SENT

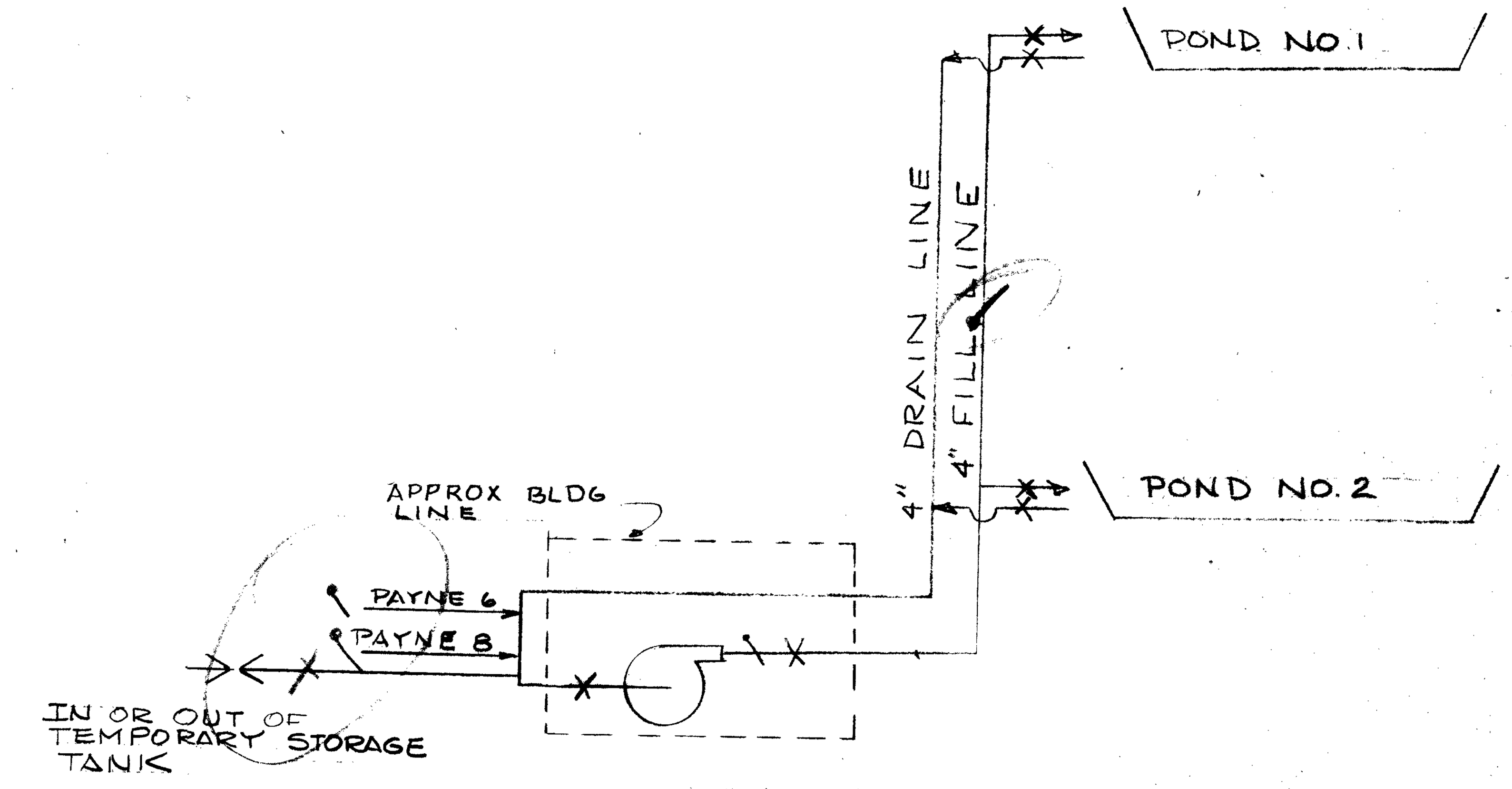
TO

ARCHIVES

except for few attached items

711-042
PAYNE EVAPORATION POND BURLINGTON
UNIT I SEC 20, T 32 N, R 10 W
CLOSED
FILE IN ARCHIVES 2000

GENERAL EARTHWORK PLAN



PUMPING SCHEMATIC
N.T.S.

NOTES
1. PIPE WITHIN 5' OF BLDG. TO BE 4" IRON, OUTSIDE OF 5' OF BLDG TO BE 4" PVC
2. PUMP TO BE "HALE 4" TNT" GASOLINE POWERED TRASH PUMP (40,000 GPH)

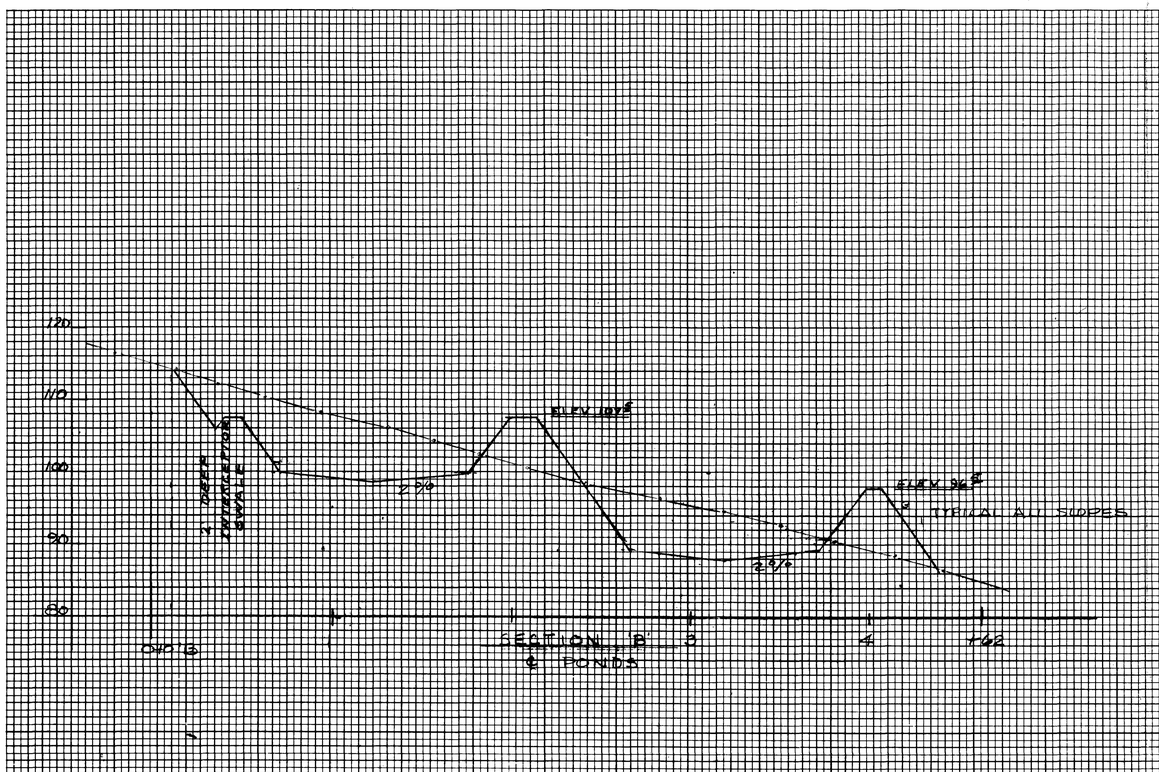
#2 Is this the limit of pond #2 show anchoring detail.

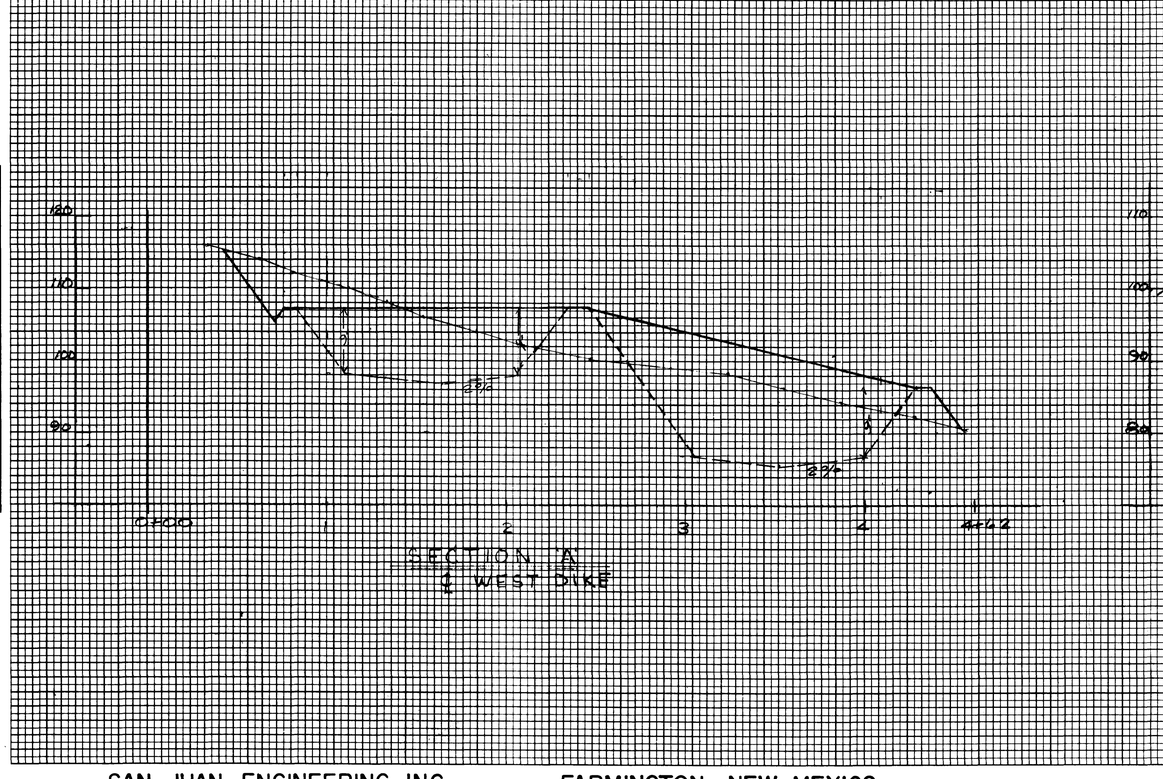
KEY
—•— CHECK VALVE
—x— GATE VALVE

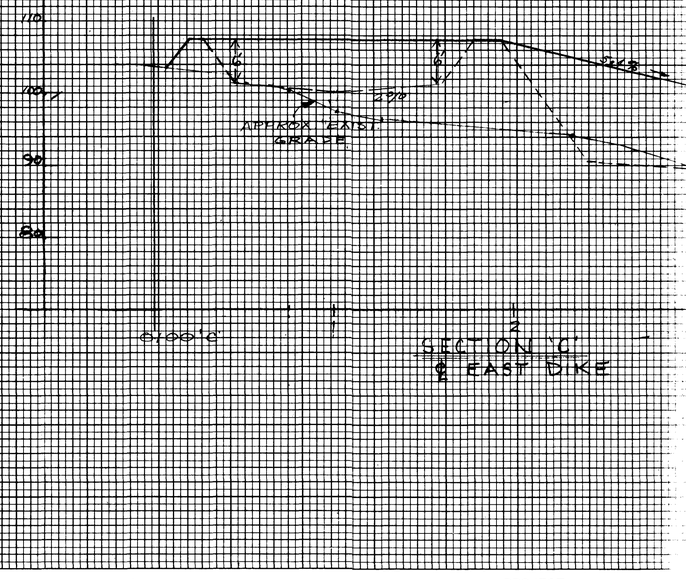
REVISED 7/8/85 PER B.F. REVIEW

EARTHWORK PLAN & PUMP SCHEMATIC					
UNION TEXAS PETROLEUM CORP EVAPORATION POND FOR PAYNE NO 6.					
SCALE	DATE 6/26/85	BOOK	DRAFTED BY RBS	SHEET 1	OF 3
	PROJECT NO. 4974	PAGE	CHECKED BY BF		

SAN JUAN ENGINEERING, INC.
101 WEST PINON ST. FARMINGTON, N.M. 87401







REVISED PAGES FOR B.E. REVIEW

EARTHWORK CROSS-SECTIONS

UNION TEXAS PETROLEUM CORP
EVAPORATION PONDS FOR
PAYNE NO. 4

SCALE	DATE	BOOK	DRAFTED BY	SHEET	OF
1" = 40' (H) 1" = 10' (V)	4/27/87		TAS	2	3
	PROJECT NO.	PAGE	CHECKED BY		
	4977A		SE		

SAN JUAN ENGINEERING, INC.
101 WEST ARRON ST. FARMINGTON, N.M. 87401

FINAL SURVEY — SURVEYED ____ PLOTTED ____ TEMPLATE ____ AREAS ____ AREAS CHECKED ____ NOTE BOOK ____ NO. ____ BY ____ DATE ____

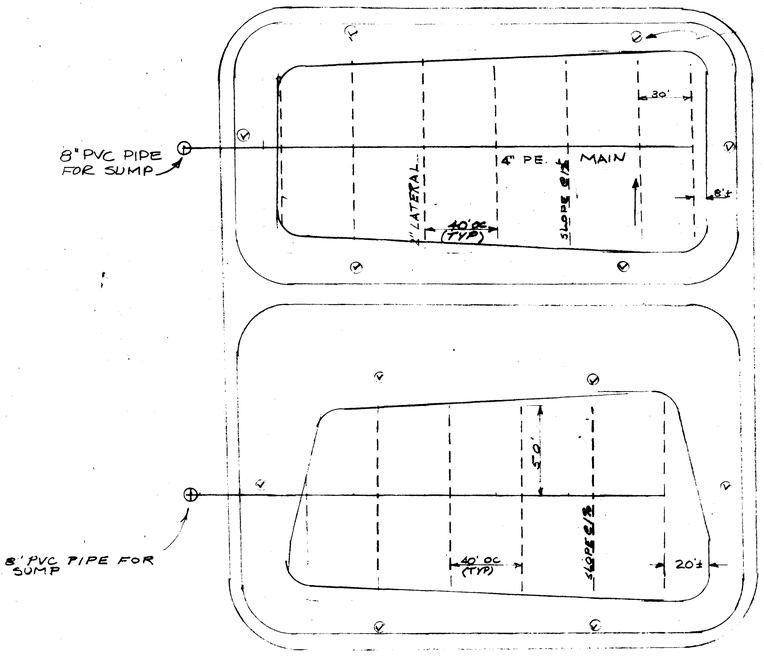
ORIGINAL SURVEY — SURVEYED ____ PLOTTED ____ TEMPLATE ____ AREAS ____ AREAS CHECKED ____ NOTE BOOK ____ NO. ____ BY ____ DATE ____

SAN JUAN ENGINEERING INC. FARMINGTON, NEW MEXICO

P.O. BOX 752 ZIP 87401 PHONE 505-325-7535

PROJECT:

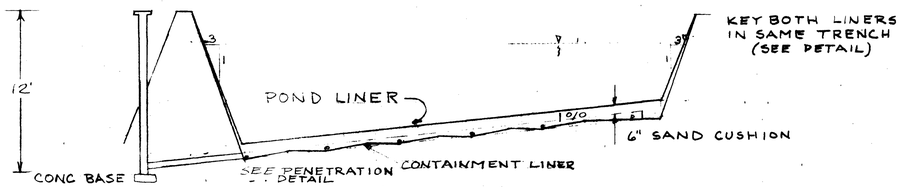
SHEET NO. ___ OF ___ SHEETS



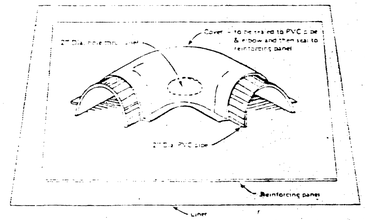
LEAK DETECTION SYSTEM
UNDERDRAIN LAYOUT
SCALE: 1"=40'

NOTES

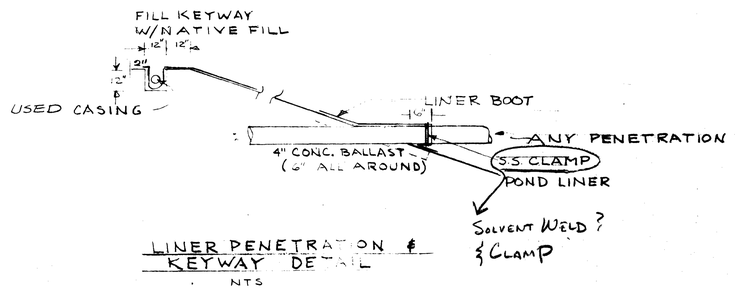
1. UNDERDRAIN TO BE JACKETED, SLOTTED FIELD DRAIN
2. PRIMARY LINER TO BE 30 MIL (MIN) CPER, OR EQUIV.
3. SECONDARY LINER TO BE 30 MIL PVC OR EQUIV.
4. LINER & UNDERDRAIN TO BE SLOPED @ 1%
5. WARP CONTAINMENT LINER, AS SHOWN.
6. BOOTS & CEMENT TO BE SUPPLIED BY LINER MFR.
7. CONSTRUCTION TO BE IN CONFORMANCE WITH "SPEC. FOR DESIGN & CONSTRUCTION OF LINED EVAPORATION PITS PUBLISHED BY N.M.O.C.D.



