GW - 107

REPORTS

YEAR(S):

1985

Jal 4 General 82-83

El Paso Natural Gas Company

MEMORANDUM

TO: H. Reiquam

DATE: July 7, 1983

FROM: W. F. Lorang

PLACE: Environmental Affairs

Subject: Meeting with the Oil Conservation Division (OCD) in Santa Fe, New Mexico, 7/6/83, 10:30 a.m.

D. N. Bigbie, H. Reiquam, J. F. Eichelmann, Jr. and W. F. Lorang met with Joe Ramey, Director of the OCD in their offices to discuss transmittal of information relative to the Jal 4 and Monument Plants discharge plans. The following summarizes each point of discussion:

1) Mr. Ramey was shown the revised Site Grading Plan for Jal 4 depicting installation of culverts allowing rain water to flow to the east across railroad and highway. He said he thought it looked good. We discussed the closing of ponds at both Jal 3 and Jal 4 by filling and mounding in accordance with previously submitted closure plans and he said that all ponds which are dry should be closed. He verbally authorized the closure of shallow dry areas (identified as ponding areas) and dry septic ponds. Pond number five at Jal 4 would be left open.

2) Mr. Bigbie explained the Jal 4 injection well pressures at various flow rates and asked for authorization of a maximum pressure. Mr. Ramey provided authorization of an injection pressure of 725 psi (attached letter).

3) The Jal 4 Drain Line Test Procedure was submitted and explained to Mr. Ramey. He was shown that the procedure now references an ICBO Standard for testing drain lines and provides specific information relative to the testing of the classifier tank. He agreed that we used a proper approach with respect to the test procedure.

4) The final report of the Organics Analysis of Pond Sludges at Jal 4 was submitted with the explanation that the final report has been revised only to clean up the text; that the data presented was essentially the same as that which appeared in the previous draft.

H. Reiquam commented that these submittals should "put Jal 4 to bed" and Mr. Ramey responded with "I'll see that it does."

5) Mr. Bigbie called Mr. Ramey's attention to one additional item which was mentioned during the EPA inspection of Jal 4, namely, the shallow drain pad which receives water released from heat exchangers during repair and drains the water to a grating emptying into the drain system/classifier. It was noted that, however unlikely, it may be possible for enough rainwater to enter the grating to overload the classifier system. Mr. Bigbie said that the Permian Engineering Department is in the process of designing a restricted flow device which would allow gradual but sufficient flow from the pad.

6) The final and complete Monument Plan was submitted to Mr. Ramey with transmittal letter from B. J. Matthews. The plan was summarized and scanned with him to show that 1) the plan is now a separate document addressing only Monument; 2) the format of the plan is changed: it is now under one cover and addresses each specific requirement of the regulations; and 3) the intention of the plan is to provide sufficient information to show compliance with the regulations (including those requests for "additional information" previously made). Mr. Ramey said that he would review the plan immediately and would advertise it in accordance with regulations as quickly as possible. After the 30 day comment period allowed by regulation, he expects to act (approve or disapprove) on the plan within the allowed 60 days. Mr. Ramey also agreed to return previously submitted documents which are superceded by the final plan.

WFL/mts
Attachment
cc: D. N. Bigbie
A. H. Carameros
J. F. Eichelmann
B. J. Matthews

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

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

July 6, 1983

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

Attention: Don Bigbee

Gentlemen:

Since step rate tests for the disposal well authorized under SWD-214 indicated to be 750 pounds, you are hereby authorized to inject at pressures not to exceed 725 psi.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

7

JCB/WFL/ 5004 Pond Closure

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

RECEIVED
JUL 13 1983

TONEY ANAYA
GOVERNOR

July 6, 1983

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

Mr. Don Bigbie
El Paso Natural Gas Company
Box 1492
El Paso, Texas 79978

Dear Mr. Bigbie:

Pursuant to your letter of July 5, 1983, concerning status of pits, the Division has no objection to your proposal to mix sand with the oily sludge in pits to speed up the drying process.

Oscar Simpson mentioned that EPA had contacted him by telephone advising that you were approved to close all pits.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

cc: Oscar Simpson

cc
J. Reigpman
D J M
K W C
J. Cunningham
B. J. Matthews
R. F. Cook
7/14/83

Table of Contents

DRAIN LINE TESTING PROCEDURE

for

EL PASO NATURAL GAS CO.

JAL NO. 4 PLANT

LEA COUNTY, NEW MEXICO

Prepared by

O. R. Dakan
Senior Project Engineer

PERMIAN DIVISION ENGINEERING

JAL, NEW MEXICO

June 10, 1983

SUMMARY

This drain line testing plan sets forth the methods and procedures which El Paso Natural Gas Company proposes to use to verify the integrity of the underground drain system at the Jal No. 4 Plant.

The purpose of this testing is to ensure that wastewater flowing through this piping system is contained and does not contribute to the degradation of groundwater quality in the general area of Jal No. 4 Plant.

The plan has attempted to allow the flexibility of testing some smaller, low-volume sections of drain piping without a total plant shutdown. This will decrease the amount of time required for testing during a shutdown.

Recordkeeping and reporting have been addressed in the General Instruction section. All charts, worksheets and resulting reports will be retained for a minimum of five years.

Detailed instructions are given for testing each major section of drain line. As each section is tested, all laterals (smaller drains) which flow into the main header will be subjected to the same test pressure. This will assure that all underground piping is tested.

Drain Line Testing Procedures for Jal No. 4 Plant

Introduction

The following procedures are arranged to allow testing of various sections of the drain system with the plant in operation. Some sections will require a plant shutdown to permit testing.

If the total system is to be tested during a plant shutdown, the test sequence should be arranged so water from one section can be routed into the next section to be tested where possible. This should shorten filling time and provide more economical use of water.

Water used in testing will be raw water from the plant water system. Use of fire hydrants and hoses will be required in some locations to provide sufficient volume and pressure for filling and testing. In most cases, test pressures will be below normal line pressure in plant water mains making use of hydrostatic test pump unnecessary. The higher pressures will require a pump.

The test pressures and duration used in this procedure exceed those specified for drainage and vent systems as set forth in the 1979 ICBO Code, Sections 1004 (A) 1 and 1005. The International Conference of Building Officials (ICBO) Plumbing Code of the Uniform Plumbing Code describe the procedures to be utilized in this testing procedure. The pressures and duration required in the ICBO Code are 4.3 psi and 15 minutes, respectively.

General Instructions

1. Before attempting to test any section of drain line, verify the sources of effluent and vapors entering the line. Any line which will contain significant amounts of Hydrogen Sulfide (H_2S) will be opened and tested observing all prescribed safety precautions and procedures.

2. Line numbers and sizes, tap numbers and locations of valves, stopple fittings and containment aprons are shown on drawing no. JJ4-1-PS, Revision D, "Underground Drain Lines." The entire test procedure is directly related to information on this drawing.

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

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

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

6. Filling a test section should always be from the lowest tap, venting at the higher taps to displace as much air or gas from the line as possible. Air or gas in the line, especially large amounts, may cause instability in pressure readings.

7. Test procedures given for each section to be tested are 10 p.s.i. above the maximum recorded pressure for that section of line. Test pressure should be applied only after system pressure is stabilized at some lower pressure.

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

9. If a section will not maintain the static test pressure for the required time, provided there is no valve, fitting or flange leakage, this section of drain line will be considered faulty. At this point it may be necessary to further isolate smaller sections of the line or expose the entire line until the leaking portion can be located and replaced or repaired.

   a. It should be noted that leakage can occur around the plug of a valve unless a sealing type grease is used to lubricate the valve in the closed position.

   b. Leakage will occur around the seal of an expandable plug unless the inside pipe surfaces are thoroughly cleaned prior to inserting the plug.

   c. Improper tightening of flange unions or faulty, used, or dirty gasket will cause leakage at the blind plate installations.

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

10. Test pressures will be recorded on a circular chart which will be retained as a permanent record. Recorders referred to in this procedure are Dickson Compact Battery Powered Recorders which use 4-1/2" diameter charts and, upon completion of section test, will be removed from the test tap and tap plugged. The 100# chart is chart no. 10; the 60# chart is chart no. 29.

11. At the end of testing interval, remove the chart from the recorder before unscrewing the unit from the pressure tap to prevent irrelevant pen markings, ink spillage, or other chart damage.

12. Each chart will have the following information recorded on the back:

    a. Date
    b. Tap location
    c. Line Description
    d. Initials of person changing chart
    e. Signature of person supervising testing

    These charts will be retained at the plant office for referenced and inspection as required.

13. When the integrity of the drain system, or a section of the system, has been verified, the system, or section, will be returned to normal service.

14. All drains will be tested annually and a written report sent to the area superintendent with copies to Engineering and the file at the Plant.

15. Because the classifier tank is to be operated at atmospheric pressure any pressure or vacuum testing of this tank can cause damage to the tank and/or coating system. Therefore, the only possible method of testing the classifier tank will involve filling the tank with water and guaging any drop in level over an 8 hour period. This test will be performed annually.

16. For same reason specified for the classifier tank, pressure or vacuum testing of the oil storage tank is precluded. The tank will be filled with water and guaged to verify the maintenance of a constant level for a 4 hour period. This test will be performed annually.

Line L14.37W-10" Backwash Drain Line from Stabilizer Reflux Condenser to Classifier tank; Includes Drains from Aprons Nos. 2, 3, &4

1) a) At caustic exchanger drain aprons, aprons Nos. 3 & 4, remove screens from (2) 8" drain line openings, clean interior surfaces and install expandable plugs.

b) At east end of "B" Gasoline Plant pump house, remove screen from drain line opening in apron No. 2, clean interior surfaces and install vented expandable plug.

c) Check block valves (2) on drains from stabilizer reflux condenser; (close and lubricate as required).

d) Close valve in 2" line from sump pump at west end of shipping pump house.

2) Insert blind flange in 4" ANSI 150 flange union at junction with line L14.4D.

3) Check 2" valve in drain line from air receiver at east end of sulfur plant analyzer building, lubricate with sealing grease in closed position.

4) Insert blind plate in 10" ANSI 150 flange union at junction with 12" line into classifier tank.

5) a) Open vent valve, F2, at 10" flange union near classifier tank.

b) Open valves on Tap No. 3 and Tap No. 18.

c) Open vents at all expandable plugs.

d) Using tap F2 at classifier, fill system with water until all air/gas has been displaced from lines.

e) Close and plug all vent valves.

6) Install properly zeroed 60# recorder on either Tap No. 3 or No. 18 then stabilize system pressure using fill tap.

7) Raise pressure to 15 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

8) If test pressure cannot be maintained on isolated system as specified, refer to General Instruction, Item 9.

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

Line L14.37W-10" Backwash Drain Line - Continued

10) Proceed with test on line L14.4D-4" before removing blind plate from 4" ANSI 150 flange union at junction with 10" - L14.37W.

11) a) Upon completion of test release pressure.

b) Remove blind plate from 10" ANSI 150 flange union at junction with 12" line to classifier tank.

c) Remove expandable plugs and replace screens in drain apron openings.

d) Open 2" valve in line from sump pump at shipping pump building.

e) Close and plug all vent and fill taps.

Line L14.4D-4" - 4" Pressure Drain from Fractionation Area to 10"-L14.37W Backwash Drain Includes Laterals: 4"-L14.5D, 4"-L14.10D, 4"-L13.18D, 4"-L14.19D

1) a) Close all valves on (6) drains from (3) storage tanks into lateral 4"-L14.5.

   b) Close valve at S.E. corner of "B" Gasoline Plant pump building in lateral 4"-L14.10D.

   c) Close 3" valves on (4) Perco Treater Drains into Lateral 4"-L14.18D.

   d) Close all valves on (25) drains from vessels into Lateral 4"-L14.19D.

2) a) Insert blind plates between 4" ANSI 150 flanges at junction with 10"-L14.37W.

   b) Open vent valve at flanges.

   c) Blind plate should still be in place from test on 10"-L14.37W.

3) Fill line with water at Taps No. F1 and No. 16. Install 60# recorder, stabilize line pressure below test pressure.

4) Raise test pressure to 15 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

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

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

7) Upon completion of test:

   a) Remove blind plate from 4" ANSI 150 flange union at junction with 10"-L14.37W.

   b) Open, as required, all valves from vessel dumps into Lateral 14.19D, Lateral 4"-L14.18D, Lateral 4"-L14.10D and Lateral 4"-L14.5D.

   c) Position valves on (4) Perco Treater drains for normal operation.

   d) Open valve at S.E. corner of "B" Gasoline Plant pump room.

   e) Position valves on (3) storage tank drains for normal operation.

   f) Close and plug all vent and fill taps.

Line 257-C4" - 4" Drain from Product Storage Area

1) a) Close all valves on drains from the product storage tanks into the 4" header.

b) Close valves in drains (2) from lean oil storage tanks to 4" header.

c) Close valve in drain from butane sand filter to 4" header.

d) Close valve in drain line at east end of shipping pump house.

e) Close valves in drains (2) from butane and propane sand towers.

2) Insert blind plate between 4" ANSI 150 flange union at junction with 4" pressure drain from treating plant to flare line stop tank.

3) a) Open vent valves at these locations: (1) Sand towers south of pump building; F3, (2) East end of storage tanks; F4, F5, (1) Near blinded 4" flange union F6.

b) Using taps No. 6 and No. 8, fill system with water until air/gas is displaced from lines.

c) Close and plug all vent valves.

4) Install properly zeroed 100# recorder on either fill tap then stabilize system pressure using other tap.

5) Raise pressure to 90 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

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

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

8) Before removing blind plate, proceed to line L14.3D test.

9) Upon Completion of Test:

a) Release test pressure.

b) Remove blind plate from 4" ANSI 150 flange union.

c) Position valves on product storage tank drains for normal operation.

d) Position valves on sand towers and sand filter for normal operation.

e) Position valves on lean oil storage tanks for normal operation.

f) Close and plug all vent and fill taps

Line: L14.3D-3" - Condensate Blowdown Line

1) Close 3" valve on vertical line in Perco Treater area where line leaves overhead pipe way to enter ground.

2) Insert blind plate between 3" ANSI 150 flange union at junction with 4" pressure drain from treating plant to flare line stop tank.

3) a) Open vent valve below 3" block valve in vertical riser (F7) and at 3" flanged union (F8).

b) Using Taps No. 4 and No. 17, fill system with water until air or gas is displaced from line.

c) Close and plug vent valves.

4) Install properly zeroed 100# recorder on either fill tap then stabilize system pressure using other tap.

5) Raise pressure to 90 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

6) If test pressure cannot be maintained on isolated system as specified, refer to General Instruction, Item 9.

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

8) Before removing blind plate proceed with test on 4" pressure drain from treating plant.

9) Upon completion of test:

a) Release test pressure.

b) Remove blind flange from 3" ANSI 150 flange union.

c) Open 3" valve in Perco Treater area.

d) Close and plug vent and fill valves.

Line: (Unnumbered) - 4" Pressure Drain from Treating Plant Headers to Flare Line Stop Tank

1) a) Check four (4) 2" valves on 20" headers, (ie. one valve at each end of each header) and lubricate with sealing grease while in closed position.

   b) Close 4" valve at stop tank.

2) a) Insert blind plate between 4" ANSI 150 flange union at junction with Line L14.4D-4".

   b) Insert blind plate between 3" ANSI 150 flange union at junction with Line L14.3D-3"; (should still be in place from previous test of L14.3D-3").

   c) These blind plates should still be in place from previous tests on these lines.

3) a) Open vent valve at west end of line near vessels V5101 and V5102; F64.

   b) Open vent valve at east end of line on vertical section below valve at tank nozzle; F63.

   c) Using Tap No. 10 fill system with water until air/gas is displaced from lines;

   d) Close vent valves.

4) Install properly zeroed 100# recorder on either vent tap then stabilize system pressure using fill tap.

5) Raise pressure to 90 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

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

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

8) Upon completion of test:

   a) Release pressure.

   b) Remove blind plates from 4" and 3" flange unions.

   c) Open 4" valve at stop tank nozzle.

   d) Close and plug all vent and fill taps.

Line L14.13D - 4" Caustic Drain to Classifier Includes Laterals: 4"-L14.12D, 2"-L14.13D, 2"-L14.26D

1) a) Close valve at North East corner of "B" Gasoline Plant pump building on Lateral 4"-L14.12D.

   b) Close all valves on (15) drains from vessels into West section of 4"-L14.13D.

2) Insert blind plate in 4" ANSI 150 flange union at junction with 16" main drain header.

3) a) Open valves on taps No. 2, No. 19 and F-13 for vents.

   b) Using tap F-12, fill the system with water until air/gas is displaced from lines.

   c) Close and plug all vent valves.

4) Install properly zeroed 60# recorder on either Tap No. 2 or No. 19 then stabilize system pressure using fill tap, F12.

5) Raise pressure to 15 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

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

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

8) a) Upon completion of test release test pressure.

   b) Remove blind plate from 4" ANSI 150 flange union at junction with 16" drain header.

   c) Return all valves on (15) vessel drains to operating position.

   d) Open 4" valve at N.E. corner of "B" Gasoline Plant pump building on Lateral 4"-L14.12D.

   e) Close and plug all vent and fill taps.

Line 4" Cooling Tower Blowdown to Conoco - THIS LINE CAN BE TESTED IN TWO (2) SECTIONS

SECTION 1

1) a) Close (2) valves at the compressor station/treating plant cooling tower pump house and header blowdown.

b) Close valve at "A" Gasoline Plant cooling tower. Blowdown; near pressure tap No. 11.

c) Close 4" gate valve near pressure Tap No. 13, (Separating Section I & II).

2) a) Open valve at Tap F14.

b) Using Tap F15, at Compressor Treating cooling tower pump house, fill system with water until all air/gas has been displaced from line.

c) Close valve at Tap F14.

3) Install properly zeroed 60# recorder on Tap F14 then stabilize system pressure using fill Tap F15.

4) Raise pressure to 35 psig on system, stabilize test pressure then begin static pressure test as specified in General Instructions, Item 8.

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

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

7) Proceed with test on Section II before opening 4" valve near Tap No. 13.

Line 4" Cooling Tower Blowdown to Conoco

SECTION II

1) a) Close 4" valve near pressure tap No. 13 (at junction with North portion of Section I).

b) Close 4" valves (2) at galvanized water surge tank; [(1) inlet to tank and (1) by-pass to overflow to classifier.]

2) UNLESS THIS LINE HAS BEEN DRAINED THROUGH TAP NO. 13, OR BY CUTTING, IT WILL BE FULL OF WATER AND READY FOR TESTING.

a) If the line has been drained it will be necessary to refill it through a 2" valve on a vertical riser near the chlorinator contact tank.

b) Due to the location in the tank, the elevated inlet line will prevent back-flowing water into the section to be tested.

c) Attach a length of hose to the 2" valve on the discharge piping from the pump at the base of the tank; connect the open end of the hose to the 2" riser valve near the chlorinator.

d) Close 4" valve on discharge of pump and open 2" riser valve.

e) Open valve at Tap No. 13 for venting and fill line until all air is displaced.

f) When filled, proceed to Item 3.

3) Attach properly zeroed 60# recorder on Tap No. 5 or No. 13 and stabilize system pressure using fill tap at 2" riser valve.

4) Raise pressure to 35 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

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

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

7) a) Upon completion of test release test pressure.

b) Open 4" valves on tank inlet and pump discharge at surge tank as required. Refer to item 2 above.

c) Open 4" valve near Tap No. 13 at junction with North portion of Section I.

d) Close and plug all vent and fill taps.

Line 261C-6" - Waste Drain from "A" Gasoline Plant (includes 2" and 1½" Drains from Propane Dehydrator and Propane Sand Filter Vessels

1) a) Close drain valves from propane dehydrator vessels.

b) Close valve on propane sand filter.

c) Open valve at Tap F21 for vent.

2) a) Install plug in 6" stopple fitting near caustic storage tanks.

b) Open valve on Tap F 20 for vent.

3) Insert blind plate in 6" ANSI 150 flange union at junction with 16" main drain header.

4) a) Assure valves on Taps F20 and F21 are open for venting.

b) Using Tap F9, fill system with water until air/gas is displaced from lines.

c) Close and plug all vent valves.

5) Install properly zeroed 60# recorder on Tap No. 7 then stabilize system pressure using fill Tap, F9.

6) Raise pressure to 15 psig on system, stabilize test pressure then begin static pressure test as specified in General Instructions, Item 8.

7) If static pressure cannot be maintained on isolated system as specified, refer to General Instructions, Item 9.

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

9) a) Upon completion of test, release test pressure.

b) Remove blind plate from 6" ANSI 150 flange union at junction with 16" main drain header.

c) Remove plug from 6" stopple fitting near caustic storage tanks (Refer to 10).

d) Position drain valves at propane dehydrators and sand filter for normal operation.

e) Close and plug all vent and fill taps.

10) Proceed with test on 261C-4"

Line 261C - 4" - Waste Drain from "A" Gasoline Plant to 6" Stopple Fitting, Includes Drains from 6 Vessels and 12 Heat Exchangers

1) a) Close drain block valves on all vessel (6) dumps; (V8, V9A & B, V11, V12, V13).

b) Close block valves on (12) heat exchanger dumps and drains; (E27, E25, E5, E7, E16, E18, E8, E9, E10, E11, E12, E13).

c) Close valve in vertical run of line 271C-4" near caustic storage tank No. 1.

d) Close (2) valves on crossover to L.P. drain, line 277C-6".

e) Close (4) valves on drains from South side of building.

f) Close valves on drains from fin fans (FF1 & FF2).

2) a) Install plug in 6" stopple fitting near caustic storage tanks.

b) Open valve at Tap No. 12 for venting.

c) Using Tap F19 at stopple fitting, fill system with water until all air/gas is displaced from line.

d) Close valve at Tap No. 12.

3) Install properly zeroed 60# recorder on Tap No. 12 then stabilize system pressure using Tap F19.

4) Raise pressure to 35 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

5) If test pressure cannot be maintained on isolated system as specified, refer to General Instructions, Item 9.

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

7) a) Upon completion of test release test pressure.

b) Remove plug from stopple fitting and secure.

c) Position drain block valves at exchangers, fin fans, vessels and building drains for normal operation.

d) Close and plug all bent and fill taps.

8) Proceed to test on line 277C-4" and 6".

Line 277C-4" and -6" - Drain Header from Process Area to Oil Separator. Includes Drains from 11 Vessels and 12 Heat Exchangers.

1) a) Close drain block valves on all vessel (11) dumps: (V1A & B, V2, V7, V3, V11, V10, V12, V13, V4, V5)

   b) Close drain block valves on all heat exchanger (12) dumps; (E2, E3, E4, E1, E27, E26, E25, E5, E7, E11, E12, E13)

   c) Close valves on crossover to H. P. Drain 261C-4";

   d) Close 3" vlave on funnel drains in "A" Gasoline Pump House;

   e) Close valve on 3" drain from boiler fuel gas scrubber at junction with 277C-6" near Caustic Pump House.

2) Install plug in 6" stopple fitting at oil separator sump.

3) a) Open valve at Tap F23 for venting;

   b) Using Tap F24 at stopple fitting, fill system with water until all air/gas is displaced from line;

   c) Close valve at Tap F23.

4) Install properly zeroed 60# recorder on Tap F23 then stabilize system pressure using Tap F24.

5) Raise test pressure to 10 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

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

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

8) Upon completion of test:

   a) Release test pressure;

   b) Remove plug from stopple fitting and secure;

   c) Position drain block valves at exchangers, vessels, and building drains for normal operations;

   d) Open 3" valve on drain from boiler fuel gas scrubber at junction with 277C-6" near Caustic Pump House;

   e) Close and plug all vent and fill taps.

Line: 10" Gravity Drain from Oil Separator Sump to 16" Drain Header At Classifier Tank

1) a) Close valve on 2" line from South end of Caustic Pump House;

b) Install blind plate in 10" ANSI 150 flange union at junction with 16" drain header.

2) Install plug in 10" stopple fitting at outlet of oil separator sump.

3) a) Open valve on Tap F54 at stopple fitting for venting;

b) Using Tap F10, fill system with water until all air/gas is displaced.

4) Install properly zeroed 60# recorder on Tap F54 then stabilize system pressure using Tap F10.

5) Raise pressure to 10 psig; stabilize; then begin static pressure test as specified in General Instruction, Item 8.

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

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

8) Upon completion of test:

a) Release test pressure;

b) Remove blind plate from 10" flange union at 16" drain header;

c) Remove plug from 10" stopple fitting and secure fitting;

d) Open 2" valve at Caustic Pump House;

e) Close and plug vent and fill valves.

Line 278C-4" - Drain Header from Oil Heater Area to API Separator

1) a) Close valves (5) on drains from oil heater piping.

   b) Close valve on dump at condensate separator.

2) Install plug in stopple fitting at oil separator sump.

3) a) Open valve at Tap F16 for venting.

   b) Using Tap F17 at stopple fitting, fill system with water until all air/gas is displaced from line.

   c) Close valve at Tap F16.

4) Install properly zeroed 60# recorder on Tap F16 then stabilize system pressure using Tap F17.

5) Raise pressure to 15 psig on system, stabilize test pressure then begin static pressure test as specified in General Instruction, Item 8.

6) If test pressure cannot be maintained on isolated system as specified, refer to General Instruction, Item 9.

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

8) a) Upon completion of test release test pressure.

   b) Remove plug from stopple fitting and secure.

   c) Position drain valves at heaters and condensate separator for normal operation.

   d) Close and plug all vent and fill taps.

Line: 4" Low Pressure Drain From Reflux Accumulator to 16" Drain Headers at Classifier

CAUTION!!! - These drain lines will contain HIGH Concnetrations of H_2S Gas. Proper safety precautions must be observed at all times during testing of these lines.

1) a) Close 1" block valves on dump from caustic regeneration separator;

b) Close 2" block valve on dump from acid gas inlet scrubber;

c) Close 2" block valve on dump from reflux accumulator;

d) Close 2" valve in vertical run from 2" drain header at fin fan;

e) Close 1" valve at regeneration unit 6" vent stack drain.

2) Install blind plate in 4" ANSI 150 flange union at junction with 16" drain header. (H_2S present at this location)

3) a) Open valve on Tap F56 below valve in vertical run at fin fan for vent;

b) Open valve on Tap F57 at acid gas inlet scrubber drain for vent;

c) Using Tap F55 at 4" flange union, fill system with water until all gas is displaced. (Displaced gas may contain HIGH Concentrations of H_2S)

d) Close valves on Taps F56 and F57.

4) Install properly zeroed 60# recorder on Tap F57 then stabilize system pressure using Tap F55.

5) Raise pressure to 15 psig on system; stabilize; then begin static pressure test as specified in General Instruction, Item 8.

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

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

8) Upon completion of test:

a) Replace test pressure;

b) Remove blind plate at junction with 16" drain header;

c) Open 1" valve at regeneration unit vent stack;

d) Open 2" valve in vertical run at fin fan;

Line: 4" Low Pressure Drain from Reflux Accumulator to 16" Drain Header at Classifier - Cont'd

e) Open 2" block valve on dump from reflux accumulator;

f) Open 2" block valve on dump from acid gas inlet scrubber;

g) Open 1" block valve on dump from caustic regeneration separator;

h) Close and plug vent and fill taps.

Line: 4" D(H)-3-Y-UG - 4" Gravity Drain Header From Air Compressor Building and Dowtherm Storage Tank Areas to 16" Drain Header At Classifier Tank

1) a) Close 2" valve, at east end of Air Compressor Building, in drain line from Wet Instrument Air Tank;

   b) Close 2" valve, at north side of building, in drain line from instrument air dryers;

   c) Close 2" valve in drain line from Dowtherm Sotrage Tank.

2) Remove screen from drain openings at containment pads No. 7 and No. 8 and install vented, expandable plugs.

3) Install blind plate in 4" ANSI 150 flange union at junction with 16" drain header near classifier.

4) a) Open valve on Tap F58 at containment Apron No. 7;

   b) Open valve on Tap 59 at north side of Air Compressor Building;

   c) Using Tap F11, fill system with water until all air is displaced.

5) Install properly zeroed 60# recorder on Tap F58 then stabilize system pressure using Tap F11.

6) Raise pressure to 10 psig; stabilize; then begin static pressure test as specified in General Instruction, Item 8.

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

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

9) Upon completion of test:

   a) Release test pressure:

   b) Remove blind plate at junction with 16" drain header;

   c) Remove (2) expandable plugs from drain openings at containment pads No. 7 and No. 8;

   d) Open (2) 2" valves at Air Compressor Building;

   e) Position 2" valve at Dowtherm Storage Tank drain for normal operation;

   f) Close and plug all vent and fill taps.

Line: 10" Boiler Blowdown Header, Including 8" Evaporator Blowdown Line

1) a) Check (4) 2" boiler blowdown valves to assure in closed position;

   b) Check (3) 2" evaporator blowdown valves to assure in closed position.

2) Install plug in 10" stopple fitting in line at blowdown pot.

3) a) Open valve on Tap F64 on 10" header north of boiler No. 4;

   b) Open valve on Tap F65 on 8" evaporator blowdown line at south evaporator.

   c) Using Tap F63, fill system with water until air is displaced from lines.

   d) Close valve on Tap F64 and F65.

4) Install properly zeroed 60# recorder on Tap F 65 then stabilize system pressure using Tap F64.

5) Raise pressure to 40 psig on system; stabilize, then begin static pressure test as specified in General Instruction, Item 8.

6) If test pressure cannot be maintained on isolated system as specified, refer to General Instruction, Item 9.

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

8) Upon completion of test:

   a) Release test pressure.

   b) Remove plug from stopple fitting and secure fitting.

   c) Close and plug all vent and fill taps.

Line: 8" Drain From Boiler Plant Blow Pot to 16" Drain Header At Classifier

1) a) Install plug in 8" stopple fitting at east side of blow pot;

b) Install plug in 8" stopple fitting at junction with 16" drain header.

2) a) Open valve on Tap F61 for venting;

b) Using Tap F60 fill line with water until all air is displaced.

3) Install properly zeroed 60# recorder on Tap F61 then stabilize system pressure using Tap F60.

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

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

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

7) Upon completion of test:

a) Release test pressure;

b) Remove plugs from stopple fittings and secure fittings;

c) Close and plug vent and fill taps.

Line: 4" Backwash Line From Disposal Plant to Classifier Tank

1) a) Close 4" Valve in line near truck loading valves;

b) Close valves on contingency tank pumps;

c) Close 4" at line entrance into contingency tank;

d) Close 4" butterfly valve on backwash outlet piping at filter;

e) Close 2" valve on discharge piping from sump pump at north end of Disposal Plant Pump Building.

2) a) Open vent valve at butterfly valve on filter piping;

b) Using Tap F62, at valve on contingency tank, fill system with water until all air is displaced from line.

3) Install properly zeroed 60# recorder on vent tap at filter then stabilize system pressure using Tap F62.

4) Raise pressure to 30 psig on system; stabilize; then begin static pressure test as specified in General Instruction, Item 8.

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

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

7) Upon completion of test:

a) Release test pressure;

b) Open 4" valve near truck loading valves;

c) Open block valves on contingency tank pumps;

d) Position 4" vlave on the contingency tank for normal operation;

e) Open valve on sump pump;

f) Open block valve on backwash line at filters;

g) Close vent and fill valves; install plug in valve on Tap F62.

Line: 4" Waste Water Dishcarge from Classifier Pumps to Disposal Station

1) a) Close (2) 4" plug valves at pump discharge header;

b) Close 4" bullerfly valve at inlet to filters

2) This line will normally be full of water and should not require filling and venting unless the line has been separated for repairs.

a) Before closing valves as indicated above (1a & 1b), set pump control to HAND on starter then after starting pump with push button station at pump, allow it to run for 5 minutes; shut pump off at starter then proceed as indicated in 1a & 1b;

or

b) Open vent valve at butterfly valve on filter inlet piping; using Tap No. 1 on pump discharge header, fill system with water until all air has been displaced from line.

3) Install properly zeroed 100# recorder on vent tap at filter inlet then stabilize system pressure using Tap No. 1.

4) Raise pressure to 65 psig on system; stabilize, then begin static pressure test as specified in General Instruction, Item 8.

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

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

7) Upon completion of test:

a) Release test pressure;

b) Open valves on discharge header and at filter inlet piping;

c) Close vent valves.

Line: 8" Cooling Tower Backwash Line from Compressor/Gasoline Plant Cooling Tower to Junction with 10" Water Treater Backwash Line.

1) a) Close drain block valve on cooling tower sidestream filter;

   b) Close valve on drain line from "A" Compressor Building;

   c) Close valves on oil cooling water sidestream filter drain;

   d) Close valves on jacket water sidestream filter drain;

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

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

   c) Install expandable plug in drain from water treater backwash sump;

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

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

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

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

   d) Close valve at Tap No. 14.

4) Install properly zeroed 60# recorder on tap No. 14 then stabilize system pressure using fill tap F26.

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

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

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

8) Upon completion of test:

   a) Release test pressure;

   b) Remove expandable plugs from:

      (1) 6" Water treater backwash sump drain;
      (2) Containment Apron No. 11;
      (3) Contianment Apron No. 5;
      (4) Contianment Apron No. 9.

   c) Position drain valves at oil and jacket cooling water sidestream fitlers, cooling tower sidestream filter, and Compressor Building drain for normal operation.

Line: 8" Cooling Tower Backwash Line from Compressor/Gasoline Plant Cooling Tower to Junction 10" Water Treater Backwash Line - Cont'd

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

e) Close and plug all vent and fill taps.

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

Line: 10" Water Treater Backwash Drain Line - Section I

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

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

b) Install expandable plug in drain from containment Apron No. 10.

3) a) Install plug in 8" stopple fitting at junction with "B" Compressor Plant cooling tower backwash line near corner of block fence.

b) Install plug in 8" stopple fitting at junction with 8" from Treating Plant cooling tower backwash newr 24" orifice fitting;

c) Instll plug in 10" stopple fitting in water treater backwash line near north block fence;

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

b) Using Tap F29 at 10" stopple fitting, fill system with water until all air is displaced from the line;

c) Close vlave at Tap F27.

5) Install properly zeroed 60# recorder on Tap F27 then stabilize system pressure.

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

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

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

9) Upon completion of test:

a) Release test pressure;

b) Remove expandable plugs from:

(1) Drain in water treater backwash sump;
(2) Drain from containment Apron No. 10.

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

d) Remove plug from 8" stopple fitting at junction with 10" near 24" orifice fitting;

e) Remove plug from 10" stopple fitting in water treater backwash line;

Line: 10" Water Treater Backwash Drain Line - Section I - Cont'd

f) Open 4" valve in line from Compressor Building Drain;

g) Close and plug all vent and fill valves.

10) Proceed to test on Section II of 10" water treater backwash line.

Line: 10" Water Treater Backwash Drain Line - Section II

1) Close valve on 4" drain line from Boiler Plant pump drains at junction with 10" water treater backwash line north of Plant fence.

2) a) Install plug in 10" stopple fitting near north block fence;

   b) Install plug in 6" stopple fitting in gravity drain from north of Plant fence.

3) Insert blind plate between 10" ANSI 150 flange union at junction with 12" header to classifier tank.

4) a) Open valve at Tap F30 for venting;

   b) Using Tap F31 fill system with water until all air is dispaced from line;

   c) Close valve at Tap F30.

5) Install properly zeroed 60# recorder on Tap F30 then stabilize system pressure.

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

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

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

9) Upon completion of test:

   a) Release test pressure;

   b) Remove plug from 6" stopple fitting at junction with 10" water treater backwash line;

   c) Remove plug from 10" stopple fitting near north fence and secure;

   d) Remove blind plate from 10" ANSI 150 flange union at junction with 12" header to classifier tank;

   e) Open 4" valve on drain line from Boiler Plant pump drains;

   f) Close and plug all vent and fill valves.

Line: 8" Cooling Tower Backwash Line from Treating Plant Cooling Tower to Junction with 10" Water Treater Backwash Line

1) a) Close 4" drain block valve on cooling tower sidestream filter;

b) Close (3) 8" valves on backwash lines from 3rd stage gas coolers at "A" Compressor Plant.

2) Install plug in 8" stopple fitting at junction with 10" water treater backwash line near 24" orifice fitting.

