was stored in tanks at this facility. It was unknown how much waste diesel oil would be generated.

Disposal Practices

At the completion of drilling, all cuttings were placed in the reserve pit. There was no required testing of pit contents. Pit contents were to be treated by pH adjustment and settling. The pit fluids were to be removed and hauled to a disposal pit. The dried pit solids were buried. The pit site would be reclaimed by

the addition of new top soil and reseeded back to forest. According to site personnel, there are records available regarding the final disposition.

Permits

The site was operating under Permit No. W-61811, issued on June 26, 1986, by the Bureau of Land Management. A copy of the permit is shown in Attachment B.

SAMPLING INFORMATION

Sampling efforts at this site followed the sampling procedures and protocols for field sampling as outlined by the Sampling Plan and Sampling Quality Assurance/Quality Control Plan in Appendix G of the EPA Technical Report (EPA 530-SW-87-005). The following is a description of site-specific sampling information and activities.

Sample Point Locations

The samples collected at Luckey Ditch Fed B Well No. 4 consisted of one supernatant and one sludge sample. Figure 3 shows the sampled pits and the location of the sample points. Supernatant was collected in the mud recirculation pit. This was done because the reserve pit held no discrete liquid surface yet all liquid in the recirculation pit passed through the reserve pit.

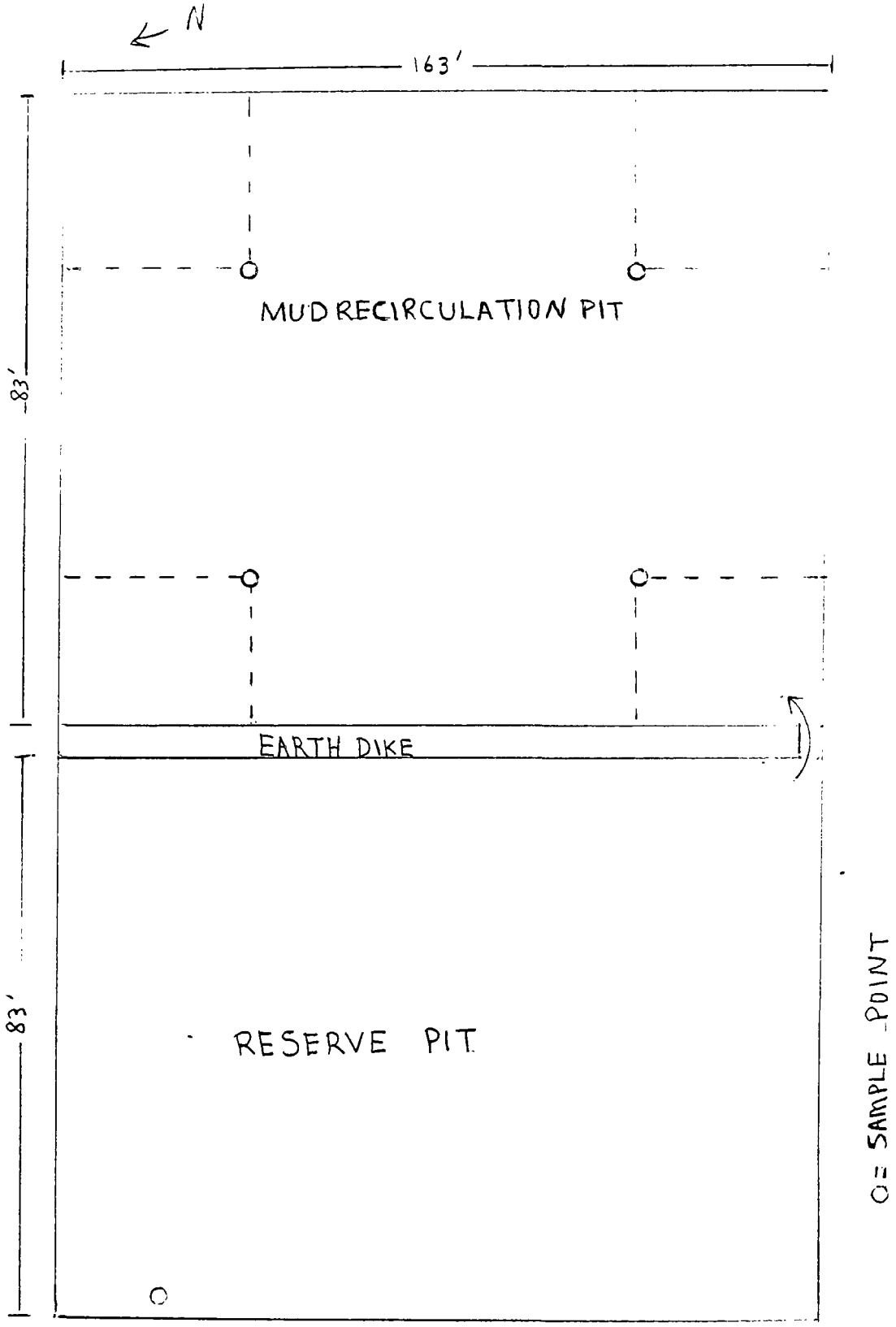


Figure 3. Sampled Reserve and Mud Recirculation Pits

Sludge was collected from the reserve pit. Four quadrants were established for supernatant sampling.

There were no discrepancies between the actual and measured sample points for supernatant sampling. For sludge sampling, the four-quadrant procedure was modified because the reserve pit had a boglike consistency and was inaccessible by boat or by foot. A sludge sample was collected along the only accessible side of the pit.

Sampling Methods and Equipment

To collect samples from the mud recirculation pit, the pit was measured to identify the four quadrants and to locate the center of each quadrant. The liquid was too shallow for thief sampling; the supernatant was sampled from the boat with a stainless steel bucket.

The boat could not be used in the reserve pit, and the pit was judged unsafe to wade into. The coring tube was not used as the sludge was too fluid to remain in the coring tube. The sludge was collected from the pit edge with the dredge, a stainless steel spoon, and the stainless steel bucket. A sludge sample depth of 1 foot below pit surface was achieved. This particular sludge sample was a grab and not a composite.

The pit supernatant was tested onsite for pH and free chlorine content after completion of the sampling. The pH of the water was 6; the free chlorine content was less than 0.2 ppm, the lowest detectable level.

Due to time constraints, the samples were held overnight under refrigeration before shipment to the laboratories.