LINER & UNDERDRAIN DETAIL
SCALE: 1"= 40' HORIZ
1"= 5' VERT



BERM-VENT DETAIL (12 R'Q'D)
NTS



LINER PENETRATION & KEYWAY DETAIL
NTS

ROBERT B. STAMMAND JR. NEW MEXICO 9155 REGISTERED PROFESSIONAL ENGINEER

REVISED 7/3/85 PER BLM REVIEW

LINER & UNDERDRAIN DETAILS

UNION TEXAS PETROLEUM CORP
EVAPORATION POND FOR
PAYNE NO 6

SCALE	DATE	BOOK	DRAFTED BY	SHEET	OF
As Noted	6/27/85		RTS	3	3
	PROJECT NO. 4974	PAGE	CHECKED BY BF		

SAN JUAN ENGINEERING, INC.
101 WEST PINON ST. FARMINGTON, N.M. 87401

Payne EVAP Pond

6/11/97

Payne Evap Pond

6/11/97

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

April 17, 1997

CERTIFIED MAIL
RETURN RECEIPT NO. P-326-936-276

Mr. Craig A. Bock
Burlington Resources
3535 East 30th St.
P.O. Box 4289
Farmington, NM 87499

RE: Payne Evaporation Pond and 30-7 Evaporation Pond Permit Cancellations

Dear Mr. Bock:

The Oil Conservation Division (OCD) has received Burlington Resources Oil and Gas Company (Burlington) request dated March 25, 1997, for permit cancellations for the above referenced evaporation ponds. The OCD requires submission and approval of plans and procedures for closure prior to the actual closure of any surface impoundment.

It is OCD's understanding that Payne evaporation pond has already been closed. Burlington is required to submit a closure report for the Payne evaporation pond by June 16, 1997. The closure report for the Payne evaporation pond (Section 20, Township 32 North, Range 10 West) should include but not be limited to the following; the number, location, and depth of soil samples taken, the original laboratory analytical results including chain of custody, the depth to ground water, and the date of closure.

In addition, it is OCD's understanding that the 30-7 evaporation pond was never constructed. If this is the case, the 30-7 pond may be removed from the permit upon receipt of the following information from Burlington: 1. the township, range, section and unit letter location of 30-7 evaporation pond and 2. documentation as to whether or not 30-7 was constructed.

If you have any questions regarding this matter please feel free to contact me at (505) 827-7153.

Sincerely,

Martyne J. Kieling

Martyne J. Kieling
Environmental Geologist

xc: OCD Aztec Office

Roger Anderson

BURLINGTON RESOURCES

SAN JUAN DIVISION

March 25, 1997

Certified - Z 382 118 236

Denny Foust
New Mexico Oil Conservation Division
1000 Rio Brazos Rd.
Aztec, New Mexico 87410

Re: Evaporation Ponds
Permit Cancellations

Dear Mr. Foust:

Burlington Resources Oil and Gas Company (Burlington) is requesting that the Surface Waste Disposal Facility (711) Permits for the Payne Evaporation Pond and the 30-7 Evaporation Pond be canceled. Burlington does not need these evaporation ponds and does not intend to use them.

If you have any questions please contact me at (505) 326-9537.

Sincerely,

Craig A. Bock
Environmental Representative

3535 East 30th St., 87402-8801, P.O. Box 4289, Farmington, New Mexico 87499-4289, Telephone 505-326-9700, Fax 505-326-9833

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

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

November 8, 1988

Mr. P. M. Pippin
UNION TEXAS PETROLEUM
375 U.S. Highway 64
Farmington, New Mexico 87401

Dear Mr. Pippin:

The Oil Conservation Division received your request of November 2, 1988, to revise the list of wells contributing produced water to the Union Texas Payne evaporation pit located in Section 20, Township 32 North, Range 10 West. The revised list and the commitments by Union Texas in the November 2 letter are hereby approved, and disposal of clear produced water from the added wells may begin immediately.

Sincerely,

Jami Bailey
Geologist

JB/sl

cc: OCD Aztec Office

Union Texas Petroleum

375 U.S. Highway 64
Farmington, New Mexico 87401
Telephone (505) 325-3587

November 2, 1988

Ms. Jamie Bailey
New Mexico Oil Conservation Division
Room 206
310 Old Santa Fe Trail
Santa Fe, New Mexico 87503

Re: Centralized Payne Evaporation Pit
Section 20, T32N-R10W
San Juan County, New Mexico

Dear Ms. Bailey:

On December 5, 1986, N.M.O.C.D. approval was granted for centralized water disposal in our Payne evaporation pit. Since that time our water disposal needs have changed, thus we would like to add several wells to the list and subtract several wells from the list. See the attached table.

As with our initial request of November 24, 1986, all of the wells we wish to add to the list are operated by Union Texas Petroleum and we will not allow anyone else to utilize our pit. Only clean water will be placed into the pit. Currently, the pit is empty because we recently utilized the water as frac fluid during completion operations on new wells in T32N-R11W, La Plata County, Colorado. We will not allow the water level to raise higher than 18" from the top of the pit, thus we will not dispose of more than 85 BWPD on a yearly average. Most of the wells on the attached list do not make a large amount of water; however, we may need to dispose of produced water for such reasons as a recent completion, a recent workover, swabbing operations, a vulnerable area well, or heavy rainfall drainage into the well's pit.

Following State approval on November 18, 1985, Union Texas Petroleum constructed an evaporation pit in Section 20, T32N-R10W of San Juan County and first delivered water production into the pit on December 6, 1985. A final survey of the completed evaporation pit was conducted on December 2, 1985. It was determined that the area of our pit is 0.9521 acres or 41,473 sq. ft., with a volume of 1,675,128 cu. ft. or 39,884 barrels. The State required freeboard of 18" was utilized in these calculations. The "top of the dike" dimensions are 292' long, 157' wide, and 9' to 5.5' deep. Using the average evaporation rate of 50.7" of net water per year, this pit should dispose of a yearly average of 85.7 BWPD.

Obviously, the evaporation pit cannot accommodate all of the water listed on the following forms. However, we would like to have the option of disposing of produced water from the attached wells into our pit when the pit is low. It is presently empty. When the pit approaches the freeboard limit, we will revert to the more expensive commercial disposal facilities which we now utilize.

Sincerely yours,

P. M. Pippin
Production Engineer

PMP:lmg
attachment

WELLS TO BE REMOVED FROM OUR PAYNE PIT WATER DISPOSAL LIST

Well Name

Trigg #1A
E Sec. 25, T31N-R9W

Teel #1
H Sec. 13, T31N-R9W

Payne #3
G Sec. 20, T32N-R10W

Oxnard #1R
K Sec. 8, T31N-R8W

Haynie #1
G Sec. 1, T30N-R13W

Ute #13
F Sec. 14, T32N-R11W
La Plata County, CO

Well Name

Ute #15
O Sec. 21, T32N-R11W
La Plata County, CO

Ute #16
J Sec. 15, T32N-R11W
La Plata County, CO

Ute #23
F sec. 15, T32N-R11W
La Plata County, CO

WELLS TO BE ADDED TO OUR PAYNE PIT WATER DISPOSAL LIST

Well Name	Potential Amount of Water for Disposal
Quinn #10 I Sec. 19, T31N-R8W	200 BWPM
Seymour #10 K Sec. 23, T31N-R9W	200 BWPM
Hunsaker #4 B Sec. 26, T31N-R9W	not drilled yet
Quinn #11 A Sec. 19, T31N-R8W	not drilled yet
Ute #17 I Sec. 9, T32N-R11W La Plata County, CO	not tested yet
Ute #18 Sec. 10, T32N-R11W La Plata County, CO	not drilled yet

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☒ Telephone ☐ Personal	Time 1:30 PM	Date 12/10/85

Originating Party	Other Parties
Chuck Smith - Union Texas	Jami Bailey

Subject: Date of 1st fluid discharged into approved evaporation pond.

Discussion: Well Payne #6: turned on 12/5/85, produced 28 Mcf + 123 bbls water.
Payne #8: turned on 12/6/85, produced 0 Mcf + 52 bbls water.

Conclusions or Agreements: 1st date of fluid into evaporation pit:
December 5, 1985

Distribution: File

Signed: Jami Bailey

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

December 5, 1986

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501-2088
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. P. M. Pippin
Union Texas Petroleum
375 U.S. Hwy. 64
Farmington, NM 87401

RE: CENTRALIZED DISPOSAL PIT

Dear Mr. Pippin:

We have received your request for, and hereby approve, use of the centralized evaporation pit located in Section 20, Township 32 North, Range 10 West, San Juan County, as the disposal pond for produced water from wells in addition to those originally permitted. These additional wells are listed in your letter of November 24, 1986.

Your request for approval of surface disposal facilities for produced water from the Vulnerable Area and modified registration of the centralized disposal pit were submitted pursuant to the Oil Conservation Commission Orders No. R-7940 and R-7940-A.

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

Sincerely,

R. L. STAMETS
Director

RLS:JB:dp

cc: OCD-Aztec District Office

Union Texas Petroleum

375 U.S. Highway 64
Farmington, New Mexico 87401
Telephone (505) 325-3587

November 24, 1986

Ms. Jamie Bailey
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: Lined Evaporation Pit - Current Status

Dear Ms. Bailey:

Union Texas Petroleum Corporation desires to have our permit authorizing water disposal from two wells into an evaporation pit expanded to allow for water disposal from several other wells.

Following State approval on 10/18/85, UTPC constructed an evaporation pit in Section 20, T32N-R10W of San Juan County and first delivered water production into the pit on 12/6/85. A final survey of the completed evaporation pit was conducted on 12/2/85. It was determined that the area of our pit is 0.9521 acres or 41,473 sq. ft., with a volume of 1,675,128 cu. ft. or 39,884 barrels. The State required freeboard of 18" was utilized in these calculations. The "top of the dike" dimensions are 292' long, 157' wide, and 9' to 5.5' deep. Using the average evaporation rate of 50.7" of net water per year, this pit should dispose of a yearly average of 85.7 BWPD.

The two wells currently approved for produced water disposal into the pit are the Payne #6 FRT (I Sec. 20, T32N-R10W) and the Payne #8 FRT (K Sec. 21, T32N-R10W). These wells produced a total of 66 BWPD during their last month on line. Each well makes approximately 33 BWPD. However, we now anticipate increased pipeline curtailment on the wells which will eliminate all water production into the pit. During September, water was disposed into the pit only 25% of the time. In addition, the Payne #8 is now shut-in due to downhole mechanical problems which may take a long time to repair.

Therefore, in order to fully utilize our evaporation pit, we would like to have the following* list of wells approved for disposal into the pit. All of these wells are operated by Union Texas Petroleum, and we will not allow anyone else to utilize our pit. Only clean water will be placed into the pit. Currently, the pit is empty because we recently utilized the water as frac fluid during completion operations on five new wells in T32N-R11W, La Plata County, Colorado. We will not allow the water level to raise higher than 18" from the top of the pit, thus we will not dispose of more than 85 BWPD on a yearly average. Most of the wells on the attached list do not make a large amount of water; however, we may need to dispose of produced water for such reasons as a recent completion, a recent workover, swabbing operations, a vulnerable area well, or heavy rainfall drainage into the well's pit.

Obviously, the evaporation pit cannot accommodate all of the water listed on the following forms. However, we would like to have the option of disposing of produced water from the attached wells into our pit when the pit is low. It is presently empty. When the pit approches the freeboard limit, we will revert to the more expensive commercial disposal facilities which we now utilize.

Sincerely yours,

P. M. Pippin
Production Engineer

PMP:lmg
attachments

State of New Mexico
Energy and Minerals Department

OIL CONSERVATION DIVISION
P. O. Box 2088
Santa Fe, New Mexico 87501
(505) 327-5800

CENTRALIZED DISPOSAL OR COLLECTION
PIT REGISTRATION FORM

Owner/Operator: Union Texas Petroleum Corp.
(List information only for pits operated by you at a lease or at other locations)

Address: 375 US Highway 64, Farmington, NM 87401

Well and Lease, or Facility Name: Payne Evaporation Pit

Location: Section 20, T32N-R10W

(A) Pit Fluid Sources	(B) Pit Fluid Type:	(C) Maximum Daily Discharge to each Pit	(D) Pit Type:
List all Wells & Locations that Contribute Fluid to Pit	(1.) Produced Water 2. Completion Fluids 3. Drilling Fluids 4. Drill Cuttings		1. Unlined (2.) Lined 3. Tank

See Attached (4 pages)

Is this facility located in or within 100 horizontal feet of a watercourse? Yes_____ No X
Watercourse: Any lake-bed or gully, draw, stream bed, wash, arroyo, or natural or man-made channel through which water flows or has flowed.

Is ground water at the site at 10 feet or less from the base of the pit? Yes_____ No X

I hereby certify that I am familiar with the information contained in and submitted with this application and that such information is true, accurate and complete to the best of my knowledge and belief."