3) a) Open valve on Tap No. 11 for venting;

b) Using Tap F28 at 8" stopple fitting, fill system with water until all air is displaced from line;

c) Close valve at Tap No. 11.

4) Install properly zeroed 60# recorder on Tap No. 11 then stabilize system pressure.

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

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

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

8) Upon completion of test:

a) Release test pressure;

b) Remove plug from 8" stopple fitting at junction with 10" drain and secure;

c) Position valves at 3rd stage gas coolers and sidestream filter for normal operation;

d) Close and plug all vent and fill valves.

Line: 4"/6" Open Drain from Treating Plant Area Thru Boiler Plant Area to Junction With 10" Water Treater Backwash Line

1) a) Close 4" valve at drain from reboiler;

b) Close 1" block valve on dump from solution sidestream filter;

c) Install vented 6" expandable plug in drain from containment Apron No. 6;

d) Install vented 6" expandable plug in drain Apron Pit at craneway;

e) Close 4" valve near solution exchanger drain pits;

f) Close 2" valve in drain on northside of Air Compressor Building;

g) Close 2" valve in drain from boiler feed pumps at east end of Boiler House;

h) Close 2" valve and 3" valve in floor drains at southwest end of Boiler House;

i) Close 4" valve in drain at west end of Boiler House.

2) a) Install plug in 6" stopple fitting in line from condensate tank overflow at junction with 6" drain header;

b) Install plug in 6" stopple fitting in drain header at junction with 10" water treater backwash drain.

3) a) Open valve on Tap F52 at west end of Boiler House for venting;

b) Open vent valves in expandable plugs at drain pit and containment Apron;

c) Open valve on Tap F53 at 4" valve at reboiler drain for venting;

d) Using Tap F35, fill system with water until all air is displaced from lines.

4) Install properly zeroed 60# recorder on Tap F52 then stabilize system pressure using Tap F35.

5) Raise pressure to 10 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

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

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

8) Upon completion of test:

a) Release test pressure;

b) Remove plug from stopple fitting at junction with 10" water treater backwash drain and secure fitting;

Line: 4"/6" Open Drain from Treating Plant Area Thru Boiler Plant Area to Junction With 10" Water Treater Backwash Line - Cont'd

c) Remove plug from stopple fitting in condensate tank overflow line and secure fitting;

d) Open valves in Boiler Plant Area: 4" at west end of Building ;
3" & 2" at soutwest side of Building;
3" at southeast side of Building; and
2" at south end of Building.

e) Open 2" valve at air compressor building drain;

f) Open 4" valve at exchanger drain pit;

g) Open valve at reboiler drain;

h) Remove expandable plugs at craneway drain pit and containment Arpon No. 6 and secure fitting;

i) Position 1" valve at solution sidestream filter for normal operation;

j) Close and plug all vents and fill valves.

Line: 4" Drain from "A" Compressor Building to 10" Water Treater Backwash Line

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

b) Close 4" valve at junction with 10" water treater backwash line near "C" Compressor Inlet Regulator Run;

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

d) Close valves on drains from sample coolers.

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

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

c) Close valves at Taps F33 and F36.

3) Install properly zeroed 60# recorder on Tap F32 then stabilize system pressure.

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

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

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

7) Upon completion of test:

a) Release test pressure;

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

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

d) Open 4" valve at west side of building near jacket water surge tank;

e) Close and plug all vents and fill valves.

Line: 3" Drain Line from Boiler Fuel Gas Scrubber to Oil Separator Sump.

1) a) Close drain block valve on fuel gas scrubber;

   b) Close valve on 3" line at junction with 277C-6" near Caustic Pump House;

2) a) Open valve at tap F25, for venting;

   b) Using Tap No. 9, fill system with water until air/gas is displaced from line.

3) Install properly zeroed 60# recorder on Tap F25 then stabilize system pressure using Tap No. 9.

4) Raise test pressure to 15 psig on system, stabilize, then begin static pressure test as specified in General Instruction, Item 8.

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

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

7) Upon completion of test:

   a) Release test pressure;

   b) Open 3" valve at junction with line 277C-6" near Caustic Pump House;

   c) Position drain block valve on fuel gas scrubber for normal operation;

   d) Close and plug all vents and fill valves.

Line: 3" Pressure Drain from 66" I.D. Inlet Scrubber to Hydrocarbon Storage Tanks (Off-Site)

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

   b) Close 4" vlave on pressure drain at junction with 3" drain to tarks;

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

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

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

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

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

   d) Close valves on Taps F40 and F41.

3) Install properly zeroed 60# recorder on Tap F38 and stabilize system pressure.

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

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

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

7) Upon completion of test:

   a) Release test pressure;

   b) Open 3" valve in line at storage tanks;

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

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

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

   f) Close and plug all vents and fill valves.

Line: 4" High Pressure Drain from "C" Compressor Area to Junction with 3" Line to Off-Site Hydrocarbon Storage Tanks

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

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

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

d) Close 4" valve on high pressure drain line at junction with 3" line near 66" I.D. inlet scrubber.

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

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

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

d) Close valves on Taps F37 and F39.

3) Install properly zeroed 60# recorder on Tap F37 and stabilize system pressure.

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

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

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

7) Upon completion of test:

a) Release test pressure;

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

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

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

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

f) Close and plug all vents and fill valves.

Line: 4" High Pressure Drain from Inlet Gas Cleaners (V6 & V6A) and "B" Compressor Inlet Scrubber to West Field Hydrocarbon Separator

1) a) Close (2) 2" block valves on dumps from inlet gas cleaners and lubricate;

b) Close (2) 2" block valves on dump from "B" compressor inlet scrubber and lubricate;

c) Close 4" valve at inlet of west fiedl hydrocarbon separator north of Plant;

d) Lubricate in closed position 2" valve on siphon drain from 16" underground drip.

2) a) Open valve on Tap F48, at hydrocarbon separator inlet, for venting;

b) Open valve on Tap F51, at "B" Plant scrubber for venting;

c) Using Tap F47, fill system with water until all gas is displaced from lines.

3) Install properly zeroed 100# recorder on Tap F51 then stabilize system pressure using Tap F47.

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

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

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

7) Upon completion of test:

a) Release test pressure;

b) Open 4" valve at inlet of west hydrocarbon separator;

c) Open block valves on dump at "B" compressor dump;

d) Open block valves on dumps at inlet gas cleaners;

e) Close and plug all vents and fill valves.

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

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

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

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

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

   c) Close valve at Tap F49.

3) Install properly zeroed 100# recorder on Tap F49 then stabilize system pressure using Tap F43.

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

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

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

7) Upon completion of test:

   a) Release test pressure;

   b) Open valve at inlet of east hydrocarbon separator;

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

   d) Close and plug all vents and fill valves.

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

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

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

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

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

e) Lubricate 2" drain valve beneath south end of header from gas coolers to 3rd stage discharge scrubber;

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

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

h) Close block valve on dump from 3rd stage discharge scrubber;

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

j) Close 1" block valve on dump from turbine fuel gas scrubber at "C" Compressor Building;

k) Close vlave on 1" line from 10" water leg at junction with 4" pressure drain header;

l) Close valve on 1-1/2" line from Gasoline Plant near Regulator Run in 20" line from Treating Plant;

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

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

o) Close 2" block valve on dump from "C" Plant 2nd stage suction scrubber;

p) Lubricate 2" valve on siphon drain on 20" inlet gas line at inlet gas cleaners (V6 & V6A):

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

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

b) Open valve on Tap F44 at turbine fuel gas scrubber;

Line: 4" Pressure Drain to Hydrocarbon Separators and Tanks North of Plant - Cont'd

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

d) Open valve on Tap F46 below block valve on dump from 2nd stage scrubber;

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

f) Close valves on Taps F42, F44, F45 and F46.

3) Install properly zeroed 100# recorder on Tap No. 22 and stabilize system pressure.

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

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

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

7) Upon completion of test:

a) Release test pressure;

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

c) Open 2" block valve on dump from "C" Plant 2nd stage scution scrubber;

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

e) Open 1-1/2" valve on line from Gasoline Plant header near Regulator Run in 20" line;

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

g) Open block valve on dump from turbine fuel gas scrubber;

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

i) Open block valve on dump from 3rd stage discharge scrubber;

j) Open 2" block valve on dump at "A" compressor 2rd stage scrubber;

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

8) Close and plug all vents and fill valves.

Line: 4" Pressure Drain from Inlet Stop Tank (V9106) to Field Storage Tank No. 22

1) a) Close (2) 2" block valves on dump from stop tank;

   b) Close valve on line at inlet to field Tank No. 22.

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

   b) Using Tap No. 20, fill system with water until all gas is displaced from line.

3) Install properly zeroed 100# recorder on Tap F50 then stabilize system pressure using Tap No. 20.

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

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

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

7) Upon completion of test:

   a) Release test pressure;

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

   c) Position block valves on dump from Stop Tank for normal operation;

   d) Close and plug vents and fill valves.

EVALUATION OF ORGANIC CONSTITUENTS IN POND SLUDGES AT THE JAL NO. 4 PLANT

El Paso Natural Gas Company

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EL PASO, TEXAS

JUNE 1983

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March 1983

EVALUATION OF ORGANIC CONSTITUENTS IN POND SLUDGES AT THE JAL NO. 4 PLANT

Introduction

The New Mexico Oil Conservation Division (OCD) in August 1982 requested an evaluation of sludges for organic constituents contained in the abandoned ponds at El Paso Natural Gas Company's (EPNG) Jal No. 4 Plant. The evaluation would be an addendum to the Jal No. 4 Plant Discharge Plan which was submitted to the OCD in August 1981. This report describes the protocol used to obtain field information and chemical analyses, results of the analyses and comparison to the New Mexico Water Quality Control Commission standards.

The evaluation is arranged in such a manner as to respond in as much detail as possible to Part 3 of the New Mexico Water Quality Control Commission (NMWQCC) Regulations and additional requests made by the OCD. EPNG has assembled, evaluated and included information from all known sources in describing the history of waste disposal ponds at the plant.

EPNG coordinated with the OCD representative all phases of this study before taking any significant action. For example, a written proposal of the evaluation was submitted to OCD in September 1982 and received OCD approval prior to field sampling. Following sampling and researching the plant's pond history a presentation was made to OCD in January 1983 to be assured that the evaluation was being accomplished in an acceptable manner.

Background

The Jal No. 4 Plant was constructed in 1952 and consisted of a gasoline plant, a purification plant, a dehydration plant and appropriate compression facilities. The plant treated, compressed and transported natural gas to EPNG's main transmission line for consumption further west. The plant was upgraded in 1959 with the addition of a new fractionating

plant and underground storage wells. Other additions to the processes have been added or deleted from time to time but the plant function has not changed significantly since construction.

A 11.12 acre area of the eastern portion of the 181-acre plant site was dedicated for unlined ponds used for disposal of wastewater from 1952 to 1981. However, due to fluctuations in quantities of gas production and process changes the location of ponds have shifted and ponds have been added or deleted; the total 11.12 acres were not used at any one time. In fact, as shown in Table 1, about 8.35 acres were used for disposal of wastewater or to capture rainfall runoff.

Prior to installation of the disposal system described in the Discharge Plan, wastewater was disposed of in the unlined ponds shown on Figure 1 (Map Pocket) and aerial photographs Figures 2 through 9. The largest ponds were Pond Nos. 1 and 3 which were in continuous service from 1952 to 1981. Other ponds were added and deleted as the need arose. None of the ponds designed to receive wastewater have been totally free of oily wastes. The aerial photographs also show ponds constructed for the sole purpose of holding storm runoff; these may or may not have received oily wastes from plant runoff. A number designation for the ponds is shown on Figure 1 and a description of each pond use, length of service and approximate date of construction is shown in Table 1. Ponds 9, 10 and 11 are brine storage ponds related to the underground liquid hydrocarbon storage facility and are not considered wastewater disposal ponds. Ponds 6 and 7 were naturally occurring low areas which have received runoff waters as well as overflow from the wastewater ponds; over time they were modified to become wastewater disposal ponds.

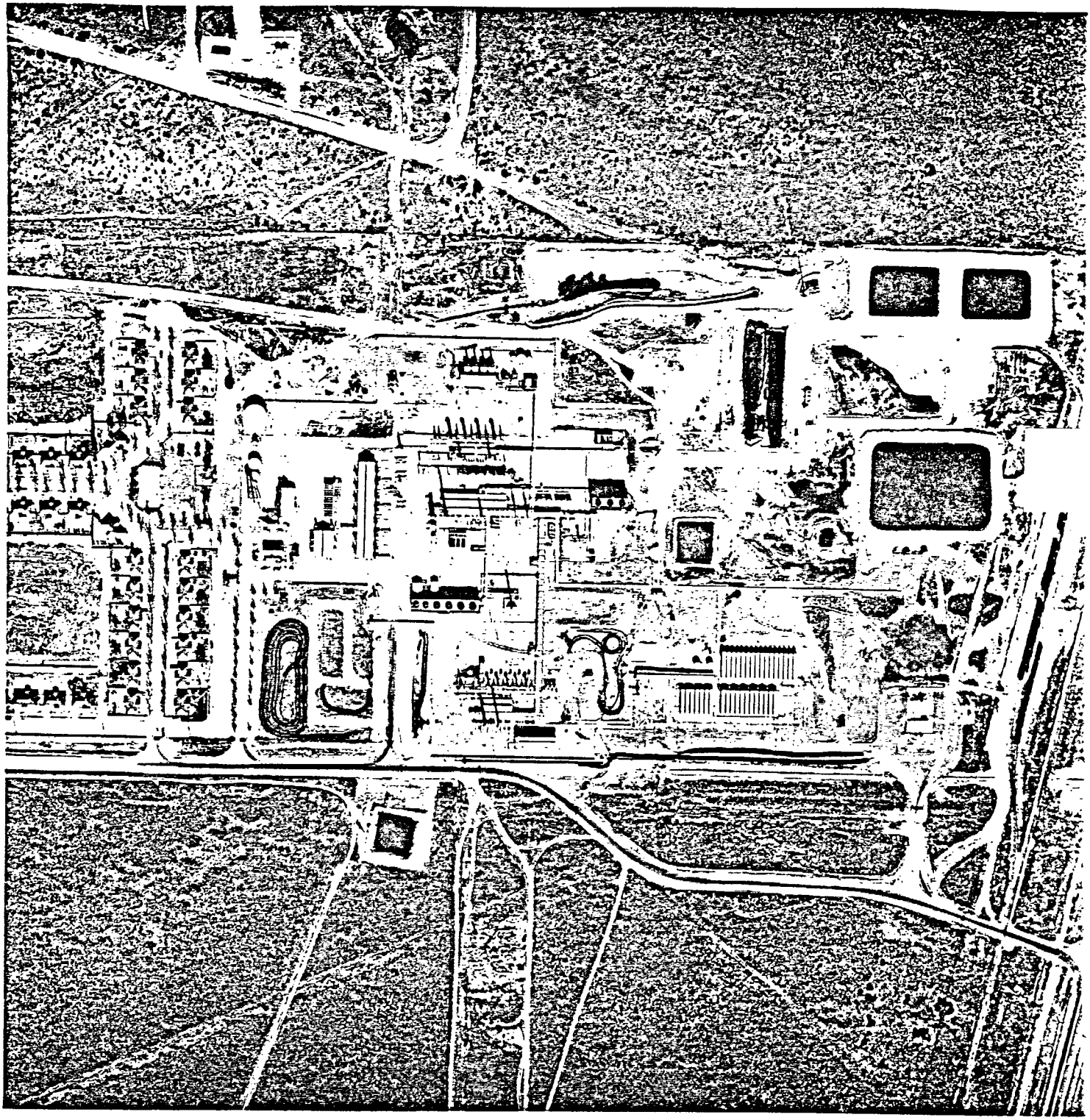
Except for the brine ponds, all the ponds have been drained by either evaporation or evacuation to the classifier. Of some 20 ponds, eight were identified as containing 5.96 acres and 53.71 acre-feet of sludge. Closure of the ponds will be accomplished following degradation

Table 1

Summary of Pond History and Sludge Volumes
for Jal No. 4 Plant

Pond No.	Date of Construction	Duration of use (years)	Purpose	Area (acre)	Sludge Depth (feet)	Sample No.	Estimated Volume of Sludge (Ac.-Ft.)	Comments
								Plant constructed in 1952; See Figure 1 for pond locations
1	1952	31	Wastewater from processes and domestic waste	1.16	Unknown	NA [1/]	NA	Pond full of water during evaluation
2	1976	5±	Wastewater from processes	0.17	NA	NA	NA	
3	1952	31	Wastewater from processes	0.69	6.0	82-099 82-100	4.14	
4	Prior 1961	12±	Old flare pit & received wastewater from processes	0.18	9.0	82-094	1.62	Figure 4; abandoned pond
5	Prior 1965	17±	Runoff of processes wastewater	0.64	10.0	82-095	6.4	
6	Prior 1961	21±	Runoff of processes wastewater	1.37	7.0	82-092	9.59	
7	1961	20	Runoff of processes wastewater	1.58	11.5±	82-093 82-096	18.17	
8	1961	20	Runoff of processes wastewater	0.89	9.0	82-097 82-098	8.01	
9	1952	31	Brine water storage	0.98	Lined pond	NA	NA	(Ponds 9, 10 & 11 are associated with the underground liquid hydrocarbon storage facility)
10	1952	31	Brine water storage	0.92	Lined pond	NA	NA	
11	1952	31	Brine water storage	0.87	Lined pond	NA	NA	
12	Prior 1965	5±	Rainfall runoff (Duck Pond)	0.58	NA	NA	NA	Figure 4; abandoned pond
13	Prior 1965	2±	Rainfall runoff	0.05	NA	NA	NA	Figure 5; abandoned pond
14	Prior 1961	15±	Drip production	0.45	10.0	82-101	4.5	Figure 5; abandoned pond
15	Prior 1961	15±	Rainfall runoff and wastewater from processes	0.16	8.0	82-102	1.28	Figure 4; abandoned pond
16	Prior 1967	2±	Wastewater from processes	0.03	Unknown	NA	NA	Figure 5; abandoned pond; site covered by plant process
17	Prior 1961	10±	Flare pit	0.05	Unknown	NA	NA	Figure 5; abandoned pond; site covered by plant process
18	Prior 1965	10±	Wastewater from processes	0.03	Unknown	NA	NA	Figure 6; abandoned pond; site covered by plant process
19	Prior 1961	5±	Wastewater from processes	0.05	Unknown	NA	NA	Figure 2 & 3; abandoned pond; site covered with plant process
20	Prior 1961	5±	Wastewater from processes	0.27	Unknown	NA	NA	Figure 2 & 3; abandoned pond; Gulf Oil Property
			TOTAL	11.12		TOTAL	53.71	

1/ NA means not applicable



El Paso Natural Gas Company

FIGURE 2

AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

DATE OF PHOTO: 2–16–61

N

NO SCALE

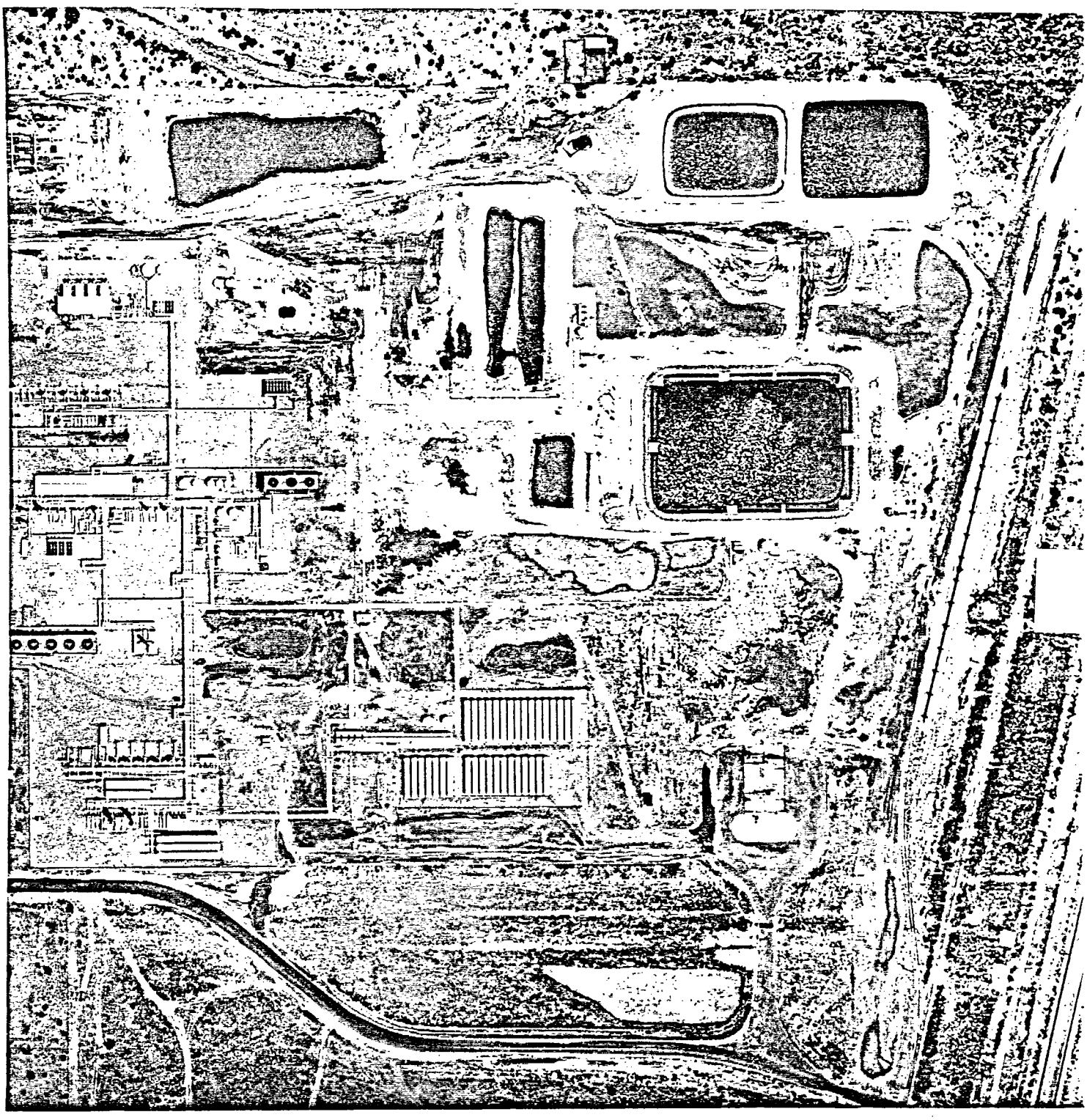
El Paso Natural Gas Company

FIGURE 3

AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

DATE OF PHOTO: 3–9–61

NO SCALE



El Paso Natural Gas Company

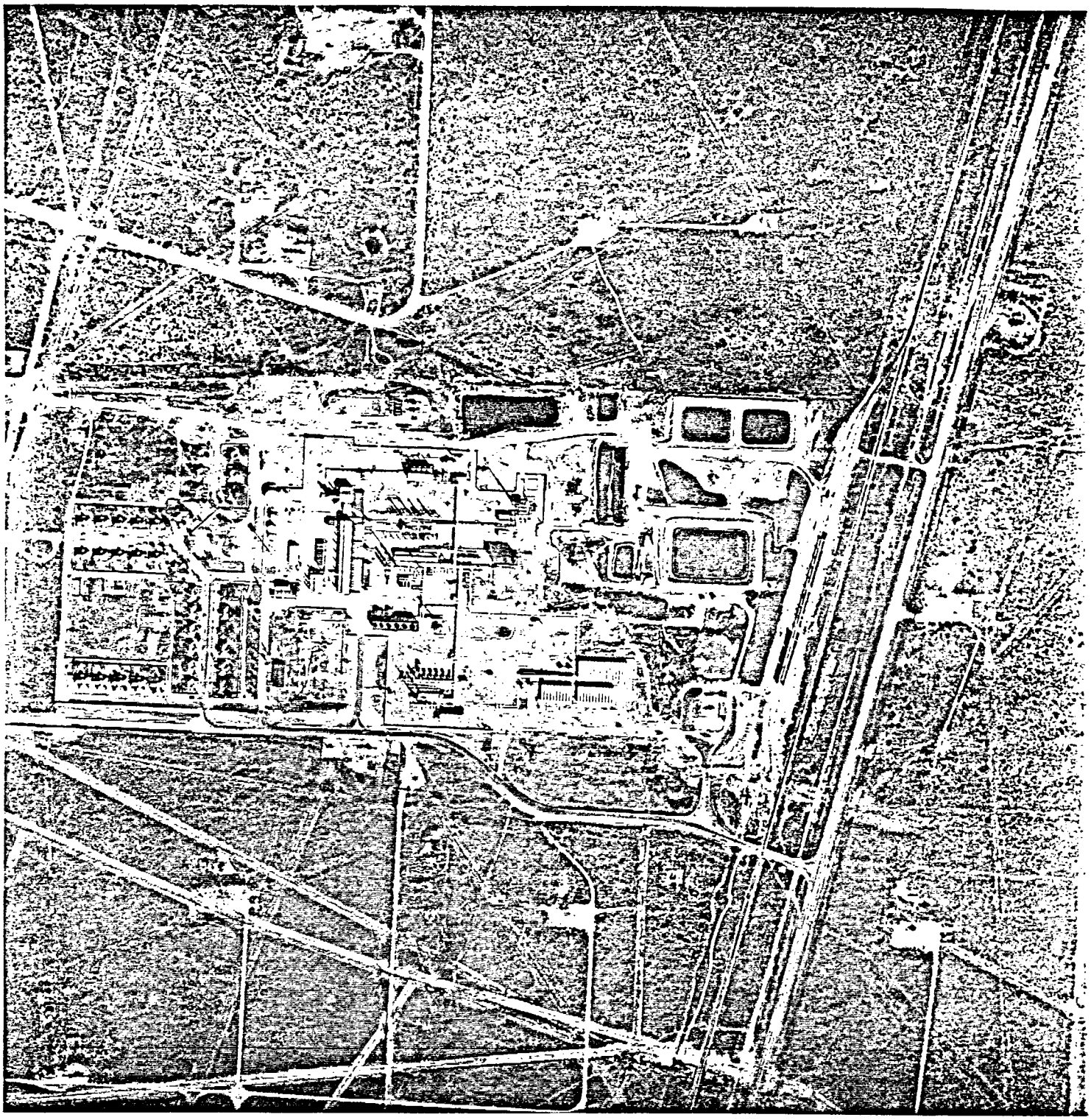
FIGURE 4

AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

DATE OF PHOTO: 6–13–65

N

NO SCALE



El Paso Natural Gas Company

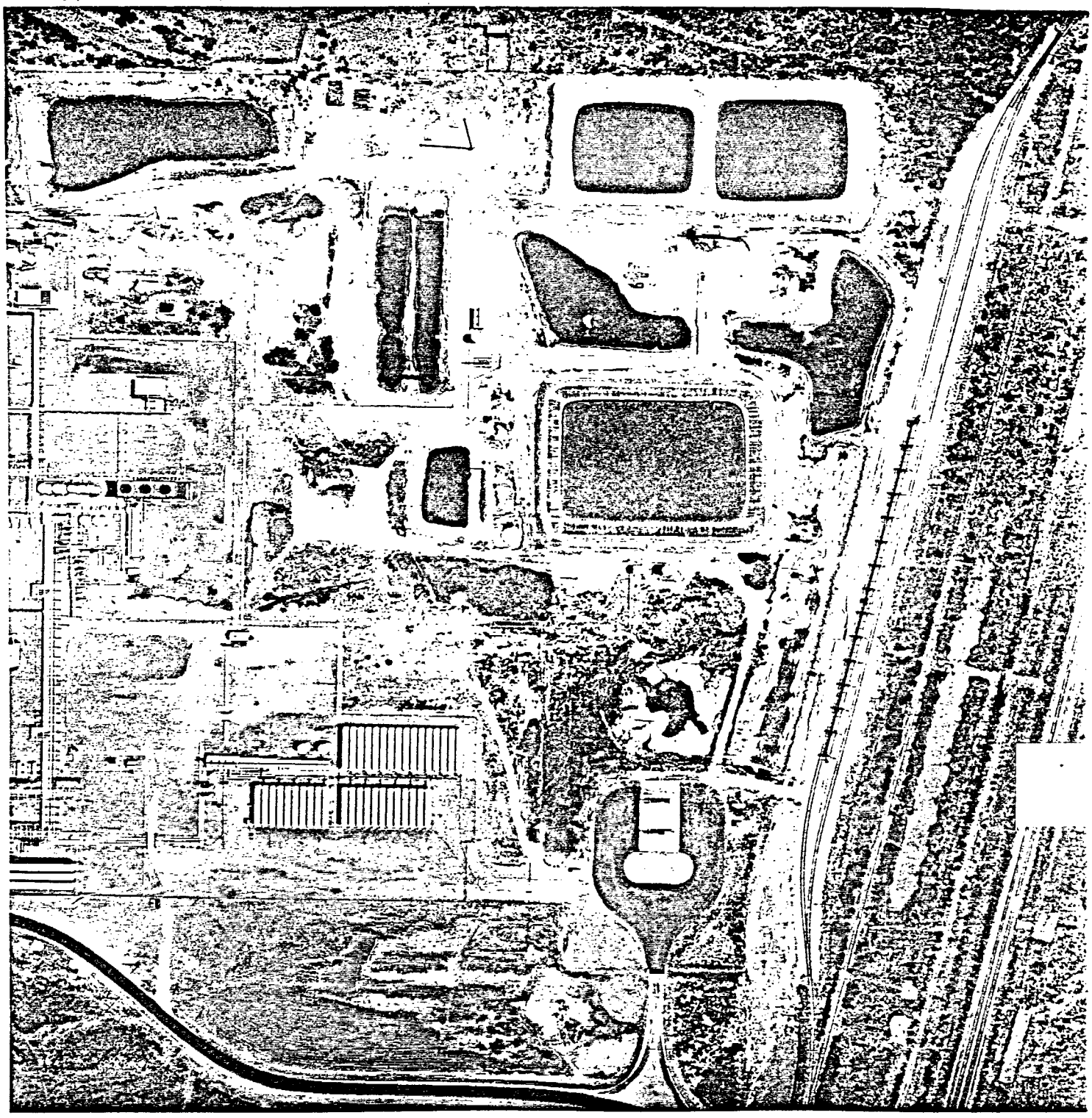
FIGURE 5

AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

DATE OF PHOTO: 11–17–67

N

NO SCALE



El Paso Natural Gas Company

FIGURE 6

AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

DATE OF PHOTO: 5-27-72

N

NO SCALE

FIGURE 7

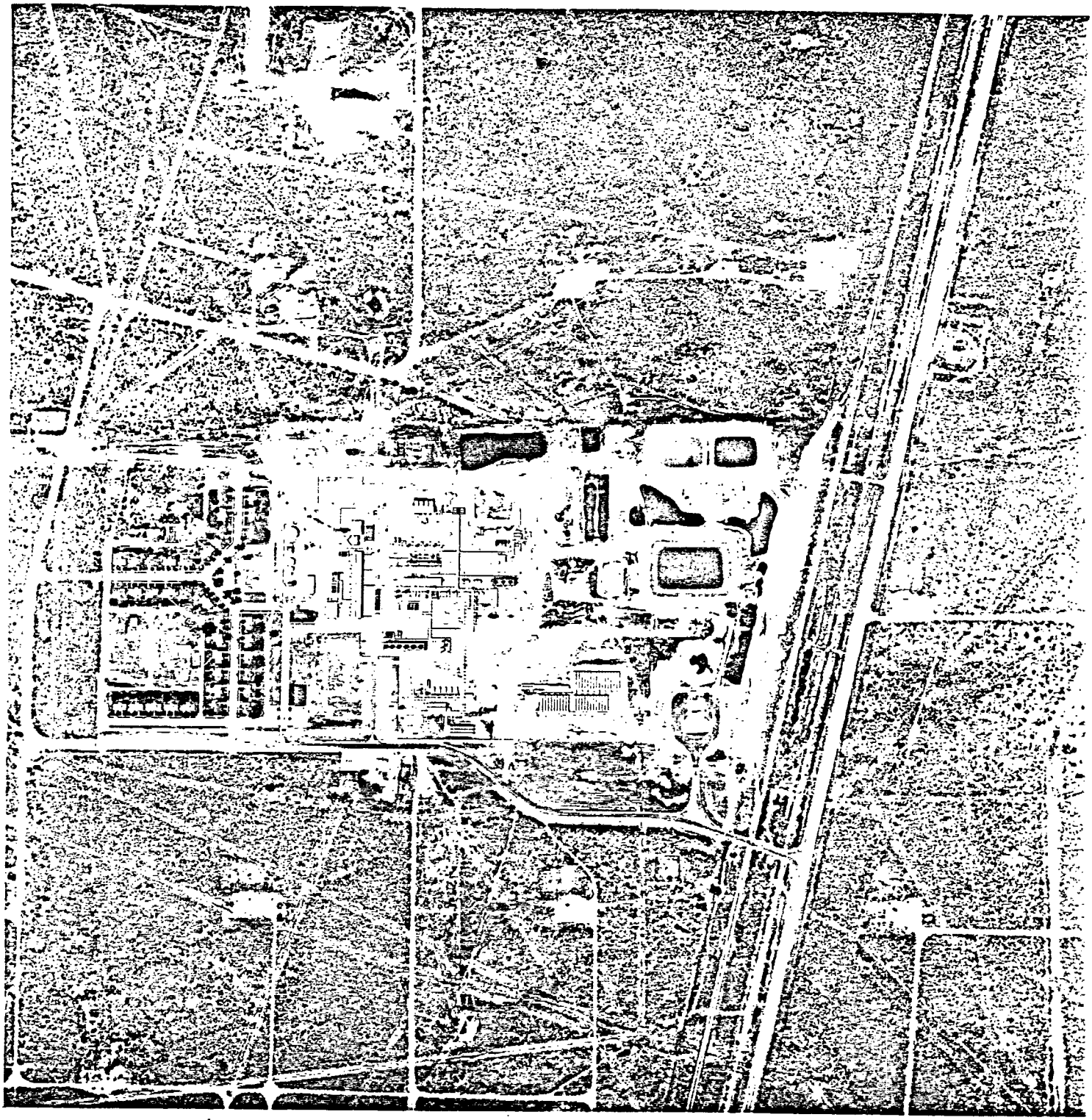
AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

DATE OF PHOTO: 11-4-76

N

NO SCALE

El Paso Natural Gas Company



El Paso Natural Gas Company

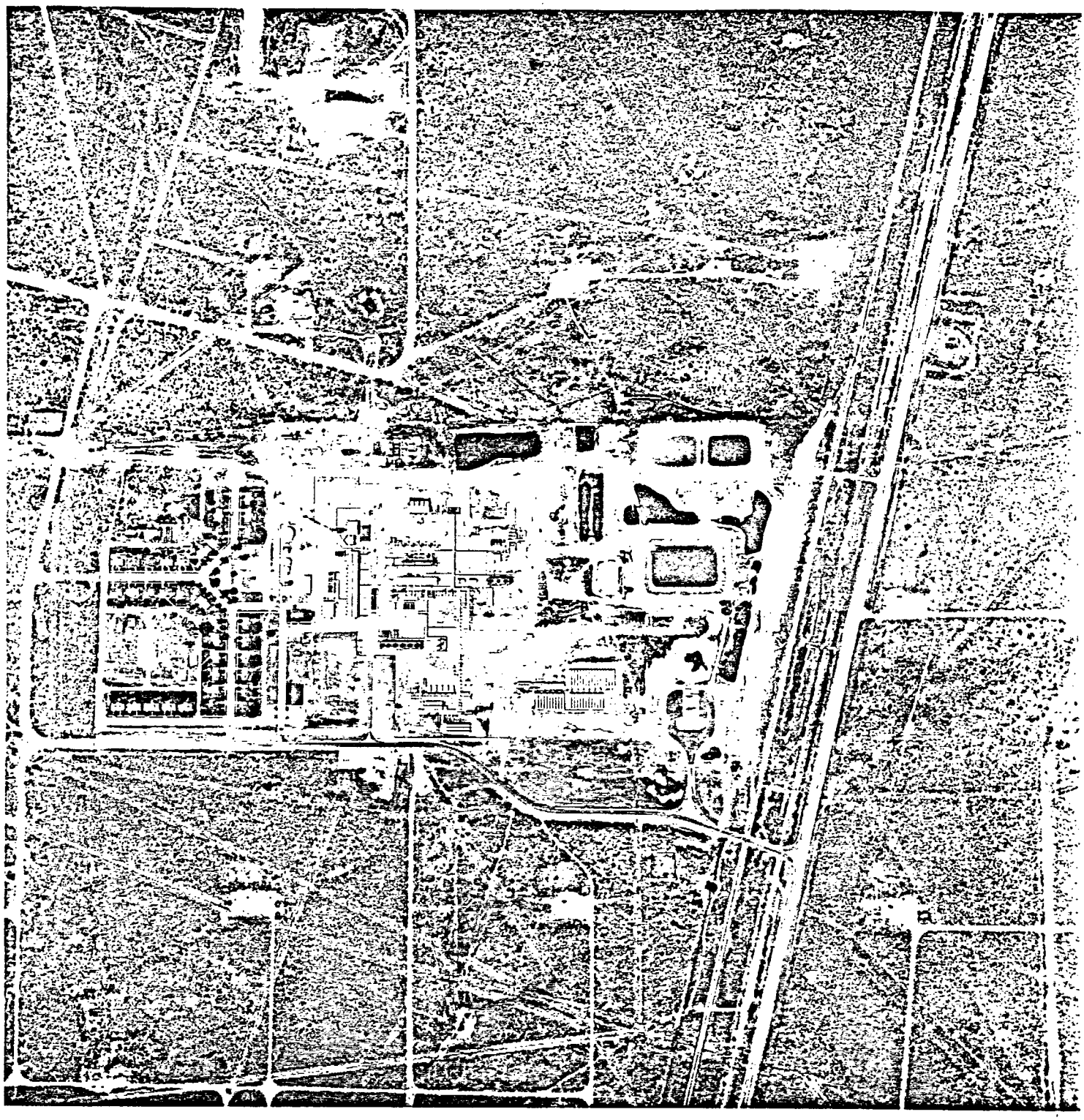
FIGURE 8

AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

DATE OF PHOTO: 6–22–79

N

NO SCALE



El Paso Natural Gas Company

FIGURE 9

AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

DATE OF PHOTO: 2-12-81

N

NO SCALE

of the organic sludge contained in the drying ponds. The sludges from the ponds which were active in 1981 were tested for inorganic constituents and recommendations made to OCD to close the ponds (George 1981). The inorganic constituents were below the standards set by the Resource Conservation and Recovery Act (RCRA) regulations. However, the report recommended the use of a caliche cap over the ponds in order to reduce the amount of water which would enter the zone occupied by the sludge due to infiltration of natural precipitation (George 1981). The results of this study will revise the recommended closure procedure, as will be discussed in the following sections.