ATTACHMENT A: PHOTO DOCUMENTATION OF SAMPLING ACTIVITIES

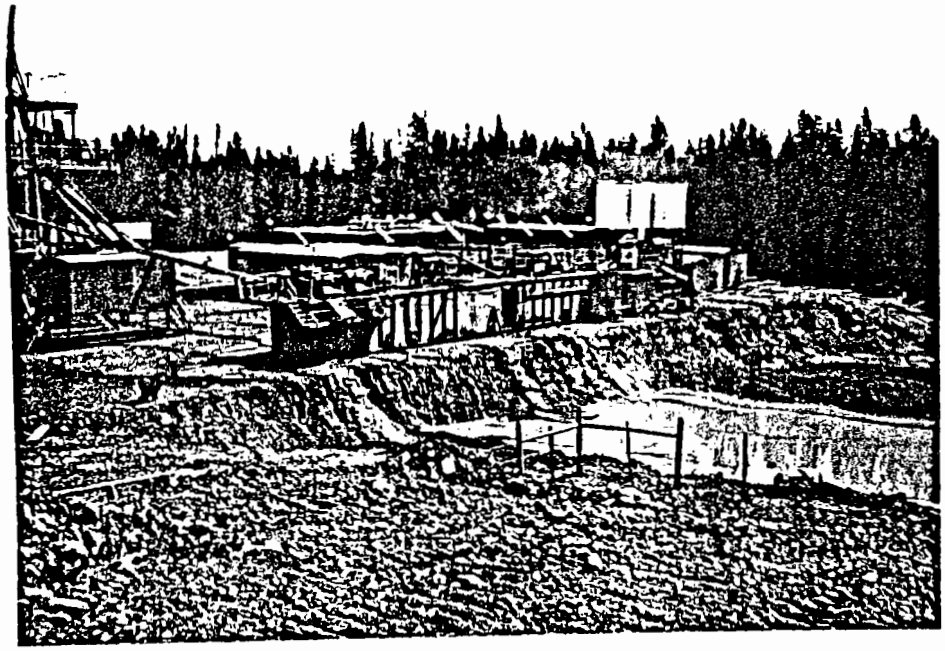


Photo 1. Mud recirculator and reserve pit

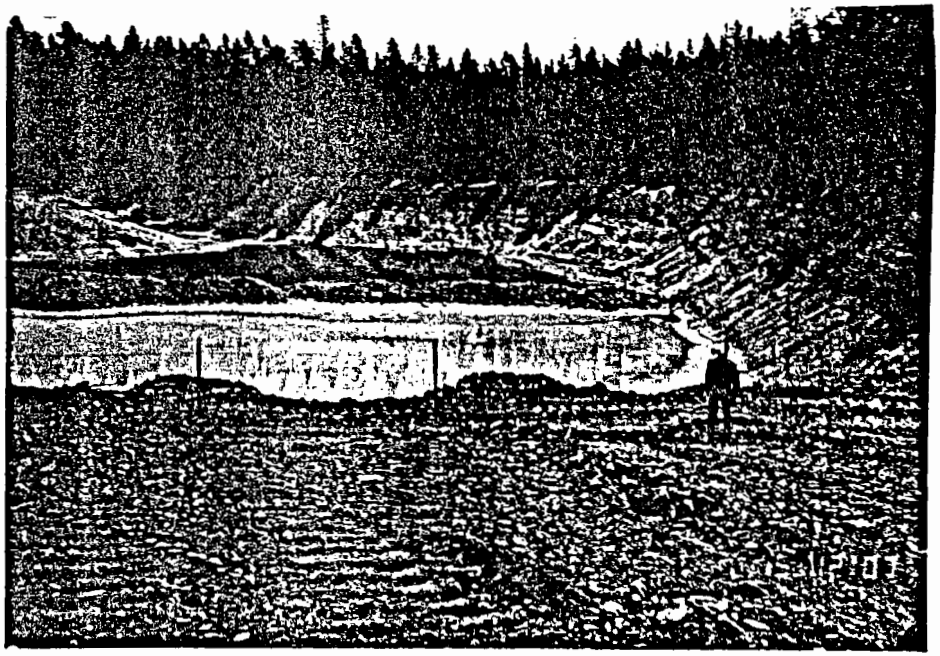


Photo 2. Reserve and mud recirculation pits

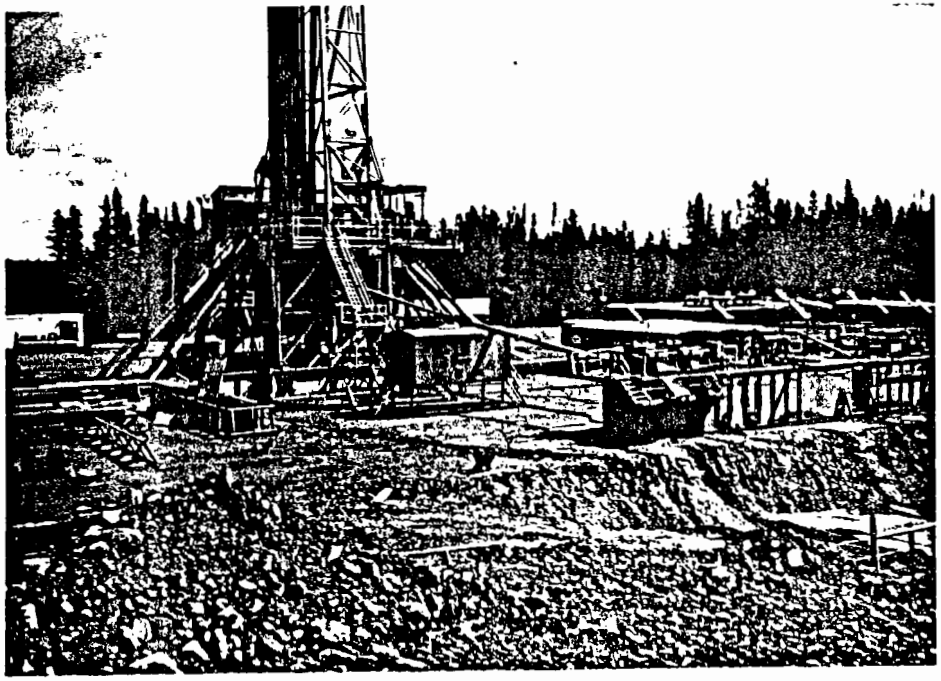


Photo 3. Drilling rig

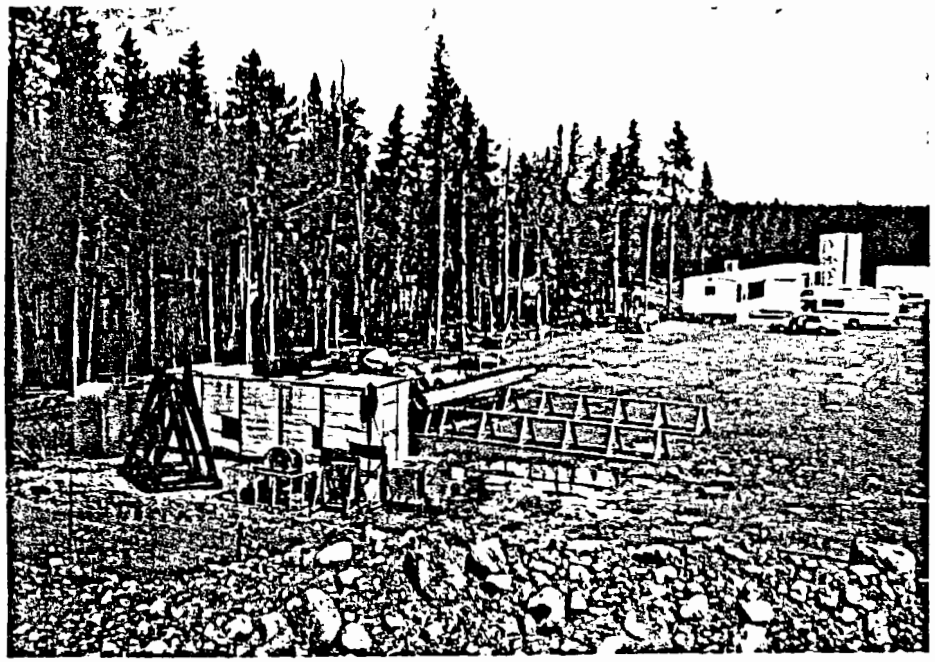