P. M. Pippin
(Signature)

November 24, 1986
(Date)

P. M. Pippin
(Printed Name of Person Signing)

Production Engineer
(Title)

V.A. ≅ 19 BWPD

WELL NAME	POTENTIAL AMOUNT OF WATER FOR DISPOSAL
Seymour #6A C Section 14, T31N-R9W-	80 BWPM
Seymour #9 F Section 23, T31N-R9W-	150 BWPM
Seymour #1 B Section 25, T31N-R9W-	80 BWPM
Quinn #2 L Section 19, T31N-R8W-	80 BWPM
Quinn #4 A Section 19, T31N-R8W-	80 BWPM
Johnston Federal #21 L Section 33, T31N-R9W-	150 BWPM
Johnston Federal #16 D Section 33, T31N-R9W-	80 BWPM
Quinn #9 P Section 20, T31N-R8W-	150 BWPM
Oxnard #1R K Section 8, T31N-R8W-	not drilled yet
Seymour #7A J Secton 23, T31N-R9W-	not drilled yet
Trigg #1A E Section 25, T31N-R9W-	not drilled yet
Teel #1 H Section 13, T31N-R9W-	not worked over yet
Payne #1R M Section 20, T32N-R10W-	not drilled yet
Payne #1A P Section 20, T32N-R10W-	32 BWPM
Haynie #2M E Section 4, T30N-R11W-	not drilled yet
Payne #3 G Section 20, T32N-R10W-	32 BWPM
Payne #2A D Section 21, T32N-R10W-	19 BWPM

WELL NAME	POTENTIAL AMOUNT OF WATER FOR DISPOSAL
Payne #5A O Section 27, T32N-R10W-	7 BWPM
Ute #13 F Section 14, T32N-R11W La Plata County, CO	not producing yet
Ute #14 B Section 22, T32N-R11W La Plata County, CO	not producing yet
Ute #15 O Section 21, T32N-R11W La lata County, CO	not producing yet
Ute #16 J Section 15, T32N-R11W La Plata County, CO	not producting yet
Ute #23 F Section 15, T32N-R11W La Plata County, CO	not producing yet
Ute #4 A Section 21, T32N-R11W La Plata County, CO	not worked over yet
Ute #5 I Section 20, T32N-R11W La Plata County, CO	not worked over yet
V.A. Albright #12 G Section 22, T29N-R10W	2 BWPD
Albright #8E O Section 15, T29N-R10W-	13 BWPM
Angel Peak "B" #24 N Section 13, T28N-R11W-	13 BWPM
Congress #7 K Section 34, T29N-R11W-	13 BWPM
Congress #14 A Section 35, T29N-R11W-	13 BWPM
Reid "B" #6 J Section 31, T29N-R10W-	13 BWPM

WELL NAME	POTENTIAL AMOUNT OF WATER FOR DISPOSAL
V.A.? Witt #1E P Section 33, T29N-R11W	13 BWPM .43BWPD
Zachry #14 M Section 10, T28N-R10W	13 BWPM
V.A. Zachry #18 M Section 11, T28N-R10W	13 BWPM
Zachry #41 O Section 12, T28N-R10W	13 BWPM
V.A. Albright #7E P Section 22, T29N-R10W	1/4 BWPD
V.A. Albright #15 M Section 23, T29N-R10W	1/4 BWPD
V.A. Armenta #1 H Section 27, T29N-R10W	2 BWPD
V.A. Saiz #1E I Section 20, T29N-R11W	1 BWPD
V.A Saiz #1 K Section 20, T29N-R11W	1 BWPD
V.A. Mangum #1E F Section 27, T29N-R11W	1 BWPD
V.A. Julander #1 J Section 31, T29N-R11W	1 BWPD
V.A. Julander #1E K Section 31, T29N-R11W	1 BWPD
V.A. Witt #1 N Section 33, N29N-R11W	1 BWPD
V.A. Maddox Com #1A I Section 17, T30N-R8W	1 BWPD
V.A. Maddox Com #1 N Section 17, T30N-R8W	1/4 BWPD
Lester #1A D Section 3, T30N-R11W	1 BWPD

WELL NAME	POTENTIAL AMOUNT OF WATER FOR DISPOSAL
V.A. Sexton #1 D Section 3, T30N-R11W	3 BWPD
V.A. Lester #1 H Section 3, T30N-R11W	TSTM
V.A. Haynie #1 G Section 4, T30N-R11W	2 BWPD
V.A. Reid "A" #1 A Section 1, T30N-R13W	TSTM
V.A. Reid "A" #2 L Section 1, T30N-R13W	TSTM
V.A. Reid "A" #1E O Section 1, T30N-R13W	1 BWPD
McCord #11E L Section 9, T30N-R13W	1 BWPD
V.A. McCord 11 N Section 9, T30N-R13W	TSTM
V.A. McCord #9 B Section 21, T30N-R13W	1/4 BWPD
Lea Federal #1E L Section 34, T31N-R13W	1/4 BWPD

22/57 V.A.

Union Texas Petroleum

375 U.S. Highway 64
Farmington, New Mexico 87401
Telephone (505) 325-3587

December 3, 1985

New Mexico Oil Conservation Division
PO Box 2088
Santa Fe, New Mexico 87501

Attn: Jami Baily

Dear Jami:

As per our conservation regarding the Payne Evaporation Pit (the lock and back fill anchor trench).

I am submitting the paper work that you requested. Enclosed you will also find the drawing of how it is built.

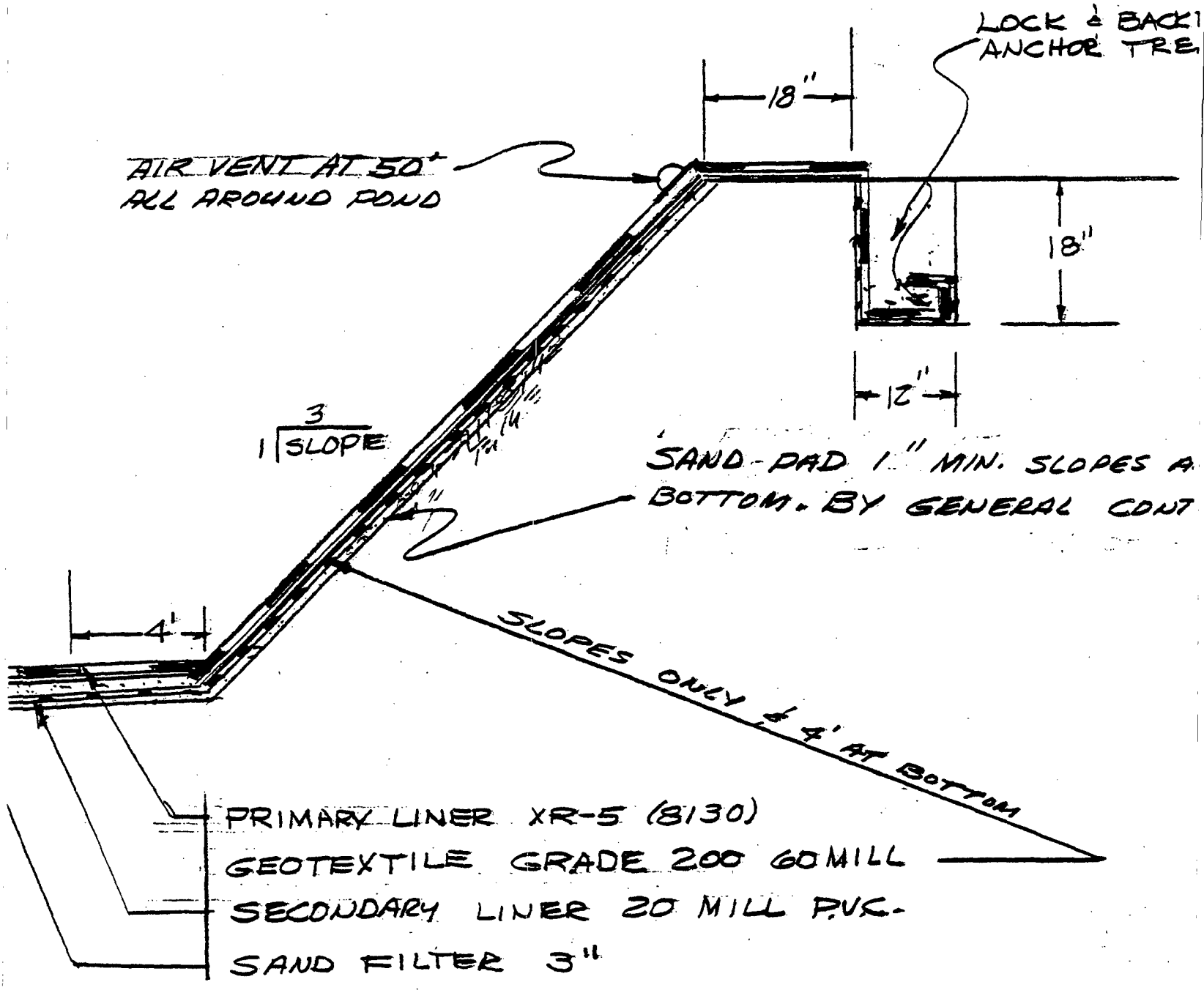
Thank you for your cooperation and approval.

Sincerely,

Chuck Smith

Chuck Smith,
Construction Foreman

CS/nc



TYP DOUBLE LINER SYSTEM

ANCHOR DETAIL

ANCH
TREN

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☒ Telephone ☐ Personal	Time 10 AM	Date 11/8/85

Originating Party	Other Parties
Chuck Smith - Union Tx. Petr.	Jami Bailey

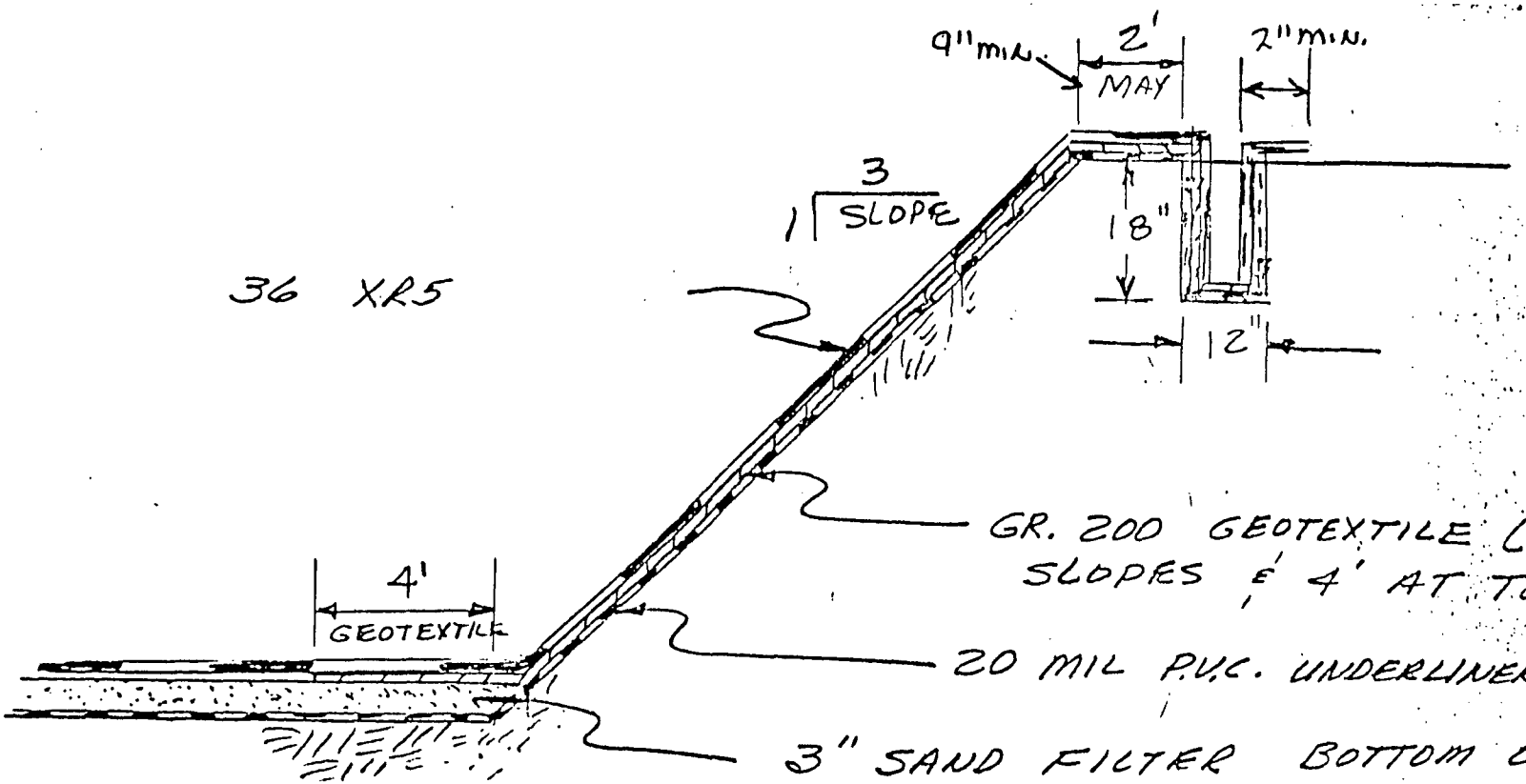
Subject: Design change for anchoring liner on evaporation pit.

Discussion: Requested liner anchor to be the same as Basin Disposal, with trench 18" x 12" wide lined with liner + 2" excess liner on ground surface. Trench then backfilled with dirt. After consulting with Phil Baca, I gave verbal approval + requested a letter after work completed on pit detailing all changes made from orginal design. C. Smith estimated pit would be receiving fluids in about 2 weeks.

Conclusions or Agreements

Distribution: file

Signed: Jami Bailey



TYP. ANCHOR DETAIL DOUBLE LINER

NO SCALE

BASIN DISPOSAL, INC.
Slope Protection and
Liner Anchor

Figure No. 10

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

50 YEARS
1935 - 1985

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

October 18, 1985

Union Texas Petroleum
P.O. Box 1290
Farmington, NM 87499

Attention: R. C. Frank

Re: Payne 6 and Payne 8
Lined Evaporation Pits

Dear Mr. Frank:

The design changes for lined pit #1 which are described in your October 18, 1985 letter are hereby approved. It is our understanding that lined pit #2 will not be constructed, and approval for that pit is hereby rescinded.

If at a later date the lined pit #2 is scheduled for construction, we will need to be informed and approval for the pit and any design changes must be obtained.

If I may be of further assistance, contact me in Santa Fe at (505) 827-5884.

Sincerely,

JAMI BAILEY
Field Representative

JB/dp

ALLIED Union Texas Petroleum

P. O. Box 1290
Farmington, NM 87499
Telephone (505) 325-3587

October 18, 1985

New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Attn: Phillip Baca

Re: Payne 6 and Payne 8 Lined Evaporation Pits

Dear Mr. Baca:

Union Texas Petroleum Corporation desires to change the design of the approved evaporation pits. There are several reasons for the design change.

The primary reason is that after more review of adjacent water production, we feel the initial combined water production will drop significantly. Within 6 months the anticipated combined production rate should drop from an initial rate of 135 BWPD to approximately 75 BWPD.

The storage capacity (compensated for freeboard) of the single pit is approximately 25,400 barrels. The net evaporative rate of this pond will be approximately 80 BWPD. With the wells starting up during a period of little or no evaporation the pit should fill to about 80% of designed freeboard capacity before the evaporation cycle commences. At that time the production should have dropped to approximately 75 BWPD.

If left alone under these conditions, the pit would reach designed freeboard capacity in January of 1987. However, we feel that we will be unable to produce this well for an entire year given the current gas take situation. The actual production will be determined by market conditions.