Sampling Methodology

Following the investigation of the history of wastewater disposal ponds at the Jal No. 4 Plant, a plan was prepared by EPNG's Environmental Affairs Department describing the intended actions, schedule and constituent standard to be used in the evaluation. This plan was discussed and approved by OCD prior to initiating the evaluation. The approved plan is shown in Appendix A. The study methodology is described in three parts: (1) Field, (2) Sampling and (3) Analytical work.

Field Methodology. A survey and cross-section of the ponds were made at areas where sludge sampling and subsurface investigation of sludge distribution would be conducted. A profile was obtained from this information in order to determine the quantity of sludge contained in the drying ponds using the "Average-End-Area" method. Subsurface information was obtained using a backhoe and hand auger. Photographs of the excavated pits were taken for inclusion in Appendix B as visual documentation to support written descriptions contained herein.

Sampling Strategy. Sludge samples were collected from all ponds and depressions that had indications of having received industrial wastes. The sample locations were selected after determining the areal extent and depth of sludge. Because the sampling involved analysis of volatile organics such as benzene, mixing and compositing of sludge was not

accomplished. Instead, the area containing the thickest sludge layer was selected to present the best environment in which volatile organics would be retained. In addition, care was taken whenever possible to collect the sample at or near the interface of the *in situ* soil and sludge. These details were taken into consideration in order to represent the worst case situation for presence of organics.

Sampling Methodology. The equipment used to collect sludge samples included a hand auger and small shovel. In sludges up to a depth of 12 feet a backhoe was used to gain access to the lower levels in order to use the shovel for collecting the sample.

Each sample was transferred to a glass bottle, the opening covered with aluminum foil and sealed to prevent loss of volatile organics. The bottles were packed in an ice chest to maintain the sludge at a constant temperature. However, the temperature of the samples measured in the field at the time of sampling ranged from 65°F to 100°F depending upon the depth of sample, time of day, and exposure to the sun. Any small fluctuation in temperature that may have occurred during transport is not believed to have adversely affected the results of the analysis.

The samples were transported to the El Paso office of Raba-Kistner Consultants, Inc. who transferred the samples to their laboratory in San Antonio, Texas. A single sample was submitted to Chaparral Lab, Mesilla Park, NM for inorganic analysis. Documentation and control necessary to identify and trace the samples from collection to final analysis were accomplished in accordance with U.S. Environmental Protection Agency (EPA) recommendations. The chain-of-custody sheets are shown in Appendix C.

Analytical Methodology. The samples submitted to Raba-Kistner Laboratory were analyzed for organic constituents using two methods of extraction: (1) General component extraction and (2) EPA leachate extraction. The general component extraction included distillation and an ultrasonic and heat (Soxhlet) methods to determine essentially the entire concentration

of organic constituents present. However, these methods cannot indicate the portion of the constituent concentration that could be leached from the sludge under normal conditions. The EPA leachate extraction method is designed to indicate only that portion of the total concentration that potentially could be leached from the sludge and percolate downward from the site.

Because the EPA leachate extraction method is more costly than the general component extraction method, El Paso proposed, and OCD agreed, that the number of leachate tests be kept to a minimum and the general component test be used for comparison. For example, from the historical documentation, Ponds 3 and 8 were known to have been receiving industrial wastes between 1952 to 1981 and should, therefore contain the highest concentration of organics. Samples from these pits were collected, split, and analyzed using both methods. The remaining ponds were analyzed using only the component method. The results of the component method were used as an indicator because the method cannot define the leachable organic portion of the sample. This method also represented the worst possible case since it should represent the total organics present. The specific methodologies prepared for EPNG by Raba-Kistner for constituent analysis are shown in greater detail in Appendix D.

The sample submitted to Chaparral Laboratory was analyzed using the EPA leachate extraction method. The EPA leachate extraction method is described in EPA's Test Methods for Evaluating Solid Waste, SW-846 (1982).

Both laboratories are certified by the New Mexico Environmental Improvement Division.

Findings and Discussion

The organic constituents evaluated in this study are listed in Table 2. OCD agreed to EPNG's proposal to establish the standard for

concentration comparison to be 100 times the standard set forth in the NMWQCC regulations which would apply the 100-fold attenuation factor as utilized in the EP toxicity threshold values for hazardous wastes (40 CFR 261.24) as utilized by the EPA.

Table 2
Organic Constituents Evaluated in the Samples
Collected from Natural Gas Plant Wastewater Pond Sludges

Constituent	NMWQCC 1/ Standard (mg/L)	Accepted OCD 2/ Extraction Standard (mg/L)
Benzene	0.01	1.0
Polychlorinated Biphenyls (PCB)	0.001	0.1
Toluene	15.0	1500
Carbon Tetrachloride	0.01	1.0
1,2-Dichloroethane (EDC)	0.02	2.0
1,1-Dichlorethylene (1,1-DCE)	0.005	0.5
1,1,2,2-Tetrachloroethylene (PCE)	0.02	2.0
1,1,2,2-Trichloroethylene (TCE)	0.1	10.0
Total Organic Carbon (TOC)	No Standard	
Phenols	0.005	0.5

1/ Standards established for groundwater in accordance with NMWQCC Regulation Part 3-103A (August 1983).

2/ Standards agreed to by New Mexico Oil Conservation Division are similiar to the U.S. Environmental Protection Agency's EP toxicity determination described in 40 CFR 261.24.

A standard acceptable to OCD was important for this study because there presently does not exist a regulation either at the State or Federal level with which to compare the findings. The results of the organics testing are shown in Table 3. Except for total phenols, none of the constituents measured exceeded the accepted standard.

Phenols and related compounds are commonly found in natural gas industry discharges and are of particular concern as they are toxic to aquatic life, create an oxygen demand and impart a taste and odor to drinking water with only small concentrations of their chlorinated derivatives (EPA 1976). Primary sources of phenolics in plant wastewaters are cooling tower additives, waste oil and waste oil by-products (Gloyna and Ford 1978).

Phenols inhibit biological growth in water and wastes. Because of this characteristic, chlorinated phenols have been used extensively for microbiological control in industry. At natural gas plants the compound sodium pentachlorophenate has been used at low concentrations (about 200 mg/L) to inhibit the growth of aerobacter aerogenes in cooling towers (Betz 1972). Sodium pentachlorophenate is a soluble and stable material that does not react with most inorganic or organic chemicals that may contaminate cooling water systems. However, typical wastewater organisms will acclimate to the phenols and biologically break them down to inoccuous substances if given sufficient time (Ford 1977). Chemical oxidation is another means of wastewater treatment which does occur to some extent in pond disposal systems.

In the case of the Jal No. 4 Plant, the ponds were not designed to provide optimum treatment for the wastes being discharged. The continuous heavy organic loading in all the ponds very likely did not allow time for either biological processes or chemical oxidation to totally remove the phenols. This hypothesis is supported by the relatively high concentrations of phenols found in the sludges. However, the samples are considered to represent the worst case situation because they were all collected at the bottom of the sludge layer where oxygen was absent. In anaerobic conditions, phenols are very slowly reduced or oxidized. In

Table 3
Results of Organic Constituent Testing
of Wastewater Pond Sludges

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

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

fact, phenols are one of the most difficult compounds to remove anaerobically, hence they persist in groundwater (Kincannon 1972).

After receiving the test results for total phenols, an inquiry was made to determine if sources of phenols other than waste oils had existed. According to plant personnel sodium pentachlorophenate had been used in the Jal No. 4 cooling towers. Therefore, the two samples indicating the highest concentration of phenols were retested for sodium pentachlorophenate. The test results indicated that there was no detectable concentration of sodium pentachlorophenate.

It must be noted that the sludge samples containing the highest phenol concentration had not been dry a sufficient time to permit biological degradation of the phenols. If the sludge had had a chance to dry from three to nine months it would have been decomposed in the dry soil. Wet soil has been observed to inhibit consumption of the sludge by microbes for much longer periods, i.e., greater than a year (Hess 1979). Hence, the sludge must be allowed time to dry before closing the ponds. Once the sludge has decomposed, the pond area should be graded to provide positive drainage to prevent any accumulation of standing water. The organics already contained in the vadose zone will remain for many years and slowly degrade as air invades the soil once hydraulic loading ceases.

Although results of inorganic analyses were reported in the original closure plan by George (1981), additional sampling and analyses were conducted to assure that inorganic loading of the sludges had not occurred in Pond No. 15. Pond No. 15 was selected for analysis because it appeared to have received some industrial wastes. Table 4 shows the results of the test along with the threshold values of characteristic EP toxicity contaminants for comparison. As can be seen from the table, none of the inorganic constituents were present in a concentration considered hazardous.

Table 4
Results of Inorganic Chemical Analyses Conducted
On Sludge Samples Collected from Jal No. 4 Plant Pond No. 15
and Maximum Allowable Concentration

Constituent	Pond No. 15 Sample No. 82-102 (mg/L)	Maximum Allowable Concentration 1/ (mg/L)
Silver	.05	5
Arsenic	.003	5
Barium	2.7	100
Cadmium	.020	1.0
Chromium	.05	5
Mercury	.0002	0.2
Selenium	.001	1.0
Lead	.5	5
Final pH	7.4	
Volume of Acetic Acid, ml	400	

1/ 40 CFR § 261.24, 45 FR:331

Total extraction of the majority of the samples was accomplished primarily as an indicator to determine the presence of organics. The total extraction procedure differs from the EPA leachate extraction in that total extraction removes nearly all the organics present and the EPA leachate extraction removes only that portion that may be leached from the sample in the environment. The limited results obtained using these two methods are difficult to correlate but in general the concentrations should be higher using the total extraction method than the EPA leachate method. The OCD standard was modified from µg/L to obtain a "calculated" total extraction standard in µg/g using the following relationship:

$$1\ \mu g/L \times 2L/100\ g = .02\ \mu g/g \qquad \text{(Equation 1)}$$

The conversion factor is derived from the fact that the EPA leachate method requires two liters of deionized water be washed through 100 grams of sample while the total extraction method does not require dilution. Equation 1 was used to convert the OCD standard to the "calculated" total extraction standards shown in Table 3.

If the result of a total extraction analysis had exceeded the "calculated" total extraction standard shown in Table 3, the sample was to be analyzed again using the EPA leachate method. OCD had agreed that the EPA leachate test results would be the method to determine compliance. Benzene was found in concentrations higher than the "calculated" total extraction standard of 20 µg/g in three samples. The two samples with the highest concentration of Benzene were retested using the EPA leachate extraction procedure and found to have much less than the accepted OCD standard. The third sample had less than one-fourth the concentration of the retested samples using the total extraction procedure, which should reflect a correspondingly smaller leachable portion. The remaining constituents, as shown in Table 3, were less than the "calculated" total extraction standard and no further EPA leachate testing was deemed necessary.

The results of cross-sectioning the ponds are shown in Figures 10 through 14 (Map Pocket) and summarized in Table 1. The amount of sludge was determined from field observations. For example, the depth of sludge was determined by color, odor and density of the soils. In most cases it was very clear where *in situ* soil began and the sludge ended, e.g., the soil beneath the sludge had retained its light brown color as compared to the overlying black organic sludge. However, where blow sand had accumulated in the ponds, in some instances in excess of 10 feet in depth, the organics had filled the interstices of the sand and colored the soil black making it very difficult to determine the difference between *in situ* soil and sludge. In these cases the density of the materials was the only guide. Photographs were taken at each test pit and are included in Appendix B. The field information was plotted on the cross sections (Figure 10-14) of the ponds clearly having a definable sludge layer.

As was discussed above, the organics listed in Table 2 were not found in concentrations that exceed the standard accepted by OCD. However, even if a standard was exceeded there would be no percolation of that constituent to the groundwater as long as hydraulic loading does not occur. That loading does not occur can be shown using the water balance method for predicting leachate generation from an abandoned pond.

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

In order to assess the leachate potential at the Jal No. 4 Plant, a procedure based on the water balance method developed by Thornthwaite and Mather (1957) and expanded by Mather (1978) was utilized. The water balance is based upon the relationship among precipitation, evapotranspiration, surface runoff and soil moisture storage. The method centers around the amount of free water present in the soil. Until the field capacity of the soil is reached, the moisture in the soil is regarded as being a balance between what enters it as a result of precipitation and what leaves through evapotranspiration. Therefore, comparing the monthly moisture loss from the soil to monthly precipitation will obtain values that indicate either percolation of precipitation or water deficit.

The amount of available water that can be stored in a given profile depends upon the soil characteristics and structure and depth of the root zone. For the sandy loam soils of the Jal No. 4 Plant area with a cover of grasses, the available water equals 200 millimeters per meter. Assuming the maximum root zone is within the uppermost 1.25 meters (Weaver 1968), the soil moisture storage would be 250 millimeters at field capacity.

The evapotranspiration values used in this report are those developed by Thornthwaite and Mather (1957) and discussed by Fenn et al (1975).

Surface runoff depends upon the intensity and duration of the storm, the antecedent soil moisture condition, the permeability and infiltration capacity of the cover soil, slope and the amount and type of vegetative cover. In this evaluation the "Rational Formula" for runoff was used. This method normally underestimates surface runoff; however, it does provide a better result in determining the leachate generation potential than ignoring it altogether. A runoff coefficient of 0.1 was used in the calculations (Sprester 1981).

A summary of the annual water balance is shown in Table 5. The detailed water balance calculations for Lea County are shown in Table 6.

Table 5
Summary of Mean Annual Water
Balance for Lea County, New Mexico

Parameters	Inches
Precipitation	11.67
Runoff	0.09
Infiltration (I)	11.58
Actual Evapotranspiration (AET)	11.58
Percolation	0

As expected, the Lea County area does not experience significant annual percolation. Analysis of the water balance calculations presented above points out three important aspects of leachate generation in the Southwest.

First, except for artificially loading the soils through irrigation, runoff collection or wastewater disposal, leachate problems are nonexistent as indicated in Figure 15. However, individual, intense thunderstorms may cause some leachate to be generated but even this would be held in the soil for an indeterminate period. As long as old embankments of a pond remain, rainfall runoff will pond in the lowest portion of the impoundment causing artificial loading of the sludge which may generate leachate.

Second, the time of year that a leachate is most likely to percolate is December-January as indicated in Figure 15.

Third, the water balance calculations are based on mean monthly climatic values determined over a 30 year period. The average annual precipitation does not indicate a leachate problem, but an above average year may result in an entirely different finding.

Table 6
Water Balance Data for
Southern Lea County, New Mexico

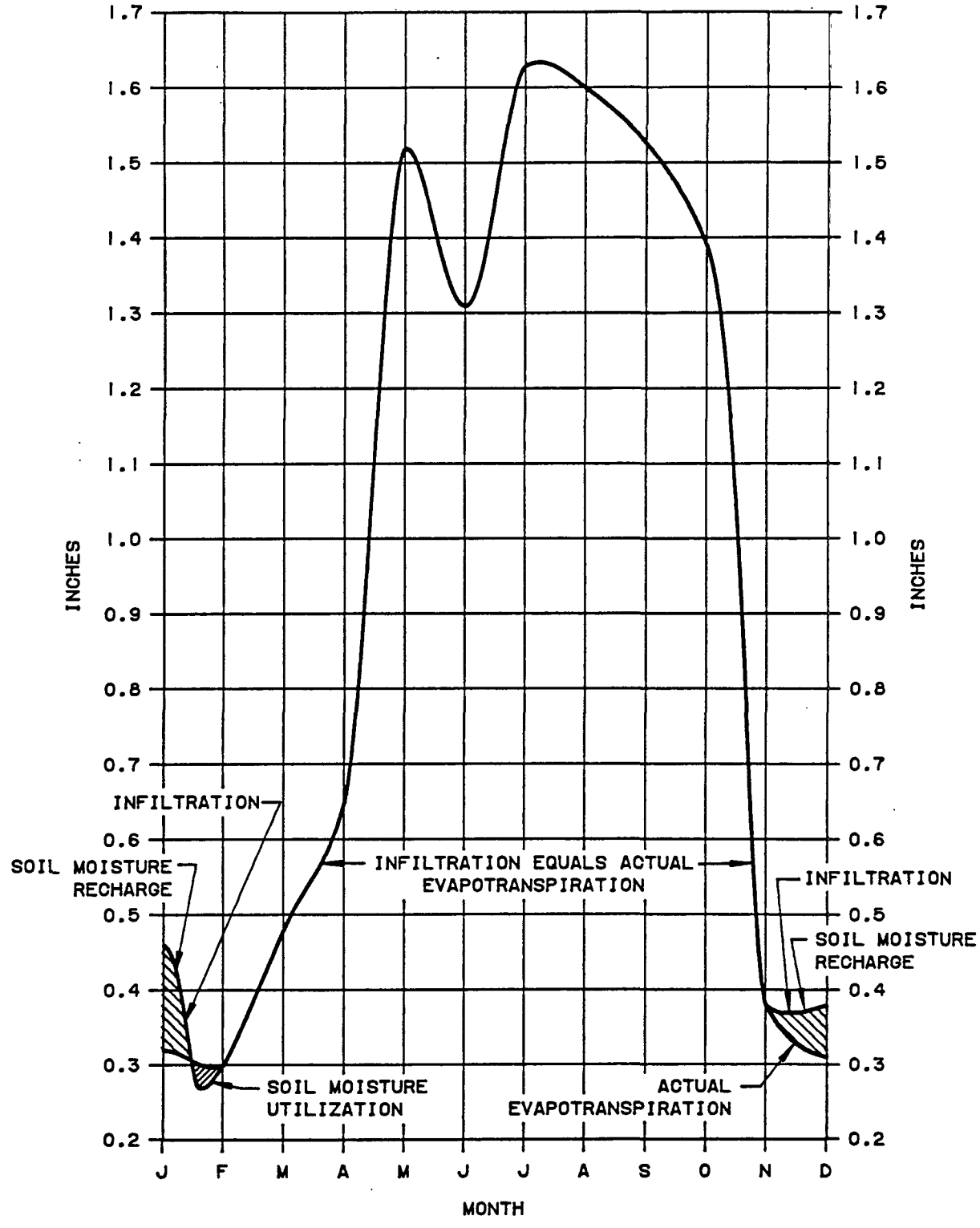
Parameter [4]	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Potential Evapotranspiration [1]	0.32	0.51	1.22	2.43	4.22	5.85	6.57	5.84	4.02	2.31	0.83	0.31	
Rainfall [2]	0.39	0.35	0.51	.81	1.73	1.85	1.98	2.55	2.50	1.73	.40	0.48	15.28
Surface Runoff Coefficient [3]	0	0	0	0	0	0	0	0	0	0	0	0	0
Surface Runoff	0	0	0	0	0	0	0	0	0	0	0	0	0
Infiltration (I) [Rain-Runoff]	0.39	0.35	0.51	0.81	1.73	1.85	1.98	2.55	2.50	1.73	0.40	0.48	15.28
Infiltration-potential Evaporation	+0.07	-0.16	-0.71	-1.62	-2.49	-4.00	-4.59	-3.29	-1.52	-0.58	-0.43	+0.17	-19.39
Σ Neg. (I-PET)	0.17	0.36	0.26	-0.48	-1.17	-1.92	-3.56	-3.86	-3.15	-1.95	-0.97	-0.14	-17.99
Storage	1	1	1	1	1	1	1	1	1	1	1	1	1
Change in Soil Moisture	0	0	0	0	0	0	0	0	0	0	0	0	0
Actual Evapotranspiration (AET) [4]	0.39	0.67	1.93	4.05	6.71	9.85	11.16	9.13	5.54	2.89	1.26	0.48	54.06
Percolation	0	0	0	0	0	0	0	0	0	0	0	0	0

1/ Thornthwaite and Mather, 1957.

2/ Period of record for Jal, New Mexico is 1937-1975, NOAA, Climatography of United States No. 60, Climate of Texas, National Climate Center, Asheville, NC, 1977.

3/ Surface Runoff Coefficient is ∿.1 if precipitation is greater than potential evapotranspiration, otherwise the value is zero.

4/ All values in inches except surface runoff coefficient. Water holding capacity is root zone of soil is 4.0 inches.



El Paso NATURAL GAS COMPANY

FIGURE 15
WATER BALANCE FOR
SOUTHERN LEA COUNTY
NEW MEXICO

In conclusion, leachate generation can be minimized by proper site grading and drainage design of the final surface. Once a pond has been closed the leachate generated from the artificial leaching of this soil will cease shortly after the area has been regraded to permit positive drainage away from the closed pond.

Conclusions

1. Approximately eleven acres of the Jal No. 4 Plant area have been used for ponds of which eight acres were used for wastewater disposal.

2. There is approximately 54 acre-feet of oily sludge contained in the abandoned ponds.

3. Of the ten organic constituents evaluated, only total phenols exceeded the accepted Standard of 100 times the New Mexico Water Quality Control Commission Regulation Standard of 0.005 mg/L. The probable source of the phenols is the waste oil and oil by-products previously disposed of in the ponds.

4. Although sodium pentachlorophenol was used in the Jal No. 4 Plants cooling tower, retesting of several sludge samples did not find the chemical in a concentration above the detection limits.

5. Because the sludges in the pond were anaerobic and remained saturated, the biological and chemical breakdown of the phenols were inhibited. If the sludge is given sufficient time to dry, the phenols will breakdown biologically and the sludge should decompose within nine months to a compost-like material.

6. Inorganic sampling and analysis of Pond No. 15 sludges did not indicate that hazardous concentrations of heavy metals existed. This conclusion confirms the earlier report concerning inorganics prepared by George (1981) which indicated that there are no hazardous wastes contained in the abandoned ponds.

7. Although the sludge did not exhibit the presence of large amounts of leachable constituents, leachate generation will be eliminated by providing proper site grading of the final surface. Once the ponds have been properly closed, further artificial leaching of the sludge will cease. Hence, the caliche cap recommended in an earlier report by George (1981) is not necessary and the ponds may be backfilled with local soils.

8. The organics contained in the sludge and vadose zone will remain for many years but will slowly degrade as air invades the drying soil.

Recommendation

Based on the findings of this evaluation the abandoned ponds can be properly closed by backfilling the ponds using local soils. The area should also be site graded using local soils to prevent standing water on or near the abandoned ponds to prevent hydraulic loading that could result in the formation of a leachate.

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APPENDIX A

EVALUATION OF ORGANIC CONSTITUENT IN SLUDGES AT THE JAL No. 4 PLANT WASTE DISPOSAL PONDS

EVALUATION OF ORGANIC CONSTITUENTS IN SLUDGES AT THE JAL NO. 4 PLANT WASTE DISPOSAL PONDS

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EVALUATION OF ORGANIC CONSTITUENTS IN SLUDGES AT THE JAL NO. 4 PLANT WASTE DISPOSAL PONDS

I. Introduction

The New Mexico Oil Conservation Division (OCD) requested evaluation of organic constituents that may be present in the sludges of the Jal No. 4 plant ponds. The evaluation would be an addendum to the August 1981 Jal No. 4 Plant Closure Plan. This report describes the protocol to be used to obtain field information, chemical analyses of sludges and compliance standards. Information verbally agreed to in a meeting held in Santa Fe, New Mexico on August 31, 1982 between OCD and El Paso Natural Gas Company (El Paso) is also included.

II. Field Information

There are eight ponds or depressions that require determination of the areal extent and depth of sludges. A field survey of each pond will be made to determine the areal extent of sludge. That information will be shown on an aerial photograph (El Paso Drw. No. 5004.19-1) at a scale of one inch to one hundred feet. The number and location of cross sections for each pond will be determined in the field. Each cross section will be indicated on the aerial photograph. A subsurface profile of the sludge will be obtained using an auger or backhoe to a depth of at least six inches into native soils at each cross section. The sludge profile will be drawn onto a cross section exhibit. The quantity of sludge in each pond will be determined using the average end area method for volume determination. A sludge sample will be collected at one cross section per pond and its location noted on the drawings.

A history of the ponds and depressions will be investigated to determine their past use and time in service. This will be accomplished by researching engineering records, reviewing aerial photographs and discussing past disposal practices with plant personnel. Pond No. 3 is believed to be the oldest industrial waste pond at the plant. If this can be substantiated, it should represent the worst case with respect to

concentration of organic constituents and quantity of sludge. If the chemical analysis of the sludge indicates there is no significant amount of organic constituents leachable from the sludge, the likelihood of groundwater contamination from other pond sludges should also be insignificant.

III. Sampling Strategy

Sludge samples will be collected from all ponds and depressions that are known to have received industrial wastewater. The sample locations will be selected after determining the areal extent and depth of sludge. Because the sampling involves collection for analysis of volatile organics such as benzene, mixing and compositing of sludge samples will not be accomplished. Instead, the area containing the thickest sludge layer will be selected since it should present the best environment in which volatile organics would be retained. The sample will be collected at or near the interface of the *in situ* soils and sludge.

IV. Sampling Methodology

The sampling equipment will be either a hand auger or shovel. In very thick sludges a backhoe will be used to uncover the upper layers of sludge to permit easy access to the lower levels for depth determination and sample collection.

The sample will be transferred to a glass bottle with the opening covered with aluminum foil and sealed to prevent further loss of volatile organics to the atmosphere. The bottle will be placed in a cooler packed with ice to maintain as low a temperature as possible during transport.

The temperature of the sludge will be taken at the time of collection. High temperatures increase the likelihood of loss of volatile organics to the atmosphere. For example, temperatures exceeding 100°F would indicate that the chance of volatile organics being present would be very slight.

The samples will be transported to Raba Kistner Consultants, Inc., El Paso, Texas for analysis. Documentation and control necessary to identify and trace the samples from collection to final analysis will be accomplished in accordance with U. S. Environmental Protection Agency (EPA) recommendations.

El Paso's Permian Division will identify potential sources of soil that may be used to cap the ponds as described in the August 1981 closure plan. Samples of the material will be collected and tested to determine the materials' permeability. The evaluation will indicate the desired compaction to be accomplished during construction.

V. Analytical Methodology

The samples will be analyzed for organic constituents using two methods of extraction: (1) general component extraction and (2) EPA leachate extraction. The general component extraction would include distillation, ultrasonic or heat (Soxhlet) method to determine essentially the entire concentration of organic constituents present. However, these methods cannot indicate the portion of the constituent concentration that could be leached from the sludge under normal conditions. The EPA leachate extraction method would indicate only that portion of the total concentration that potentially could be leached from the sludge and migrate down or outward from the area.

The cost of the EPA leachate extraction method is more costly than the general component extraction method. For economic reasons El Paso proposed and OCD agreed to keep the number of leachate tests to a minimum. The general component method test can be used for comparison. For example, Ponds 3 and 8 would have two samples collected and analyzed using both extraction methods. The remaining ponds would be analyzed using only the general component extraction method. The results of the general component method would be used only as an indicator because it cannot define the leachable organic portion of the sample. The analytical results obtained from the two methods on samples from ponds 3 and 8 will be compared to determine if there is a correlation in results obtained

from the two methods. If the results from a general component extraction method indicates the quantity of organics may exceed the standard that sample will be retested using the EPA leachate extraction method.

VI. Constituents to be Analyzed

The organic constituents to be evaluated in this study are listed in the New Mexico Water Quality Control Commission (NMWQCC) Regulations (as amended through August 1982 Part 3-103A). The OCD agreed to establish the standard for concentration comparison to 100 times the Human Health Standard. The constituents are listed in Table 1 and indicate the standard to be used.

TABLE 1
ORGANIC CONSTITUENTS TO BE EVALUATED
IN JAL NO. 4 PLANT SLUDGES

Constituent	Human 1/ Health Standard mg/L	Standard 2/ For Extraction Analysis mg/L
Benzene	0.01	1.0
Polychlorinated biphenyls (PCB's)	0.001	0.1
Toluene	15.0	1500.
Carbon Tetrachloride	0.01	1.0
1, 2-dichloroethane (EDC)	0.02	2.0
1, 1-dichloroethylene (1, 1-DCE)	0.005	0.5
1, 1, 2, 2-Tetrachloroethylene (PCE)	0.02	2.0
1, 1, 2-Trichloroethylene (TCE)	0.1	10.0
Total Organic Carbon	NO STANDARD	-----

1/ Human health standard established for groundwater in accordance with NMWQCC Regulation Part 3-103.A.

2/ The method agreed to by the OCD parallels the U.S. Environmental Protection Agency's EP Toxicity characteristic determination described in 40 CFR 261.24.

VII. Schedule

Two of the ponds recently contained wastewater. These ponds will be pumped to the classifier tank and ultimately be disposed of in the plant injection well. Because the sludges will remain saturated for some time it is not practical to attempt to collect samples until they have had a chance to dry. It is believed that two months should be sufficient to allow drying to a point that sampling can be accomplished. The sampling and surveying will take several weeks to accomplish. The laboratory may require up to one month to conduct the leachate extraction, dependent upon the condition of the samples. Following receipt and evaluation of the sludge, a report of findings and recommendations will likely take a month to complete. The OCD agreed to a maximum of six months to accomplish the tasks outlined above. Therefore, assuming the wastewater in the two ponds as being pumped into the classifier on September 1, 1982 the project should be complete by the end of February 1983.

VIII. Discussion

The findings of the study may indicate that no standards are exceeded. Although the August 1981 closure plan indicated no hazardous concentration of inorganics existed, a caliche cap was proposed to be installed on ponds 1 and 2. Because of the more detailed study required by OCD, the results may indicate that capping any of the ponds may not be necessary. Therefore, site grading may be all that is required. The OCD agreed that if the results indicate there is no leachable quantities of inorganics or organics, the need for capping is obviated.

APPENDIX B

EL PASO NATURAL GAS COMPANY'S

JAL No. 4 PLANT

AREA PONDS - PHOTOGRAPHS

Photo No. 1
(November 16, 1982)
Showing Test Pit in Pond No. 8
Looking From West to East
Reference: Figure 1 for Pit Location.

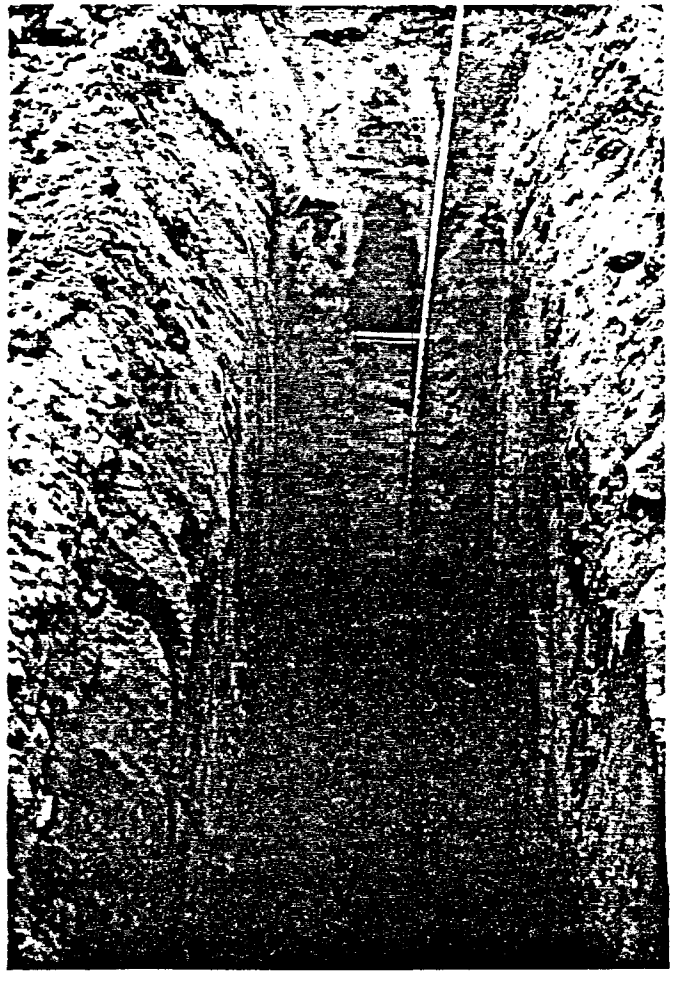


Photo No. 2
(November 16, 1982)
Trench By Existing Flare - Pit, Pond No. 17
2.0' - Dark Brown Soil
3.0' - Light Brown Caliche
3'+ - Red Brown Sand Caliche
Reference: Figure 1 For Pit Location.