Photo 4. Operation trailers

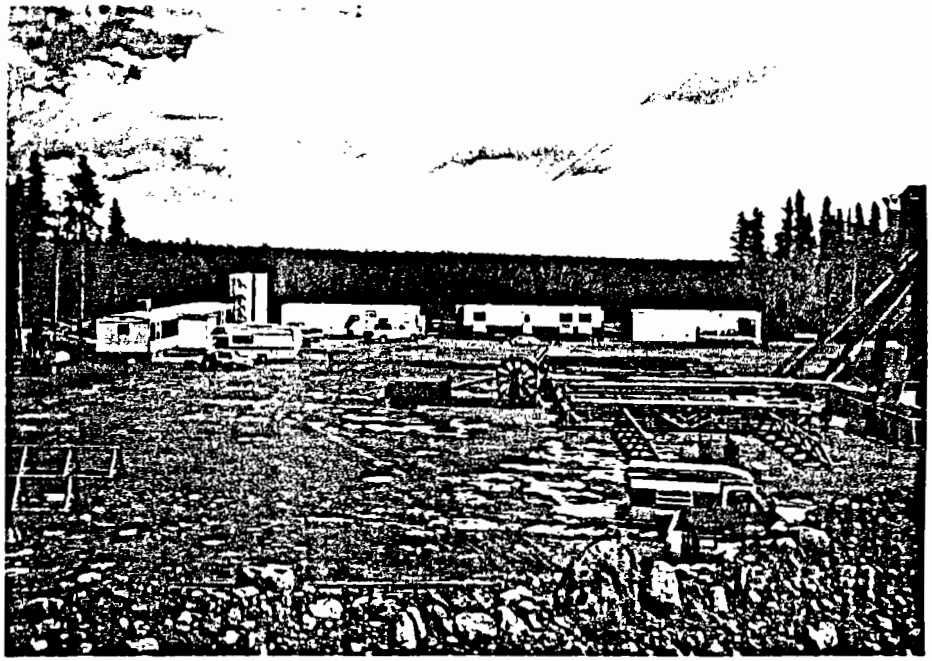


Photo 5. Operation trailers

ATTACHMENT B: PERMITS

Form 1
January, 1966

STATE OF WYOMING
OIL AND GAS CONSERVATION COMMISSION
Office of State Oil and Gas Supervisor
P. O. Box 2640
Casper, Wyoming 82602

5 State Lease No. BLM W
6. Unit Agreement

1. **APPLICATION FOR PERMIT TO:** (Submit in Duplicate, Triplicate on State Lands)

DRILL ☐ DEEPEN ☐ PLUG BACK ☐

OIL WELL ☐ GAS WELL ☐ OTHER SINGLE ZONE ☐ MULTIPLE ZONE ☐

7. Farm or Lease Name: Luckey Ditch Fed "B"
8. Well No.: 4
9. Reservoir:
10. Field Name: Luckey Ditch
11. Section, Township and Range: Sec. 19-12N-114W