If it appears that the water level will encroach on the minimum freeboard, an economic evaluation will be made to determine if the second pit should be built or if the original pit should be fit with an aeration sprinkler system

In as much as there will be only one pit there will be no need for a manifold system, circulating pump, insulated house or catalytic heater. The pit will be enclosed by a 6' chain link fence with the drain line access being from only inside the fence. The fence will

be locked at all times when an authorized Union Texas Petroleum Corporation representative is not present.

We desire to make two additional changes in the pit design. The leak detection system will be made of 4" perforated PVC pipe rather than the 3" jacketed polyethelene as specified in the original application.

A 60 mil Geotextile material rather than sand will be placed on the inside of the berm between the ground and secondary liner and between the two liners.

In summary, we feel that a single pit will be sufficient given the storage capacity, a declining water production and questionable market take. In any case, the water level will not rise above the 1.5' minimum freeboard. If necessary one of the two aforementioned alternatives will be pursued if the single pit is incapable of handling the actual water volume.

I am sorry for any inconvenience this may have caused. If I may be of any furter assistance, please advise.

Very truly yours,

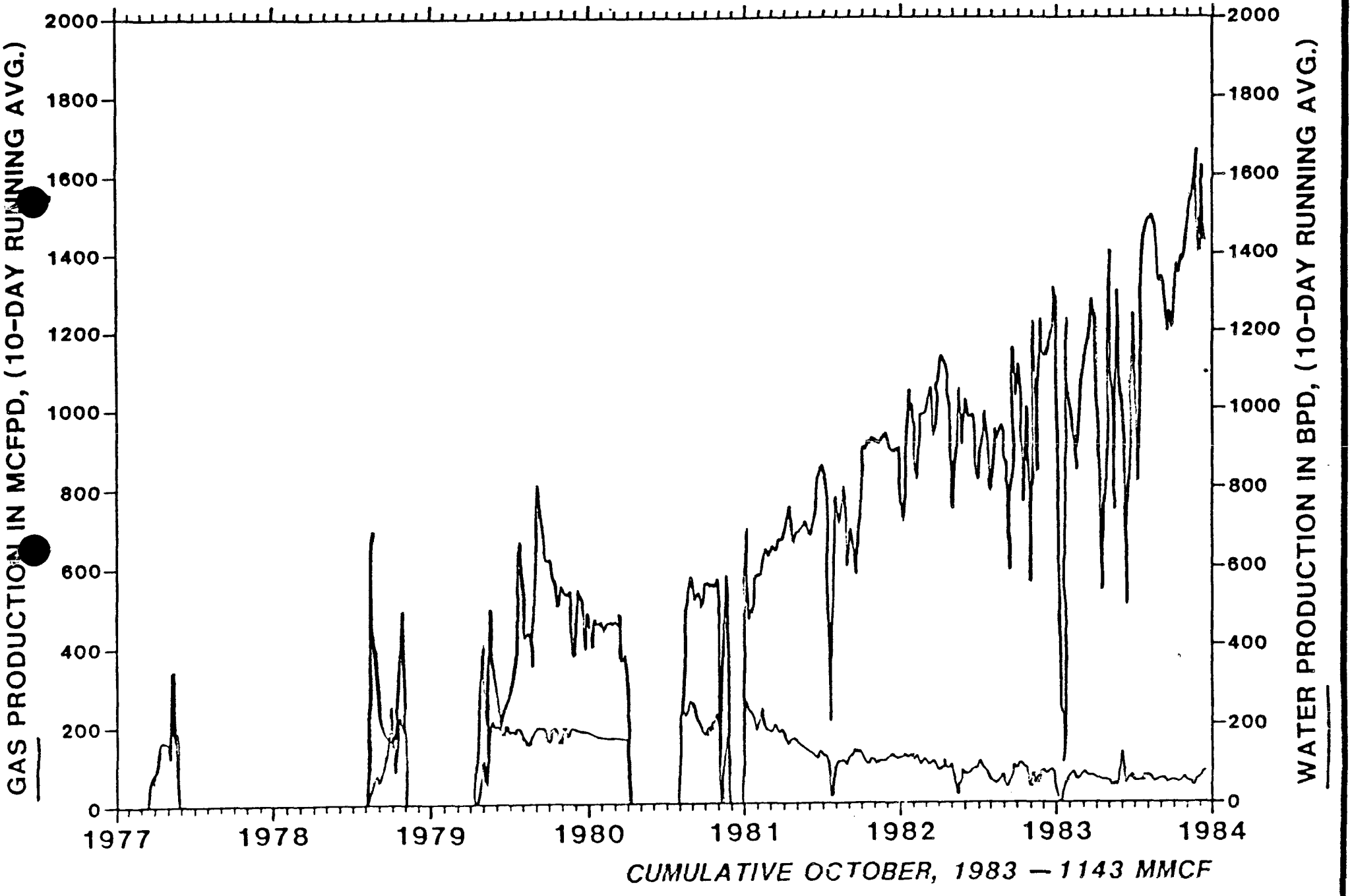
Robert C. Frank

R. C. Frank
Regulatory Analyst

RCF:svr

PRODUCTION HISTORY - CAHN NO. 1

NW Sec. 33 T-32-N R-10-W



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

50 YEARS
1935 - 1985

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

August 9, 1985

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Union Texas Petroleum
P. O. Box 1290
Farmington, New Mexico 87499

Attn: Mr. R. C. Frank

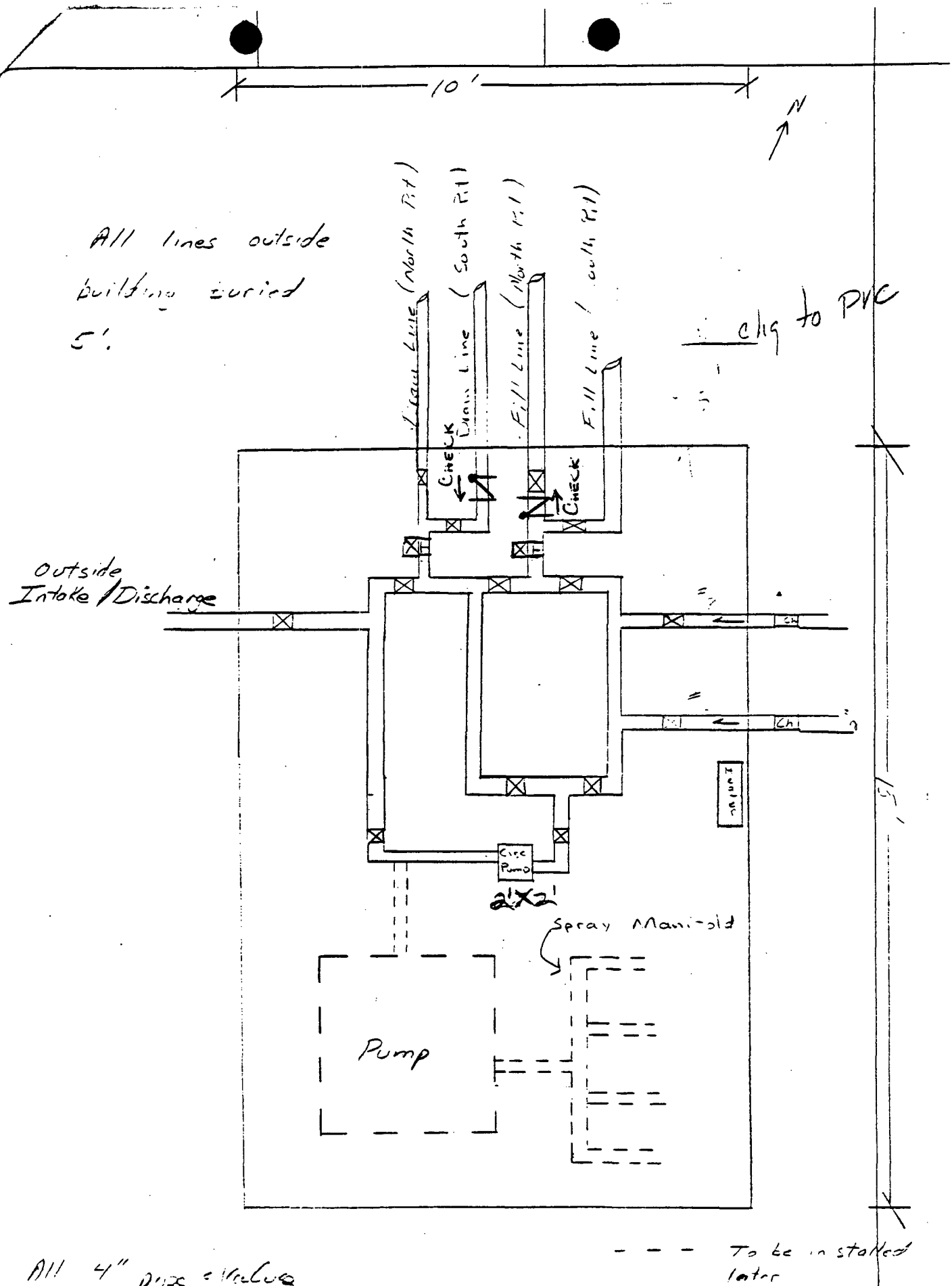
Re: Payne #6 and Payne #8 Lined Evaporation Pits Located in Sec. 20, T-32-N, R-10-W, NMPM, San Juan County, New Mexico.

Dear Mr. Frank:

We have reviewed the plans and specifications in your application (WP-1) for the above referenced lined evaporation pits. The design specifications for the pits is acceptable and is hereby approved with the provision that check valves are installed in the south pit drain line and the north pit fill line. It is my understanding that this provision is acceptable to you as per your phone conversation of 8-9-85 with Mr. Philip Baca of OCD. A copy of your schematic submitted on July 25, 1985 is attached with the required check valves drawn in red.

The approved application consists of the application dated July 9, 1985, and the materials dated July 25, 1985, submitted as supplements to the application. Approval of this application allows for the disposal of produced water from the vulnerable area as outlined in Oil Conservation Commission Order No. 7940. Please be advised that the approval of this application does not relieve you of liability should your operation result in actual pollution of surface or groundwaters which may be actionable under other laws and/or regulations.

There will be no routine monitoring requirements; however, any design change or increase in the design disposal rate (159 BBL/day) shall be reported to the Division.


10'
N
All lines outside building buried 5'.
Clg to PVC
Clean Line (North Pit)
Clean Line (South Pit)
Fill Line (North Pit)
Fill Line (South Pit)
CHECK
CHECK
Outside Intake / Discharge
Circ Pump
2'x2'
Spray Manifold
Pump
To be installed later
All 4" Pipe & Valves
Steel inside house
Clamp to plastic 5' outside

The OCD District Office in Aztec shall be notified at least 24 hours in advance of primary and secondary liner installation to allow for the opportunity of an OCD representative to witness the installation.

On behalf of the staff of the Oil Conservation Division, I wish to thank you (and your staff and/or consultants) for your co-operation during this application review.

Sincerely,

R. L. STAMETS
Director

cc: OCD-Aztec Office

PROPOSED EVAP. PONDS FOR UNION TEXAS PET. CO.

I LOCATION: Sec. 20 32 N 10 W

II (A.) EVAPORATION CALCULATIONS:

- Union Texas uses an evap. rate of 60" in/yr and a net evap. rate of 48" in/yr. Based on Data From Arizona Public Sevice Co. For their plant near Farmington.
- Lat and Long Approx 108° and 37° so I will use Bloomfield data from data book by Summers. No evap. data for Bloomfield so use Farmington 4 NE.

Floating Pan = 51.69"/58.12"
Ppt. in Bloomfield = 9.35"/8.94"

Union Texas Evap. Rate of 48" is conservative enough.

Design surface Area = 81,404 ft

	EVAP	PPT.
J	.96	.45
F	1.56	.76
M	3.79	.63
A	6.34	.72
M	8.01	.53
J	8.83	.52
J	8.73	1.19
A	7.38	1.27
S	5.71	.98
O	3.79	.75
N	2.03	.55
D	.99	.59

MONTHLY DISCHARGE = 159 $\frac{BBL}{DAY}$ = 6678 $\frac{GAL}{DAY}$

YR 1 DAY/MO.		DISCHARGE, FT^3	RESIDUAL DEPTH, FT
31	J	27,676	0.30
28	F	24,998	0.54
31	M	27,676	0.61
30	A	26,783	0.48
31	M	27,676	0.19
30	J	26,783	0.00
31	J	27,676	0.00
31	A	27,676	0.00
30	S	26,783	0.00
31	O	27,676	0.087
30	N	26,783	0.29
31	D	27,676	0.60

YR 2		DISCHARGE, FT.	RESIDUAL DEPTH, FT
	J	27,676	0.90
	F	24,998	1.14
	M	27,676	1.21
	A		1.07
	M		0.79
	J		0.42
	J		0.34
	A		0.17
	S		0.10
	O		0.19
	N		0.40
	D		0.70

YR 3	RESIDUAL DEPTH, FT
J	1.0
F	1.2
M	1.3
A	1.2
M	0.89
J	0.53
J	0.24
A	0.073
S	0.008
O	0.094
N	0.30
D	0.61

∴ SURFACE AREA APPEARS REASONABLE FOR WATER BUDGET

NOTE: These calculations assume floating pan evap. data can be used directly.

WAVE CALCULATIONS (REF. SHORE PROTECTION MANUAL)

ASSUMPTIONS: WIND SPEED = U_A = 50 MPH
FETCH = F = 300 FT.

I FOR DEPTH = 5ft, FROM SHORE PROTECTION MANUAL, PG. 3-56, FIG. 3-27A

WAVE HEIGHT = H = 0.4 ft
PERIOD = T = 0.7 sec

NOTE: A DEPTH OF 10ft WILL GIVE APPROX. THE SAME VALUES. SINCE T < 1.4 sec., THE WAVES ARE CONSIDERED DEEPWATER WAVES, i.e. $d/T^2 > 2.56$

CONCLUSION: FOR THIS CASE, MAX. WAVE HEIGHT WILL BE 0.5 ft

II FIND BREAKING WAVE HEIGHT, H_b
FROM FIG 7-3 PG 7-7

$$\frac{H}{gT^2} = \frac{0.4}{32.2(0.7)^2} = 0.0254$$

THUS $\frac{H_b}{H} = 1.0$ FOR 1:3 SLOPE

$H_b = H = 0.5$ ft

$$\frac{H_b}{gT^2} = \frac{H}{gT^2} = 0.0254$$

FROM FIG. 7-2 PG 7-6 USING A SLOPE OF 1:3
$\alpha \approx 2.5$ } ROUGH EXTRAPOLATION
$\beta \approx 1.6$ } VALUES PROBABLY HIGHER

$d_{B\,max} = \alpha H_b = 2.5$ ft
$d_{B\,min} = \beta H_b = 1.6$ ft

CONCLUSION: WITH A SLOPE OF 1 Vertical FOOT RISE FOR 3 HORIZONTAL FEET BREAKING WAVES COULD OCCUR WITH A DIKE TOE DEPTH BETWEEN 1.6 ft - 2.5 ft. IF CALCULATED EVAPORATION RATES ARE REALIZED, THIS DEPTH RANGE SHOULD NOT BE MET.