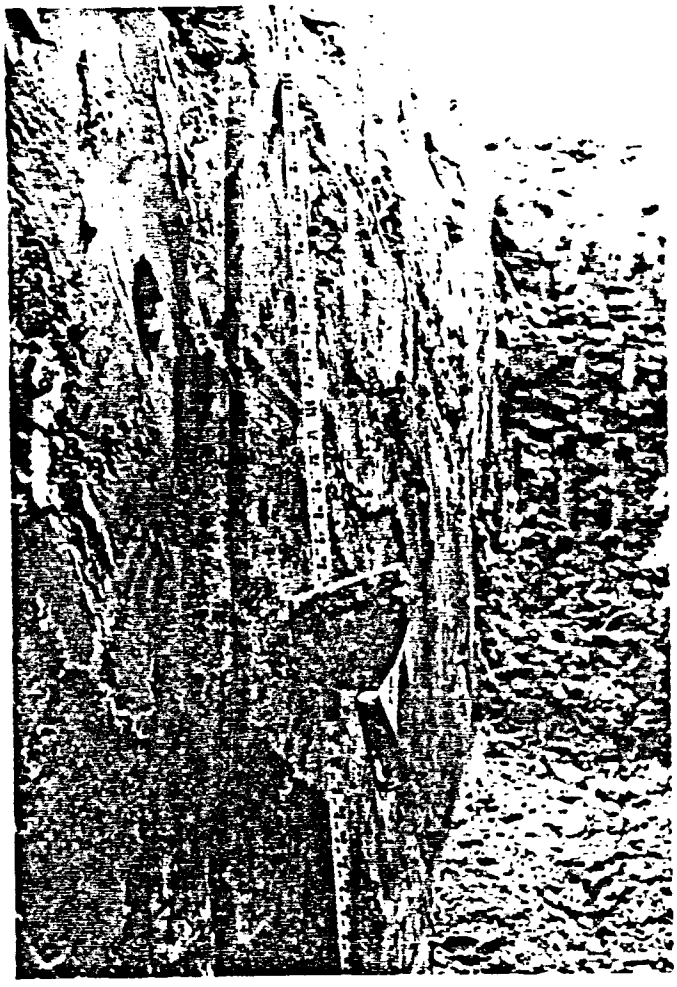


Photo No. 3
(November 16, 1982)
Old Abandoned Pond Near Front Gate - Pond No. 12
(Duck Pond - 1965 Plant Photograph)
0.5' - Top Soil
1.0' - Sand
7.5' - Red Sand With Black Root Organics
9' Total Depth of Pit.
Reference: Figure 1 for Pit Location

Photo No. 4
(November 16, 1982)
Showing Test Pit In Pond No. 6
Looking From North to South @
3 + 06 N, 25+27 E
1.0' - Top Soil Sand Brown
2.0' - Black Organics
1.5' - Brown Sand
2.5' - Light Brown Caliche
7.0' Total Depth of Pit
Sample Taken No. 82-092
Reference: Figure 1 For Pit Location

Photo No. 5
(November 16, 1982)
Showing Test Pit in South End of Pond No. 7
Looking From West to East
3.5' - Sand - Caliche, Light Brown
1.5' - Red Brown Sand with Some Caliche
4.0' - Black Organics Mixed with Soil
1.0' - Stain Grey Caliche
10'-0" - Total Depth of Pit
Sample Taken No. 82-093
Reference: Figure I For Pit Location

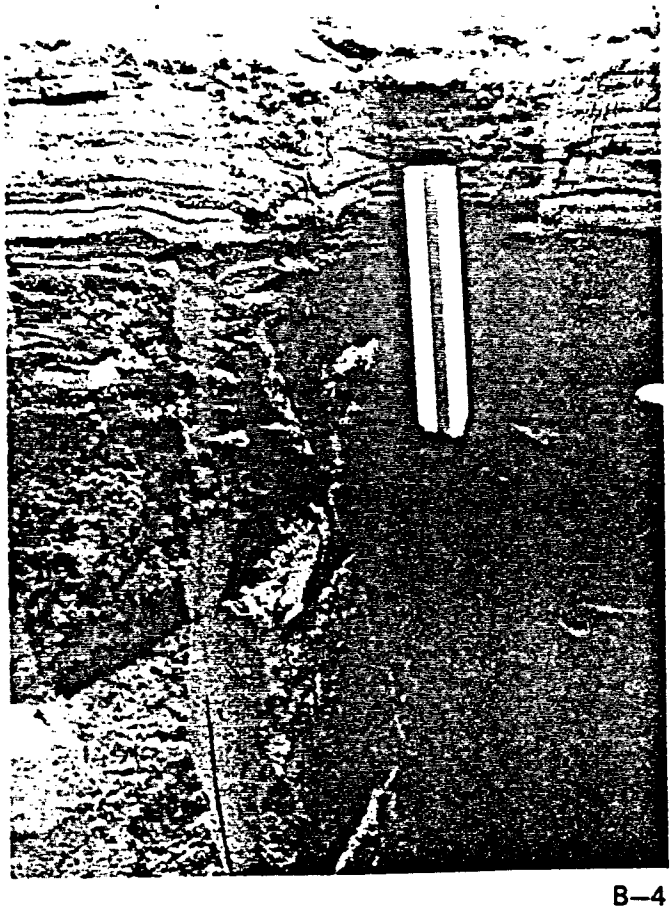


Photo No. 6
(November 16, 1982)
Showing Test Pit In South End of Pond No. 7
Looking from East to West, Showing Soil
Layer Formations Just Below Surface of Pond.
Reference: Figure I For Pit Location

Photo No. 7
(November 16, 1982)
Showing Test Pit In Pond No. 4
Looking East to West
1.5' - Blow Sand Brown
7.5' - Fill Material Mixed With Organics, Black
Below 7.5' Caliche With Organic Streaks
9.0' Total Depth of Pit.
Sample Taken No. 82-094
Reference: Figure 1 For Pit Location.

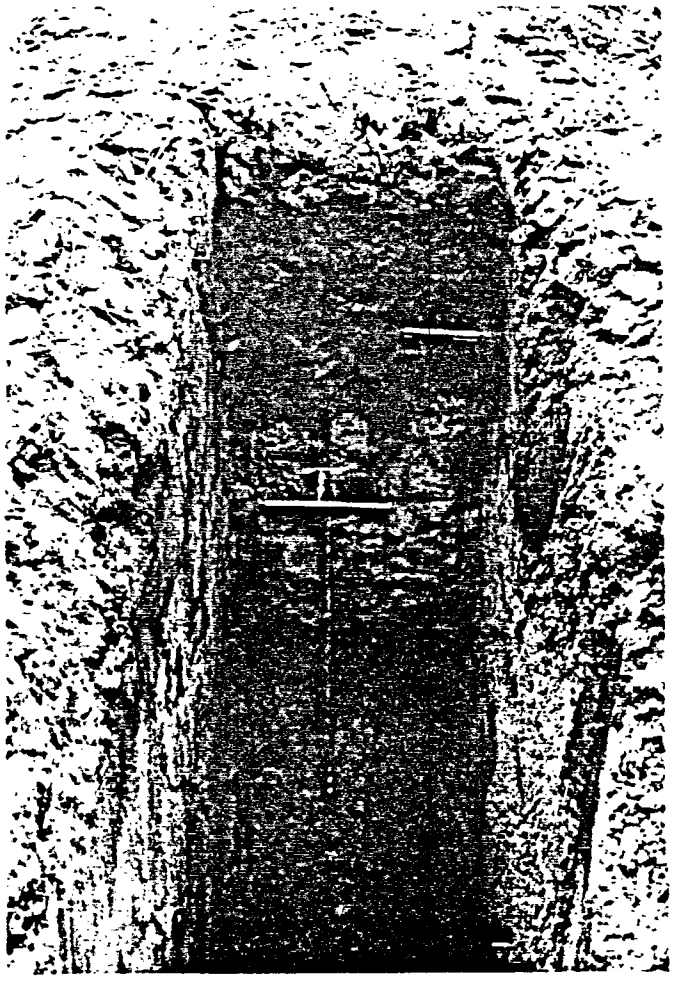
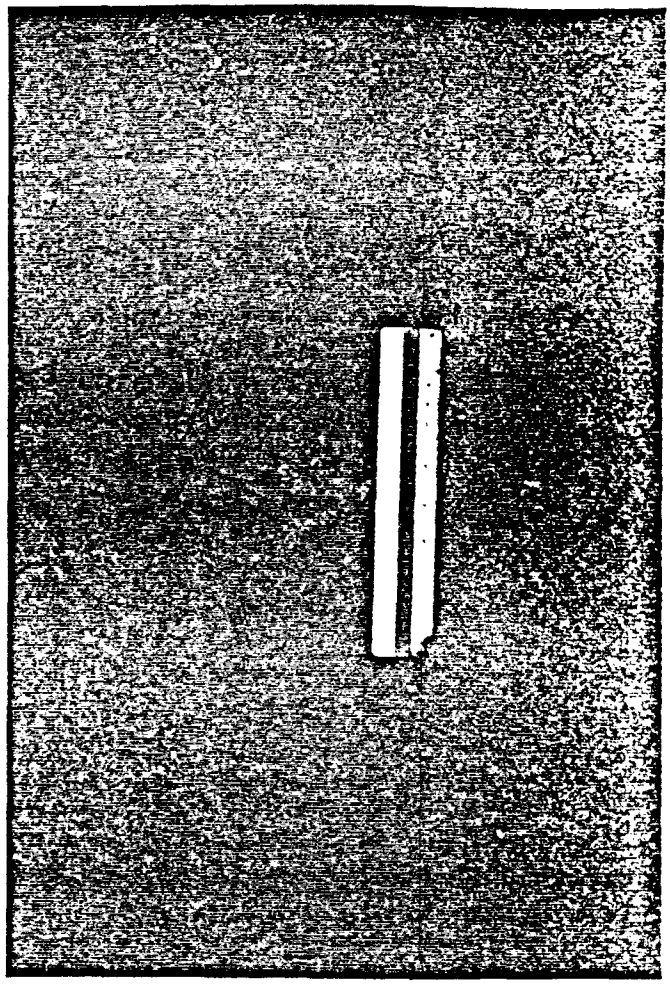


Photo No. 8
(November 16, 1982)
Showing Test Pit in Getty Property, West of Pond 4
Looking East to West
1.0' - Blow Sand Brown
1.0' - Dark Brown Sand
2.0' - Caliche - Grey
2.0' - Grey Brown Sand
1.0' - Brown Sand, Streaks of Red
7.0' Total Depth of Pit.
Reference: Figure 1 For Pit Location

Photo No. 9
(November 16, 1982)
Showing Test Pit In Pond No. 5
Looking At Side of Pit
Depth 10' - All Fill Material
Sample No. 82-095
Reference: Figure 1 For Pit Location



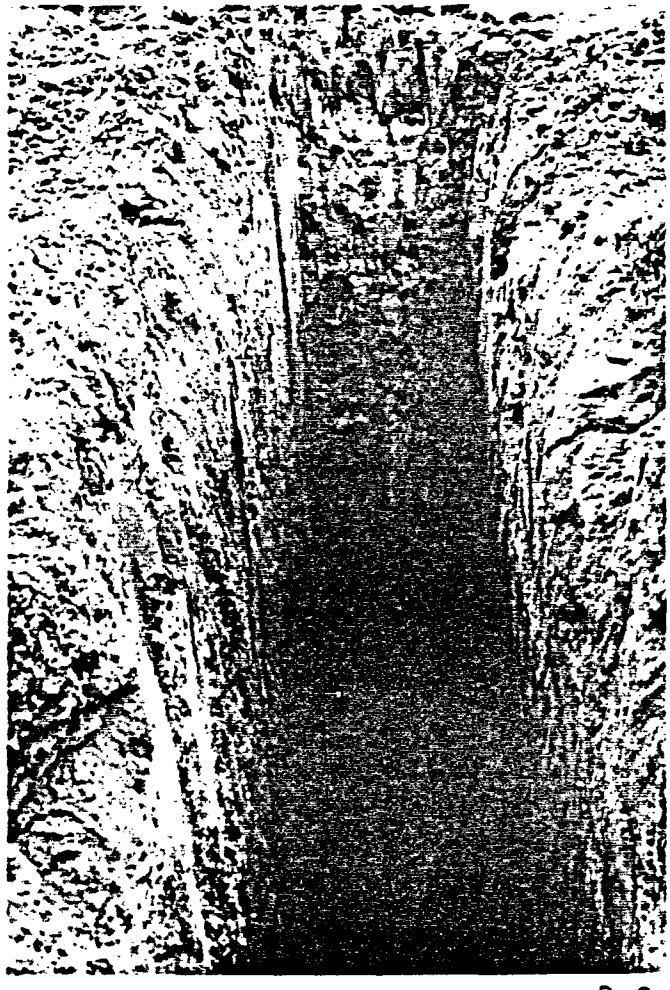
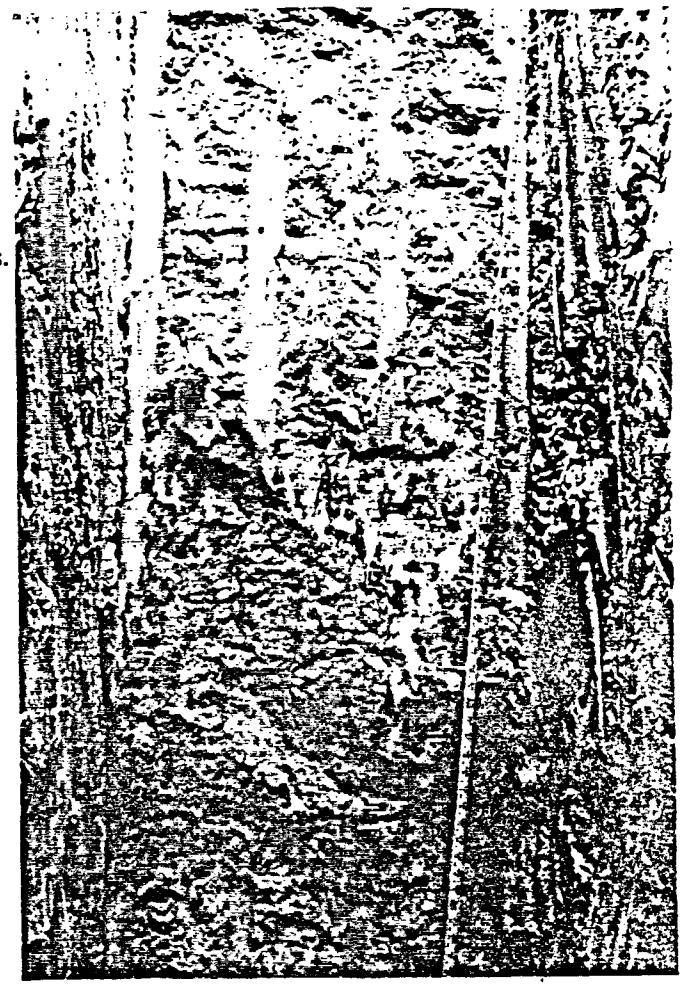


Photo No. 10
(November 16, 1982)
Showing Test Pit In Pond No. 5
Looking North to South
Depth 10' - All Fill Material
Sample No. 82-095
Reference: Figure 1 For Pit Location

Photo No. 11
(November 16, 1982)
Showing Test Pit In North Section of Pond 7
Looking West to East
Depth of Pit 13' - All Mixed Fill Material with Organics.
Sample No. 82-096
Reference: Figure 1 For Pit Location



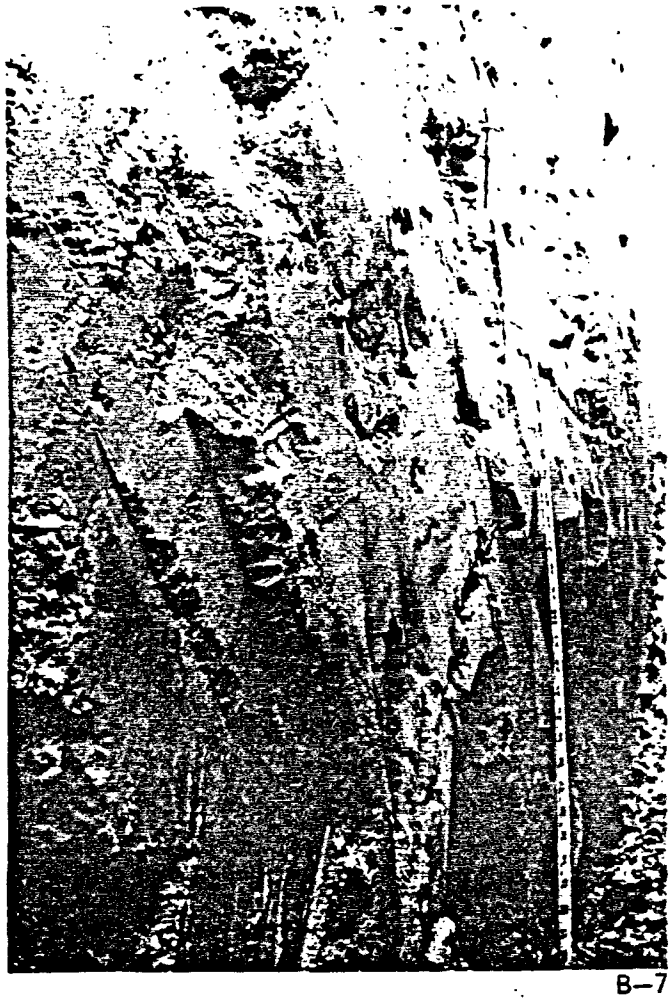


Photo No. 12
(November 16, 1982)
Showing Test Pit In Pond No. 8 At East End
Looking North to South
1.0' - Layers of Sediments, Dried Colors
2.0' - Mixed Red Sand
6.0' - Black Organics - Streaks of Red
9.0' Total Depth of Pit
Sample No. 82-097
Reference: Figure 1 For Pit Location

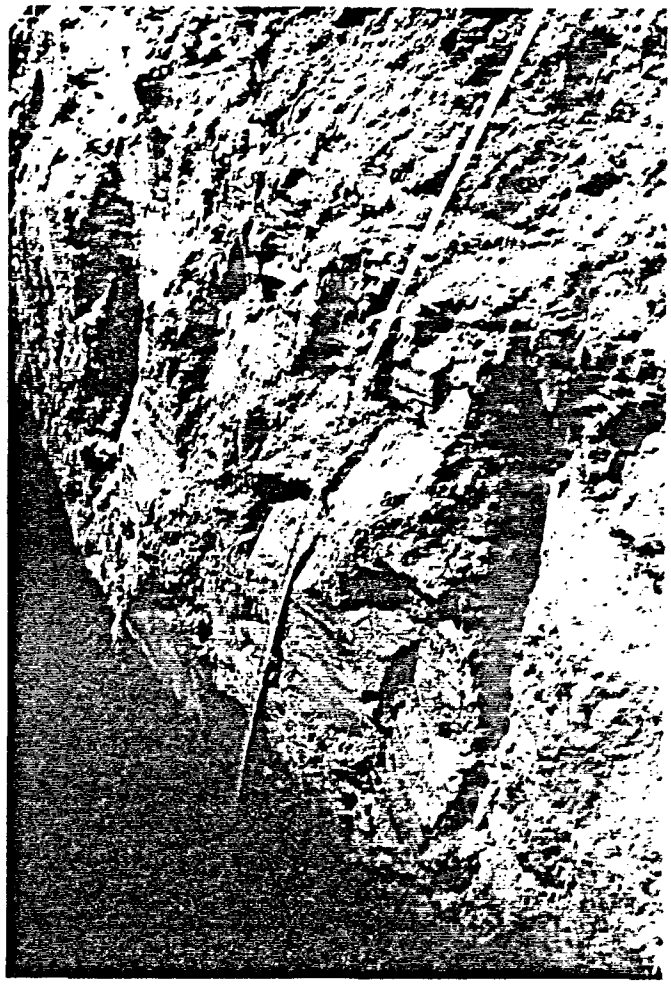


Photo No. 13
(November 16, 1982)
Showing Test Pit In Pond No. 8 At East End
Looking At Side of Pit
1.0' - Layers of Sediments, Dried Colors
2.0' - Mixed Red Sand
6.0' - Black Organics - Streaks of Red.
Sample No. 82-098
Reference: Figure 1 For Pit Location

Photo No. 14
(November 17, 1982)
Showing Test Pit In Pond No. 14 "Drip Production"
Looking At Side Of Pit
5.0' - Black Organic Material, Soft
0.5' - Dark Black Sticky Layer
2.5' - Red Sand, Streaks of Black
2.0' - Light Color Caliche With Streaks Of Black
10.0' Total Depth of Pit
Sample No. 82-101
Reference: Figure 1 For Pit Location

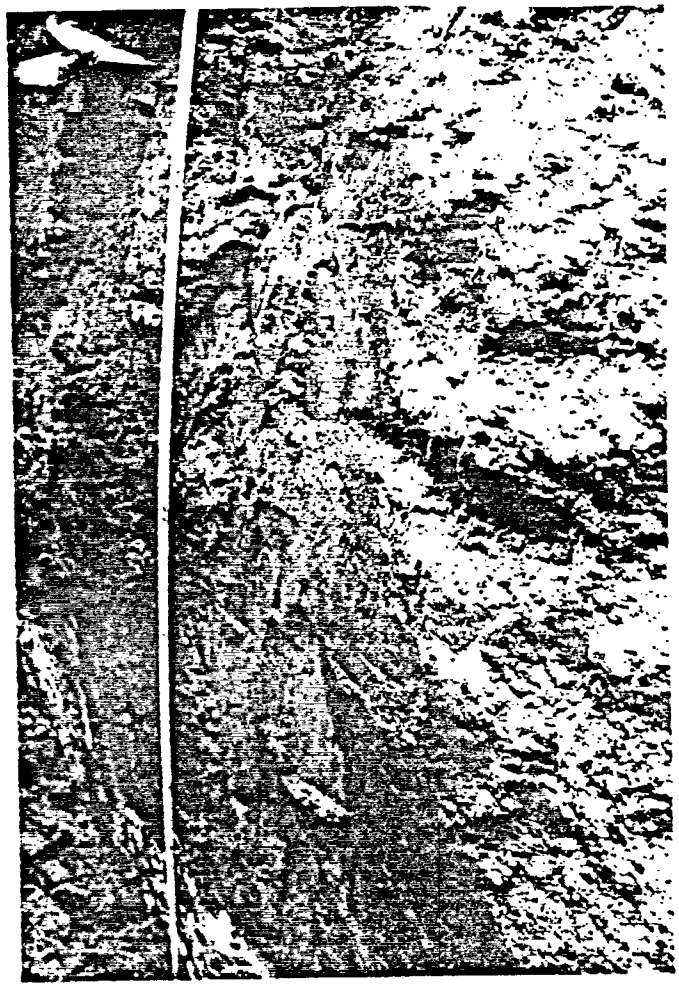


Photo No. 15
(November 17, 1982)
Showing Test Pit In Pond No. 14 "Drip Production"
Looking North to South
5.0' - Black Organic Material, Soft
0.5' - Dark Black Sticky Layer
2.5' - Red Sand Streaks of Black
2.0' - Light Color Caliche With Streaks of Black
10.0' - Total Depth of Pit
Sample No. 82-101
Reference: Figure 1 For Pit Location

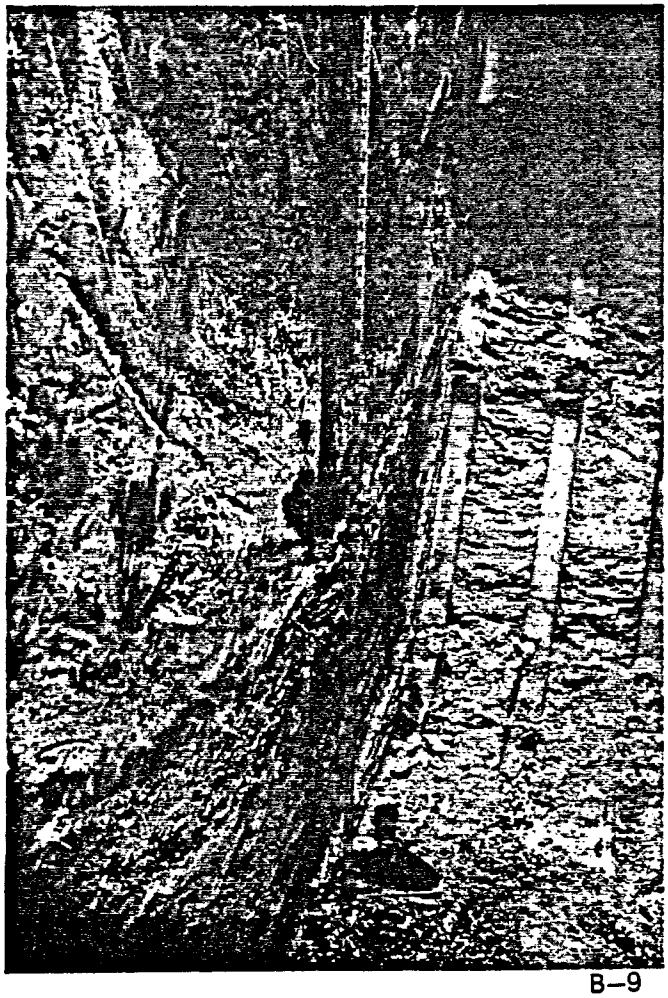


Photo No. 16
(November 17, 1982)
Showing Test Pit In Pond No. 15
Looking South to North
6.0' - Red Sand, Some Streaks of Black, Roots
2.0' - Light Grey Ash Material, Very Hard
8.0' - Total Depth of Pit
Sample No. 82-102
Reference: Figure 1 For Pit Location

APPENDIX C

CHAIN OF CUSTODY
RECORDS FOR SLUDGE
SAMPLES COLLECTED FROM
JAL No. 4 PLANT'S
WASTE DISPOSAL PONDS

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

Collector's Sample No. 82-107

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓ Disposal Site

___Other: _____

Sample

Shipper Name: EL PASO NATURAL GAS COMPANY EAD

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

Collector's Name F.R. SPRESTER / O. Uribe (signature) Telephone: (915) 541-6138 2467

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

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

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

Sample Receiver:

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

2. _____

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

Chain of Possession:

1.	Orion Uribe (signature)	Environmental Tech. (title)	Nov. 17-22, 1982 (inclusive dates)
2.	[signature] (signature)	Lab Manager (title)	November 22, 1982 (inclusive dates)
3.	Francis Y. Huang (signature)	Manager, Chemical R&D (title)	November 23, 1982 Tuesday (inclusive dates) December 21, 1982 Tuesday (Analysis Completed)

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

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

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: _____

Sample

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

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

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

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

Type of Process Producing Waste WASTEWATER FROM INDUSTRIAL PROCESS

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

Sample Receiver:

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

2. _____

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

Chain of Possession:

1.	Osias Ureña (signature)	ENVIRONMENTAL TECH. (title)	NOV. 18, 1982 THURSDAY (inclusive dates)
2.	[signature]	RABA-KISTNER LABORATORY MANAGER EL PASO TEX	NOV 18, 1982 Thursday (inclusive dates)
3.	Francis Y. Huang (signature)	Manager, Chemical R&D. (title)	NOV. 22, 1982 Monday DEC. 21, 1982 Tuesday (inclusive dates)

(analysis completed)

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

ANALYSIS REQUEST

PART I: FIELD SECTION

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

LABORATORY SAMPLE NUMBER	COLLECTOR'S SAMPLE NO.	TYPE OF SAMPLE*	FIELD INFORMATION **
			BACK HOE
	82-092	SLUDGE	7'-1' TOP SOIL SAND, BROWN; 2' ORGANIC BLACK; 1.5' BROWN SAND 2.5' LT. BR CALICHE
	82-093	"	10'- 3.5'- SAND/CALICHE LIGHT BROWN; 1.5'- RED BROWN SAND, SOME CALICHE; 4.0'- ORGANICS BLACK MIXED SOIL; 1.0'- STAIN GREY CALICHE
	82-094	"	9'-1.5 BLOW BRN SAND; 7.5' FILL MATERIAL MIXED ORGANICS BLK 7.5' CALICHE WITH ORGANIC STREAKS.
	82-095	"	10'- FILL MATERIAL
	82-096	"	13'- ALL MIXED FILL MATERIAL WITH ORGANICS
	82-097	"	9'- 1.0' LAYERS/CALICHE MATERIAL MIXED SOIL; 2.0' RED SAND MIXED; 6.0' ORGANICS BLK., STREAKS OF RED.
	82-098	"	" " " " "
	82-099	"	SLUDGE SAMPLE AT TWO FEET DEPTH
	82-100	"	" " " " " "

ANALYSIS REQUESTED ORGANIC CONSTITUENTS

SPECIAL HANDLING AND/OR STORAGE QUART SIZE MASON JAR GLASS, ALUMINU FOIL COVERING OPENING.

PART II: LABORATORY SECTION **

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

ANALYSIS REQUIRED _____

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

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

ANALYSIS REQUEST

PART I: FIELD SECTION

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

LABORATORY SAMPLE NUMBER		COLLECTOR'S SAMPLE NO.	TYPE OF SAMPLE*	FIELD INFORMATION **
		82-101	Sludge	10' { 5' Mixed Fill Material with Organics, Blk. 6" Dark Blk Soft Material, Sticky Layer 2.5' Red Soil, Streaks of Black 2.0' Lt. Color Caliche, Hard, Streaks of Blk.
		82-102	"	8' - 6' Red Soil Sand, Some Streaks Blk, Roots 2' Grey Lt. Ash, Very Hard
	*	82-103	"	Composite Surface Sample - Inorganics
		82-104	"	Sludge Sample at One Foot Depth - Organics
	*	82-105	"	Composite Surface Sample - Inorganics
		82-106	"	Sludge Sample at One Foot Depth - Organics

ANALYSIS REQUESTED Organic Constituents, Note Samples 82-103 & 82-105 are for Inorganics.

SPECIAL HANDLING AND/OR STORAGE All Samples Glass Quart Size Mason Jar with Aluminum Cover.

PART II: LABORATORY SECTION **

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

ANALYSIS REQUIRED _____

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

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

ANALYSIS REQUEST

PART I: FIELD SECTION

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

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

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

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

PART II: LABORATORY SECTION **

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

ANALYSIS REQUIRED

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

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

ANALYSIS REQUEST

PART I: FIELD SECTION

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

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

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

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

PART II: LABORATORY SECTION **

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

ANALYSIS REQUIRED

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

APPENDIX D

SPECIFIC METHODOLOGIES USED IN THE ORGANIC ANALYSES PERFORMED BY RABA-KISTNER CONSULTANTS, INC.

METHODOLOGIES

1. Analytical Schemes

The ten parameters interested in the dry oil pit sludge can be divided into three catagories:

(1) Volatile organics (7 components)

(2) Nonvolatile-polychlorinated biphenyls, and

(3) General characteristics - total phenolics and total organic carbons.

In keeping with the requirements of this project and the nature of the chemical constituents in the sample, these three catagories of parameters should be determined using different techniques. The methods proposed to use are described hereafter.

Scheme A (see Figure 1):

This analytical scheme is designed to analyze the total composition of the ten parameters in the sample.

Catagory 1 - Volatile Organics

In order to recover the volatile organics in the solid sample, heating and concentration in the analysis of these compounds shall be avoided. Ultrasonic extraction is an ideal technique because it possess several advantages over other technique: 1) Lesser amount of solvent required; 2) Heating is not necessary; 3) Contamination from the laboratory glassware is limited; 4) Procedure is relatively simple, and 5) It can be operated in a closed system. In this technique, the sampel will be placed in a minivial and organic solvent is then added to the vial. After being ultrasonicated for a period of time, the extract is subjected to screening analysis on a gas chromatography (GC) with flame ionization

detector (FID) and electron capture detector (ECD). Any detected component of the interested parament will be confirmed on a gas chromatography-mass spectrometer - computer system (GC/MS/COM). Ultrasonic extraction of organics in solid has been thoroughly investigated.[1,2] For these volatile compounds, a solvent system containing methanol and carbon disuefide will be employed.

Catagory 2 - Polychlorinated Biphenyls (PCBs)

Analytical procedures for PCBs in spilled material have been well documented in EPA methodologies.[3] Soxhlet extraction using organic solvents is the most effective method for extrating nonvolatile organics from solid material. This technique requires less attention from analyst in working on the samples. Long extraction time can be applied to achieve high recovery.

As it can be expected, the oil pit sludges are rich in organic materials which might interfer with the analysis of PCBs using GC/ECD technique. If the interferences are encountered, a clean-up procedure shall be employed. Florisil chromatography is an effective method for the removal of interferences from the sample for PCBs analysis.[4]

PCBs is a generic term for polychlorinated biphenyls. It consists of serveral commonly used Anochlors. In this proposal, the type of Arochlor will be determined by the pattern recognition method on GC chromatograms. GC/MS technique will be used to confirm the findings.

Catagory 3 - General Parameters

a) Total Recoverable Phenolics

The analysis will be performed in accordance with EPA Method 420.1.[5] Phenols in the solid sludge will be acidified in a water slurry mixture and distilled. Color response of phenolic materials with 4-amino-

antipyrine is then measured spectrophotometrically. The amount of color produced is a function of the concentration of phenoic material.

b) Total Organic Carbon

The total organic carbons in the sludge will be analyzed using Walkley-Black Method.[6] Oxidizable matter in a sludge sample is oxidized by $Cr_2O_7^{2-}$. The excess $Cr_2O_7^{2-}$ is determined by titration with standard $FeSO_4$ solution, and the quantity of substances oxidized is calculated from the amount of $Cr_2O_7^{2-}$ reduced.

Scheme B (see Figure 2)

For the evaluation of the leachable parameter in water, this analytical scheme provides the analytical approach for the analysis of the ten parameter. Basically, a leachate will be generated from the sludge in accordance with the EPA EP method.[7] The resulting aqueous solution is then subjected to analysis for the various catagories of parameter interested.

Catagory 1 - Volatile Organic

A purge/trap technique, EPA Method 624[8], will be employed. The volatile organics is first purged from the water and absorbed onto a trap. After being desorbed from the trap, the seven components then are analyzed on GC/MS.

Catagory 2 - Polychlorinated Biphenyls (PBCs)

The leachate will be subjected to liquid - liquid extraction with organic solvent. The PCB - containing extract then will be concentrated, screened on GC/EC, and/or cleaned up on florisil column for GC/MS confirmation. EPA Method 625[8] will be employed.

Catagory 3 - Total Phenolics

The procedure is identical to that of solid in Scheme A; however, the leachate will be used instead of solid sample.

Catagory 4 - Total Organic Carbon (TOC)

The TOC in the leachate will be measured in accordance with EPA Method 415.1[5] Organic carbon in the leachate is converted to carbon dioxide (CO_2) by catalytical combustion. The CO_2 formed is converted to methane (CH_4) and measured by a flame ionization detector. The amount of CH_4 is directly proportional to the concentration of carbonaceous material in the leachate.

2. Instrumentation

Gas Chromatograph (GC) and Gas Chromatograph-Mass Spectrometer (GC/MS) will be used exclusively for the entire analytical scheme. A Perkin-Elmer Sigma 1 GC with electron capture (ED) detector and flame ionization detector (FID) will be used. All the data will be manipulated through a computerized console. This GC will be used primarily for screening the extracts for organic constituents. Quantitative determination of the components will also be conducted on this unit once the identification of the compounds are confirmed by GC/MS. Several column systems will be involved in accordance with the types of compounds interested. Basically, a 6-ft x 2mm glass column filled with OV-1 and QF-1 non-polar phase will be used for PCBs and other non-volatile chlorinated compounds while a 6-ft x 2mm glass colunn filled with SP-1000 on carbopak B will be used for volatile organics. ECD will be employed for chlorinated compounds used and FID will be operated for benzene and toluene.

A Hewlett-Packard 5992 B Gas Chromatograph-Mass Spectrometer (GC/MS) with a computer system will be used for the confirmation of the compounds detected on GC. This system has the capabilities of monitoring the characteristics ions of each interested organic in this project. Electron impact mass spectrometer will provide sufficient information for the identification.

A software will be prepared to search for these compounds in each run. Detected ion signals and intensities will be stored both in magnetic tapes and on the hard copies of output. The quantitating of each compounds can be calculated based on the areas of each characteristic ion. However, GC signals will be used as primary data for quantitative calculation.

REFERENCES

1. Sykes, A.L., Wagoner, D.E., and Decker, C.E., "Determination of Perchloroethylene in the Sub-Park-per-Billion Range in Ambient Air by Gas Chromatography witOh Electron Capture Detection", Analytical Chemistry, 52, 1630 (1980).

2. Handa, T., Keto, Y., Yamamura, T., and Ishii, T., "Correlation Between the Concentrations of Polynuclear Aromatic Hydrocarbons and those of Particulates in an Urban Atmosphere", Environmental Science Technology, 15, 416 (1980).

3. "Sampling Methods and Analytical Procedure Manual for PCB Disposal: Interim Report - Tentative Method of Testing for Polychlorinated Biphenyls in Spilled Material", US EPA, Feb. 10, 1978.

4. "Polychlorinated Biphenyls (PCBs) by Gas Chromatography", ASTM D 3534-80.

5. Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, 1979.

6. "Methods of Soil Analysis - Part 2. Chemical and Microbiological Properties", C.A. Black, ed., Chapt 90. American Society of Agronomy, 1965.

7. "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", SW-846, US EPA, 1980.