2. OPERATOR: Sun Exploration & Production Company

3. ADDRESS: P.O. Box 5940 T.A., Denver, CO 80217

4. LOCATION. Show quarter-quarter description and footage measurements.
At surface: NWNE 496' FNL & 1620' FEL
At proposed prod. zone:

12. County: Uinta 13. State: WY

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: Approx (8) miles W/SW of Lonetree, WY

15. DISTANCE IN FEET FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE (Also to nearest drlg. unit line, if any): 496'

16. No. of acres in lease: 1454.58

17. No. of wells on this 40-acre tract, including this well, completed in or drilling to same reservoir(s): 160

18. DISTANCE IN FEET FROM PROPOSED LOCATION TO NEAREST DRILLING, COMPLETED OR APPLIED FOR WELL ON THIS LEASE: 3629.6'

19. Proposed depth: 15,750'

20. Rotary or cable tools: rotary

21. Elevations Derrick Floor | Rotary Kelly Bushing | Rotary Table | Ground: 9257' | Other

22. Approx. date work will start: 4/1/86

23. IF LEASE PURCHASED WITH ANY WELLS DRILLED, FROM WHOM PURCHASED (Name and Address)

24. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	NEW OR SECOND HAND	DEPTH (MD)	SACKS OF CEMENT
17-1/2	13-3/8 K-55	54.5#	new	0-500	625 sx
12-1/4	9-5/8 S-95	43.5#	new	0-8800	800 sx
8-1/2	5-1/2 N-80	20.0, 23.0#		8800-TD	625 sx

DESCRIBE PROPOSED OPERATIONS:
If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. Give blowout preventer program, if any.
If proposal is to directionally drill or deepen, give pertinent data on subsurface locations and measured and true vertical depth.

Primary Objective: Dakota
Fed. Lse No. W-61811

called 3-17-86 (needs checked) needs approved 3-31-86

302 WAS SOSPENDED FOR ENTIRE LUCKY DITCH UNIT BY LETTER FROM D.B.B.

RECEIVED
MAR 17 1986
WYOMING OIL & GAS
CONSERVATION COMMISSION

25. SIGNED Ona McKissack TITLE Sr. Acctg. Assist. DATE 3/14/86

26. KIND AND STATUS OF BOND

(This space for State office use)
PERMIT NO. C11-20752 DATE 5-14-86
APPROVAL DATE
APPROVED BY State Oil and Gas Supervisor
Approvals Expiration 196

CONDITIONS OF APPROVAL, IF ANY:

C-1203

*See Instructions On Reverse Side

Form 3160-5
(November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO.: W-61811

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

7. UNIT AGREEMENT NAME: LUCKEY DITCH UNIT

8. FARM OR LEASE NAME: LUCKEY DITCH FEDERAL "B"

9. WELL NO.: 4

10. FIELD AND POOL, OR WILDCAT: LUCKEY DITCH

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SEC. 19-12N-114W

1. OIL WELL [XX] GAS WELL [ ] OTHER

2. NAME OF OPERATOR: SUN EXPLORATION AND PRODUCTION CO.

3. ADDRESS OF OPERATOR: P.O. BOX 5940 T.A., DENVER, COLORADO 80217

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface
~~730'~~ 496' FNL, ~~2000'~~ 1620' FEL NW¼ NE¼ SECTION 19-T12N-R114W

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 9257' GR

12. COUNTY OR PARISH: UINTA

13. STATE: WY

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[X]	(Other)			[ ]
(Other)	[ ]						

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS: (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

SUNDRY NOTICE TO CHANGE THE DRILLING PLAN. DUE TO PROBLEMS ASSOCIATED WITH COAL SEAMS IN THE FT. UNION AND MESAVERDE. THE CASING DESIGN HAS BEEN CHANGED TO THE FOLLOWING.

HOLE SIZE	DEPTH	CASING SIZE
17½	0-500	13 3/8
12¼	500-11,000	9 5/8
8½	11,000-TD	5 1/2

ATTACHED IS THE REVISED 8 POINT PLAN WHICH SHOWS THE WEIGHTS AND GRADES OF EACH CASING STRING.