III FREEBOARD DETERMINATION FOR EACH POND

FROM METHODS ON PG. 7-161
ASSUME SMOOTH WALL: $\chi = 1.0$
$H_i = H = 0.4$ ft
$T = 0.7$ s

FOR POND 1:
$d = 5$ ft

$$\frac{H_i}{d} = \frac{0.4}{5} = 0.08$$

$$\frac{H_i}{g T^2} = \frac{0.4}{(32.2)(0.7)^2} = 0.0254$$

FROM FIG. 7-90 FOR $\frac{H_i}{g T^2} = 0.0254$
$\frac{h_o}{H_i} \approx 0.49$

$h_o = H_i\ 0.49 = 0.4(0.49) = 0.20$

FROM EQS. 7-73 & 7-74 ON PG. 7-161 AND FIG. 7-88 ON PG 7-162

$$y_c = d + h_o + \left(\frac{1+\chi}{2}\right) H_i$$

$$y_c = 5 + 0.2 + \left(\frac{1+1.0}{2}\right) 0.4$$

$$y_c = 5.6 \text{ ft}$$

$$y_t = d + h_o - \left(\frac{1+\chi}{2}\right) H_i$$

$$y_t = 5 + 0.2 - \left(\frac{1+1.0}{2}\right) 0.4$$

$$y_t = 4.8 \text{ ft}$$

SINCE THE NORTH SIDE OF POND 1 IS SIX FEET THE VALUE FOR y_c MAY BE TOO RISKY ALTHOUGH SUSTAINED 50 MPH WINDS ARE PROBABLY RARE,

TRY $d = 4.5$

$$\frac{H_i}{d} = \frac{0.4}{4.5} = 0.0889$$

$$H_i/gT^2 = 0.0254$$

FROM FIG. 7-90 $\frac{h_o}{H_i} = 0.48$

$$h_o = 0.48\ H_i = 0.48\,(0.4) \approx 0.20$$

$$z_c = d + h_o + \left(\frac{1+\chi}{2}\right) H_i$$

$$z_c = 4.5 + 0.2 + \left(\frac{1+1.0}{2}\right) 0.4$$

$$z_c = 5.1$$

CONCLUSION:

IF A 1.5 ft. FREEBOARD IS MAINTAINED AT THE NORTH END OF THE POND, THERE IS LITTLE OR NO RISK OF OVERTOPPING.

FOR POND 2:

$d = 5.5$ ft.

$$\frac{H_i}{d} = \frac{0.4}{5.5} = 0.0727$$

$$H_i / gT^2 = 0.0254$$

FROM FIG. 7-9 $\quad \frac{h_o}{H_i} \approx 0.48$

$$h_o = 0.48\,H_i = 0.4(0.4) \approx 0.2$$

$$z_c = d + h_o + \left(\frac{1+\chi}{2}\right) H_i$$

$$z_c = 5.5 + 0.2 + \left(\frac{1+1.0}{2}\right) 0.4$$

$$z_c = 6.1 \text{ ft}$$

$\rho = 120\ lb/ft^3$

CONCLUSION:
A 1.5 ft FREEBOARD (MIN.) MUST BE MAINTAINED AT THE NORTH END OF POND 2.

IV FIND THE SAFETY FACTOR FOR THE DIKES

ASSUMPTION: DIKES ARE COMPACTED TO 95% PROCTOR COMPACTION.

SOIL DENSITY = $\rho_s = 120\ lb/ft^3$

WATER DENSITY = $\rho_w = 66\ lb/ft^3$

POND #1

EAST DIKE, N. CORNER

WATER DEPTH = 4.5 ft = D

HORIZONTAL STATIC PRESSURE = P_x (FORCE AGAINST DIKE)

$$P_x = \int_0^D \rho_w D\, dD = \rho_w \left.\frac{1}{2}(D^2)\right|_0^{D=4.5}$$

$P_x = 668\ lb/lin.\ ft.$

FROM EQ. 7-145 ON PG. 7-257, WE CAN FIND THE PASSIVE RESISTING FORCE ON THE DIKE

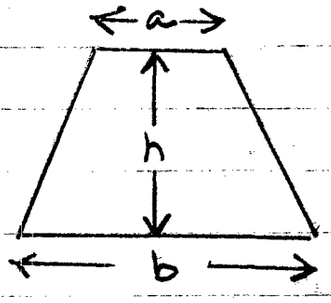
$$P_p = \frac{wh^2}{2}\left[\frac{\csc\theta\ \sin(\theta+\phi)}{\sqrt{\sin(\theta-\delta)} - \sqrt{\frac{\sin(\theta-\delta)\sin(\phi+i)}{\sin(\theta-i)}}}\right]^2$$

SEE FIG. ON NEXT PG FOR EXPLANATION

ϕ = Friction Angle = 15° (FROM PG. 7-258)

NOTE: CAN'T USE THIS EQ BECAUSE THERE IS NO BACKFILL BEHIND DIKE

JUST USE APPROX. CALC. WITH A FRICTION FACTOR OF 0.4 (SAFE APPROX.)



$A = \frac{a+b}{2} h$

$a = 15$ ft

$b = 50$ ft

$h = 6$ ft

$\text{Vol/ft} = A(1\text{ ft})$

$= \frac{15+50}{2}(6)(1) = 195\ \text{ft}^3$

$F_s \equiv$ Shear Force

$F_s = V(\rho_s)0.4 = 195(120)(0.4) = 9360$

SAFETY FACTOR $= \frac{9360}{668} = 14$ GOOD

EAST DIKE, S. CORNER

WATER DEPTH = 7 ft = D

$P_x = \frac{1}{2}(66)(7)^2 = 1617$ lb/lin ft

$a = 15$ ft

$b = 65$ ft

$h = 9$ ft

$\text{Vol/ft} = \frac{15+65}{2}(9)(1) = 360$

$F_s = 0.4(360)(120) = 17{,}280$

SAFETH FACTOR $= \frac{17280}{1617} = 10.6$ GOOD

SOUTH DIKE

D = 7 ft

∴ P_x = 1617

a = 10

b = 65

h = 9

$$F_s = 0.4\left(\frac{10+65}{2}(9)(1)\right)(120) = 16200$$

$$\text{SAFETY FACTOR} = \frac{16200}{1617} = 10 \quad \underline{\text{GOOD}}$$

POND #2

EAST DIKE, N. CORNER

WATER DEPTH = 5.5 ft = D

$$P_x = \tfrac{1}{2}(66)(5.5)^2 = 998 \text{ lb/ft}$$

a = 8 ft

b = 40 ft

h = 7

$$F_s = 0.4\left(\frac{8+40}{2}(7)(1)\right)120$$

F_s = 8064

$$\text{SAFETY FACTOR} = \frac{8064}{998} = 8.1 \quad \underline{\text{GOOD}}$$

EAST DIKE, S. CORNER

$D = 4$ ft (REMAINING 3.5' BELOW GRADE)

$a = 8$ ft
$b = 45$ ft
$h = 6$

$P_x = \frac{1}{2}(66)(4)^2$

$P_x = 528$ lb/ft

$F_s = 0.4\left(\frac{8+45}{2}(6)(1)\right)(120) = 7632$ lb/ft

SAFETY FACTOR $= \frac{7632}{528} = 14.5$ GOOD

SOUTH DIKE

$D = 7.5$

$P_x = \frac{1}{2}(66)(7.5)^2 = 1856$

$a = 10$
$b = 65$
$h = 9$

$F_s = 0.4\left(\frac{10+65}{2}(9)(1)\right)(120) = 16{,}200$

SAFETY FACTOR $= \frac{16200}{1856} = 8.7$ GOOD

CONCLUSION: AT MIN. FREEBOARD PONDS ARE STRUCTURALLY SOUND.

ALLIED Union Texas Petroleum

P. O. Box 1290
Farmington, NM 87499
Telephone (505) 325-3587

July 25, 1985

New Mexico Oil Conservation
Division
Phillip Baca
P.O. Box 2088
Santa Fe, New Mexico 87501

RE: Payne #6 and Payne #8
Lined Evaporation Pits
Section 20, T32N-R10W
San Juan County, New Mexico

Dear Phillip:

As per our conversation of July 24, 1985, enclosed please find copies of the information you requested. The manifold system will be enclosed in an insulated and heated building. The building will be locked during periods of non-use. The building will be within the confines of a locked fence.

The fill line and drain line "boots" will be solvent welded to actual lines at the point of entry into the pit.

In addition, I have enclosed some information I recently received from GEO-CON, Inc. This information is for your benefit and not to be considered part of our application.

If I may be of any further assistance, please advise.

Robert C. Frank

Robert C. Frank
Regulatory and Environmental
Analyst

RCC:ljm

Hazardous Waste Containment

Case Study No. 3

LINER APPLICATION

A small city operates a waste water treatment plant specifically for the treatment of effluent from a textile manufacturer. The effluent consists of waste water from a yarn mill's knitting, dyeing and finishing operations (cotton and polyester), with Ph and temperatures in the range of 12.0 and 120°F respectively. Two 2.7 million gallon aeration ponds were originally designed with clay liners over a limestone substrata. The clay liners leaked and within a few days large sinkholes formed in both ponds. This necessitated a redesign of the liner which called for a High Density Polyethylene liner with a full leak collection and moitoring system. A leakage rate of 2.7 gals/min. or less measured in the collection pipe beneath the synthetic liner was specified for each pond.

LOCALITY

Talladega, AL

WHAT HAD TO BE DONE

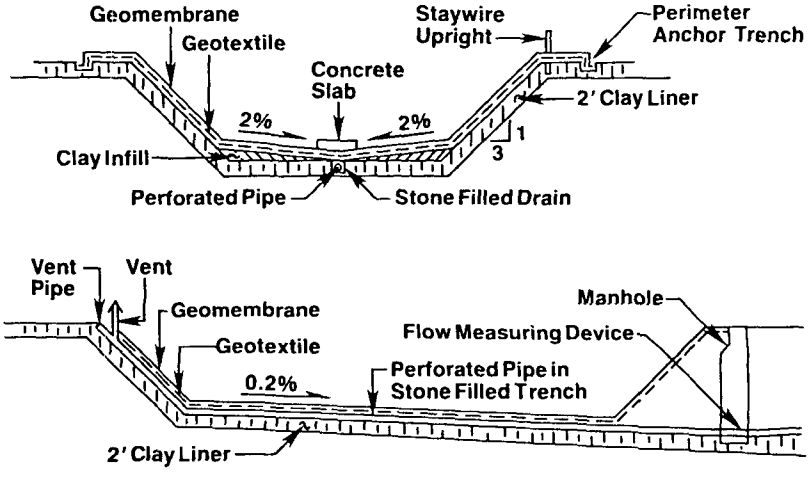
The original clay liner was repaired and the surface trimmed and rolled and then treated with a herbicide to prevent vegetation growth. The bottom was sloped to a collection drain that runs down the center of the pond enabling any leakage to flow to the drain. Prior to the liner installation, a heavy non-woven geofabric was laid over the subgrade, to act as a drainage layer to allow the passage of any leakage to the collection drain.

Immediately afterwards, the 36 mil High Density Polyethylene liner was laid over the geofabric and welded using a fusion extrusion welding system. Each pond had an inlet, outlet, emergency outlet and access ramp all of which were surrounded by concrete. The liner was fixed to the concrete using neoprene gasketing, stainless steel battens and stainless steel anchor bolts. Vents were installed at 50 ft. intervals around the perimeter of the ponds to vent any gas that might be generated under the liner.

COMMENTS

The extremely tight leakage requirement of this project necessitated a strict quality control program that allowed no deviations from the specifications. Quality Control consisted of a full time Q.C. technician, weld test sections, insitu weld tests, vacuum box testing of all welds and a full visual inspection of all welds and the full area of membrane.

After a two week test period with both ponds filled and the aerators operating, neither pond leaked enough to fill up behind the measuring weirs and are therefore considered as having zero leakage.



Acid Plant Underfloor Liner

Case Study No.2

LINER APPLICATION

A phosphoric acid plant had experienced serious erosion and corrosion to the footings and foundations for the pumps and structural steel. Urgent remedial action had to be taken to ensure the structural integrity of the plant, consisting of removing the old floor slabs, recompacting the subgrade to required grades and levels, lining the subgrade with a plastic membrane and then recasting the concrete slab on top of the plastic.

The plastic sheet acts as a collector, in the event of the acid getting beneath the slab, allowing the liquid to drain to a collector. The membrane prevents the acid from ever coming in contact with the concrete foundations and thus ensures their integrity.

LOCALITY

Lakeland, Florida

WHAT HAD TO BE DONE

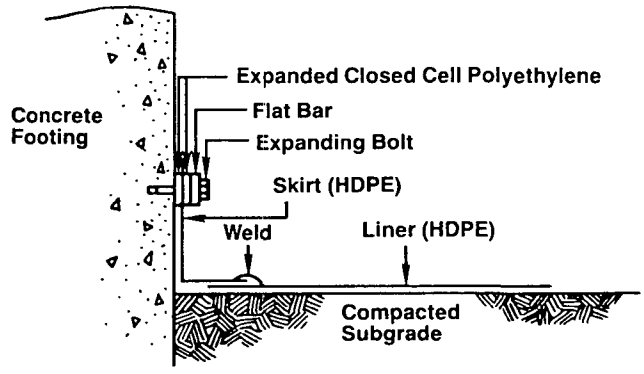
The liner installation involved intricate cutting and fitting of the sheet to accommodate 14 column bases, 6 hexagonal pump bases and a sloping subgrade. Each of the bases had to have a welded "skirt" fitted and the plastic had to extend six inches up all enclosing strip footings so that the membrane formed a six-inch-deep reservoir capable of containing any accidental acid spills.

The plastic "skirts" and vertical extensions then had to be fixed to the concrete using plates, gasketing and expanding bolts to form a seal between membrane and concrete.

The placing and welding of the sheeting were complicated by the limited working area available since all piping and fittings were in place during the installation.

COMMENTS

The plastic membrane under the concrete slab gives the owner of the acid plant peace of mind that in the event of acid spills, all concrete work is fully protected and that there can be no pollution of the underground water supply.



CONNECTION FIXING DETAIL

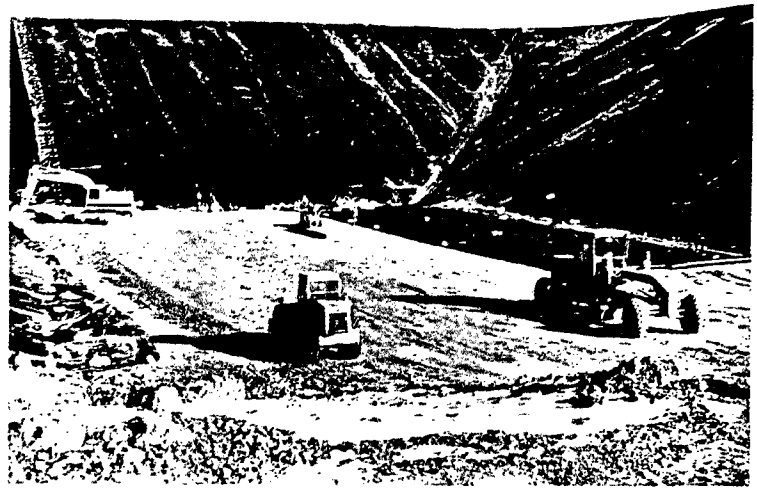
Hazardous Waste Containment

Case Study No.1

LINER APPLICATION

A company specializing in hazardous waste disposal needed to construct a new containment facility. The liner design consisted of ten feet of compacted clay beneath an 80 mil high-density polyethylene liner and then one foot of clay above the plastic liner.