8. "Guidelines Establishing Test Procedures for the Analysis of Pollutants; Proposed Regulations", Federal Register, vol 44, No. 233, Dec. 3, 1979.

FIGURE 1: ANALYTICAL SCHEME A (TOTAL COMPONENTS)

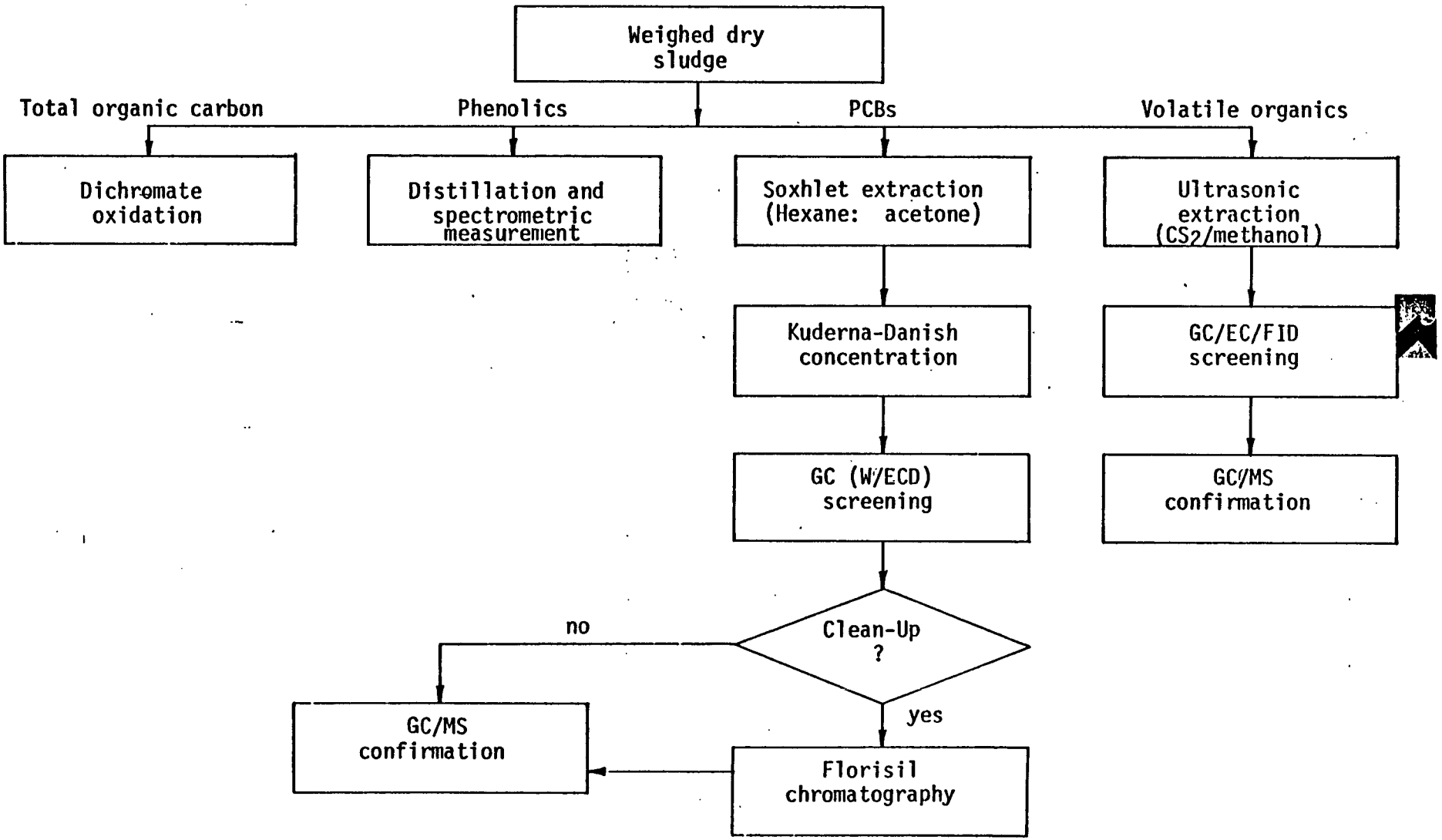
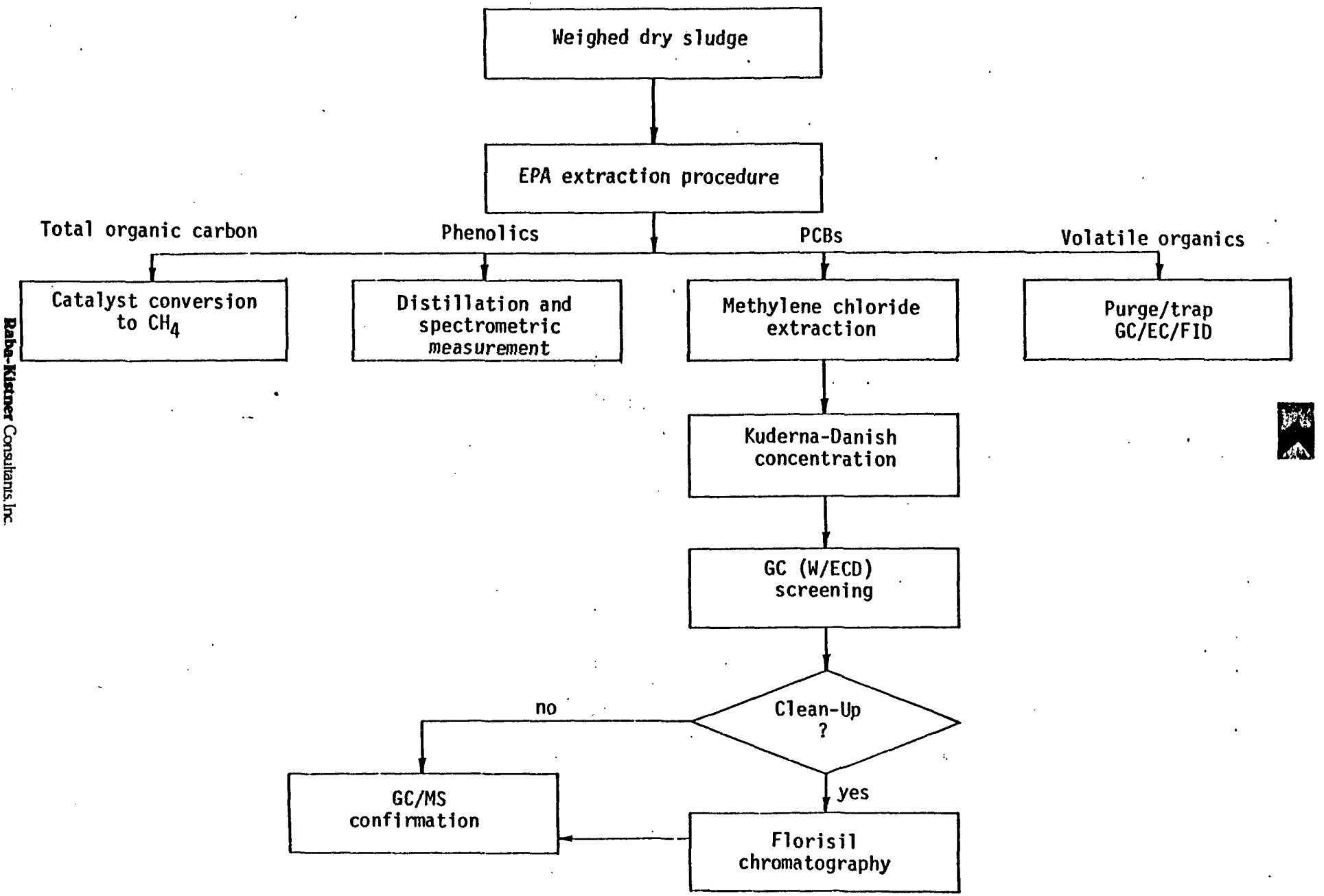


FIGURE 2: ANALYTICAL SCHEME B (EPA EP LEACHATE)



METHOD DETECTION LIMITS OF THE CHEMICAL ANALYSIS OF THE ORGANICS IN OIL PIT SLUDGE

Parameters	Detection Limits for Ultrasonic Extraction (µg/g)[1]	EPA Leachate (µg/l)[2]	Soxhlet Extraction (µg/g)[1]
I. Volatile Organics			
Benzene	1.0	0.1	---
Carbon Tetrachloride	0.07	0.007	---
1,1-dichloroethane	0.04	0.004	---
1,2-dichloroethylene (DCE)	0.06	0.006	---
Tetrachloroethylene (TCE)	0.07	0.007	---
Trichloroethylene (TCE)	0.05	0.005	---
Toluene	1.0	0.1	---
II. PCB's			
Arochlor 1016	---	5.0	0.1
Arochlor 1221	---	5.0	0.1
Arochlor 1232	---	5.0	0.1
Arochlor 1242	---	5.0	0.1
Arochlor 1248	---	5.0	0.1
Arochlor 1254	---	5.0	0.1
Arochlor 1260	---	5.0	0.1
III. Total Phenolics	50 µg/l (leachate)		0.25 µg/g (sludge)
IV. Total Organic Carbons	1 mg/l (leachate)		10 µg/g (sludge)

1. The detection limits are based on the amount of individual parameter that can be detected per unit weight of dry sludge sample. These limits are determined by GC/EC and GC/FID.

2. These limits are the lowest recognizable levels of each parameters leachated in the water. They are determined by Purge/Trap GC/ED and GC/FID.

METHODOLOGY FOR ANALYSIS OF SODIUM PENTACHLOROPHENATE IN SLUDGE SAMPLES

Sodium pentachlorophenate (trade name Santobrite) is a sodium salt of pentachlorophenol. The salt in sludge is converted back to phenol upon acidification with acid and, in turn, can be distilled out into a aqueous solution. EPA Method 420 1[1] is used to carry out the distillation step. One hundred (100) grams of the sludge is mixed with water and pH adjusted to form a slurry for distillation.

Pentachlorophenol in the distillate is then extracted with methylene chloride in accordance with EPA Method 625[2]. After drying and condensation, the extract is subjected to analysis using Gas Chromatogram - Mass Spectrometer (GC/MS) with a Single-Ion Monitoring (SIM) software program for the characteristic mass ions, 165, 264, 266 and 268. The detected peak area of characteristic ion 266 of pentachlorophenol is used for quantitiation calculation.

---

1. Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, 1979.
2. "Guidelines Estabilishing Test Procedures for the Analysis of Pollutants; Proposed Regulations," Federal Register, Vol. 44, No. 233, Dec, 3, 1979.

SURGE TANK (LOCATED NEAR DISPOSAL WELL)
21'-7" O.D. X 24'-0" HEIGHT
1500bbl CAPACITY
1/4" CARBON STEEL PLATE

SALT WATER DISPOSAL LINE TO WELL SDW-214

PROPERTY LINE

POND No. 19
0.05 Ac.±

POND No. 1
1.16 Ac.±

CLASSIFIER
20'-4" O.D. X 15'-4" HEIGHT
925bbl CAPACITY
1/4" CARBON STEEL PLATE W/40 MI. EPOXY COATING

OIL STORAGE TANK
12'-3" O.D. X 15'-4" HEIGHT
335bbl CAPACITY
1/4" CARBON STEEL PLATE W/40 MI. EPOXY COATING

POND No. 18
0.03 Ac.±

4" DIAMETER DISCHARGE LINE TO TRUCK FILL STANDS

JAL No. 4 CLASSIFIER

POND No. 3
0.69 Ac.±

PLANT WASTEWATER INFLOW
APPROX. 16" DIAMETER CORRUGATED STEEL PIPING

POND No. 2
0.17 Ac.±

POND No. 17
0.05 Ac.±

POND No. 10
0.92 Ac.±

POND No. 11
0.87 Ac.±

CONTINGENCY POND
12,980bbl CAPACITY

POND No. 8
0.82 Ac.±

POND No. 9
0.98 Ac.±

POND No. 4
0.18 Ac.±

POND No. 20
0.27 Ac.±

POND No. 5
0.64 Ac.±

POND No. 7
1.58 Ac.±

POND No. 15
0.16 Ac.±

POND No. 6
1.37 Ac.±

POND No. 14
0.35 Ac.±

PROPERTY LINE

MISSOURI-PACIFIC RAILROAD (TEXAS-NEW MEXICO R.R.)

NEW MEXICO HIWAY 18

N

A

B

31 32 6 5

-LEGEND-
A DRAINAGE AREA PREDICTION POINT
DRAINAGE DIVIDE FOR PLANT AREA
CLASSIFIER (JAL No. 4)
EXISTING CONTOURS TO BE REGRADED
PROPOSED CONTOURS
CULVERTS

Proposed 36" Culvert S = 4.0%

REV. A-VMC ON OF WASTE DISPOSAL SYSTEM ADDED (6-5-81)
REV B-LE 2/3/84 REVISED DRAINAGE CULVERTS TO CONFORM WITH TERRAIN

Contour Lines Have Been Adjusted To Match Rectified Photo Base

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

El Paso NATURAL GAS COMPANY
PIPELINE SERVICES DIVISION
EL PASO, TEXAS

PLANT AREA AND PROPOSED DRAINAGE PATTERN
JAL NO. 4 PLANT
SEC. 5,6,31,32, TWS. 23-S & 24-S, RANGE 37-E
LEA COUNTY, NEW MEXICO

0 100 200 400
SCALE IN FEET

DWG. NO. 5004.19-1 REV. B

SALT WATER DISPOSAL LINE TO WELL SDW-24

SURGE TANK (LOCATED NEAR DISPOSAL WELL)
21'-7" O.D. X 24'-0" HEIGHT
1500bbl CAPACITY
1/4" CARBON STEEL PLATE

PROPERTY LINE

POND No.1
1.16 Ac.±

POND No.19
0.05 AC.±

CLASSIFIER
20'-4" O.D. X 44' HEIGHT
925bbl CAPACITY
1/4" CARBON STEEL PLATE W/40 MI. EPOXY COATING

OIL STORAGE TANK
12'-3" O.D. X 16'-4" HEIGHT
335bbl CAPACITY
1/4" CARBON STEEL PLATE W/50 MI. EPOXY COATING

POND No.18
0.03 Ac.±
FIGURE 6

WELL NO.1

POND No.2
0.17 Ac.±

POND No.17
0.05 Ac.±
FIGURE 6

BRINE POND
W.E. 3312.4

POND No.10
0.92 Ac.±

BRINE POND
W.E. 3312.6

POND No.11
0.87 Ac.±

POND No.16
0.03 Ac.±
FIGURE 5

JAL NO.4 CLASSIFIER

CONTENGENCY POND
2,980bbl CAPACITY

POND No.3
0.69 Ac.±
FIGURE 11

POND No.8
0.89 Ac.±
FIGURE 10

6" DIAMETER DISCHARGE LINE TO TRUCK FILL STAND

PLANT WASTEWATER INFLOW
2" THRU 16" DIAMETER CARBON STEEL PIPING

POND No.4
0.18 Ac.±
FIGURE 4 & 13

POND No.9
0.98 Ac.±

POND NO.20
0.27 Ac.±

POND No.15
0.16 Ac.±
FIGURE 4

POND No.5
0.64 Ac.±
FIGURE 14

POND No.7
1.58 Ac.±

POND No.6
1.37 Ac.±
FIGURE 12

POND No.13
0.05 Ac.±
FIGURE 4

POND No.14
0.45 Ac.±
FIGURE 5

POND No.12
0.58 Ac.±
FIGURE 4

NEW MEXICO HIWAY 18

PROPERTY LINE

3.1 3.2

6 5

A

B

—LEGEND—

- A — DRAINAGE AREA PREDICTION POINT
- DRAINAGE DIVIDE FOR PLANT AREA
- CLASSIFIER (JAL NO.4)
- EXCAVATED TEST PIT
- 82-092 — SAMPLE NUMBER AND LOCATION
- CORE SAMPLE LOCATION
- CROSS SECTION AREA
- ABANDONED POND

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

El Paso NATURAL GAS COMPANY
PIPELINE SERVICES DIVISION
EL PASO, TEXAS

WASTE WATER PONDS LOCATIONS FROM
1952 THRU 1981

JAL NO. 4 PLANT

SEC. 5,6,31,32, TWS. 23-S & 24-S, RANGE 37-E
LEA COUNTY, NEW MEXICO

FIGURE 1

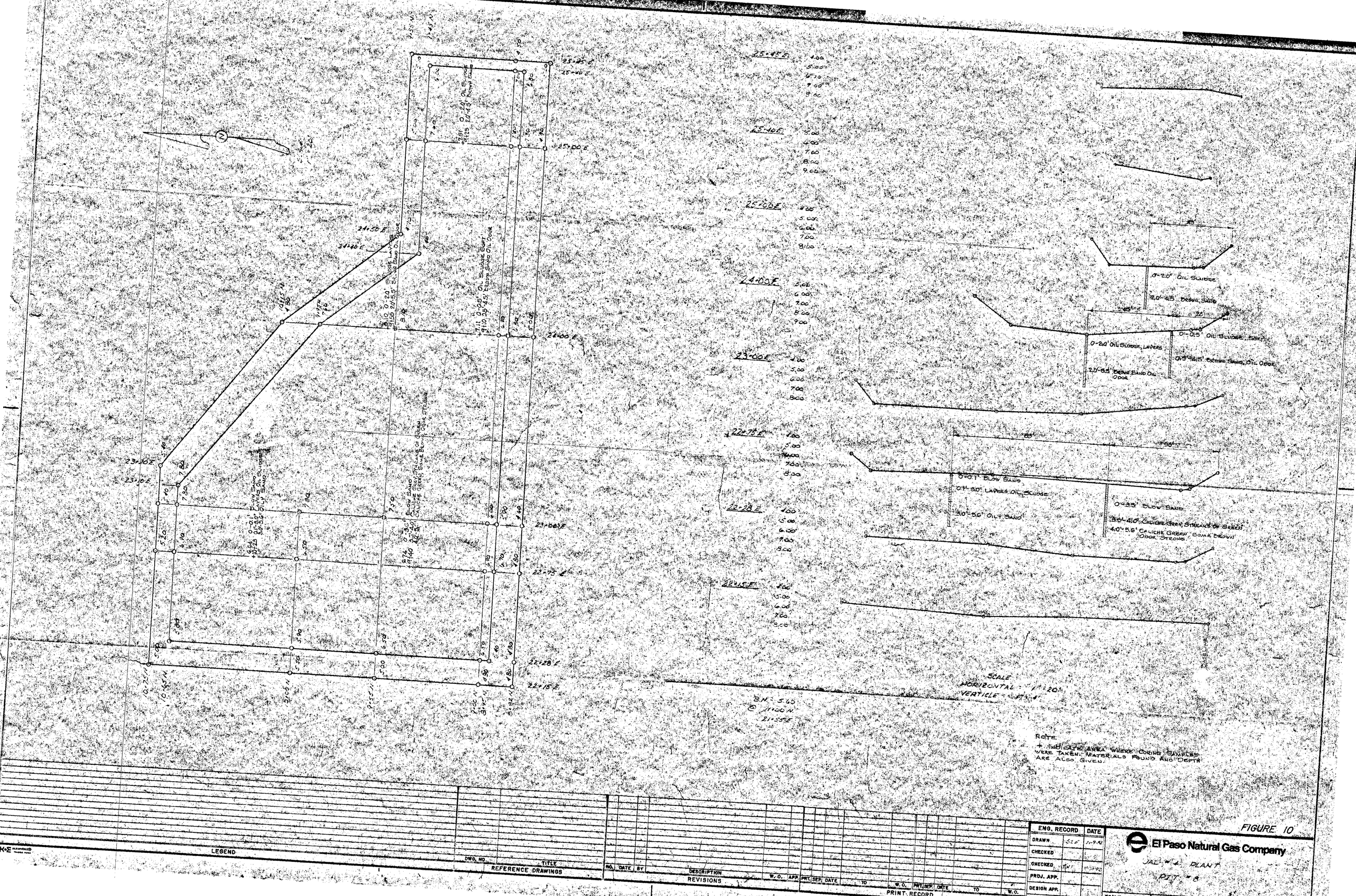
0 100 200 400
SCALE IN FEET

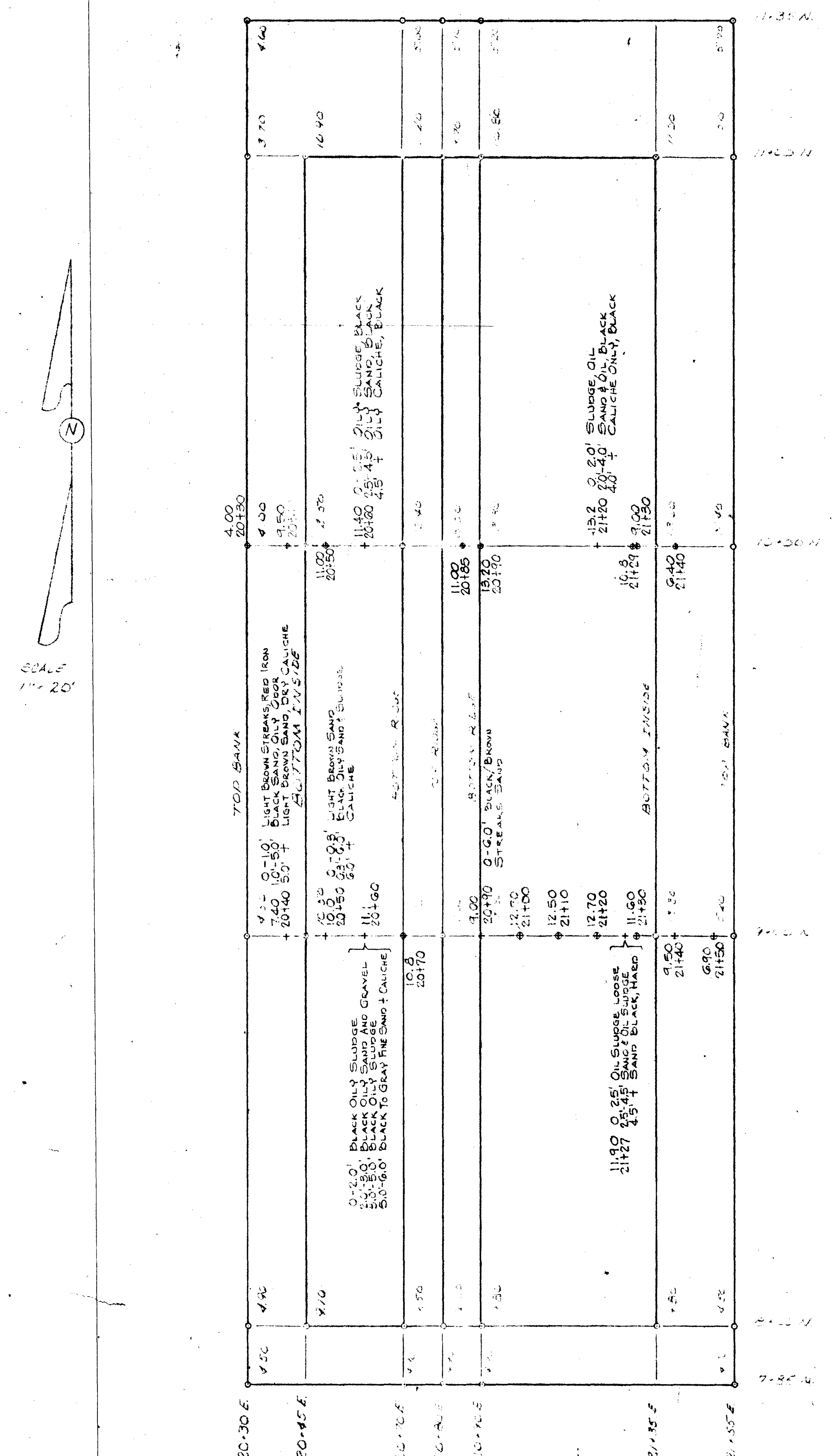
DWG. NO. 5004.19-2

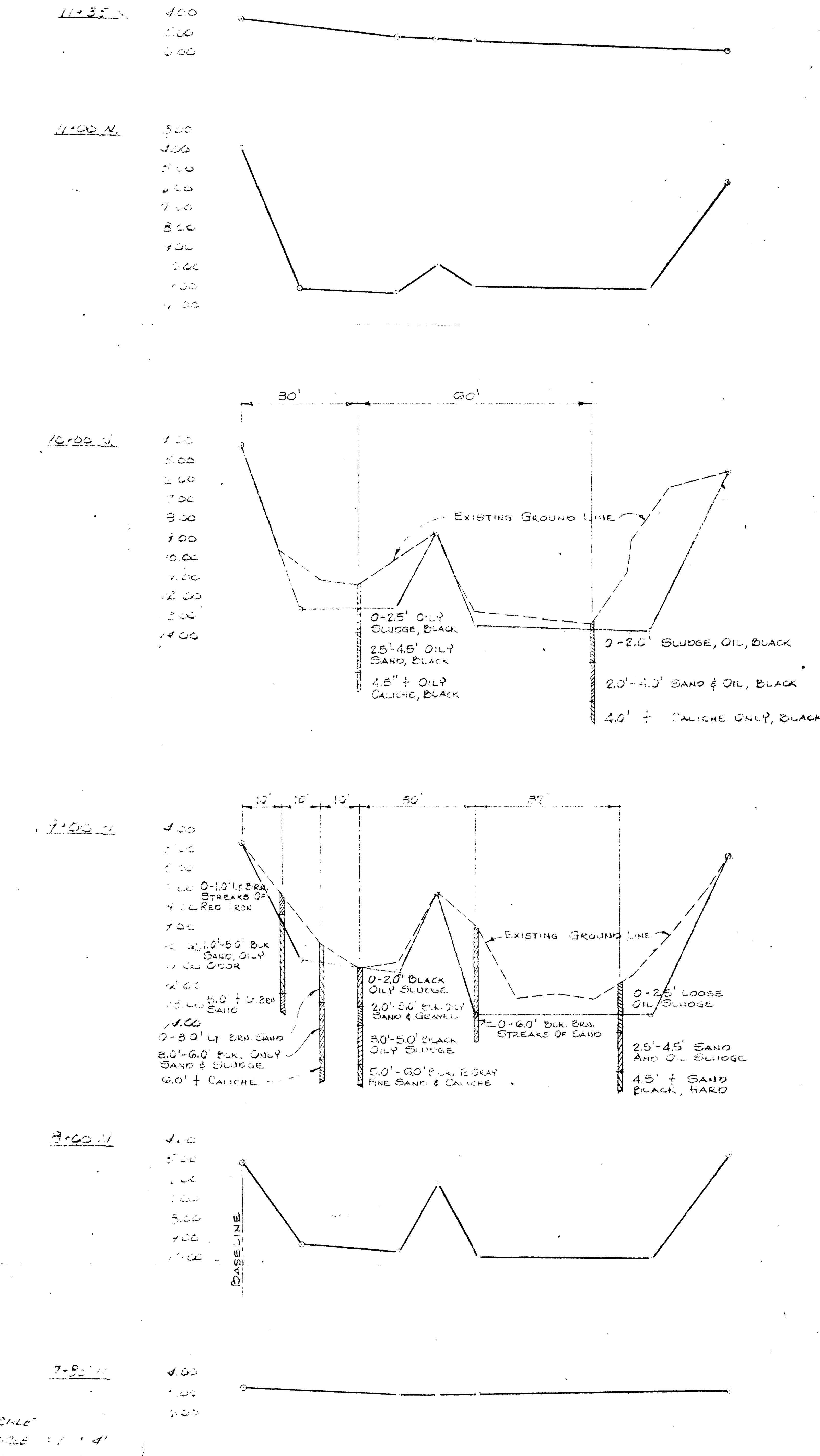
REV.

REPRODUCTION BY aero-graphics

Contour Lines Have Been Adjusted To Match Rectified Photo Base


25+45 E
25+40 E
25+00 E
24+50 E
24+46 E
24+00 E
23+60 E
23+10 E
22+75 E
22+28 E
22+15 E
0-2.0' Oil Sludge
2.0'-4.5' Brown Sand
0-0.5' Oil Sludge, Sandy
0-2.0' Oil Sludge, Layers
2.0'-6.5' Brown Sand Oil Odor
0-0.1' Blow Sand
0.1'-3.0' Layers Oil Sludge
3.0'-5.0' Oily Sand
0-3.5' Blow Sand
3.5'-4.0' Caliche/Grey, Streaks of Green
4.0'-5.6' Caliche Grey, Some Brown Odor, Strong
BASELINE
SCALE
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 4'
BN: 5+60 @ 11+00 N 21+55 E
NOTE
INDICATES AREA WHERE CORING SAMPLES WERE TAKEN. MATERIALS FOUND AND DEPTH ARE ALSO GIVEN.
LEGEND
REFERENCE DRAWINGS
DWG. NO.
TITLE
REVISIONS
NO.
DATE
BY
DESCRIPTION
W.O.
APP.
PRINT RECORD
ENG. RECORD
DATE
DRAWN
CHECKED
CHECKED
PROJ. APP.
DESIGN APP.
FIGURE 10
El Paso Natural Gas Company
JAL #4 PLANT
PIT #8
SCALE: SHOWN
DWG. NO. 5004-4-3
REV.
W.O.





NOTE
+ INDICATE AREAS WHERE CORING SAMPLES WERE TAKEN. MATERIAL FOUND AND DEPTHS ARE ALSO GIVEN

FIGURE H

NO.	DATE	BY	DESCRIPTION	W.O.	APP.
"A"	1-5-83	SE	CORRECTED PIT WIDTH		

LEGEND | REFERENCE DRAWINGS (DWG. NO. / TITLE) | REVISIONS | PRINT RECORD

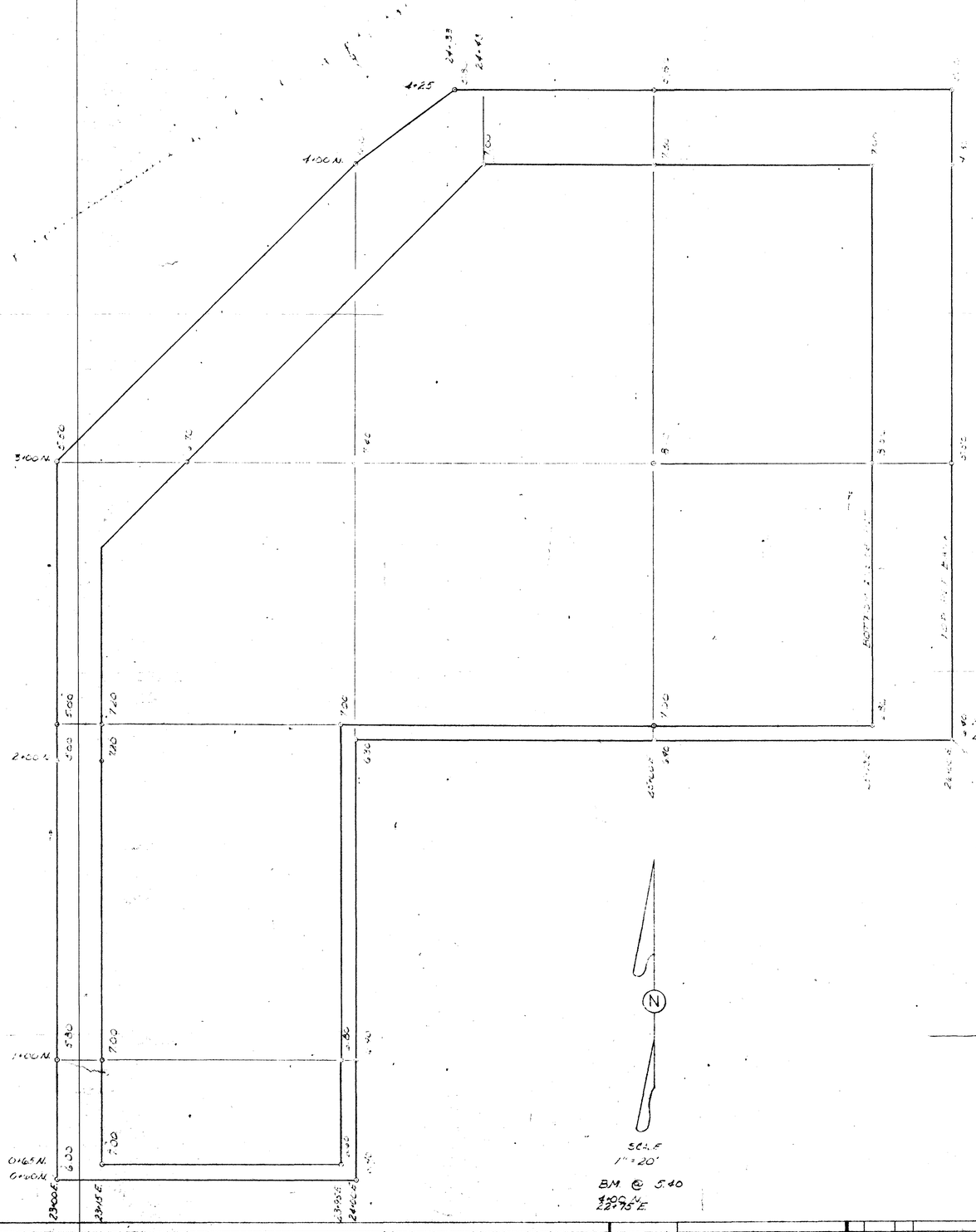
ENG. RECORD		DATE
DRAWN	SLE	11-11-82
CHECKED		
CHECKED	T.H.P.	11-11-82
PROJ. APP.		
DESIGN APP.		

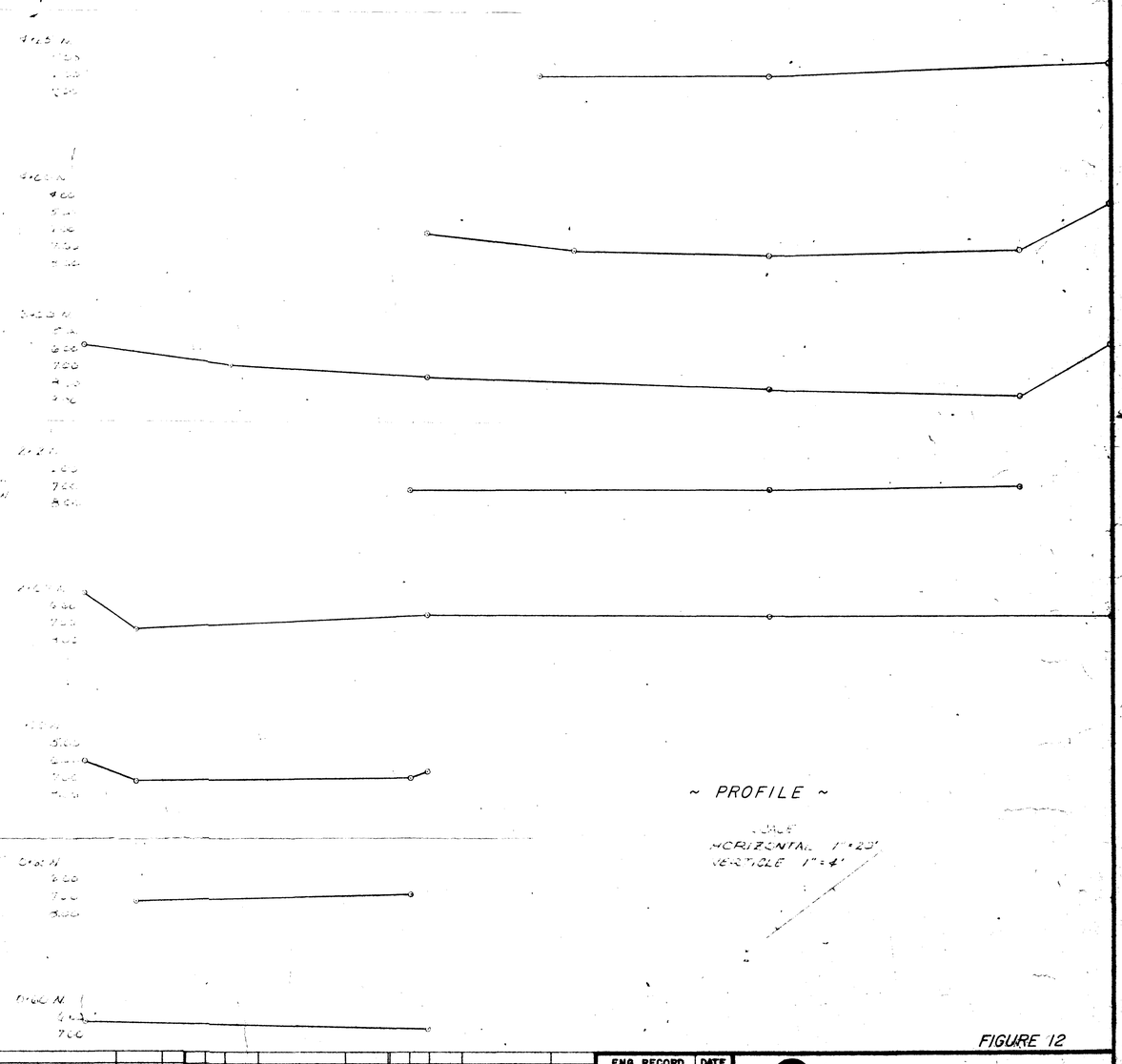
El Paso Natural Gas Company

JAL # 4 PLANT
PIT # 3

SCALE: SHOWN
W.O.
DWG. NO. 5004.13-4
REV. "A"

JFJ4-1-2





~ PROFILE ~

SCALE
HORIZONTAL 1" = 20'
VERTICLE 1" = 4'

FIGURE 12

LEGEND	REFERENCE DRAWINGS	REVISIONS	PRINT RECORD
	DWG. NO. / TITLE	NO. / DATE / BY / DESCRIPTION / W. O. / APP.	PRT. SEP. DATE TO W. O. / PRT. SEP. DATE TO W. O.