18. I hereby certify that the foregoing is true and correct

SIGNED _____ TITLE _____ DATE _____

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

* They do have a sign copy - consider but it's identical to these forms

SUN EXPLORATION AND PRODUCTION COMPANY

Lease # W-61811, Luckey Ditch Federal "B" #4
NW¼ NE¼ Section 19, T12N - R114W
Uinta County, Wyoming

Drilling Prognosis

1. Estimated Tops of Geologic Markers

Bridger	Surface
Green River/Wasatch	1,408'
Fort Union	8,392'
Coal Seams	9,042-10,692'
Mesaverde	10,942'
Hilliard	12,913'
Frontier	15,199'
Mowry	15,353'
Dakota	15,574'
TD	15,900'

2. Estimated Depths of Anticipated Water, Oil, Gas or Mineral Formations

Green River/Wasatch	1,408'	Water Possible
Fort Union	8,392'	Water Possible
Mesaverde	10,942'	Oil/Gas Possible
Frontier	15,199'	Oil/Gas Possible
Dakota	15,574'	Oil/Gas Possible

If any shallow water zones are encountered, they will be adequately protected and reported; none anticipated. Potentially productive hydrocarbon zones will be cemented off.

3. Pressure Control Equipment

A. Interval(s) at which used: 0-500'

None

B. Interval(s) at which used: 500-15,900'

Type: 13-5/8" Double Gate Hydraulic, 13-5/8" Annular Preventer equipped with hydraulic choke and manifold.

3. Pressure Control Equipment (Continued)

Pressure Rating:	10,000 psi working pressure BOP's 5,000 psi working pressure annular 10,000 psi manifold
Testing Procedure:	The BOP and choke manifold will be tested to 70% of the internal yield of the casing or rated working pressure whichever is less. The annular preventer will be tested to 1/2 of rated working pressure. The test will be for a period of 15 minutes upon installation, once every thirty days and/or when flange seals are broken if a "nipple up" or "nipple down" takes place.

The fill line will be 3", kill line will be 3" and choke line will be 4". BOP drills and tests will be recorded in the drillers log.

The choke manifold and BOP extension rods and handwheels will be located outside the substructure. The hydraulic BOP closing unit will be located at least 25 feet from the wellhead in the accumulator house, with a remote control unit on the rig floor available to the driller. Exact locations and configurations will depend upon the particular rig layout.

4. The Proposed Casing and Cementing Program

A. Casing Program

Hole Size	Casing Size	Wt/Ft	Grade	Joint	Depth Set	String Length
17½	13-3/8	54.5#	K-55	BTC	0-500'	500'
12¼	9-5/8	43.5#	N-80	LTC	0-9000'	9000'
12¼	9-5/8	47#	N-80	LTC	9000-11,000'	2000'
8½	5-1/2	20#	S-95	BTC	0-3200'	3200'
8½	5-1/2	20#	N-80	LTC	3200-11,600'	8400'
8½	5-1/2	23#	N-80	LTC	11,600-15,900'	4300'
	2-7/8*	6.5#	N-80	EUE	0-15,900'	15,900'

* Production tubing if well is productive.

Casing strings will be tested to .2 psi/ft or 1000' whichever is greater prior to drilling out. Conductor pipe will not be tested.

4. The Proposed Casing and Cementing Program (Continued)

B. Cementing

Surface Casing:	350 sacks Dowell Lite w/3% $CaCl_2$ and ¼#/sx D-29, followed by 150 sacks Class "G" w/3% $CaCl_2$ and ¼#/sx D-29. TOC - Surface
Intermediate Casing:	825 sacks Class "G" w/.5% D-60. Estimated TOC - 9000' w/50% excess.
Production Casing:	350 sacks Class "G" w/1% D-60, 30% D-66, 3% KCL and retarder as needed followed by 350 sacks Class "G" w/30% D-66, 2.5 gal/sx D-600, 3% KCL and retarder as needed. Estimated TOC - 12,900' w/30% excess.

Cement volumes will be adjusted to ensure that all potentially productive hydrocarbon zones are cemented off. The actual top of cement will be determined from logs.

5. Mud Program

Interval	Type	Weight	Viscosity	Fluid Loss
0-500	Fresh water with gel & lime sweeps	8.6-8.8	30-40	NC
500-800	LSND w/ASP-700 and Gel & lime sweeps	8.6-9.0	30-40	NC
8000-11,000	LSND w/gel, lime, caustic, ASP-700, shale stabilizer as needed	8.8-9.4	38-45	15-30
11,000-14,750	LSND w/weight as needed, ASP-700, and shale stab.	9.5-12.0	38-45	10-15
14,750-15,900	LSND w/weight as needed, ASP-700, shale stab, and 3% KCL	9.5-12.0	40-48	5-10

Sufficient mud material to maintain mud properties, control lost circulation and prevent a blowout will be available at the wellsite.