A full leachate collection system with filter fabric, crushed stone, perforated piping and collection manholes with pumps was constructed above the second clay layer to collect all leachate from rain or melted snow percolating through the waste. To monitor the liner's integrity, a deep well system was drilled downstream of the facility from which samples of the groundwater can be sampled to determine if any leachate is escaping from the lined area.



LOCALITY

Waukegan, Illinois

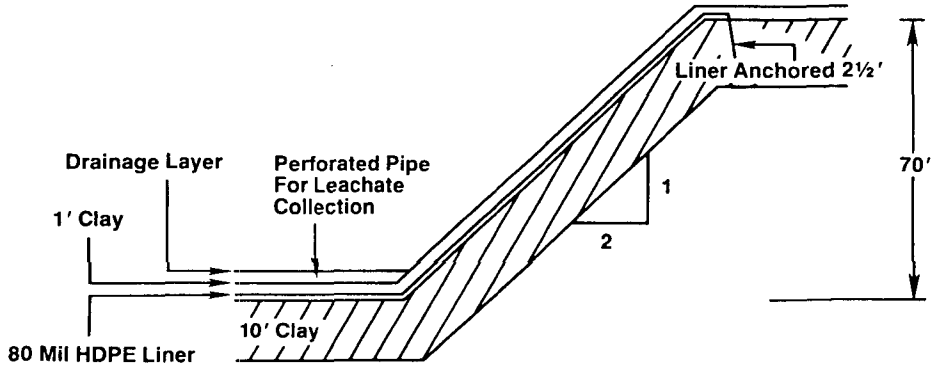
WHAT HAD TO BE DONE

The plastic liner installation presented a number of unusual problems, the most notable being that the installation had to be carried out during the Midwest's coldest winter on record. The other main difficulty was the length of slope and its grade. The slope length was 170 feet on a grade of 2:1. This meant that 70 percent of the 200,000 s.f. total area to be lined was on slopes.

To minimize surface damage due to rain or snow, a crew of seven laid sheeting whenever the earthwork crew had subgrade ready for liner. Rolls were precut to suit the slope lengths and corner details were prefabricated to minimize roll handling and weld length in the field. This attention to detail was necessary as the liner was installed in sub-zero temperatures with high winds and snow. Despite the adverse weather conditions, full quality control measures were carried out, consisting of vacuum box, ultrasonic and in situ tensile testing, to ensure that the required standards were attained.

COMMENTS

Planning, attention to detail and cooperation between Geo-Con and the client meant that the facility was completed on time despite the prevailing adverse weather conditions.



TYPICAL SLOPE SECTION—HAZARDOUS WASTE LANDFILL

The usual method of constructing the bentonite liner is by mixing the liner materials in place. After the working surface is prepared, the dry bentonite is spread uniformly across the prepared soil surface at the specified application rate. Next, the bentonite should be thoroughly mixed into the existing soil to the specified depth. It is critical that the layer be compacted at wet or optimum moisture content. The compaction should be performed with any type of compactor other than a sheepsfoot roller. The spikes on a sheepsfoot roller will often be too long and can penetrate through the soil sealant layer.

A higher quality bentonite seal can be obtained by using an alternate method. When a project requires a bentonite seal to contain hazardous wastes, Geo-Con recommends using a soil-bentonite mixed in a computer-controlled pugmill. Soil, bentonite and water are fully blended to yield a superior soil sealant. Geo-Con has constructed and used a large blending plant (Figure 2) to prepare liners for several projects. Project specifications normally require that the bentonite and soil be completely mixed with a precise amount of water to bring the soil sealant mixture to an optimum moisture content.

The Geo-Con blending plant operates as follows:

Soil is dropped onto a conveyor belt as it moves over a sensor which continuously weighs the soil. An amount of bentonite is then added to the soil at the specified rate. Note the light-colored powdered bentonite (Figure 2) being put on the belt about halfway up the conveyor. The bentonite and soil are then mixed in a pugmill with a metered amount of water. After mixing is complete, the prepared soil sealant is loaded for transport to the lagoon area. The mixed soil sealant material is transferred to an asphalt paving machine that precisely distrbutes the blended soil sealant (Figure 3). After the distribution, the soil sealant is compacted to a specified density to complete the liner.

This method of premixing all of the components of the soil sealant has proved to be extremely accurate on projects of a critical nature. We expect this method of construction will become more common on projects which require the storage of hazardous wastes.

CONCLUSION

Bentonite pond liners have been used successfully for over 50 years to seal lakes, dams, ponds and lagoons. The bentonite can be spread and worked into the ground with conventional earthmoving/agricultural equipment or installed by sophisticated new and precise machines. The bentonite soil sealant will not deteriorate with time as long as it is not contaminated by a material that would chemically attack it. In addition, the bentonite pond liner stays flexible as long as it stays wet and will normally heal itself in case of a puncture. Testing methods are now available to ensure the owner that the liner installed will perform as expected under the particular leachate conditions.

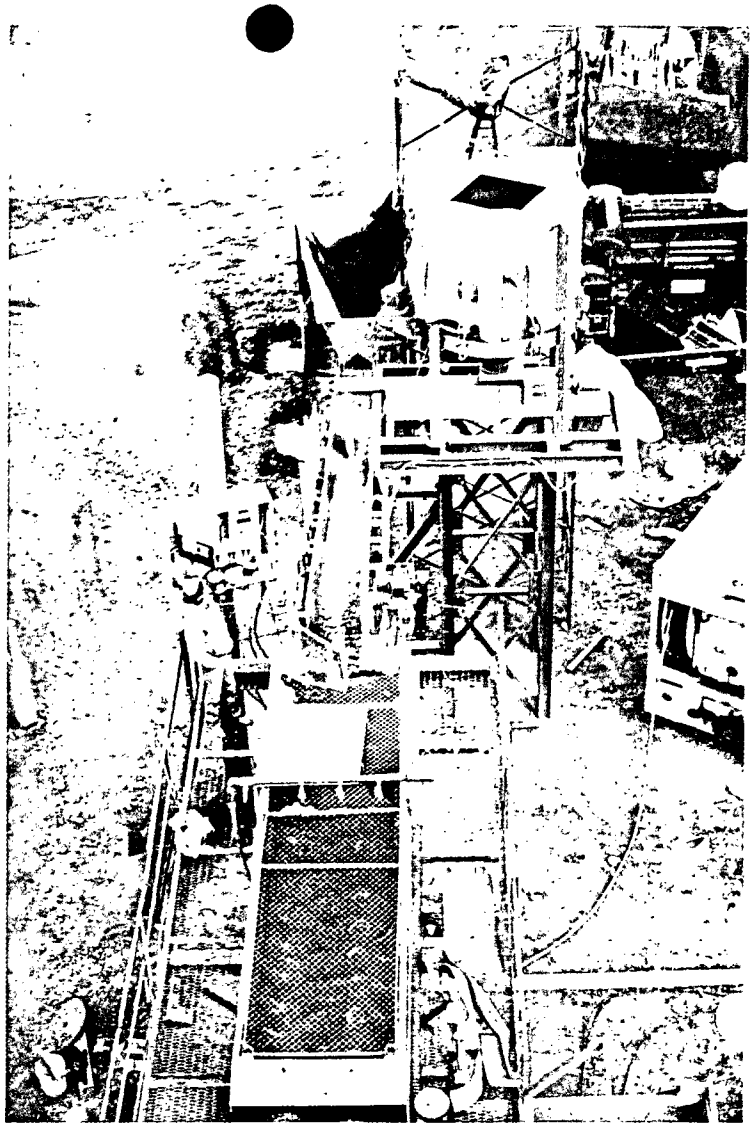


FIG. 2: SOIL-BENTONITE MIXING PLANT

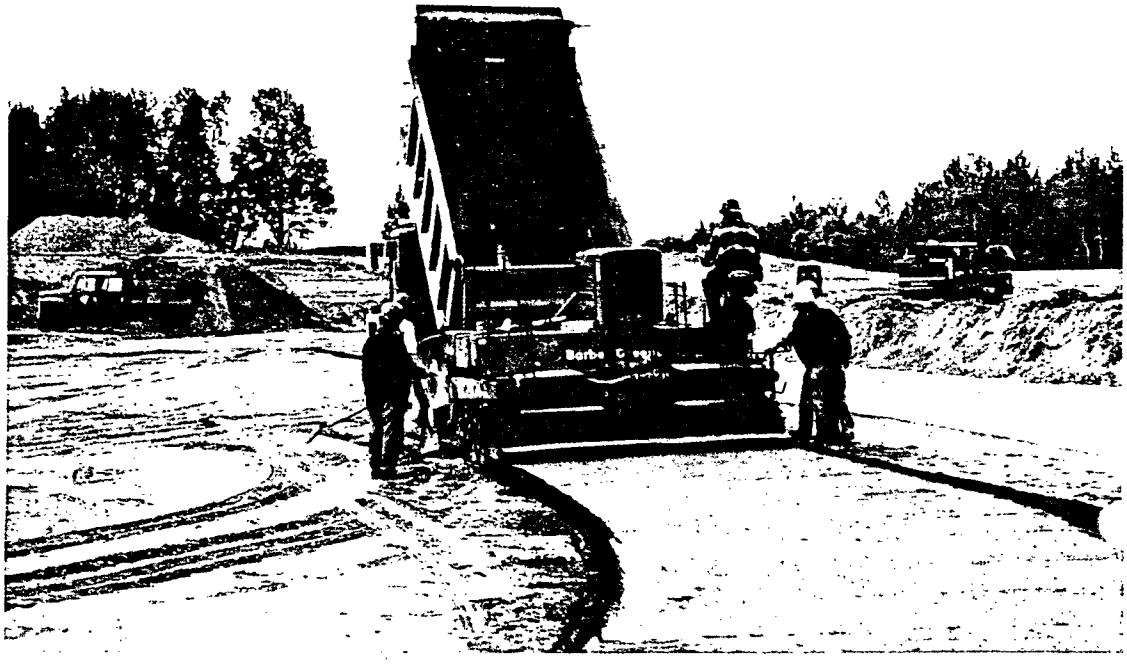


FIG. 3: PAVING MACHINE APPLYING SOIL-BENTONITE

Soil-Bentonite Liners

A soil-bentonite liner is a thick membrane-like seepage barrier composed of soil and bentonite, a natural clay mineral. When contacted by water, bentonite swells and fills the voids in the soil, thus preventing the passage of water and other liquids. Two of the principal advantages of bentonite pond liners are the low permeability imparted to a soil by the addition of bentonite and the self-healing nature of the liner.

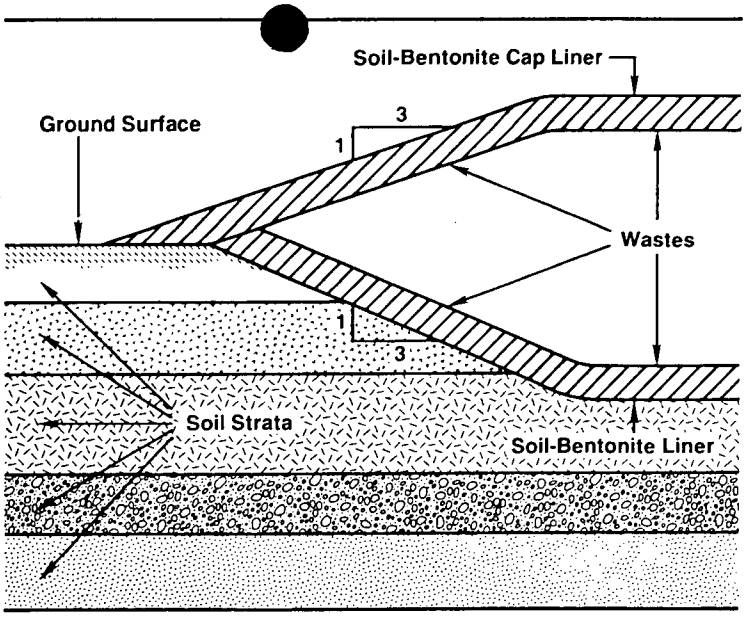


FIG. 1: CROSS SECTION OF TYPICAL SOIL-BENTONITE LINER AND CAP

APPLICATIONS

The principal applications are:

- Underliners for sanitary or hazardous landfills
- Cap liners for sanitary or hazardous landfills
- Lagoons and holding pond liners
- Blanket liners for reservoirs
- Canal liners
- Impermeable cores for earthen dams
- Oil and chemical tank farm liners

Bentonite pond liners are most applicable to projects which require a higher quality liner than can be obtained by using native soils, or on sites where there is no native clay available. In some cases it may be cost-effective to specify a thinner high-quality bentonite liner instead of a thicker native clay liner.

Bentonite liners can be used alone or in conjunction with synthetic liners on hazardous waste landfills. The bentonite liner provides a backup to the synthetic liner and also makes an excellent subgrade for the installation of synthetic liners. The installation of a double liner system using two dissimilar materials may provide an additional margin of safety in hazardous waste applications.

CLAY MINERALOGY

Sodium bentonite is generally the type of bentonite used in pond linings. The world's highest quality sodium bentonite is found in Wyoming and a few surrounding states. It is mined and processed there and exported worldwide.

The base material in bentonite is a high-swelling sodium montmorillonite that has a unique molecular structure enabling the clay to absorb many times its own weight in water. Good-quality sodium bentonite will swell 10-15 times its dry bulk volume. The molecular structure of bentonite and the presence of a large amount of sodium ions in the bentonite account for its ability to swell to a much greater volume than other natural clays.

Routinely available sodium bentonites may not be resistant to leachates which contain some salts or alkalis or acid solutions. However, chemically treated bentonites are available that have improved the contaminant resistance for some applications.

DESIGN

Bentonite pond liners are normally designed to have a permeability in the range of 10^{-7} cm/sec; however, it is possible to install a lining having a permeability in the range of 10^{-9} cm/sec. Most native clays when compacted are more pervious than bentonite liners.

A soil that has a relatively high permeability can be treated with a sodium bentonite to reduce its permeability substantially. Typically, the higher the permeability of the soil to be sealed, the larger the quantity of bentonite required. Standard permeability tests can determine the application rate for a particular site.

It is good practice to place a soil or riprap cover over the compacted soil sealant to protect it from desiccation or wave erosion. A cover will also serve to increase the pressure on the liner and thus decrease the liner's permeability.

CONSTRUCTION

In the area where the pond liner is to be installed, the working surface should be graded smooth and slopes should preferably not exceed a grade of 3:1 (horizontal to vertical). Steeper grades are more difficult to compact and require special attention. All vegetation and any boulders which might penetrate through the thickness of the seal should be removed. There are two principal methods of mixing and applying the bentonite liner.

The end product: properly stabilized sludge, treated and handled from start to finish by Geo-Con's professionals.

Sludge Stabilization Problem?

GO-88023

"Hazardous waste" is a no-nonsense term — and no place for amateurs, beginners, part-timers or a pick-up team.

Geo-Con **alone** brings a no-nonsense attitude to the handling of sludge stabilization, fixation, neutralization and removal. Just look at the dramatic example shown in these pictures. It reflects the many years of experience Geo-Con has amassed as contractors in the handling and containment of liquids of all kinds. It shows Geo-Con personnel working with the protective attire specified by EPA and supervised by Geo-Con's own professional health and safety experts.