ENG. RECORD		DATE
DRAWN	SLE	1-24-52
CHECKED		
CHECKED		
PROJ. APP.		
DESIGN APP.		

El Paso Natural Gas Company

JAL # 4 PLANT

PIT # 6

SCALE: SHOWN

W. O.

DWG. NO. 5004.9-5

REV.

M-E

JFJ4-1-3

~PROFILE~

SCALE
HORIZONTAL 1" = 20'
VERTICLE 1" = 4'

BM. @ 7.80
7+00 N.
22+75 E.

FIGURE 13

LEGEND.

REFERENCE DRAWINGS

DWG. NO.	TITLE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W. O.	APP.

PRINT RECORD

PRT. SEP.	DATE	TO	W. O.	PRT. SEP.	DATE	TO	W. O.

ENG. RECORD		DATE
DRAWN	S.L.E.	11-30-82
CHECKED	W.A.	
CHECKED		
PROJ. APP.		
DESIGN APP.		

El Paso Natural Gas Company

JAL # 4 PLANT
PIT # 1

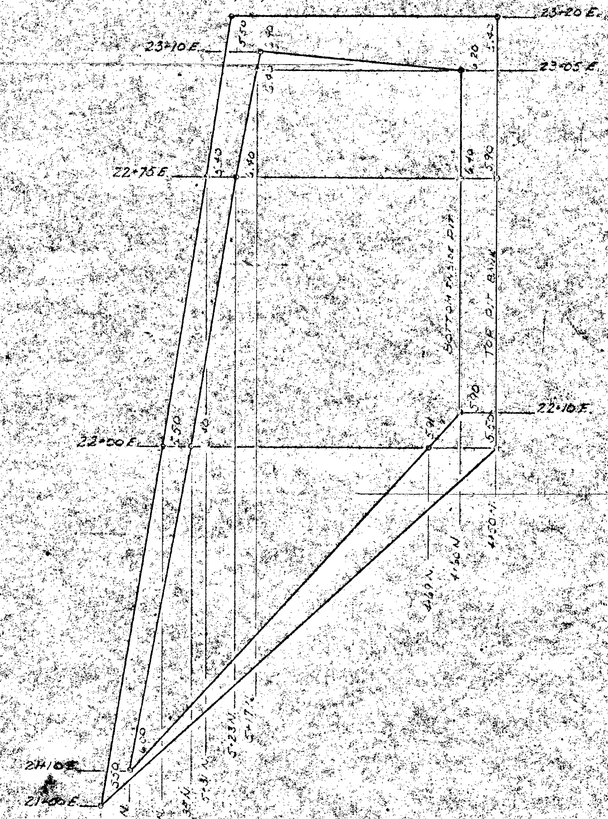
SCALE: SHOWN
W.O.

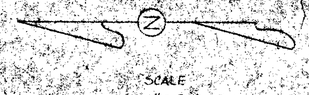
DWG. NO. 5004 19-6

REV.

JFJ4-1-4

K+E





PROFILE

SCALE
HORIZONTAL 1" = 20'
VERTICLE 1" = 4'

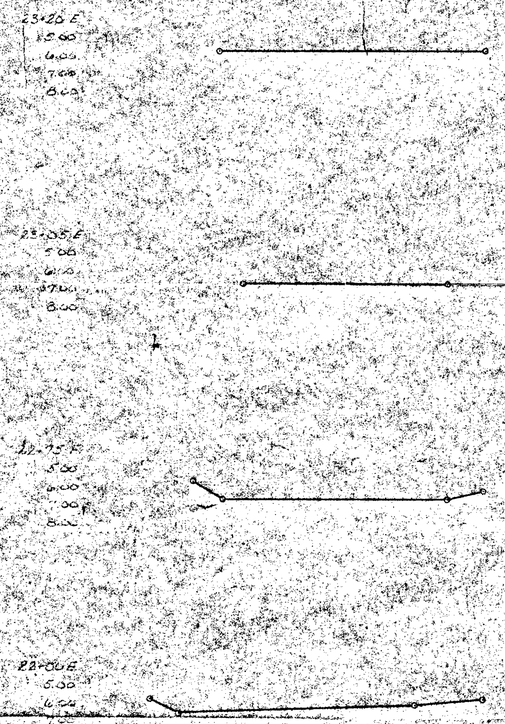


FIGURE 14

LEGEND	REFERENCE DRAWINGS	REVISIONS	PRINT RECORD
	DWG. NO. / TITLE	NO. / DATE / BY / DESCRIPTION / W. O. / APP.	PRT. SEP. DATE / TO / W. O. / PRT. SEP. DATE / TO / W. O.

ENG. RECORD	DATE
DRAWN	S.L.E. 12-04
CHECKED	JMD
CHECKED	
PROJ. APP.	
DESIGN APP.	

El Paso Natural Gas Company

JAL #4 PLANT
PIT #5

SCALE: SHOWN
W.O.
DWG. NO. 5004.19-7
REV.

NFU 4-1-5

Contour Lines Have Been Adjusted To Match Rectified Photo Base

ENGINEERING RECORD	
DRAWN BY	Aero-Graphics
TRACED BY	
CHECKED BY	
APPROVED	
DATE	
PHOTO DATE	9-8-84
CONTOUR INTERVAL	2'

El Paso Natural Gas Company
PIPELINE SERVICES DIVISION

TOPOGRAPHIC PLAN

JAL NO. 4 PLANT

SEC. 31, TWS. 23-S, RANGE 37-E
LEA COUNTY, NEW MEXICO

0 100 200 300

General 82-83

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

525 Camino de los Marquez
Santa Fe, New Mexico
87501

JAN 4 1983
ENVIRONMENTAL AFFAIRS

BRUCE KING
GOVERNOR

December 29, 1982

El Paso Natural Gas Company
Two Petroleum Center / Suite 200
North "A" at Wadley
Midland, Texas 79701

ATTENTION: D. N. Bigbee

RE: GWR-7
Discharge Plan

Gentlemen:

The Discharge Plan with accompanying addendums and additional information submitted pursuant to the Water Quality Control Commission Regulations for the controlled discharge of waste water and associated fluids from Jal Plant No. 4 located in Sections 5, 6, 31 and 32, Townships 23 and 24 South, Range 37 East, NMPM, Lea County, New Mexico, is hereby approved with the following stipulations:

1. El Paso will submit on April 4, 1983 a complete comprehensive closure plan for all waste water ponds and the associated sludge at Jal Plant No. 4. The proposed closure plan shall demonstrate that leachate from the ponds and sludges will not degragate ground water for present or future use.

2. El Paso will submit on April 4, 1983, their report entitled, "Evaluation of Organic Constituents in Sludges at the Jal No. 4 Plant Waste Disposal Ponds " to the Oil Conservation Division. Justification for the methodology to close present and past waste water disposal ponds containing sludges will be derived from this report. Phenols shall be included in the organic constituents to be evaluated.

3. El Paso will submit on April 4, 1983, a detailed leak testing system for all drain lines and open floor or apron drains at Jal Plant No. 4 in lieu of a monitoring system for ground water. The leak testing system will provide a detailed description of testing procedures for each type of drain line and illustrate graphically each segment of the various drain lines to be tested. El Paso will submit an engineering report which includes data and calculations to substantiate the validity of the leak testing methods to be used and supply specifications and detection limits for each test method.

The Oil Conservation Division will review the above additional information when submitted and upon acceptance of this material, will consider El Paso to have completed its requirements for a discharge plan at Jal Plant No. 4.

The discharge plan was submitted pursuant to Section 3-106 of the Water Quality Control Commission regulations. It is approved pursuant to Section 109. Please note subsections 3-109.E and 3-109.F which provide for possible future amendment of the plan. Please also be advised that the approval of this plan 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.

Yours very truly,

Joe D. Ramey
Division Director

JDR/OS/dp

cc: El Paso Natural Gas Company
P. O. Box 1492
El Paso, Texas 79978

ATTN: Environmental Affairs

5004
Enclosure

7

El Paso
Natural Gas Company

P. O. BOX 1492
EL PASO, TEXAS 79978

PHONE. 915-543-2600

June 2, 1982

Oscar Simpson III
Water Resources Specialist
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, NM 87501

Re: Discharge Plan for El Paso Natural Gas Company's
Jal No. 4 Plant

Dear Mr. Simpson:

For response to your letter of January 11, 1982 requesting additional information for the Jal No. 4 Discharge Plan, specifically the closure of ponds, the enclosed Addendum to the Closure Plan for Jal No. 4 Plant is submitted. This Addendum amends the Closure Plan submitted to your office August 7, 1981.

El Paso believes that the enclosed Addendum and other information conveyed to you in Mr. D. N. Bigbie's letter of April 28, 1982 provide adequate information for your office to approve the Jal No. 4 Discharge Plan.

If you should have any questions, please contact me.

Sincerely,

E. F. Smythe, P.E.
Chief, Permits & Support
Environmental Affairs Department

jb

Enclosure

cc: D. N. Bigbie - Midland

bc: J. C. Bridges (w/o enclosure)
J. F. George (w/o enclosure)
G. J. Odegard (w/o enclosure)
F. R. Sprester (w/o enclosure)
H. Reiquam (w/o enclosure)
File: PDP-19 (w/enclosure)

ADDENDUM

TO

CLOSURE PLAN FOR

EL PASO NATURAL GAS COMPANY

JAL NO. 4 PLANT

LEA COUNTY, NEW MEXICO

For

El Paso Natural Gas Company

Prepared by
Environmental Affairs Department
El Paso Natural Gas Company
El Paso, Texas

June 1982

SUMMARY

This Addendum is in response to requests made by the New Mexico Oil Conservation Division (NMOCD) for additional information to supplement the Closure Plan for Jal No. 4 Plant dated August 1981. Information presented herein includes results of chemical analyses and estimates of fill material necessary to close ponds not included in the original Closure Plan.

Chemical analyses on sludge samples collected from all ponds indicate that wastes contained therein are not hazardous wastes as defined by EPA under RCRA. Therefore, the closure of the ponds is not subject to EPA regulations under RCRA for closure of disposal facilities containing hazardous wastes. Nevertheless, the closure of the ponds will be performed as outlined in this Addendum and the August 1981 Closure Plan in such a way to protect human health and the environment in accordance with State and Federal guidelines.

Execution of the procedures presented in the Closure Plan as amended by this Addendum will result in the closure of all ponds at Jal No. 4 Plant.

Prepared by:

James F. George, Ph.D.
Senior Environmental Scientist

Approved by:

Howard Reiquam, Ph.D.
Director
Environmental Affairs Department

TABLE OF CONTENTS

FIGURE

TABLES

APPENDIX

INTRODUCTION

The Closure Plan for Jal No. 4 Plant, dated August 1981, was presented to the New Mexico Oil Conservation Division (NMOCD) in response to a request for additional information stemming from their review of the Discharge Plan for Jal No. 4 Plant dated March 1981. A subsequent request by NMOCD for additional information dated January 11, 1982 has resulted in this Addendum to the August 1981 Closure Plan.

This document presents information derived from chemical analyses of sludge and soil samples obtained from ponds not considered in the Closure Plan. These data in conjunction with the Closure Plan show that none of the ponds at Jal No. 4 Plant contain hazardous wastes as defined by EPA under RCRA. More detailed estimates of the amount of caliche, fill dirt and topsoil necessary for the closure of eight wastewater evaporation ponds at Jal No. 4 Plant are presented herein.

SLUDGE SAMPLING AND ANALYSES

All ponds from which sludge samples were collected for this Addendum were dry at the time of sampling. Sampling was conducted using a tractor-mounted backhoe, which enabled samples to be obtained to relatively great depths, as well as a tubular soil coring apparatus. A soil sample was also obtained from natural, undisturbed soil near the Plant entrance; that sample is designated the "Control" sample in Table 1. All chemical analyses were conducted in accordance with the analytical methodology presented in the Closure Plan. Results of the chemical analyses are presented in Table 1. The chain of custody records for all samples collected for this Addendum are found under Appendix A.

The results of the chemical analyses indicate that no sludge from any of the eight ponds at Jal No. 4 Plant exhibit characteristics of EP toxicity as defined in 40 CFR § 261.24.

TABLE 1

Results of Chemical Analyses Conducted on Sludge
Samples Collected from Ponds at Jal No. 4 Plant

Pond	Sample Depth(in)	Oil and Grease(%)	Milligrams per Liter[1/]							
			Ba	Cu	Zn	As	Se	Na	Cl	Hg
3	0-26	2.76	0.50	<0.10	0.15	<0.002	<0.002	76	36	0.0008
	26-34	1.91	0.88	<0.10	1.65	0.006	<0.002	81	28	0.0010
	34-46	0.67	0.56	<0.10	0.20	<0.002	<0.002	77	28	0.0020
	46-62	2.88	2.50	0.60	0.58	0.004	<0.002	200	28	0.0030
4 east	0-4	0.99	3.00	<0.10	2.00	0.006	<0.002	90	18	0.0020
4 west	0-4	0.41	0.50	0.10	0.22	0.007	0.006	35	11	0.0020
5	0-4	0.05	<0.50	<0.10	0.29	<0.002	<0.002	512	759	0.0003
6	0-9	0.27	1.50	0.12	2.65	0.030	<0.002	273	223	0.0010
	9-81	0.09	<0.50	<0.10	0.28	0.006	<0.002	135	138	0.0006
	caliche	0.03	2.75	0.12	<0.05	0.007	<0.002	141	135	<0.0002
7 south	2-14	0.05	0.50	<0.10	0.80	0.015	0.006	153	124	<0.0002
	14-20	0.03	0.50	<0.10	0.21	0.016	0.006	103	64	0.0011
	caliche	0.02	3.25	0.11	0.05	0.017	0.006	86	53	0.0004
7 east	0-18	0.16	<0.50	<0.10	0.20	<0.002	<0.002	79	21	0.0003
	18-36	0.14	1.50	0.10	0.28	<0.002	<0.002	154	18	0.0022
7 west	0-24	1.02	1.00	0.10	0.20	0.006	<0.002	66	18	0.0003
	24-48	0.08	3.80	0.10	0.15	0.015	0.006	84	25	<0.0002
8	0-12	1.27	2.50	0.13	<0.05	0.006	<0.002	1,392	1,879	<0.0006
	12-24	0.58	1.50	<0.10	0.11	<0.002	<0.002	106	80	0.0006
	24-30	0.43	2.50	<0.10	0.26	<0.002	<0.002	120	11	0.0025
	30-54	0.10	4.50	<0.10	<0.05	0.033	0.006	134	0	0.0012
Control[2/]	4-8	0.09	<0.50	<0.10	0.08	<0.002	<0.002	2	0	0.0003

1/ All samples contained less than: 0.05 mg/L Cd, 0.10 mg/L total Cr and 0.50 mg/L Pb.

2/ Control sample collected from undisturbed soil near plant entrance.

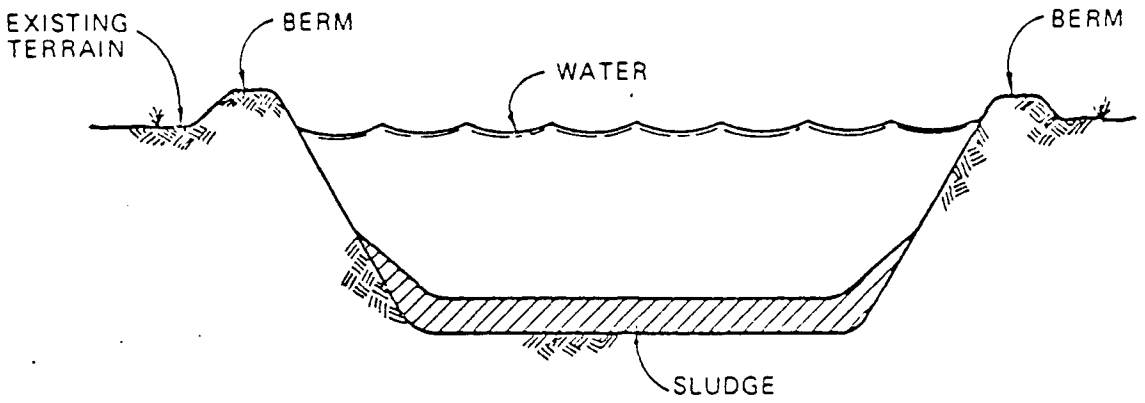
CLOSURE PLAN

The ponds addressed under this Addendum are ponds Nos. 3, 4, 5, 6, 7 and 8. The previously submitted Closure Plan detailed closure procedures for ponds 1 and 2. This Addendum also presents detailed estimates of the amount of caliche, fill material and topsoil necessary to close ponds 1 through 8. Pond No. 3 was originally proposed to serve as a contingency pond, however, it will be closed and emergency storage of wastewater is to be provided by a 5,035-barrel-capacity steel contingency storage tank to be buried near pond No. 3 (as indicated in D. N. Bigbie's letter of April 28, 1982 to O. Simpson).

All ponds have had berms constructed around them to prevent surface runoff from interfering with the drying of the sludge prior to closure.

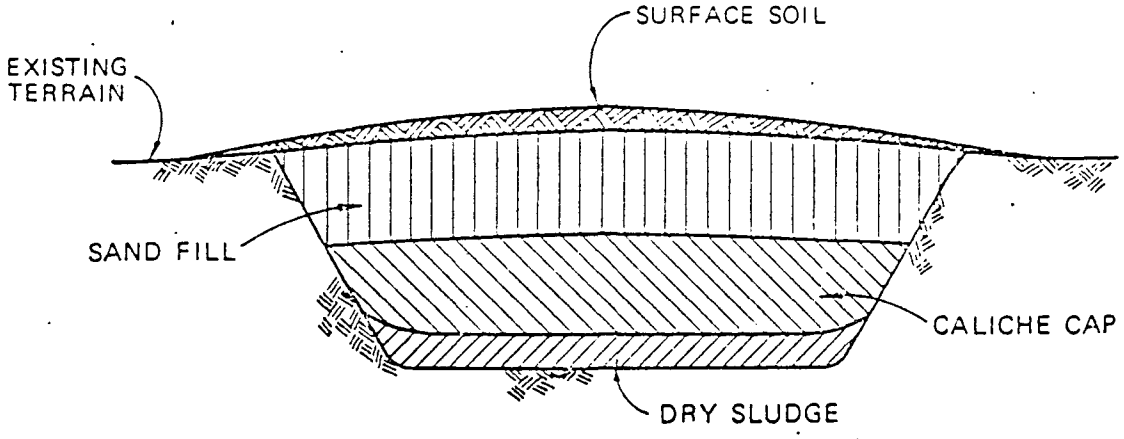
Ponds 1, 2 and 3, the only ponds to be closed which have depths greater than 2 feet, will be closed by first pushing the dried sludge down from the sloping sides, leveling the sludge and applying a caliche layer to an average depth of 2½ feet to yield a slight convex dome of approximately 3 feet in thickness at the apex. Over the caliche layer will be placed a layer of filler dirt material in ponds Nos. 1 and 3, while pond No. 2 will not have such a buffer layer between the caliche and topsoil due to its shallower depth. Topsoil will be applied to a depth of 2 feet directly over the caliche layer on pond No. 2 and over the fill layer on ponds Nos. 1 and 3. The final surface configuration of all closed ponds will be a gently sloping knoll for each, replacing the present ponds with berm. This surface configuration should assist in directing precipitation and surface runoff away from the closed ponds. Figure 1 of this Addendum, which is a revised version of Figure 3 of the Closure Plan, exhibits a schematic cross section of a pond representative of ponds 1, 2 and 3.

Ponds 4 through 8, due to their very shallow nature (see Figure 2, Closure Plan), will be closed differently than the deeper ponds 1, 2 and 3. These shallow depressions will be closed by spreading topsoil over them to a depth of approximately 2½ feet, yielding a convex knoll which will blend with the surrounding terrain and will serve to direct



BEFORE CLOSURE

NOT TO SCALE



AFTER CLOSURE

NOT TO SCALE

EL PASO NATURAL GAS COMPANY

CROSS SECTIONS
OF
POND CLOSURE

FIGURE 1

drainage away from the covered sludge to existing drainage points. Some minor earthwork may be necessary to connect drainage channels within the Plant area and to prevent ponding.

Estimates of the amount of caliche, fill dirt and topsoil necessary to close the eight wastewater evaporation ponds at Jal No. 4 Plant are presented in Table 2. The actual quantities of fill material actually used will, no doubt, differ from these estimates due to errors made in estimating average depth of ponds, pond acreage, etc. However, the values shown in Table 2 are to be considered as best-available working estimates.

Erosion control and post-closure activities of all closed ponds at Jal No. 4 Plant will be in accordance with the Closure Plan.

TABLE 2

Estimated Fill Material (cubic yards)
Necessary to Close Ponds at Jal No. 4 Plant

Pond	Size (acres)	Depth (feet)	Fill Material Needed (yd^3)		
			Caliche	Fill Dirt	Topsoil
1	1.16	8	4,679	6,550	3,743
2	0.17	4	686	-	549
3	0.69	6	2,778	2,222	2,222
4	0.18	2	-	-	726
5	0.64	<2	-	-	2,065
6	1.37	2	-	-	5,526
7	1.58	2	-	-	6,373
8	0.89	<2	-	-	2,872
Totals	6.68		8,143	8,772	24,076

APPENDIX A

Chain of Custody Records

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

Collector's Sample No. 82-002

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 ~ POND No. 3
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT, EL PASO NATURAL GAS

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

Collector's Name Orin Weir Telephone: (915) 541-2407
signature

Date Sampled FEBRUARY 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste INDUSTRIAL DISCHARGE FROM PRINE POND & GAS PLANT

Field Information REFERENCE PHOTO No. B&O DRAWING No. 5004.19-1 (A)
AUGERED FROM POND BOTTOM AT THE WEST SIDE OF POND NEAR THE CLASSIFIER INLET. SAMPLE COLLECTED FROM 0-26" DEPTH WITH 1½" Ø AUGER.

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Orin Weir signature	Environmental Tech title	FEB. 3, 1982 – FEB. 9, 1982 inclusive dates
2.	Carl F. Murray signature	Chief Chem S. P. Lab title	Feb 9 1982 – inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-003

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 ~ POND No. 3
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT., EL PASO NATURAL GAS

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

Collector's Name Orias Ureta Telephone: (915) 541-2407
signature

Date Sampled FEBRUARY 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste INDUSTRIAL DISCHARGE FROM GAS PLANT, WATER TREATER, DEHYDRATION PLANT ETC.

Field Information AUGERED FROM POND BOTTOM AT THE WEST SIDE OF POND NEAR THE CL CLASSIFIER INLET. SAMPLE COLLECTED 26"-34" DEPTH WITH 1½"ϕ AUGER

REFERENCE PHOTO NO. B.C.&D. DRAWING NO. 5004.19-1 (A)

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Orias Ureta signature	ENVIRONMENTAL TECH. title	FEB. 3, 1982 - FEB. 9, 1982 inclusive dates
2.	Carl L Murray signature	C.L. Chm. S.D. title	2-9-1982 - inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-004

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 ~ POND No. 3
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT., EL PASO NATURAL GAS

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

Collector's Name Orion Uribe Telephone: (915) 541-2407
signature

Date Sampled FEBRUARY 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste INDUSTRIAL DISCHARGE FROM BRINE POND & GAS PLANT

Field Information AUGERED FROM POND BOTTOM AT THE WEST SIDE OF POND NEAR THE CLASSIFIER INLET. SAMPLE COLLECTED FROM 34"-46" DEPTH WITH 1½" ∅ AUGER. REFERENCE PHOTO No. B,C,D. DRAWING No. 5004.19-1 E

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Orion Uribe signature	ENVIRONMENTAL TECH. title	FEB. 3, 1982 - FEB. 9, 1982 inclusive dates
2.	Carl L. Mimay signature	Ch. Chem., S.D. Lab title	Feb 9, 1982 - inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-005

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 ~ POND No. 3
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT., EL PASO NATURAL GAS

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

Collector's Name Osias Urias Telephone: (915) 541-2407
signature

Date Sampled FEBRUARY 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste INDUSTRIAL DISCHARGE FROM BRINE POND & GAS PLANT

Field Information AUGERED FROM POND BOTTOM AT THE WEST SIDE OF POND NEAR THE CLASSIFIER INLET. SAMPLE COLLECTED FROM 46"-62" DEPTH WITH 1½" ø AUGER. REFERENCE PHOTO No. B,C,& D. DRAWING No. 5004.19-1 (A)

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Osias Urias signature	ENVIRONMENTAL TECH. title	FEB. 3, 1982 - FEB. 9, 1982 inclusive dates
2.	Carl L. Murray signature	C/Chem S.D. Lab. title	Feb 9 1982 - inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-006

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: Jal No. 4 ~ Pond No. 4
Sample

Shipper Name: Environmental Affairs Dept., El Paso Natural Gas

Address: P.O. Box 1492 (number) (street) El Paso (city) Texas (state) 79978 (zip)

Collector's Name Orion Uribe (signature) Telephone: (915) 541-2407

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste Wastewater From Industrial Process At The Natural Gas Plant.

Field Information Composited the surface to 4" depth across east side of pond. Surface of pond was dry & solid enough to walk on. Auger was used to define depth of sludge. The section found the upper two feet to be soil (brown-clay some sand) and below to be oil sludge of unknown depth. Reference photo No. D.& E. Dwg No 5004.19-1

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Orion Uribe	Environmental Tech.	Feb. 3, 1982 - Feb. 9, 1982
2.	Carol L. Murray	C.A. Chem, S.P. Lab	Feb. 9, 1982 -
3.			

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

Collector's Sample No. 82-007

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: Jal No. 4 ~ Pond No. 4
Sample

Shipper Name: Environmental Affairs Dept., El Paso Natural Gas

Address: P.O. Box 1492 El Paso Texas 79978
number street city state zip

Collector's Name Osias Ueltz Telephone: (915) 541-2407
signature

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste Wastewater From Industrial Process at the Natural Gas Plant

Field Information Composited the surface to 4" depth across west side of pond. Surface of pond was dry & solid enough to walk on. Auger was used to define depth of sludge. The section found the upper 2' to be soil (brown clay, some sand) and below to be oil sludge of unknown depth. Refereace Photo No. D & E Dwg. No. 5004.19-1 (A)

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Osias Ueltz signature	Environmental Tech title	Feb. 3, 1982 - Feb. 9, 1982 inclusive dates
2.	Carl T. Murray signature	Chief Chem., SD Lab title	Feb 9 1982 - inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-008

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓ Disposal Site

___Other: Sample JAL No. 4 ~ POND No. 7

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT, EL PASO NATURAL GAS CO.

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

Collector's Name Forrest R. Sprosty (signature) Telephone: (915) 541-6138

Date Sampled FEBRUARY 3, 1982 Time Sampled — hours

Type of Process Producing Waste NATURAL GAS PLANT WASTEWATER DISCHARGE

Field Information 0-24" Sample - ADARK BROWN DISCOLORATION OF Sandy Soil. Appeared to be Soil excavated From POND No. 9 AND/OR embankment material washed Down The Slope. Reference Photo. # DRAW No 5004.19-1

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest R. Sprosty	Senior Environmental Eng.	Feb 3, 1982 - Feb 9, 1982
2.	Carl F Murray	C Tech. SDL	Feb 9 1982 -
3.	_____	_____	_____

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

Collector's Sample No. 82-009

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 ~ POND No. 7
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT, EL PASO NATURAL GAS CO.

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

Collector's Name FORREST R. SPANGLER Telephone: (915) 541-6138
signature

Date Sampled FEBRUARY 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING PLANT WASTEWATER

Field Information 24" → 48" NATURAL SOIL, REFERENCE PHOTO H, DWG. No. 5004.19-1 REV A.

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	FORREST R. SPANGLER signature	Senior Environmental Eng. title	Feb. 3, 1982 - Feb. 9, 1982 inclusive dates
2.	[illegible] signature	[illegible] title	[illegible] inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-010

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: Sample Pond No. 7 Jal No. 4

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT, EL PASO NATURAL GAS

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

Collector's Name: Forest R. Sprouse (signature) Telephone: (915) 541-6138

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING PLANT WASTEWATER

Field Information 0-18" depth moist SAND slightly DARKER in color THAN soil beneath. Appears to be NATURAL SOIL. Reference Plat No. H, DWG. No. 5004.19-1

Sample Receiver:

1. Southern Division Laboratory, EPNG
   name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Forest R. Sprouse	Senior Environmental Eng.	Feb. 3, 1982 - Feb 9, 1982
2.	[illegible]	[illegible]	[illegible]
3.			

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

Collector's Sample No. 82-011

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓Disposal Site

___Other: Jal No.4 ~ Pond No. 7
Sample

Shipper Name: Environmental Affairs Dept. El Paso Natural Gas Co.

Address: P.O. Box 1492, El Paso Texas 79978
number street city state zip

Collector's Name Orisa Ulrich Telephone: (915) 541-2407
signature

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste Overflow From Pond No. 8, Recieves Surface Runoff & Industrial Waste From Gas Plant Processes.

Field Information Excavated From A Pit, 100' East Of Pond # 9

Embankment: 18"-36" Depth, Light Brown Sand, Natural Soils.

Reference Photo No. H, Dwg. No. 5004.19-1 (A)

Sample Receiver:

1. _____
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.			
2.	[illegible]	[illegible]	Feb 3 1982
3.			

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

Collector's Sample No. 82-012

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: POND No. 5 JAL No. 4 PLANT
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT, EL PASO NATURAL GAS

Address: PO Box 1492 EL PASO, TEXAS 79978
number street city state zip

Collector's Name Forrest R. Spuster Telephone: (915) 541-6138
signature

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING PLANT WASTEWATER

Field Information SALT CRYSTALS NOTED ON THE SURFACE WHERE BRINE HAD EVAPORATED. Reference PHOTO No. F, DWG. No. 5004.19-1

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY, EANG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest R. Spuster	Senior Environmental Eng.	Feb 3, 1982 – Feb 9, 1982
2.	[illegible]	[illegible]	Feb 9 1982 –
3.			

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

Collector's Sample No. 82-03

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site (Control)

___ Other: JAL No. 4 Plant, Background Sample
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPARTMENT, EL PASO NATURAL GAS

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

Collector's Name Forrest R. Sprusta Telephone: (915) 541-6138
signature

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NONE

Field Information Soil Sample is NATURAL soil Collected From South of PLANT ENTRANCE FOR Comparison Purposes

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest R. Sprusta	Senior Environmental Eng.	Feb. 2, 1982 – Feb. 9, 1982
2.	[illegible]	[illegible]	[illegible]
3.			

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

Collector's Sample No. 82-013

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓ Disposal Site (Control)
___Other: JAL No. 4 PLANT, BACKGROUND SAMPLE A
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPARTMENT, EL PASO NATURAL GAS

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

Collector's Name Forrest R. Sprosty Telephone: (915) 544-6138
signature

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NONE

Field Information Soil Sample is NATURAL soil Collected From South of PLANT. ENTRANCE FOR Comparison Purposes - from 4'-8"

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest R. Sprosty	Senior Environmental Eng.	Feb. 2, 1982 - Feb. 9, 1982
2.	[illegible]	[illegible]	Feb. 19[illegible]
3.	_____	_____	_____

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

Collector's Sample No. 82-04

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 PLANT, POND 6
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT, EL PASO NATURAL GAS CO.

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

Collector's Name Forrest R. Smith signature Telephone: (915) 541-6138

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING PLANT WASTEWATER

Field Information SURFACE TO 9 inch DEPTH SEDIMENT from RUNOFF AND POSSIBLY SOME INDUSTRIAL WASTES. THE LAYERS WERE GREEN, BLUE, GRAY AND BROWN. Reference Photo No. 6, DWG. No. 5004.19-1

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Forrest R. Smith signature	Senior Environmental Eng. title	Feb. 3, 1982 – Feb 9, 1982 inclusive dates
2.	[illegible] signature	[illegible] title	Feb. 9 1982 – inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-015

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓Disposal Site

___Other: JAL No. 4 ~ POND No. 6
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT, EL PASO NATURAL GAS

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

Collector's Name Osias Urias Telephone: (915) 541-2407
signature

Date Sampled FEBRUARY 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste RUNOFF FROM PLANT SITE.

Field Information EXCAVATED PIT USING BACKHOE, SAMPLE COLLECTED FROM SIDE OF PIT. 9" TO 6'-9" OF ORGANIC MATERIAL CONTAINING ROOTS. THE SOIL CONTAINED SAND AND WAS MOIST. REFERENCE PHOTO No. G. DWG. No. 5004.19-1 (A)

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY, EPNG.
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Osias Urias signature	Environmental Tech. title	Feb 3, 1982 - Feb. 9, 1982 inclusive dates
2.	Carl L Murray signature	Ch. Chem, S.A.Lab title	Feb 9, 1982 - inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-016

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 PLANT, POND 6
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT / EL PASO NATURAL GAS Co.

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

Collector's Name Forrest R. Sprester Telephone: (915) 541-6138
signature

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING PLANT WASTEWATER

Field Information Bottom of PIT, white-brown, caliche.

Reference Photo No. 6, DWG. No. 5004.19-1

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. Forrest R. Sprester signature	Senior Environmental Engineer title	Feb. 3, 1982 - Feb 9, 1982 inclusive dates
2. Carl L Murray signature	Ch. Chem, S.D. Lab title	Feb 9, 1982 - inclusive dates
3. _____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-017

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 - POND No. 8
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT., EL PASO NATURAL GAS CO.

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

Collector's Name Osias Ueltz (signature) Telephone: (915) 541-2407

Date Sampled FEBRUARY 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING PLANT WASTE

Field Information EXCAVATED PIT USING BACKHOE, COLLECTED SAMPLE FROM SIDES OF PIT. 0-12" DEPTH, LAYERS OF SEDIMENT, WELL DRIED & BROKEN, CONTAINS MANY COLORS (BLUE, WHITE, GREEN, BROWN) IN SEPERATE LAYERS. REFERENCE PHOTO No. H THRU O DWG. No 5004.19-1 (A)

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Osias Ueltz (signature)	ENVIRONMENTAL TECH. (title)	FEB. 3, 1982 - FEB. 9, 1982 (inclusive dates)
2.	Carl L. Murray (signature)	Lab. Clerk, S.D. Lab (title)	Feb. 9, 1982 - (inclusive dates)
3.	_____ (signature)	_____ (title)	_____ (inclusive dates)

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

Collector's Sample No. 82-018

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 PLANT, POND No. 8
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT., EL PASO NATURAL GAS CO.