6. Evaluation Process

Logs:	DIL/SFL/CNL	Total Depth to 11,000'
	FDC-GR/Sonic-BHC	Total Depth to 11,000'
DST's:	None	
Cores:	2 - 60 foot cores in Dakota	

Evaluation process may change at the discretion of the wellsite geologist with the approval of the BLM.

Stimulation: No stimulation or frac treatment has been formulated for this test. The BLM will be notified by "Sundry Notice" prior to any completion activity with a complete frac program. The drillsite as approved, will be of sufficient size to accommodate all completion activity.

7. Abnormal Conditions

No abnormal temperatures or pressures are anticipated. No H_2S has been reported or known to exist from previous drilling in the area to this depth. Maximum anticipated bottom hole pressure is 6836 psi.

8. Drilling Activity and Auxiliary Equipment

A. Drilling Activity

Anticipated Commencement Date:	July 1, 1986
Drilling Days:	Approximately 110 days
Completion Days:	Approximately 30 days

B. Auxiliary Equipment

1) A Kelley Cock will be kept in string at all times.

2) Periodic checks will be made each tour of the mud system.

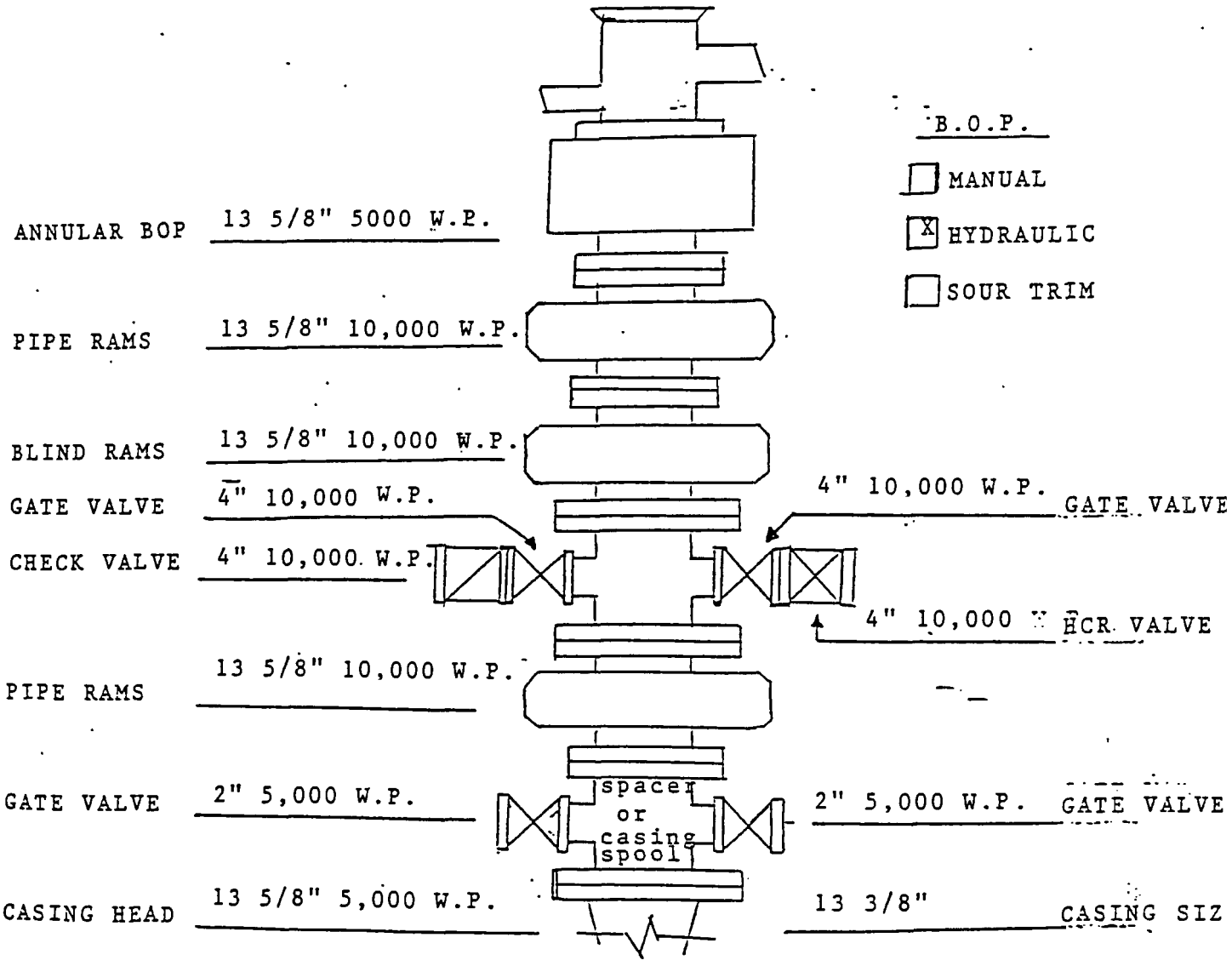
3) A Stabbing Valve will be kept on the derrick floor to be stabbed into the drill string whenever the Kelley is not in the string.