Geo-Con is **the contractor source** in the hazardous waste handling field. To learn more about us and our one-call, one-stop contracting service, please write or phone Geo-Con, Inc., P.O. Box 17380, Pittsburgh, PA 15235 —phone 412-244-8200. Offices also in Dallas, TX and Lakeland, FL.

GEO-CON INC.

GEOTECHNICAL CONTRACTING

Bentonite and synthetic liners • Slurry cut-off walls • Containment construction

MEMBRANE PROPERTIES

To be effective, flexible membrane liners should have a combination of the following properties:

1. Strength—the stress/strain characteristics of the material.
2. Toughness and flexibility—the tear and puncture resistance should be high while retaining flexibility.
3. Durability—resistance to environmental factors.
4. Chemical resistance—to be able to withstand exposure to the chemical solutions to be stored. A thirty-day immersion test can be carried out if there is a combination of solutions.
5. Effective jointing system—seaming methods are solvent/adhesive, thermal, dielectric and homogeneous welding. The seaming method should be capable of producing a bond as strong as the base material.

MEMBRANE SELECTION CRITERIA

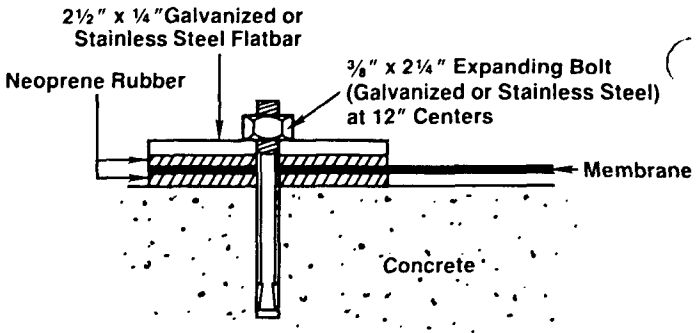
There are five basic criteria which should be evaluated when selecting the type and thickness of membrane liner:

1. Site planning considerations to be considered are:
   a. Characteristics of the waste or liquid to be impounded
   b. Side slope length and grade
   c. Characteristics (type and texture) of "in situ" soil materials
   d. Drainage considerations, both above and below the ground surface
   e. Impoundment dimensions
   f. Ambient temperature and contained material temperature
   g. Gas venting from underneath the liner due to decomposing vegetation
   h. Inflow, outflow and overflow conveyances
   i. Monitoring/leak detection systems
   j. Covering the liner or leaving it exposed
2. Degree of hazard will also influence selection criteria. Put simply, containment of a pure water supply does not present the same degree of hazard as containment of a toxic and hazardous waste, although the former may be equally important due to water conservation requirements.
3. Service time should also be considered. There are many applications which only require service for one or two years. The membrane for this service could be of lower quality than one required for twenty years' service.
4. Chemical nature of the material to be stored and the effect that it may have on different liner types determine which liner is suitable.
5. Physical stress that the liner may be subject to during installation and during its life.

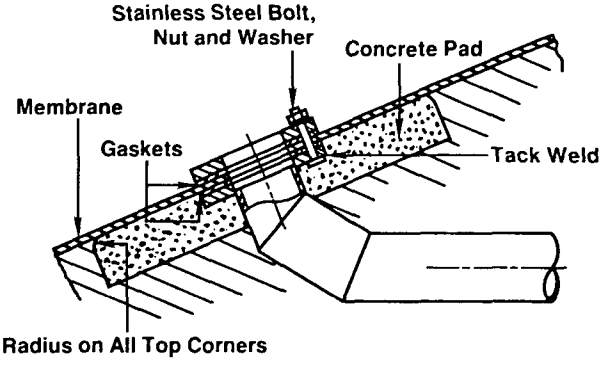
All the above factors and considerations affect in one way or the other the type of lining material to be used, if it should be reinforced with a scrim or not, its thickness and the seaming method to be employed.

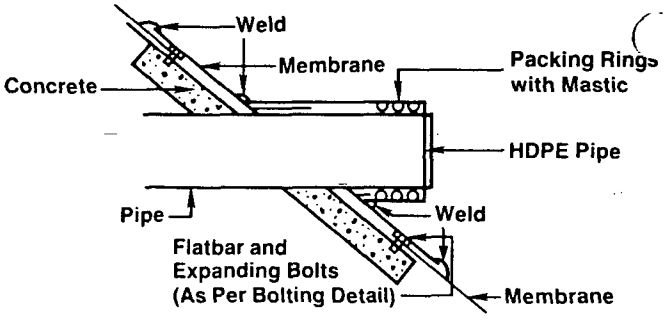
CONCLUSION

Synthetic membrane liners have gained engineering recognition as an effective solution to the containment of wastes, liquids and gases. They offer a cost-effective and quick method of sealing an area, are capable of handling a wide range of chemicals and ground movement, and if selected and installed properly will last a considerable length of time.

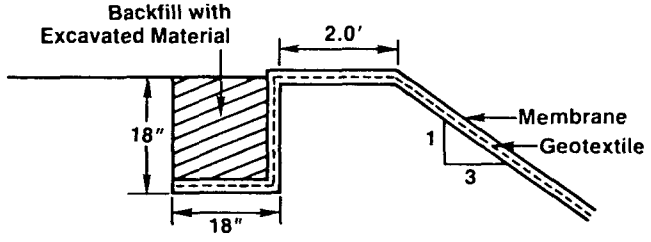


BOLTING DETAIL

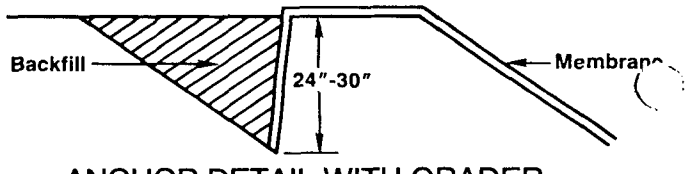




PIPE PENETRATION DETAILS



ANCHOR DETAIL WITH TRENCHER



ANCHOR DETAIL WITH GRADER

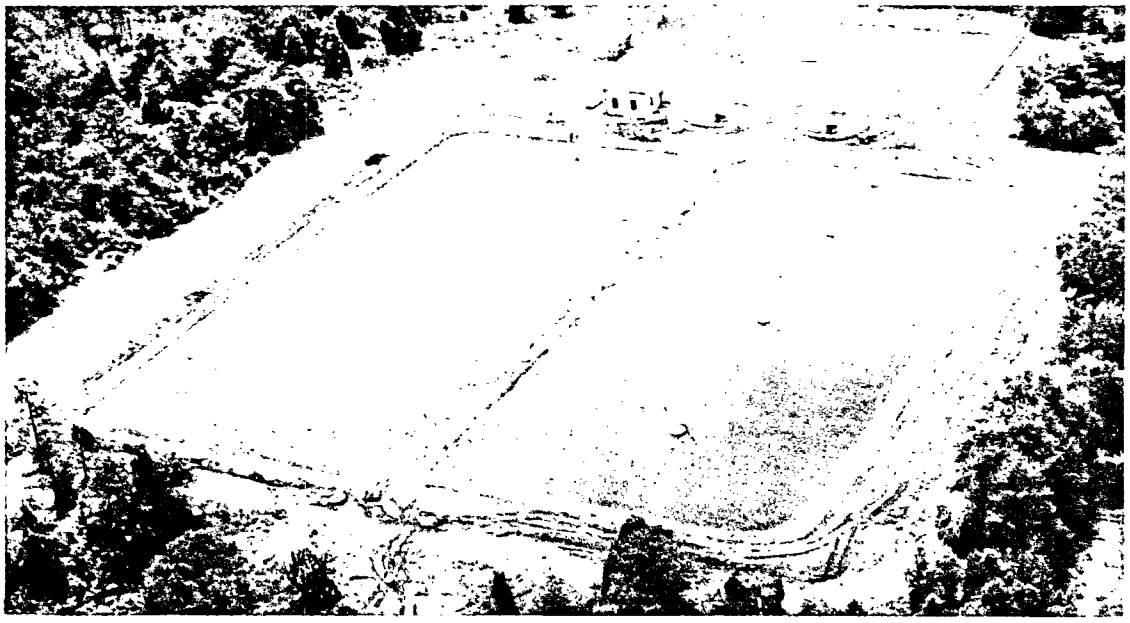
Synthetic Liners

Synthetic liners are a relatively new method of sealing areas to contain liquids or gases that are either too valuable to lose or too hazardous to allow into the environment.

The technology of linings was developed in the 1940s, but only since the early 1970s has it attained recognition as a viable and technically acceptable solution to containment problems. Liner systems for waste or water storage usually consisted of varying thicknesses of clay, asphalt or concrete; however, these materials have sometimes been found to be deficient because of increases of permeability due to chemical attack or cracking due to subgrade movement. A correctly chosen synthetic membrane will handle most chemical solutions with no increase in permeability and reasonable subgrade movement without tearing.

Another factor that has helped synthetic membranes gain acceptability has been the development of new lining materials and seaming systems that offer high chemical resistance with secure seams. The more common flexible lining materials are polyvinyl chloride (PVC), butyl rubber, low-density polyethylene, EPDM rubber, chlorinated polyethylene (CPE), chlorosulfonated polyethylene (Hypalon) and high-density polyethylene (HDPE), listed in order of improving physical characteristics and chemical resistance properties. Seaming systems are also improving and have progressed from adhesing to welding seams where welding gives a true homogeneous joint with all the properties of the parent material. Materials such as PVC, CPE and Hypalon can be modified by the encapsulation of a scrim between two layers of membrane material; this improves the liner's puncture and tear resistance and also its ability to be laid on steep slopes without creeping.

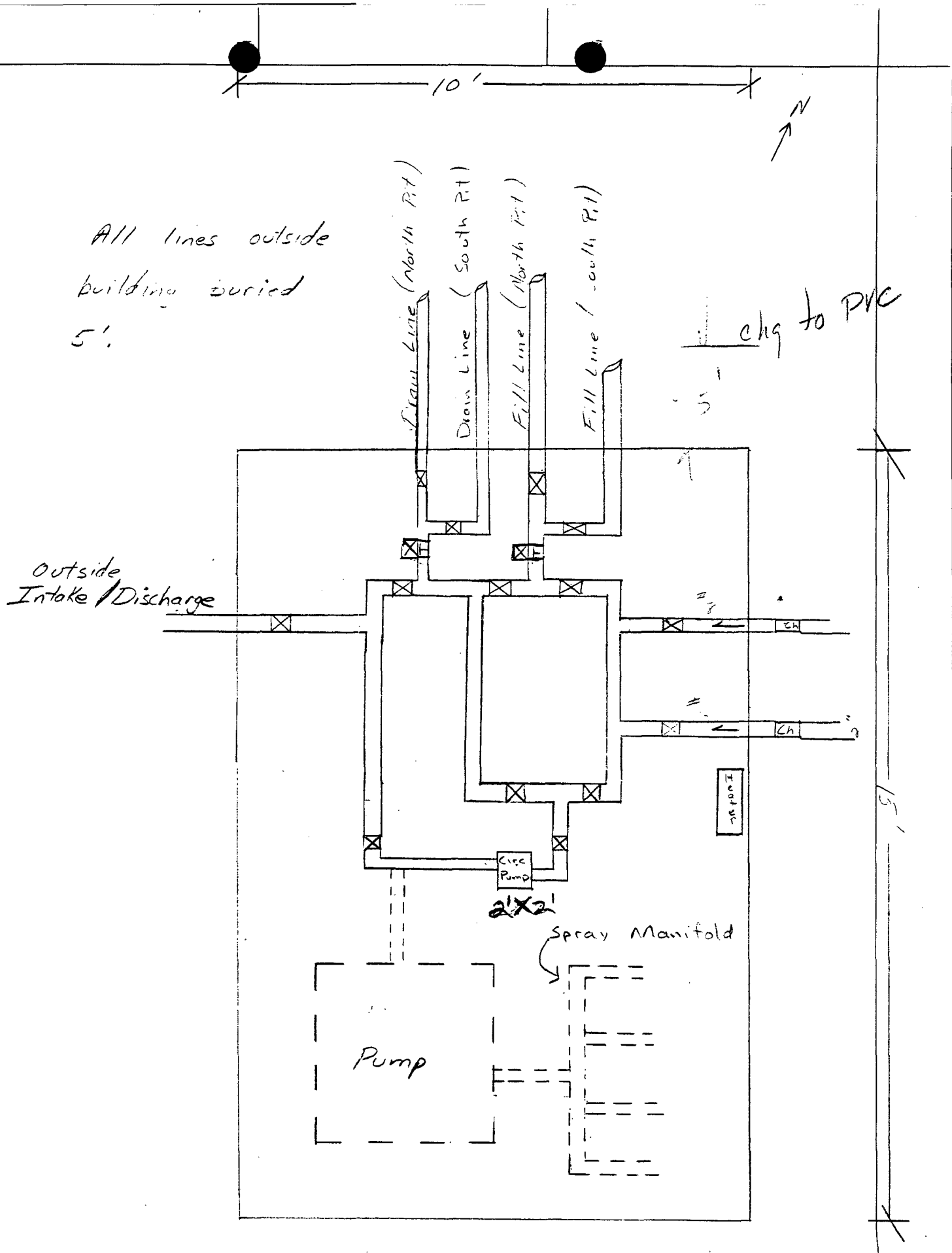
Membrane materials come in different thicknesses varying from 20 mil to 150 mil (not all the materials have this range) with a wide range of lining materials with different properties and capabilities. The thickness to be chosen depends largely on the physical or mechanical abuse that the liner may have to endure during its installation and during its operating life. The requirements of different containments will vary according to the liquid or gas to be contained and the attendant risk associated with that liquid or gas if it enters the environment. For example, PVC might be suitable for the storage of irrigation water, but if a highly hazardous solution that may contain hydrocarbons is to be contained, then HDPE is the most suitable liner.



APPLICATIONS

Industry
Hazardous landfill linings and caps
Aeration ponds
Brine storage ponds
Cooling and evaporation ponds
Fire protection ponds
Floating covers
Oil spill protection
Oxidation ponds
Process water ponds
Reservoirs and dams
Settling ponds
Sludge drying ponds
Tank linings
Waste collection and treatment ponds
Tailings dam linings and caps

Public Works
Artificial lakes
Canal linings
Dams
Embankment protection
Sanitary landfills
Sewage lagoons



All 4" Pipe & Valves
Steel inside house
Clamp to plastic 5' outside of house

ALLIED Union Texas Petroleum

P. O. Box 1290
Farmington, NM 87499
Telephone (505) 325-3587

July 9, 1985

New Mexico Oil Conservation
Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Phillip Baca

Re: Payne #6 and Payne #8 Lined Evaporation Pits
Section 20, Township 32 North-Range 10 West N.M.P.M.
San Juan County, New Mexico

Dear Phillip:

As per our conversation of June 24, 1985, I am submitting the following permit letter for your review and approval. I will address each section of the "Guidelines for The Design and Construction of Lined Evaporation Pits (Revised 5/85)" on a line by line basis.

1(a) The area in which the pits are situated are out of any watercourse, known sinkhole or other depression.