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

Collector's Name Forrest R. Sprester Telephone: (915) 541-6138
signature

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING PLANT WASTEWATER

Field Information 12" – 24" Depth, LAYERS OF SEDIMENT, CONTAINED MANY colors in seperate layers Reference Photos H-70, RW 5004.14-1

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest R. Sprester	Senior Environmental Eng.	Feb 3, 1982 – Feb 9, 1982
2.	Carl L Murray	Ch. Chem. S.D. Lab	Feb 9, 1982 –
3.	_____	_____	_____

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

Collector's Sample No. 82-019

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓Disposal Site

___Other: JAL No. 4 PLANT, POND 8
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT. EL PASO NATURAL GAS

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

Collector's Name Forrest R. Sprosty Telephone: (915) 541-6138
signature

Date Sampled February 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING PLANT WASTEWATER

Field Information 24"-30" Top soil, Roots, Leaves etc., BLACK & Soft.
Reference Photo No. H-0, DWG. No. 5004.19-1

Sample Receiver:

1. Southern Division Laboratory, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Forrest R Sprosty signature	Senior Environmental Engineer title	Feb. 3, 1982 - Feb 9 1982 inclusive dates
2.	Carl E Murray signature	C.L. Chem, S.O. Lab title	Feb. 9, 1982 - inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-020

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 ~ POND 8
Sample

Shipper Name: ENVIRONMENTAL AFFAIRS DEPT., EL PASO NATURAL GAS CO.

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

Collector's Name Osias Ueits Telephone: (915) 541-2407
signature

Date Sampled FEBRUARY 3, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING

Field Information EXCAVATED PIT USING BACKHOE, SAMPLE COLLECTED FROM SIDE OF PIT. 30"-54" CLAY & SAND, MOIST, BROWN COLOR.

REFERENCE PHOTO NO. H THRU O. DWG. NO. 5004.19-1 (A)

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY, EPNG
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Osias Ueits signature	ENVIRONMENTAL TECH. title	FEB 3, 1982 - FEB. 9, 1982 inclusive dates
2.	Carl L. Murray signature	Ch. Chem. S.D. Lab title	Feb. 9, 1982 - inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

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

Collector's Sample No. 82-022

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 PLANT POND 7
Sample

Shipper Name: EL PASO NATURAL GAS COMPANY E.A.D.

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

Collector's Name Forrest N. Sparks Telephone: (915) 541-6138
signature

Date Sampled FEBRUARY 16, 1982 Time Sampled 1530 hours

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

Field Information CUT TRENCH & SAMPLE COMPOSITE FROM EXPOSED LAYER. FROM 2" TO 12" DEPTH OILY SAND - BLACK - OIL VERY THICK AND SEEPED FROM SIDES OF TEST PIT.

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY
name and address of organization receiving sample

2. ___

3. ___

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest N. Sparks	SENIOR ENVIRONMENTAL ENG.	2-16-82 - 2-19-82
2.	Carl L. Kinney	Chem Div. Chemist	2-19-82
3.	___	___	___

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

Collector's Sample No. 82-023

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓Disposal Site

___Other: JAL No. 4 PLANT POND 7
Sample

Shipper Name: EL PASO NATURAL GAS COMPANY E.A.D.

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

Collector's Name Forrest N. Sprott Telephone: (915) 541-6138
signature

Date Sampled FEB. 16, 1982 Time Sampled 1530 hours

Type of Process Producing Waste DISCHARGE OF OILY WASTES FROM NATURAL GAS PROCESSING PLANT

Field Information COMPOSITE OF SAND FROM EXPOSED SIDES OF TEST PIT. FROM 14" TO 20" DEPTH. BROWN SOIL.

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY
name and address of organization receiving sample

2. ___

3. ___

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest N. Sprott	SENIOR ENVIRONMENTAL ENG.	2-16-82 - 2-19-82
2.	Carl L. Murray	C.H. Div. Chemist	2-19-82
3.			

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

Collector's Sample No. 82-024

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓ Disposal Site

___Other: JAL No. 4 PLANT POND 7
Sample

Shipper Name: EL PASO NATURAL GAS COMPANY E.A.D.

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

Collector's Name Forrest R. Sprouse Telephone: (915) 541-6138
signature

Date Sampled FEB. 16, 1982 Time Sampled 1530 hours

Type of Process Producing Waste DISCHARGE OF OILY WASTES FROM NATURAL GAS PROCESSING PLANT

Field Information GRAB FROM BOTTOM OF TEST PIT. HARD "PAN" CALICHE SOIL LIGHT BROWN AT A DEPTH OF 20" TO 22".

Sample Receiver:

1. SOUTHERN DIVISION LABORATORY
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest R. Sprouse	SENIOR ENVIRONMENTAL ENG.	2-16-82 2-19-82
2.	Carl L. Murray	C.A. Div Chemist	2-19-82
3.			

JEG / FRS / R+n JCB
General 6-2-82

El Paso
Natural Gas Company

TWO PETROLEUM CENTER / SUITE 200
NORTH "A" AT WADLEY
MIDLAND, TEXAS 79701

PHONE: 915-684-5701

May 27, 1982

Mr. Oscar Simpson III
Water Resources Specialist
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: El Paso Natural Gas Company
Jal No. 4 Plant Discharge Plan

Dear Mr. Simpson:

During our meeting of May 4, 1982, you requested additional information from El Paso to enable the Oil Conservation Division to complete its evaluation of the Jal No. 4 Discharge Plan. Information requested includes:

1. Engineering drawings for the proposed contingency tank and associated pump and piping systems.

2. Coating specifications for the contingency tank internal and external coating system.

3. A contingency plan for operation of the overall disposal system to assure a continuous, approved means of disposing of the Jal No. 4 waste water discharge.

4. A pond closure plan containing results of analyses of sludge samples obtained from all Jal No. 4 ponds, as well as proposed construction procedures for closure of the ponds.

Pursuant to your request, the following information is enclosed:

1. El Paso Natural Gas Company drawings:

1J4-1-P27 Classifier Area Piping Plan
1J4-1-P44 Contingency Tank Area Piping Plan
1J4-1-P45 Contingency Tank Piping Details Plan
1J4-1-P46 Classifier and Flare Line Piping Plan
1J4-1-P47 Chlorinator Station and Drain Area Piping Plan

2. El Paso Natural Gas Company Paint Systems specification sheet for a coal tar epoxy coating system. This system will be applied to the internal and external surfaces of the contingency tank.

3. Contingency plan for operation of the Jal No. 4 waste water disposal system.

The pond closure plan is being prepared by our main office Environmental Affairs Department and will be forwarded directly from that department to your attention.

During our telephone conversation of May 18, 1982, you requested that El Paso also include in its contingency plan a proposal for guaranteeing that underground drain lines and collection systems are not leaking. Based on our preliminary evaluation of this requirement, we propose to conduct an annual pressure test of these lines and systems, similar to the test procedures which you indicated were used by other companies to satisfy this requirement. Our engineering personnel are presently evaluating the actual requirements for implementing such a test at Jal No. 4. A plan for conducting the tests will be prepared upon completion of the evaluation.

I trust the above information and the enclosures satisfy the remaining requirements for acceptance by the Oil Conservation Division of El Paso's Jal No. 4 Discharge Plan.

If you should have any questions relative to this response, please notify me.

Sincerely,

EL PASO NATURAL GAS COMPANY

Don Bigbie

Don Bigbie
Administrative Assistant to
Division Superintendent

DNB:dc
Encl.

bcc: B. J. Matthews
M. E. McEuen
J. W. Cronenberg
K. W. Corder
D. J. Mobbs
J. F. Eichelmann, Jr.
H. Reiquam
F. Smythe
R. H. Lovell

JAL NO. 4 PLANT
WASTE WATER DISPOSAL SYSTEM

OPERATING CONTINGENCY PLAN

Waste water disposal at El Paso Natural Gas Company's Jal No. 4 Plant is accomplished by injection into an approved disposal well. The waste water is passed through a classifier system for removal of oils and then filtered before it is injected into the well. The following information outlines El Paso's plans and preparations for assuring operational integrity of the overall system to prevent discharge of waste water onto the ground surface.

1. Injection Pumps

   Only two pumps are required for the injection rates at Jal No. 4. Three pumps are installed to provide a stand-by spare.

2. Waste Water Filters

   A bypass filter was recently installed with switching valves and a backwash system to prevent system shutdowns due to filter plugging.

3. Classifier Discharge Pumps

   Two pumps, one of which is a full capacity spare, are installed for transfer of fluids from the classifier tank to the injection system surge tank.

4. Contingency Tank

   The contingency tank will have two sump pumps, one of which is a full capacity spare, to transfer fluids back into the classifier tank.

   In the event of a system shutdown of more than 48 hours due to a well workover or unforeseen problems, the Jal No. 4 waste water would be transported by tank truck to the Jal No. 3 disposal well or other acceptable disposal site.

May 26, 1982

TABLE 485-12
PAINT SYSTEMS, EXTERIOR BOTTOMS OF ALL GROUND STORAGE TANKS[1]

MANUFACTURERS	PORTER	CEILCOTE
PREPARATION	White Metal No. 1	White Metal No. 1
COATS		
PRIMER	Porter "Tarset" Standard Coal Tar Epoxy (Red) Amine Cured	Flake Tar Coal Tar Epoxy Amine Cured
Dry Mil Thickness (mm)	8.0-9.0 (0.20-0.23)	8.0-9.0 (0.20-0.23)
Recoat Time In Hours	8-24	8-24
Application Method	Spray	Spray
SECOND COAT	Porter "Tarset" Standard Coal Tar Epoxy (Black) Amine Cured[2]	Flake Tar[2] Coal Tar Epoxy Amine Cured
Dry Mil Thickness (mm)	8.0-9.0 (0.20-0.23)	8.0-9.0 (0.20-0.23)
Recoat Time In Hours	8-24	8-24
Application Method	Spray	Spray
THIRD COAT	None	None
SYSTEM SOLVENT	Tarset Thinner #T-13	T-460 Above 60°F T-470 Below 60°F
TOTAL MIN./MAX. DRY MIL THICKNESS/SYSTEM (mm)	16.0-18.0 (0.41-0.46)	16.0-18.0 (0.41-0.46)

[1]Coating materials for these tanks shall be specified by the Company's Engineering Department in accordance to the specific requirements of the particular vessel as the operating conditions become known. All exterior bottoms of storage tanks resting on ground.

[2]Finished system shall be allowed to cure a minimum of 72 hours before being placed on the ground.

General 82-83

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 827-5271
Russell F. Rhoades, M.P.H., Director

Bruce King
GOVERNOR

George S. Goldstein, Ph.D.
SECRETARY

Larry J. Gordon, M.S., M.P.H.
DEPUTY SECRETARY

cc: BJM
MEM
JWC
DJM
H. Leigue
R. Louie
6/21

June 16, 1982

Mr. D.N. Bigbie
Administrative Assistant to the
Division Superintendent
El Paso Natural Gas Company
Two Petroleum Center, Suite 200
North "A" at Wadley
Midland, Texas 79701

RE: Domestic Sewage Discharge Plans for El Paso Natural Gas Company's Eunice (DP-221), Jal #3 (DP-198), Jal #4 (DP-199), and Monument (DP-226) Plants.

Dear Mr. Bigbie:

The New Mexico Environmental Improvement Division (EID) has received your letter of May 26, 1982, concerning the above referenced discharge plans. In accordance with your request in that letter, these discharge plans are withdrawn from EID review and consideration for approval. We understand that these domestic effluents will be commingled with other plant discharges and therefore be transferred the Oil Conservation Division (OCD) regulatory jurisdiction.

Thank you for the cooperation of you and your staff during the EID review of these discharge plans. If we can be of any further assistance or if you need further information, please do not hesitate to ask.

Sincerely,

David G. Boyer
Ground Water Hydrologist
Water Pollution Control Bureau

DGB:jba

cc: John Guinn, District IV
Brown Edwards, EID Hobbs
R.L. Stamets, OCD, Santa Fe
John Eichelmann, El Paso Natural Gas Co., Santa Fe

El Paso
Natural Gas Company

TWO PETROLEUM CENTER / SUITE 200
NORTH "A" AT WADLEY
MIDLAND, TEXAS 79701

PHONE: 915-684-5701

May 26, 1982

Randall T. Hicks
New Mexico Environmental Improvement Division
P. O. Box 968
Santa Fe, New Mexico 87503

Re: Domestic Sewage Discharge Plans for El Paso Natural Gas Company's Eunice, Jal No. 3, Jal No. 4, and Monument Plants

Dear Mr. Hicks:

Domestic Sewage Discharge Plans for El Paso Natural Gas Company's Eunice, Jal No. 3, Jal No. 4, and Monument Plants were submitted to the New Mexico Environmental Improvement Division under cover letters dated March 31, 1982, October 1, 1981, and April 6, 1982. Additionally, addendums to the plans were submitted at various dates.

Following receipt of your April 14, 1982 letter addressing the Jal No. 4 Discharge Plan and the subsequent meeting that Mr. John Eichelmann and I attended in your Santa Fe office on May 4, 1982, El Paso re-evaluated its sewage disposal proposals based on the potential additional requirements and uncertainties associated with the leach field arrangements.

El Paso's further evaluations have resulted in a decision to chlorinate and inject the sewage effluent into the waste water disposal systems at all plants; therefore, we respectfully request withdrawal of the Domestic Sewage Discharge Plans as previously submitted for your consideration and approval.

We understand from the discussions of our May 4, 1982 meeting in your office that El Paso's decision to discharge the sewage effluent with the plant waste water will result in the transfer of regulatory jurisdiction for this operation from the New Mexico Environmental Improvement Division to the New Mexico Oil Conservation Division.

If anything further is required from El Paso to effect the withdrawal of these plans, please notify me. Your assistance and cooperation in this matter is greatly appreciated.

Sincerely,

EL PASO NATURAL GAS COMPANY

D. N. Bigbie

D. N. Bigbie
Administrative Assistant to
Division Superintendent

DNB:dc

Distribution:

M. E. McEuen
J. W. Cronenberg
H. Reqiquam
F. Smythe
R. H. Lovell
John Eichelmann, Jr.

Oscar Simpson
NMOCD - Santa Fe, N. M.

NOTICE OF PUBLICATION

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

SANTA FE, NEW MEXICO

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following proposed discharge plan has been submitted for approval to the Director of the Oil Conservation Division, P. O. Box 2088, State Land Office Building, Santa Fe, New Mexico 87501, telephone (505) 827-3260.

EL PASO NATURAL GAS COMPANY, Jal Plant No. 4 (Sections 5, 6, 31, and 32, Townships 23 and 24 South, Range 37 East) P. O. Box 1384, Jal, New Mexico 88252, also P. O. Box 1492, El Paso, Texas 79978, telephone (915) 541-3292, proposes to discharge approximately 2330 barrels of waste water per day. The waste water is derived from plant process, boiler and cooling tower water, and domestic effluent. Approximately 430 barrels per day of cooling tower water will be supplied to Conoco Inc. for their use in a nearby waterflood project. The remainder of the waste water will be disposed of by an injection well(Section 32, Township 23 South, Range 37 East) located at the plant site. The total dissolved solids content of the waste water is approximately 1100 mg/L.

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

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

the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN Under the Seal of the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 25th day of October, 1982.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

JCB
Jal 4 Discharge Plan
General 80-41

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

May 8, 1981

El Paso Natural Gas Company
Two Petroleum Center/Suite 200
North "A" Wadley
Midland, Texas 79701

Attention: M. E. McEven

Re: Discharge Plan for El Paso Natural Gas Company Jal No. 4 Plant, Lea County, New Mexico

Gentlemen:

We have received your Discharge Plan for Jal No. 4 Plant on April 8, 1981. In reviewing your discharge plan we find that additional information is needed in order to evaluate the plan.

The additional information needed is as follows:

1. Submit a complete schematic diagram with accompanying text illustrating the flow of water and wastewater from the point or points of collection to the point or points of discharge. The schematic diagram and text should include:

   A. the water field

   B. the Housing Area

   C. the plant area (illustrate and name each part of the plant using water or emitting wastewater.

   D. the collection and storage system for receiving cooling tower blowdown to be sold to Conoco

   E. irrigation systems (sources of water)

2. Submit additional information on each component of the typical block flow diagram (figure 6) such as dimensions, capacity, material constructed of, location on figure 5, and plumbing and valve arrangement between each component.

3. Specify what specific disposal methods will be used for the solids from the classifier and for the sludge and associated waste from the evaporation ponds.

4. Submit an overall detailed outline which includes:

   a. The present procedures and methods used FOR disposing of sewage and the disposal methods to be used until chlorination can take place.

   b. The estimated dates for budgeting, installation, and completion of the chlorination equipment to treat sewage.

   c. Estimated date treated sewage will begin to be dumped into the classifier for injection.

5. Submit estimated daily production of wastewater coming from the plant, sewage from the housing and plant area, cooling tower blowdown to be sold to Conoco, and any other sources.

6. Submit past records of the daily and yearly totals of wastewater and or saltwater injected into SWD 214 well.

7. Submit time table for draining, drying out, removing sludge and waste, and backfilling of the evaporation ponds.

8. Submit data to back up the statement, "The water quality of the Ogallala in the Plant area is brackish", made on page 19, third paragraph from the top, of the Discharge Plan. (Data should include a chemical water analysis of elements listed in Section 3-103 A,B, and C of the Water Quality Control Commission Regulations.

9. Submit a detailed outline of inspection and testing procedures that will be utilized on a regular basis for detection of leakage on the injection system.

10. Submit a cement bond log of the SWD well Shell State No. 13 (32-T23S-R17E) NMPM, Lea County, New Mexico, and the injection rate tests done on the Grayburg.

11. Submit a diagram showing the location and design of site(s) and method(s) to be available for sampling and for measurement or calculation of flow of discharge.

To further clarify the use of the unlined contingency pond for emergency purposes, we would expect the discharge permit to provide that:

1. Permission would be obtained from Hobbs district office prior to discharge into the contingency pond.

2. The quantity, quality, and duration of the discharge into the contingency pond will be considered on each occurrence.

3. The contingency pond would not be allowed to be used as an overflow pond, and would only be used in cases of emergency due to failure of the injection system.

12. Submit a system for recording and reporting to Oil Conservation Division on a semi or annual basis the following:

    a. monthly production of wastewater

    b. inspection and testing intervals and results of

    c. failures of injection system. (date and duration of)

13. Submit a complete chemical analyses of the combined wastewater which will include those elements as listed in Section 3-103 (A,B, and C) of the Water Quality Control Commission Regulations.

If you have any questions on this matter, please do not hesitate to ask.

Sincerely,

OSCAR SIMPSON III
Water Resource Specialist

OS/og

Jal 4 Discharge Plan

El Paso NATURAL GAS COMPANY

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-543-2600

August 7, 1981

Oscar Simpson III, Water Resources Specialist
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87501

RE: El Paso Natural Gas Company
Jal No. 4 Treating Plant
Wastewater Discharge Plan

Dear Mr. Simpson:

Pursuant to your letter of May 8, 1981, El Paso hereby submits the additional information requested regarding the above referenced discharge plan.

These responses, together with the Discharge Plan submitted on April 2, 1981 and the request for exemption of the plant brine storage ponds [letter dated July 6, 1981 from M. E. McEuen (El Paso) to Richard Stamets (NMOCD)], address all the discharge and process waters at the Jal No. 4 plant.

El Paso trusts that compliance with the rules and regulations of the New Mexico Water Quality Control Commission has been demonstrated, and that the Discharge Plan, with attachments and amendments is acceptable to the New Mexico Oil Conservation Division.

Yours truly,

E. F. Smythe

E. F. Smythe, P. E.
Chief - Permits & Support
Environmental Affairs

sg
attach.
cc: M. E. McEuen w/attach.

bcc: L. E. Anderson (w/attach)
J. C. Bridges "
J. W.Cronenberg "
O. R. Dakan "
J. W. McCarthy "
D. Mobbs "
H. Reiquam (w/o attach.)
F. R. Sprester (w/attach.)
T. L. Wright "
File SDP-19 "

Responses to New Mexico Oil Conservation
Division's Request for Additional
Information on the
Jal No. 4 Plant Discharge Plan[1/]
Lea County, New Mexico

Response No. 1: A schematic diagram of the water and wastewater flow for El Paso's Jal No. 4 Plant is shown in Figure 1.

Response No. 1a. The water well field consists of 10 active wells located approximately two miles west of the plant site. The average depth of the wells is 250 feet with the pumping level averaging 195 feet.[2/] The collection system is made of 4 and 6 inch transite and steel pipe with two - 6 inch lines in parallel transporting the water to the plant.

Three steel storage tanks are located at the plant site: 10,000 bbl. at ground level, 2000 bbl. at ground level, and an elevated 595 bbl. tank. The distribution system from the storage tanks consists of steel pipes that vary from 2 to 6 inches in diameter.

Response No. 1.b. The Housing Area water supply is stored in the 595 bbl. elevated tank prior to distribution.

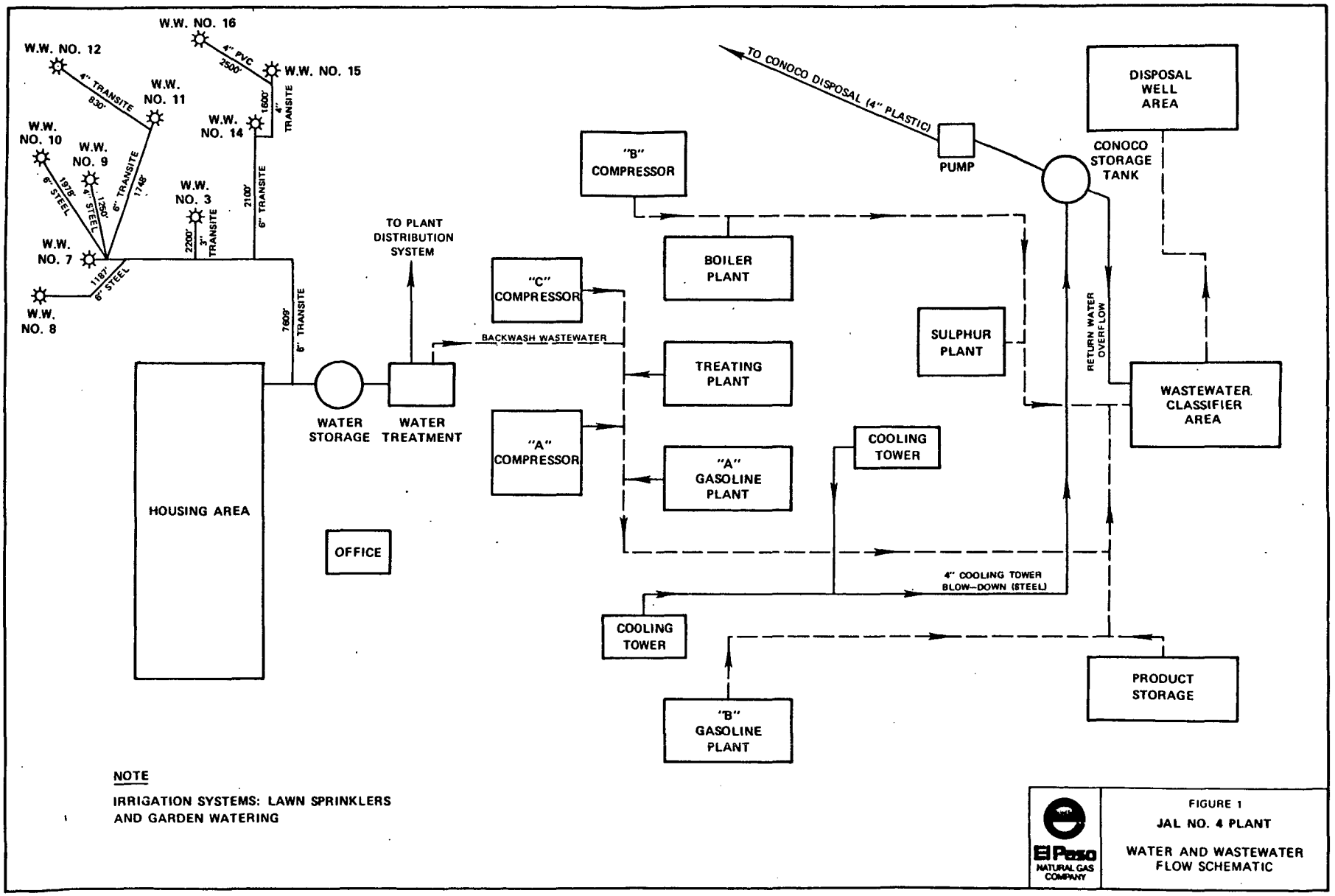
Response No. 1.c. The plant area obtains water from the two ground level storage tanks. Raw water from storage is treated in a zeolite process prior to distribution to plant equipment requiring such waters.

Discharged wastewaters flow from the various processes in steel drain pipes to a collection header then to a steel wastewater classifier tank, for oil and water separation. The separated wastewater is pumped through a 4-inch PVC line to an anthracite filter then into a surge tank. The wastewater from the surge tank is discharged into the disposal well (SWD-214) by means of high pressure plunger type pumps.

The separated oil in the classifier is pumped through a 4-inch steel line to an oil storage tank. The oil is removed from the storage tank to be sold to a reclaimer/refiner as volumes warrant.

1/ Original Discharge Plan Submitted April 2, 1981.

2/ This represents a change to the discharge plan, Section VII Water Use and Disposal, page 23.



NOTE

IRRIGATION SYSTEMS: LAWN SPRINKLERS AND GARDEN WATERING

El Paso NATURAL GAS COMPANY

FIGURE 1

JAL NO. 4 PLANT

WATER AND WASTEWATER FLOW SCHEMATIC

GUIDELINES BY WED.

Response No. 1.d. Wastewater from the cooling tower basin flows through a steel pipe to a steel collection header then to a galvanized steel storage tank. The stored wastewater is then pumped to Conoco through a 4-inch PVC line. An overflow return line is connected to the classifier in the event Conoco can not use the cooling tower wastewater.

Response No. 1.e. The irrigation system consists of lawn sprinklers at individual houses and gardens located in the housing area. The water is derived from the wells described in Response No. 1.a.

Response No. 2: Additional information on each component of the classifier is shown on Figure 5, Revision A, to the submitted Discharge Plan and Figure 2, both attached.

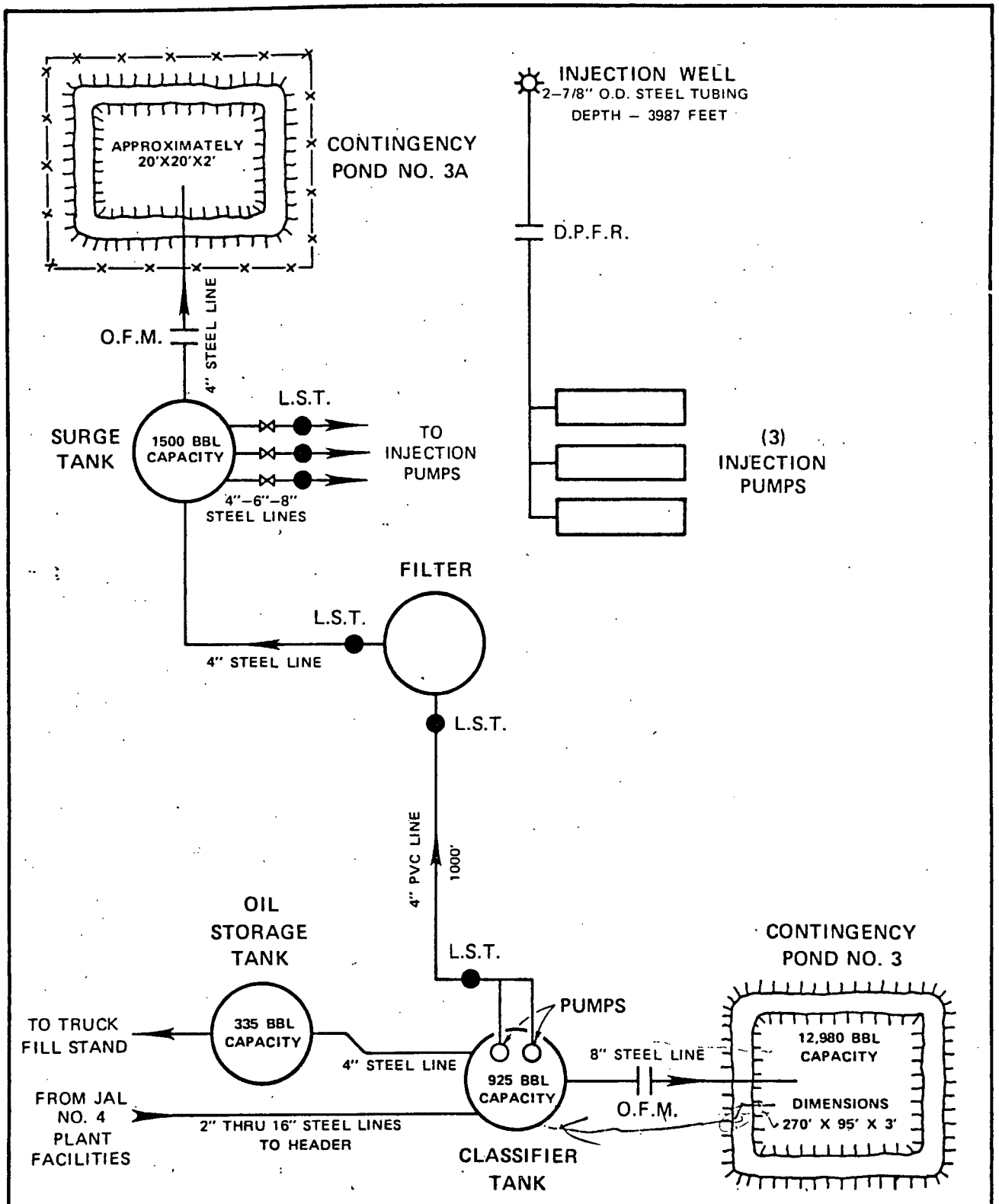
Response No. 3: Sludge from the classifier tank will be removed as necessary and dewatered in steel containers. The dewatered sludge will be stored on site to permit stabilization to further reduce the sludge. The degraded sludge will be sampled and analyzed for ignitability and toxicity. After a negative determination for ignitability and toxicity the sludge will be disposed of in a sanitary landfill certified by the New Mexico Environmental Improvement Division.

Sludge in the two waste disposal pits to be closed are addressed in the attached closure plan (Response No. 7).

Response No. 4: The past and present method of domestic wastewater treatment consists of a septic tank with the effluent being pumped to pond No. 1 (see Figure 5) for disposal by evaporation. El Paso is presently designing an absorption field for domestic wastewater disposal in order to close Pond No. 1.

Domestic wastewaters at oil and gas facilities are regulated by the New Mexico Environmental Improvement Division, if the industrial wastes and domestic wastes are separate discharges. Therefore, a Notice of Intent to Discharge will be filed with the New Mexico Environmental Improvement Division following preliminary design and prior to construction of the new system. The Domestic wastewater will not be chlorinated nor disposed of in the disposal well as previously stated in the discharge plan.[1/]

1/ Represents a change to the discharge plan, Section VIII Discharge Plan, page 25.



LEGEND

O.F.M. – OVERFLOW METER (ON ORDER)

L.S.T. – LIQIUD SAMPLE TAP

D.P.F.R. – DIFFERENTAL PRESSURE FLOW RECORDER

El Paso NATURAL GAS COMPANY

FIGURE 2

JAL NO. 4 PLANT

SAMPLE TAP AND MEASUREMENT SCHEMATIC OF DISPOSAL WATER

Response No. 5: The estimated daily production of wastewater from the Jal No. 4 Plant is shown in Table 1.

TABLE 1

Estimated Daily Production of Wastewater
Jal No. 4 Plant
El Paso Natural Gas Company

Source	Quantity Barrels[1] per day
Industrial wastewater from classfier	1645
Domestic wastewater	256
Cooling tower blowdown wastewater given to Conoco	427
TOTAL DISCHARGE	2328

1/ 42 gallons per barrel.

The total daily discharge averages 68 gallons per minute. Data obtained from the totalizing meter maintained by Conoco indicates an average of 427 barrels of wastewater per day for the first half of 1981 as shown in Table 2.

TABLE 2

Cooling Tower Blowdown Wastewater
Given to Conoco Jan-June 1981

Month	Quantity Average Barrels per day
January	573
February	459
March	377
April	425
May	325
June	400
Average	427

Response No. 6: El Paso's disposal well (SWD-214) was placed in operation on March 7, 1981. The average daily flow rate has been approximately 1550 barrels. The monthly injection of wastewater is shown in Table 3. Actual yearly values are not yet known.

TABLE 3

Monthly Injection of Wastewater into SWD-214

Month	Barrels
March	48,371
April	50,400
May	42,076
June	48,369

Response No. 7: El Paso has evaluated the pond sludges and prepared a closure plan for the two ponds to be abandoned. The closure plan is attached.

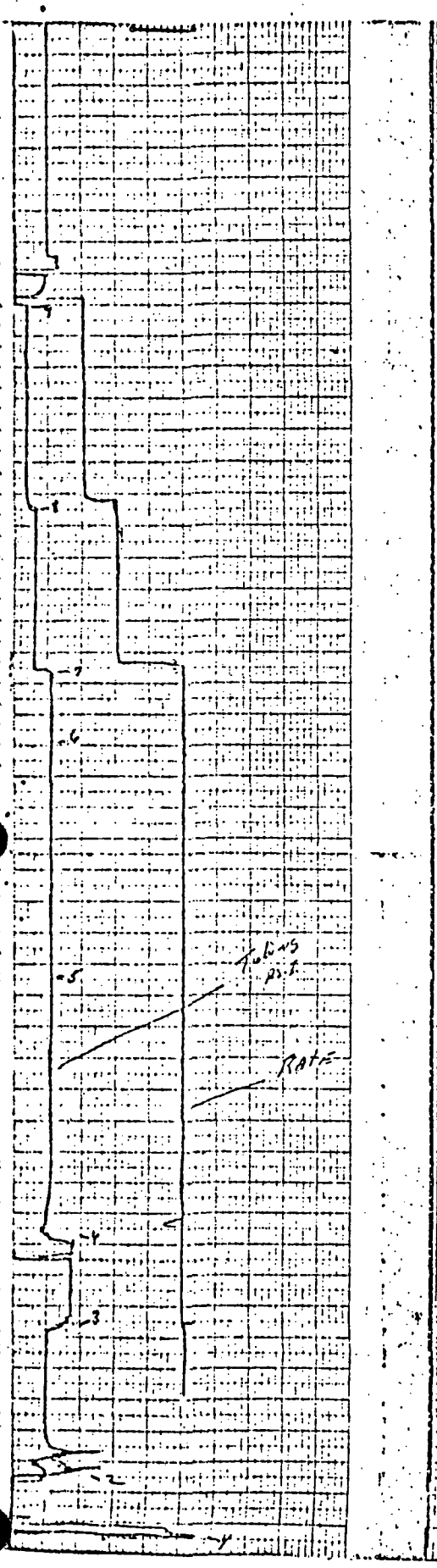
Response No. 8: The quality of the Ogallala formation water in the general area is brackish as defined by Clark et al (1977).[1/] That is, brackish water ranges from 1000 to 35,000 mg/L of dissolved salts. The Discharge Plan contains a summary of water quality data produced by the New Mexico State Engineer and reproduced in Figure 7 of the Plan. From this source the groundwater was determined to range up to 3000 micromhos per centimeter in the general area. According to Standard Methods 14th Edition, specific conductance can be used to check total dissolved solids (TDS). In this case, the TDS or total salts would range up to 2100 mg/L.

A groundwater sample was collected from El Paso Well No. 1 located within the plant boundaries (See Figure 5, Revision A) and analyzed for the constitutents listed in NMWQCC Regulation Section 3-103. The results of the analysis is shown in Table 4.

Response No. 9: El Paso will conduct a tracer-temperature survey when requested by NMOCD for detection of leakage on the injection system. SWD-214 was completed without a pressure monitor system because of the lack of clearance for a tubing packer for the 2-7/8 inch tubing inside the 4-1/2 inch casing.

Response No. 10: Copies of the cement bond log of SWD-214 and the job log performed by Halliburton Services are attached.