4) No float will be used in the drill string.

COMPANY SUN EXPLORATION & PROD. WELL NAME LUCKEY DITCH FED. B #4

LOCATION NW NE SECTION 19 T12N R114W

INTERVAL TO BE USED 500' to 15,900' TD



TEST PROCEDURE

1) Ram type preventers will be tested to rated working pressure of stack o 70% of internal yeild of casing whichever is less.
2) Annular type preventers will be tested to 50% of rated working pressure
3) BOP will be tested at time of installation and at least every 30 days. Pipe rams will be operated once each 24 hours and blind rams will be tested on trips.

BOP PROCEDURES AND DRILLS

1) Approved close in procedure to be posted on the rig floor.
2) Each rig crew to hold a close in drill weekly.
3) Drills will be noted on IADC daily drilling report at the rig.

AUXILLIARY BOP EQUIPMENT

1) Upper and lower kelly valve (in use)
2) Safety valve (rig floor)
3) Inside BOP valve (rig floor)
4) Extra drill pipe to drill collar sub (rig floor)

CHOKE MANIFOLD

All valves and fittings will be rated at 10,000# working pressure.

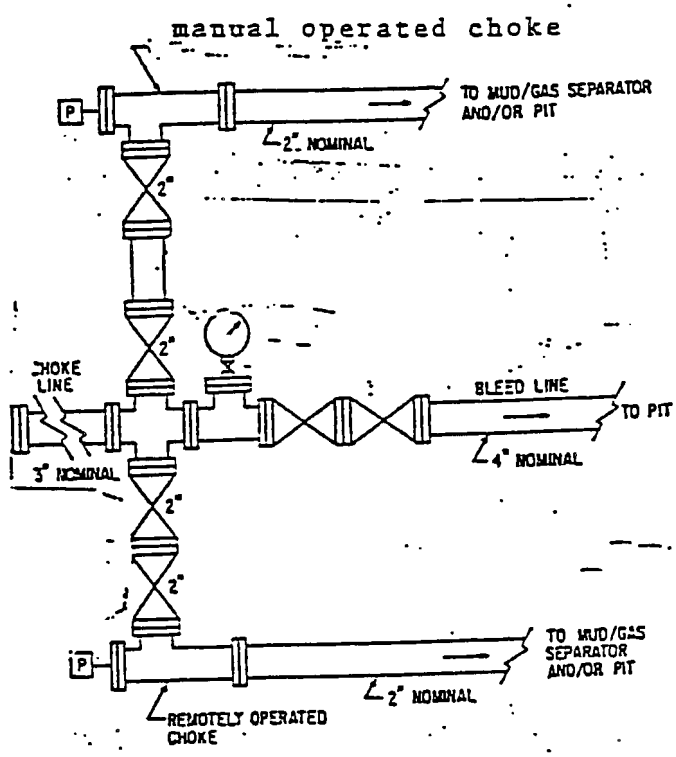


FIG. 3.A.3.
TYPICAL CHOKE MANIFOLD ASSEMBLY FOR 10M AND 15M RATED WORKING PRESSURE SERVICE — SURFACE INSTALLATION

BOP ACTUATING SYSTEM

1) Accumulator capacity will supply 1½ times volume necessary to close all BOP equipment units with a minimum pressure of 203 psi above pre-charge pressure.
2) Accumlator back up system supplied by a secondary power source independent of primary power source, will be provided with sufficient capacity to close all blowout preventers.
3) Locking devices will be provided on ram type preventers.
4) Primary BOP actuating control will be hydraulic and located either in the dog house or on the rig floor. Back up control will be provided by hand-wheel manual operation of BOP.