2(a) The pits were sized using a net evaporation rate of 48"/year. The evaporative rate of 60"/year was determined from evaporation studies conducted by the Arizona Public Service Company on their cooling/ evaporation ponds near Farmington, New Mexico. This evaporative rate was compensated for an anticipated yearly rainfall of 12", thereby giving a net evaporation rate of 48"/year. The maximum evaporative surface area (compensated for freeboard) for both pits is 81,404 $ft.^2$. The pits will yield a yearly net evaporation rate of 159 barrels of water per day. The two wells that the pit will service have combined water production capacity of 135 barrels per day. The water production rates were derived from short term production tests. In as much as the tests were short, we feel that the 24 barrel per day difference between the designed evaporation rate and the production rate will compensate for any over production of water.

(b) The pits will be leveled, compacted, set into a gentle sloping hill located and will be rectangular. The levees will rise at least 18" above ground.

(c) Wave calculations for a pit this small and shallow are difficult. After consulting the Corps of Engineers and evaluating readily available data, a 6" freeboard allowance will satisfactorily cover any waves generated in this pit. The maximum water depth will be 3.5' and the maximum diagonal fetch is 313.5'. A 50 MPH wind sustained for approximately 1-1/2 minutes would generate approximately a 6" wave over the maximum fetch. Wind gusts over 50 MPH in this area are not uncommon but the chance for a 1-1/2 minute sustained wind of 50 MPH in the direction of the maximum fetch is remote, at best. The waves generated will be a non-breaking type and will have negligible effect on the levees. The levees will have a 3:1 inside slope, be a minimum of 8' wide, and will be compacted to 95% of proctor compaction.

(d) The inside and outside slope of the pit will be 3:1.

(e) The top of the levee will be level and greater than 18" wide.

(f) Both pits will have a primary liner, secondary liner and leak detection system. The leak detection system will be set in a permeable medium between liners.

3(a-d) The primary liner will be 36 mil C.P.E.R. The bottom liner will be 30 mil P.V.C. The primary liner is resistant to ultra-violet light and both liners are resistant to rot, fungus, hydrocarbons, salts, acidic and alkaline solutions.

4(a-d) A leak detection system will be installed. The leak detection system will be made of 3" jacketted and slotted polyethlene pipe. The leak detection system will rest in a permeable sand medium in between the primary and secondary liner. No point in the pit will be over 20'from any one point of the leak detection system. The leak detection laterals will be sloped at 2% to the center drain line. The center line is sloped 1% to a corrosion proof sump. The sump will be outside the pit but within the confines of the facility's fence.

5(a) All portions of the pit will be smooth and compacted to 95% of proctor and will be free of holes, rocks, stumps, clods, or any other debris which may rupture the liner. A thin layer of permeable sand will be spread over the bottom and sides of the pit prior to installing the secondary liner. The sand will provide a permeable medium so any gaseous matter may be vented from beneath the liner.

(b) A trench will be excavated in the top of the levee. The trench will be set back a minimum of 9" from the slope break and will be at least 12" deep.

6(a) The OCD district office in Aztec, New Mexico will be notified at least 24 hours in advance of the secondary liner installation.

(b) Both liners will be installed and sealed to manufacturer's specifications. The liners will be installed by a qualified and experienced oil field service company.

(c) Folds will be placed in the liner to allow contraction and expansion. The liner will be of sufficient size to extend 2" beyond the outside edge of the anchor trench.

(d) A venting system will be installed in both pits. A permeable layer of sand will be placed between the earthen pit-bed and secondary liner. The pit-bed will be sloped upward at 2% from the longitudinal pit axis to the toe of the levee.

(e) Used casing and/or tubing will be placed over both liners in the anchor trench prior to backfilling and compacting the trench.

(f) The primary liner will be made of sun resistant material.

(g) Any sand or gravel that may be placed on top of the liners will not jeopardize the liner integrity.

7(a-g) A skimmer pond will not be necessary as all water placed in the pits will have been previously discharged from an A.P.I. separator.

8(a) A 6 foot chain link fence will be installed around the facility. The manifold system will be within the fenced area.

(b) A sign will be posted on the fence at the service entrance. The sign will be a minimum of 12" x 24". The lettering will be 2 inches or greater and will indicate the operator, quarter-quarter section, township and range.

9(a) The leak detection sump will be inspected weekly and noted by our production personnel.

(b) The outside walls of the levee shall be maintained so as to prevent erosion. Natural vegetation will be allowed to grow back onto the levee walls. After any significant rainfall, the levee walls will be inspected.

10 (a) In the event a leak is detected in one of the pits, that pit will be drained into the remaining pit until the second pit is at freeboard design. At that time, the wells will be shut-in. Any remaining water in the pit containing the leak will be pumped into temporary storage tanks. The leak will be repaired. The water in the temporary storage tank will be pumped back into the pit. At this time, the wells will be turned back on. If there are leaks in both pits, one pit will be drained into the other pit and storage tank, as outlined previously. The leak will be repaired and the process repeated on the remaining pit. In the event both the primary and secondary liners are punctured, the pit will be drained as outlined above and the leak detection sump will be continuously pumped out until the leaks are found and repaired.

If this permit letter meets with your approval, please acknowledge in the space provided below. Please return one signed original to Union Texas Petroleum Company.

Very truly yours,

Robert C Frank

Robert C. Frank
Regulatory and Environmental
Analyst

RDF/ljm

Attachments:

Acknowledgement:

_____
Phillip Baca
Environmental Engineering Specialist
New Mexico Oil Conservation Division

JICARILLA ARCHAEOLOGICAL SERVICES

CULTURAL RESOURCES SURVEY #85-68

OF THE PROPOSED FRUITLAND WATER POND AND LINE

AND THE COX CANYON COMPRESSOR STATION EXPANSION

FOR UNION TEXAS PETROLEUM

ABSTRACT

On May 28, 1985, 21.58 acres of Bureau of Land Management land about 2 miles northwest of Cedar Hill, New Mexico, were searched to allow rights of way for the above projects. Four "isolated finds" were found near the water pond, but are not recommended for potential significance. No cultural resources were found along the water line, nor at the compressor station; nor are any on record in the areas to be affected. The proposed construction may be considered in compliance with E.O. 11593, the Historic Preservation Act and the Archaeological Resources Protection Act. Clearance is recommended.

JICARILLA ARCHAEOLOGICAL SERVICES

REPORT #CR-85-68
JUNE 9, 1985

ANDREW R. GOMOLAK
ARCHAEOLOGIST

BUREAU OF LAND MANAGEMENT
PERMIT #20-2920-84 B

JICARILLA ARCHAEOLOGICAL SERVICES

505-334-9777 - P.O. Box 430 Aztec, New Mexico 87410

THE REPRODUCTION OF

THE

FOLLOWING

DOCUMENT (S)

CANNOT BE IMPROVED

DUE TO

THE CONDITION OF

THE ORIGINAL

INTRODUCTION

On May 28, 1985, Andrew Gomolak of Jicarilla Archaeological Services, and Robert L. LaFollette representing Union Texas Petroleum, inspected the proposed right of way for a Fruitland Formation Water disposal pipeline, an area for the location of a water evaporation pond, and an area to allow for expansion of the existing Cox Canyon Compressor Station. The Bureau of Land Management inspection was scheduled to take place at another time.

METHODOLOGY

The pipeline was walked in a single sinuous transect with an amplitude and frequency of about twenty five meters. The compressor and pond locations were walked in multiple parallel transects, spaced about eight meters apart.

Museum of New Mexico and Bureau of Land Management site location data were checked for cultural resources on record in the areas to be affected.

SPONSOR

Union Texas Petroleum
P.O. Box 808
Farmington, New Mexico
87499

UNION TEXAS PETROLEUM PAYNE FRUITLAND WATER EVAPORATION SYSTEM

LAND STATUS: Public, administered by the Farmington Resource Area Bureau of Land Management.

LEGAL: POND A 450 foot square area on the north and east sides of the existing well Payne #6 (1667'FSL & 805'FEL) in the SE1/4, NE1/4, SE1/4 and the E1/2, SW1/4, NE1/4, SE1/4, of Section 20.

LINE About 2100 feet, all along the north side of an existing pipeline, 500' East across the S1/2, SW1/4, NW1/4, SW1/4 of Section 21, turning Northeast for about 1600' across the SE1/4, NW1/4, SW1/4 to Payne #2, and the SW1/4, NE1/4, SW1/4 to end at Payne #2E in Section 21,

Township 32 North, Range 10 West, NMPM, San Juan County, New Mexico.

UTM: Z13

Pond	-2,42,050mE:	40,95,075mN
Line	-2,42,200mE:	40,95,000mN EOL at pond
	2,42,300mE:	40,95,000mN Turn NE
	2,42,625mE:	40,95,075mN at Payne #2
	2,42,800mE:	40,95,100mN at Payne #2E

MAP REFERENCE: USGS Aztec, New Mexico Quadrangle, 15 Minute Series, 1959. (See FIGURE 1)

AREA OF DISTURBANCE:
Pond 450'x 450', 4.65 acres
Line 30'x 2100', 1.45 acres

AREA OF THIS SURVEY:
Pond 600'x 800', 11.02 acres
Line 100'x 2100', 4.82 acres

TOTAL AREA SEARCHED: 15.84 acres

TERRAIN/SOILS: The pond area is on rough, eroding east slopes down to a minor arroyo, and cobble covered southwest slopes across the arroyo, between 6280' and 6320'amsl. There are sandstone outcrops and old river cobbles scattered throughout the survey area. The line runs over a narrow cobbly ridge east of the pond area, and traverses rough to mild slopes over to Payne #s 2 and 2E.

The soils in this area are included in the Travessilla-Rockland association. These are fine textured, cobbly, gravelly, thin sandy loams, from alluvial and eolian deposits.

VEGETATION: The survey area is canopied in juniper (Juniperus monosperma) and pinon (Pinus edulis), with an understory of bitterbrush (Purshia tridentata), mountain mahogany (Cercocarpus montanus), Mormon tea (Ephedra viridis), broad leaf Yucca (baccata), blue grama (Bouteloua gracilis), alkali sacaton (Sporobolus airoides), bottlebrush (Sitanion hystrix), ricegrass (Oryzopsis hymenoides), cholla and prickly pear (Opuntias sp.).

WATER: The Animas River is about a mile east of this survey area. Cox Canyon, to the west, is an occassional water source.

CULTURAL RESOURCES:

THIS REPORT - Four isolated finds were recorded along the north and east edges of the pond area:

JAS-IF-AZT-10, is a possible mano fragment, 15m north of the northwest edge of the pond area, near 2,41,875mE: 40,95,175mN;
JAS-IF-AZT-11, is a large single flake/core test debris, of mottled grainy chert, 10m north of the north center of the pond area, near 2,42,050mE: 40,95,150mN;
JAS-IF-AZT-12, is one cortical flake of biege chert, on the east center edge of the pond, near 2,42,150mE: 40,95,075mN; and
JAS-IF-AZT-13, is a thin flake of black/grey mottled chert, just off the east center, near 2,42,160mE: 40,95,050mN.

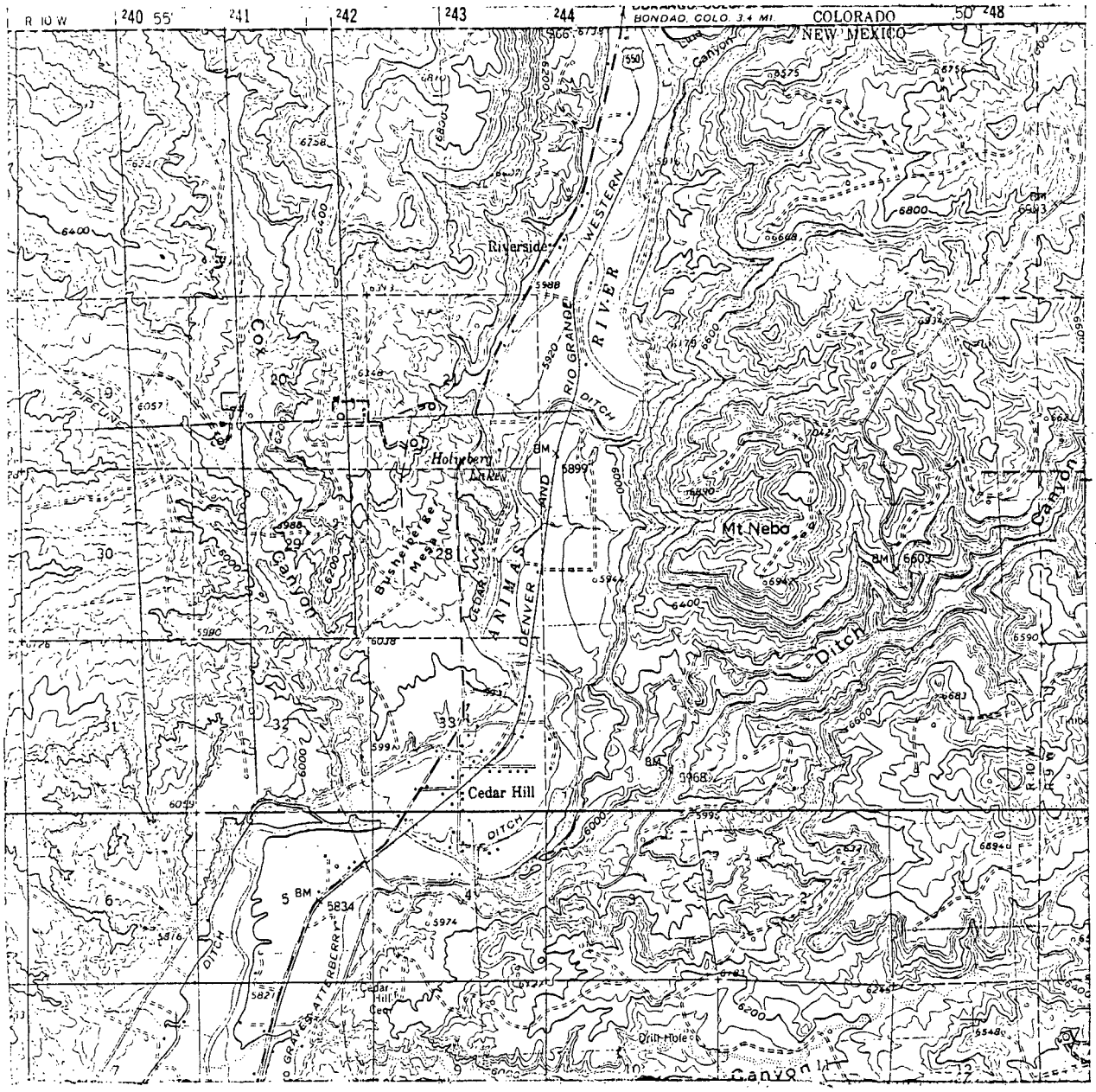
Each of these artifacts is most probably the result of resource testing among the surface cobbles, as there appeared to be no concentration, or other association, between them.

ON RECORD - No sites are on record in the area to be affected.

RECOMMENDATION: Because no cultural resources are on record in the area to be affected, and as those located by this survey do not appear potentially significant by current criteria: the proposed construction may be considered in compliance with E.O. 11593, the Historic Preservation Act and the Archaeological Resources Protection Act. Clearance is recommended.

FIGURE 1

R10W



UNION TEXAS PETROLEUM
PAYNE FRUITLAND WATER
EVAPORATION POND AND PIPELINE
SCALE 1:62,500

USGS AZTEC, NEW MEXICO
15 MINUTE QUADRANGLE
1959
UTM ZONE 13