[1/] Clark, J. W., W. Viessman, Jr., M. J. Hammer, Water Supply and Pollution Control, 3rd Edition, Harper & Row, Publishers, New York, N.Y., 1977.



HALLIBURTON SERVICES
JOB LOG

WELL NO. #1 LEASE JAL #4 PLANT SWD JOB NO. 715978
CUSTOMER EL PASO NATURAL PAGE NO. 1
JOB TYPE Injection DATE 11/20/79

CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS T	PUMPS C	PRESSURE (PSI) TUBING	PRESSURE (PSI) CASING	DESCRIPTION OF OPERATION AND MATERIALS
								safety meeting
1	17:55					5300		test lines
2	17:58	5.0	2140			1100		breakdown (2000 PSI)
3	18:08	7.0	1400			1700		increase rate
4	18:16	5.0				990		decrease rate
5	18:31	5.0				1100		
6	18:46	5.0				1090		
7	18:51	3.0	7610			600		decrease rate
8	19:01	2.0	1320			360		decrease rate
9	19:14		1160			0		shutdown ISIP
								total load 341 barrels water

HALLIBURTON SERVICES
JOB SUMMARY

HALLIBURTON DIVISION Midland
HALLIBURTON LOCATION Hobbs
DOWELL SCHL. & EMPLOYEE NO. JOB NO. 715978

WELL DATA

FIELD N. of Jal SEC. TWP. RNG. COUNTY Lea STATE N.M.
FORMATION NAME Grayburg TYPE
FORMATION THICKNESS FROM TO
INITIAL PROD: OIL GAS WATER GRAVITY
PRESENT PROD: OIL GAS WATER GRAVITY
COMPLETION DATE MUD TYPE MUD WT.
PACKER TYPE Latch Down Plug SET AT
BOTTOM HOLE TEMP. PRESSURE
MISC. DATA TOTAL DEPTH

	NEW/USED	WEIGHT	SIZE	FROM	TO	MAX. ALLOW. P.S.I.
CASING				0	td	
LINER						
TUBING			2 7/8	0	3947	
OPEN HOLE						SHOTS/FT.
PERFORATIONS				3400	3982	
PERFORATIONS						
PERFORATIONS						

TOOLS AND ACCESSORIES

TYPE AND SIZE	QTY.	MAKE
FLOAT COLLAR		
FLOAT SHOE		
GUIDE SHOE		
CENTRALIZERS		
BOTTOM PLUG		
TOP PLUG		
HEAD		
PACKER		
OTHER		

MATERIALS

TREAT. FLUID fresh water DENSITY LB/GAL/API
DISPL. FLUID DENSITY LB/GAL/API
PROP. TYPE SIZE LB.
PROP. TYPE SIZE LB.
ACID TYPE GAL. %
ACID TYPE GAL. %
ACID TYPE GAL. %
SURFACTANT TYPE GAL. IN
NE AGENT TYPE GAL. IN
FLUID LOSS ADD. TYPE GAL/LB. IN
GELLING AGENT TYPE GAL/LB. IN
FRIC. RED. AGENT TYPE GAL/LB. IN
BREAKER TYPE GAL/LB. IN
BLOCKING AGENT TYPE GAL/LB.
PERFPAC BALLS TYPE QTY.
OTHER
OTHER

JOB DATA

CALLED OUT	ON LOCATION	JOB STARTED	JOB COMPLETED
DATE 11/20/7	DATE 11/20/7	DATE 11/20/7	DATE 11/20/79
TIME 11:30	TIME 13:00	TIME 17:55	TIME 19:14

PERSONNEL AND SERVICE UNITS

NAME	UNIT NO. & TYPE	LOCATION
M. Dority	treater	Hobbs
L. Stoneum		
J. Crawford		
Burgess		

DEPARTMENT
DESCRIPTION OF JOB
JOB DONE THRU: TUBING ☐ CASING ☐ ANNULUS ☐ TBG./ANN. ☐
CUSTOMER REPRESENTATIVE X Mr. Kelly
HALLIBURTON OPERATOR Dority COPIES REQUESTED

CEMENT DATA

STAGE	NO. OF SACKS	TYPE	BRAND	BULK SACKED	ADDITIVES	YIELD CU.FT./SK.	MIXED LBS./GAL.

PRESSURES IN PSI

CIRCULATING 2010 DISPLACEMENT 2100
BREAKDOWN MAXIMUM
AVERAGE 991 FRACTURE GRADIENT
SHUT-IN: INSTANT 0 5 MIN. 15 MIN.

HYDRAULIC HORSEPOWER

ORDERED AVAILABLE USED

AVERAGE RATES IN BPM

TREATING DISP. OVERALL 4.7
CEMENT LEFT IN PIPE
FEET REASON

SUMMARY

VOLUMES

FLUSH BBL/GAL TYPE
LEAD & CMENT BBL/GAL PAD BBL/GAL
TREATMENT BBL/GAL 341 DISPL BBL/GAL
CEMENT SLURRY BBL/GAL
TOTAL VOLUME BBL/GAL 341

REMARKS

EL PASO NATRL JAL #4 PLANT SWD 1 acid injection 11/20/79

Response No. 11: Figure 2 shows the location, design and methods available for sampling and for measuring wastewater flows into the disposal system.

There are six locations within the disposal system which may be used to collect wastewater samples. These are located at the classifier pump, discharge header on the upstream and downstream end of the filter, and three at the surge tank outlets.

Measurement of wastewater flow to the injection well will be accomplished using the differential pressure flow recorder at the injection well. During unplanned shutdown of the disposal well, the flow into the contingency pond will be measured by totalizing meters to be installed at the classifier and surge tank.

El Paso will use the unlined contingency pond 3 and 3A for emergency purposes only. However, if a planned discharge is to occur the following will be adhered to:

1. Permission will be obtained from Hobbs District Office on a planned discharge to the contingency pond,

2. The quantity, quality, and duration of the discharge into the contingency pond will be reported on each occurrence by El Paso to the Hobbs Office, and

3. The contingency pond will not be allowed to be used as an overflow pond.

Response No. 12: The following will be submitted to the New Mexico Oil Conservation Division Hobbs Office on an annual basis:

A. monthly production logs of wastewater,

B. annual inspections and tests of the mechanical and meter components of the disposal system, and

C. the date and duration of any failure of the injection system.

Response No. 13: An analysis of the wastewater collected from the surge tank for those constituents listed in Section 3-103 (A, B, and C) of the Water Quality Control Commission Regulations is shown in Table 4.

TABLE 4

Analysis of Jal No. 4 Plant

Groundwater and Wastewater

Constitutent	Results in Milligrams per Liter Groundwater Depth 105 Feet	Groundwater Depth 173 Feet	Wastewater Discharge to Disposal Well
Arsenic (As)	0.014	0.016	0.022
Barium (Ba)	0.40	0.30	0.05
Cadmium (Cd)	0.002	0.03	0.4
Chromium (Cr)	0.040	0.058	2.1
Cyanide (CN)	1/	1/	1/
Fluoride (F)	0.78	0.56	2.36
Lead (Pb)	0.05	0.04	<0.1
Total Mercury (Hg)	<0.0005	<0.0005	<0.0005
Nitrate (NO_3 as N)	4.15	4.70	0.0
Selenium (Se)	<0.005	<0.005	0.008
Silver (Ag)	<0.01	0.01	<0.05
Chloride (Cl)	96	96	274
Copper (Cu)	0.12	<0.05	<0.05
Iron (Fe)	49.5	16.2	0.17
Manganese (MN)	0.50	0.40	<0.005
Phenols	<0.05	<0.05	0.14
Sulfate (SO_4)	1.20	1.15	140
Total Dissolved Solids (TDS)	767	854	1045
Zinc (Zn)	9.8	3.4	0.01
pH	10.8	7.1	7.3
Aluminum (Al)	<0.3	0.9	<0.3
Boron (B)	0.34	0.32	0.38
Cobalt (Co)	<0.05	<0.05	<0.05
Molybdenum (Mo)	<0.01	<0.01	<0.01
Nickel (Ni)	<0.5	<0.5	<0.5

1/ Cyanide analysis will be accomplished upon receipt of chemicals. The estimated completion date is August 31, 1981.

Closure Plan For
El Paso Natural Gas Company
Jal No. 4 Plant
Lea County, New Mexico

For

El Paso
Natural Gas Company

Prepared by
Environmental Affairs Department
El Paso Natural Gas Company
El Paso, Texas

August 1981

SUMMARY

This Closure Plan presents to the New Mexico Oil Conservation Division (NMOCD) the procedures, and justification for those procedures chosen, for the closure of two wastewater evaporation ponds located within El Paso Natural Gas Company's Jal No. 4 Plant. The ponds are being closed as a result of implementing the classifier and disposal well detailed in the Discharge Plan for the Jal No. 4 Plant submitted to the NMOCD on April 2, 1981.

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

Prepared by: James F. George

James F. George, Ph.D.
Senior Environmental Scientist

Approved by: H. Reiquam

Howard Reiquam, Ph.D.
Director, Environmental Affairs Department

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INTRODUCTION

Regulatory Background

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

The Agency has exercised their delegated authority with regard to the Jal No. 4 Discharge Plan.

Pursuant to verbal instructions from Mr. Oscar Simpson, of the NMOCD on April 27, 1981, El Paso was instructed to prepare and submit closure plans for two evaporation ponds at Jal No. 4 Plant. This requirement was incorporated as question number 7 in the NMOCD request for additional information dated May 8, 1981.

In the case of facilities treating, storing, or disposing of hazardous wastes identified at 40 CFR Part 261 Subparts C and D, there are specific Federal regulatory requirements for submittal of closure plans; 40 CFR § 265.112 calls for a detailed closure plan to be developed and kept at each such facility. There are no identified Federal requirements for closure plans in the case of non-hazardous waste facilities. No hazardous wastes were found in the ponds at Jal No. 4 Plant.

Scope

The purpose of this document is to describe the proposed procedures for the closure of two wastewater evaporation ponds at El Paso Natural Gas Company's Jal No. 4 Plant located in Lea County, New Mexico (see Figure 1). This document (the "Closure Plan") is presented to the NMOCD as a companion document to the Discharge Plan for Jal No. 4 Plant submitted to the NMOCD on April 2, 1981 (referred to hereafter as the "Discharge Plan"). Certain information contained in that Discharge Plan will be either reproduced or incorporated by reference into this Closure Plan. As in the aforementioned Discharge Plan, much of the information included herein has been obtained from published sources. Chemical analyses of sludges were conducted by the Southern Division Laboratory of El Paso Natural Gas Company and ignitability determinations of sludges were conducted by the Research and Development Laboratory of the El Paso Products Company. Complete methodologies for sludge sampling and analyses are given.

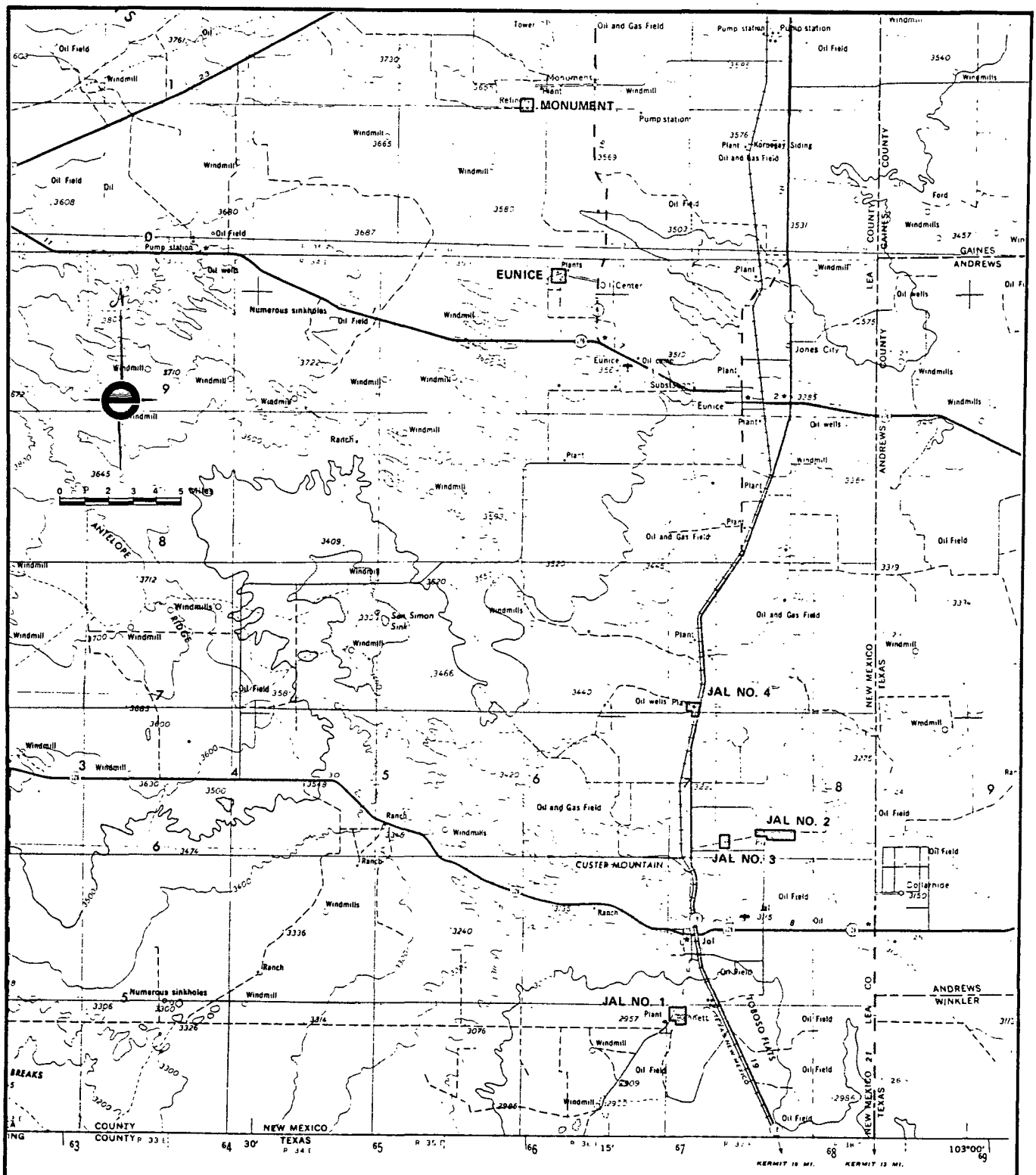
This Closure Plan has been prepared to set forth the procedures by which the two ponds located at Jal No. 4 Plant will be closed and the justification for those procedures. The reasoning for the methods proposed, including supportive analytical data, are presented and discussed in this report.

ENVIRONMENTAL FACTORS

A complete environmental description of the Jal No. 4 Plant area was included in the Discharge Plan. That description will not be duplicated here; however, the environmental factors important to the development and execution of this Closure Plan are summarized below.

Climate

Annual precipitation for the Jal No. 4 Plant area averages 9.75 inches (NOAA 1977), while evaporation averages approximately 79 inches



El Paso Natural Gas Company

FIGURE 1

LOCATION OF EL PASO NATURAL GAS COMPANY PLANTS

SOUTHERN LEA COUNTY, NEW MEXICO

F283 17078124

Prepared By
Pipeline Services Division

per year (Reynolds 1956). The estimated precipitation received in a 100-year, 1-hour storm is 3.27 inches, while a 100-year, 24-hour storm is expected to produce 5.80 inches of rainfall (Miller et al. 1973). Such a 100-year, 24-hour storm was estimated in the Discharge Plan to produce 3.6 inches of runoff in the Jal No. 4 Plant area, with the remaining 2.2 inches of rainfall infiltrating the soil to either percolate to groundwater or return to the atmosphere via evapotranspiration (see Discharge Plan for runoff calculations).

Hydrogeology

The Jal No. 4 Plant is underlain by clastic and sedimentary rocks of Ordovician through Triassic age and by Quaternary alluvial sediments. The alluvial cover over the sedimentary rocks consisting of sand, gravel, silt and clay contains the Ogallala Formation, the principal source of potable groundwater in the area. The Ogallala aquifer slopes to the southeast in the area of Jal No. 4 Plant and has a hydraulic gradient of 10-12 feet per mile toward the east or southeast (Cronin 1969). The soils of the Plant area on which ponds are located consist of the Berino-Cacique loamy fine sands association which developed on wind-worked sands of mixed origin overlying alluvial, sandy, calcareous sediments (Turner et al. 1974). The soils of the Plant area are an integral component of the hydrogeology due to the shallow nature of the Ogallala aquifer and the relatively high permeability of the predominant sandy soils present.

SLUDGE SAMPLING AND ANALYSES

Sampling Methodology

Sampling Strategy. Sludge samples were collected only from those ponds known to have contained industrial or domestic wastewater discharges that may have had toxic or ignitable wastes. The past and present use of the ponds was determined by reviewing construction

POND No. 1
1.16 Ac. ±

POND No. 2
0.17 Ac. ±

POND No. 7
0.69 Ac. ±

POND No. 10
0.92 Ac. ±

W.E.
3312.6

POND No. 11
0.87 Ac. ±

3310

W.E.
3305.5

POND No. 8
0.89 Ac. ±

3300

POND No. 9
0.98 Ac. ±

W.E.
3302.3

POND No. 4
0.18 Ac. ±

W.E.
3302.8

POND No. 5
0.64 Ac. ±

POND No. 6
1.58 Ac. ±

POND No. 3
1.37 Ac. ±

14.8
14.2
14.5
10.0
07.1
01.8
10.5
14.7
09.2
09.2
05.1
04.2
05.5
05.2
08.6
3300
3300

SCALE IN FEET

El Paso Natural Gas Company

FIGURE 2

JAL No. 4 PLANT
PONDS 1 thru 11

drawings, interviewing plant personnel and conducting an onsite evaluation prior to preparing the sample collection program. Using this procedure the three brine ponds (Nos. 9, 10 and 11 - see Figure 2) were excluded because they are part of the liquid storage process at the Jal No. 4 Plant. The brine, a 20% sodium chloride solution, is used to displace liquid hydrocarbons that are in underground storage. Also, several depressions, Pond Nos. 4,5,6,7 and 8, were excluded as they were not considered to be disposal ponds. These ponds consist of natural or man-made depressions that temporarily hold sheet runoff from the Plant area. Pond Nos. 1, 2 and 3 were specifically constructed and utilized for wastewater disposal, hence, were the primary ponds considered for closure. It has since been determined that pond Nos. 1 and 2 will be closed; pond No. 3 will be retained for contingency use in emergencies.

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

Sampling Equipment and Methodology. The sludge samples were collected when the ponds were either full or partially full of wastewater, except for pond No. 3 which was dry. Due to the unknown depth and composition of wastewater and sludge in each pond the method of collection had to take into consideration the safety of the personnel collecting the sample. A number of sampling devices, including a dredge, auger and dipper, were tried. The sampling equipment and technique finally selected for safety and efficiency was a weighted, five-gallon, steel bucket on a rope which was dragged across the bottom of the pond.

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

This routine was followed at a minimum of one location on each of the four sides of each pond. The sludge amassed in the plastic bucket was then stirred to mix the sludge thoroughly in order to obtain a single composite sample for each pond. Prior to obtaining samples from another pond, the buckets were rinsed using the wastewater contained in the next pond to be sampled. Pond No. 3 was sampled using a soil auger.

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

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

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

261.24. By preserving the samples in this manner the chemical analyses were more stringent than required by RCRA. The pH of several of the preserved samples was lowered to or below 2. This caused the test results to show total extractable and not the amount leachable (or available) at a pH of 5.2 as required by RCRA (EPA 1980). An unpreserved sludge sample was collected from pond No. 3 for the determination of manganese, chloride, calcium and magnesium. A sludge sample was collected from Pond 3 at a later date in the same manner as above and not preserved in order to conduct ignitability testing in accordance with 40 CFR § 261.21. A one pint Mason canning jar with a plastic-lined lid was used for storage and shipment of the sample tested for ignitability.

The pH of the wastewater affects solubility of metal salts. With regard to those heavy metals listed in 40 CFR Part 261, the lower the pH below a pH of 7 the more soluble these metals become. For example, the molar concentration of chromium (+3) is 10^{-8} at a pH of 6.5 and 1 at a pH of 3.9. At a pH of 5.2 the molar concentration is $10^{-3.8}$. Therefore, the method of preservation used in which pH was lowered below 5.2 caused essentially all of the chromium (+3) to be oxidized and go into solution.

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

Analytical Methodology

The sludge samples were analyzed by El Paso Natural Gas Company's Southern Division Laboratory. The laboratory is certified by New Mexico

Environmental Improvement Division for testing water and wastewater for inorganic and microbiological constitutents. The sample collected for ignitability testing was analyzed by the Research and Development Laboratory of the El Paso Products Company, Odessa, Texas.

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

Results and Discussion

The results of the chemical and ignitability determinations for the sludge samples from ponds 1, 2 and 3 are presented in Table 1. The results of the chemical analyses indicate that none of the sludges analyzed exhibit the characteristics of EP toxicity as defined in 40 CFR § 261.24. Threshold values characteristic of EP toxicity for contaminants as presented at 40 CFR § 261.24 are also shown in Table 1 for purposes of comparison. These threshold values assume an attenuation factor of 100-fold as adopted by the EPA.

Sludge collected from pond No. 1 exhibited an ignitability greater than 212°F which is well above the threshold value of 140°F for ignitable waste as defined in 40 CFR § 261.21. The contents of the three ponds are similar in character, particularly in regard to oil wastes; therefore, analysis of each pond for ignitability was not considered necessary. Sludge from ponds 2 and 3 is not considered to be ignitable.

CLOSURE PLAN

The ponds to be closed under this Plan are ponds 1 and 2, with pond No. 3 being kept as a contingency pond (see Figure 2) for emergency usage. The closure process described herein is presented in as much detail as possible.

TABLE 1

Results of Chemical Analyses Conducted on Sludge Samples Collected from Ponds 1, 2 and 3, Jal No. 4 Plant and Maximum Allowable Concentrations.

Constituent	Level of Constituents in Milligrams per Liter			Maximum Allowable Concentration 1/ (mg/L)
	Pond 1 Sludge	Pond 2 Sludge	Pond 3 Sludge	
Lead	<0.1	<0.1	<0.1	5.0
Cadmium	<0.02	<0.02	<0.02	1.0
Silver	<0.02	<0.02	<0.02	5.0
Mercury	<0.0005	<0.0005	<0.0005	0.2
Arsenic	0.040	0.012	<0.005	5.0
Selenium	<0.005	<0.005	<0.005	1.0
Barium	1.6	1.0	1.3	100.0
Chromium	0.56	0.85	<0.03	5.0
Copper	<0.04	<0.04	<0.04	
Zinc	1.33	2.40	0.10	
Nickel	<0.2	<0.2	<0.2	
Manganese	*	*	0.58	
Phosphate	0.7	0.3	1.5	
Total Phosphorous	1.0	0.8	1.9	
Nitrate	0.15	0.12	0.17	
Chloride	*	*	7	
Calcium	*	*	1000	
Magnesium	*	*	170	
Boron	0.15	0.04	0.50	
Vanadium	<0.1	<0.1	<0.1	
pH	7.28	6.57	*	

* - analysis not conducted

1/ 40 CFR §261.24, 45 FR:33122

Schedule

Prior to commencement of actual pond closure activities, the ponds will be allowed to dry. No wastes have been discharged into pond No. 2 since the injection well described in the Discharge Plan became operational March 7, 1981. Pond No. 1 is currently receiving liquid waste from septic tanks pending installation of a liquid waste system scheduled to become operational in the last quarter of 1981. However, the factors affecting evaporation of the pond contents as disccused in the Discharge Plan require that ample time be alloted for evaporation of liquids. The length of time necessary for drying of the ponds cannot be determined beforehand due to climatic vagaries, etc. An inspection of the ponds will be conducted in the summer of 1982 to determine the progress of the drying of the ponds. If excess rainfall is received so that timely removal of the liquid by evaporation is prevented, it may be necessary to pump liquid from the ponds to the disposal well on an as-available basis. The ability of the sludge to support earthmoving equipment will be determined prior to closure field activities.

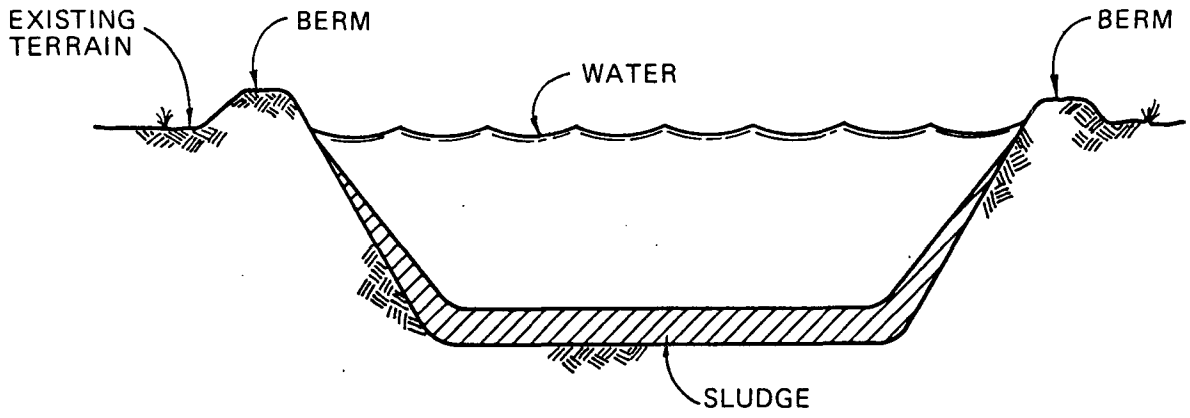
Closure Procedures

Ponds 1 and 2 measure 1.16 and 0.17 acres, respectively, with average depths of 8 and 4 feet. The amount of fill material needed to close the ponds is estimated to be 14,973 cubic yards for pond No. 1 and 1,097 cubic yards for pond No. 2. The fill material to be used in the closure process is expected to consist of a clayey caliche base layer, with a loamy sand to loam surface soil cover suitable for revegetation. The caliche fill material will originate from one or more of the many privately owned "caliche pits" located in the area. The surface soil material will be taken from the existing berms of the two ponds to the maximum extent possible. Any deficiency in suitable soil material will be alleviated by obtaining such material from local sources.

The placement of the caliche layer between the surface soil and the existing sludge is designed to reduce the amount of water which would enter the zone occupied by the sludge due to infiltration of natural precipitation. The *in situ* permeability of the caliche to be used as fill is anticipated to be no greater than 0.6 in/hr. That permeability is expected to decrease upon application due to compaction by the earth-moving equipment. Caliche found in the vicinity of the Jal No. 4 Plant is variable in permeability, ranging from over 2 in/hr for soft caliche of sandy loam to less than 0.2 in/hr for clayey caliche (Turner et al. 1974). A concerted effort will be made to obtain the highest quality, most clayey caliche available for use as fill material. Due to the large number of caliche pits in the area, the availablity of such suitable material is not expected to present a problem. Due to the low rainfall for the area and lack of hazardous wastes in the sludge of the ponds to be closed, the use of such fill material instead of other material such as bentonite is expected to perform satisfactorily.

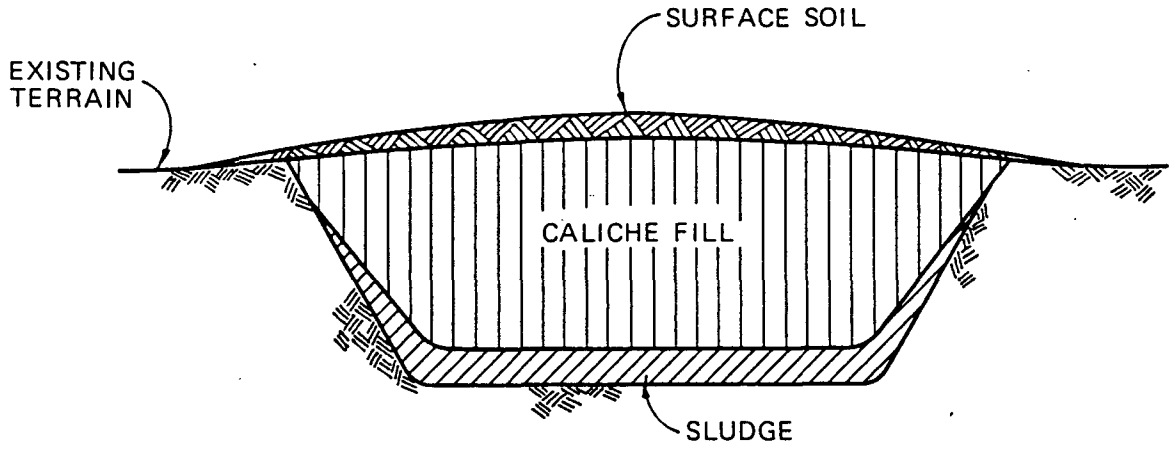
The caliche layer will be applied in such a way as to prevent ponding over the closed pond by imparting a slight convex form to the caliche layer. The surface soil layer will then be applied to a depth of one to two feet over the caliche layer. The convex nature of the fill material will result in a slight elevation increase for the closed pond; however, that elevation increase is not anticipated to be greater than the existing berm elevation. The natural topography of the immediate area will be approximated with the exception that a gently sloping knoll will replace the present pond with surrounding berm. Figure 3 presents conceptualized cross sections of a typical pond structure before and after closure.

The small total acreage of the two ponds to be closed (approximately 1.33 acres) and gentle slope resulting from the knoll-like configuration of the closed ponds is not expected to appreciably increase runoff onto adjacent areas. The runoff originating from the closed ponds is expected to drain to point A east of the Plant area as indicated in Figure 5 of the Discharge Plan.



BEFORE CLOSURE

NOT TO SCALE



AFTER CLOSURE

NOT TO SCALE

El Paso
NATURAL GAS
COMPANY

CROSS SECTIONS
OF
POND CLOSURE

FIGURE 3

Pond Nos. 4, 5, 6, 7 and 8, which are not considered to be disposal ponds will be closed by grading berm material into the depressions to level each area. Commercially-obtained fill material will be used as required.

Erosion Control

The final step in the closure process will be the application of erosion control measures to the closed ponds to control wind and water erosion. This process could involve one of two methods: revegetation or application of gravel. These will be discussed separately below.

Revegetation. Specific revegetation methods would be determined through consultation with the local office of the Soil Conservation Service in order that the most suitable site-specific revegetation program could be conducted. Such consultation would be expected to include such matters as specific fertilizer requirements, development of a suitable seed mixture, seeding schedule, etc. Soil fertilizer needs cannot be determined until the surface soil layer has been actually deposited in place. A tentative seed mixture may include such native, adapted species as buffalograss, blue grama, sideoats grama and dropseed. Species such as these are expected to be capable of controlling erosion while retaining a low growth form with shallow, wide-spreading root systems. Invading, deep rooted woody species capable of breaching the underlying caliche layer, such as mesquite and sand sagebrush, would be controlled during post-closure activities by application of approved herbicides or manual removal. The small area involved should present no problem in that regard.

Gravel. Due to the arid nature of the area and resultant uncertainty of such revegetation efforts, El Paso would like to retain the option of controlling erosion on closed ponds through the application of materials such as gravel or crushed rock in lieu of vegetation. The use of such physical methods of erosion control has been cited as being useful for stabilizing surface cover soil in arid regions (Severn et al. 1980).

Post-Closure Activities

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

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Appendix A

Chain of Custody Records

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

Collector's Sample No. 81-11

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓Disposal Site

___Other: _____

Shipper Name: El Paso Natural Gas Co (Sample)

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

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

Date Sampled April 29, 1981 Time Sampled 0850 hours

Type of Process Producing Waste Natural Gas Processing Plant - Condition Plant

Field Information Pond #1 at Sol No 4 Plant about 10 ft in depth covered with thick layer of oil (Black) - Sludge was very thick & hard to get into bottle. Outside temp = 22°C. Composite sample using bucket

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

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

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	David K. Grant	Env. Eng	Apr 29 - May 1, 1981
2.	Carol L. Murray	Chief Div. Chemist	5-1-81
3.			

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

Collector's Sample No. 81-12

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓Disposal Site

___Other: _____

Shipper Name: El Paso Natural Gas Co. (Sample)

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

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

Date Sampled April 29 1981 Time Sampled _____ hours 0930

Type of Process Producing Waste Natural Gas Processing Plant

Field Information Small pond - Pond #2 at Jal No. 4 Plant covered with black and red oil - Bucket splash caused light brown oil to be uncovered. Bank of pond soaked with oil - feet would sink into oil soaked soil. Composite sample using bucket.

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

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

2. _____

3. _____

Chain of Possession:

1.	Darrell W. Guest (signature)	Env. Engr (title)	Apr 29-May 1, 1981 (inclusive dates)
2.	Carl F. Murray (signature)	Chief Div. Chemist (title)	5-1-81 (inclusive dates)
3.	(signature)	(title)	(inclusive dates)

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

Collector's Sample No. 81-13

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓ Disposal Site

___Other: _____

Shipper Name: El Paso Natural Gas Co. (Sample)

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

Collector's Name Terri A. Smith (signature) Telephone: (915) 543-6538

Date Sampled April 29 1981 Time Sampled 10 AM hours _____

Type of Process Producing Waste Natural Gas Processing - Overflow from injection well

Field Information Pond # 3 at Jal No. 4 Plant. Sample collected with soil auger. 2-3 ft of oil-soaked soil in bottom of pond.

Sample Receiver: Southern Division Laboratory

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

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Terri A. Smith	Env. Engr	Apr 29 – May 1, 1981
2.	Carl D. Murray	Chief Div. Chemist	5-1-81
3.			

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

IGNITABILITY TESTING

Collector's Sample No. 81-28

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: JAL No. 4 PLANT AND No. 1 Sample

Shipper Name: EL PASO NATUCAL GAS CO

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

Collector's Name Forrest R. Smith (signature) Telephone: (915) 543-2600

Date Sampled JUNE 11, 1981 Time Sampled 1115 hours ____

Type of Process Producing Waste NATURAL GAS PROCESSING

Field Information TEMP 31°C, ONE PINT Collected FOR IGNITABILITY TESTING

Sample Receiver:
1. El Paso Products Co; Res & Develop. Dept, Odessa, TX (name and address of organization receiving sample)
2. ____
3. ____

Chain of Possession:

	signature	title	inclusive dates
1.	Forrest M. Smith	Env. Engr	6/11/81 - 6/12/81
2.	Ralph Sparkman	Hzy. Waste Cont.	6/12/81 - 6/22/81
3.			

Discharge Plan For
El Paso Natural Gas Company
Jal No. 4 Plant
Lea County, New Mexico

For

El Paso Natural Gas Company

Prepared By

Permian Division
El Paso Natural Gas Company
Midland, Texas

and

Environmental Affairs Department
El Paso Natural Gas Company
El Paso, Texas

March 1981

Summary

This discharge plan[1/] sets forth the methods and procedures which El Paso Natural Gas Company proposes to use, in accordance with New Mexico Water Quality Control Commission Regulations, to ensure that the water quality in the general area of Jal No. 4 Plant is not degraded.

El Paso Natural Gas Company has operated a gas processing plant near Jal, New Mexico since 1952. Water has been and is being mined from the Ogallala Formation for both industrial and domestic uses. The waste waters remaining have previously been discharged to evaporation ponds.

The use of evaporation ponds for wastewater disposal was discontinued in March, 1981 and replaced by disposal in an injection well with one exception. Some plant cooling tower blowdown will continue to be used by Conoco for secondary oil recovery. The injection well was permitted before drilling by the New Mexico Oil Conservation Division on October 23, 1979 under administrative order SWD-214. An acceptable monitoring and reporting system was established for the well in accordance with that order.

1/ This is to certify that I am a registered professional engineer and this report was prepared from studies of actual field observations and environmental sampling made by me or under the direction of El Paso Natural Gas Company, and that the same are true and correct to the best of my knowledge and belief.

Forrest R. Sprester

Forrest R. Sprester, P.E., R.L.S.

Approved by: A. Reiquam

Howard Reiquam, Director
Environmental Affairs Department

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Discharge Plan for
El Paso Natural Gas Company's
Jal No. 4 Plant
Lea County, New Mexico

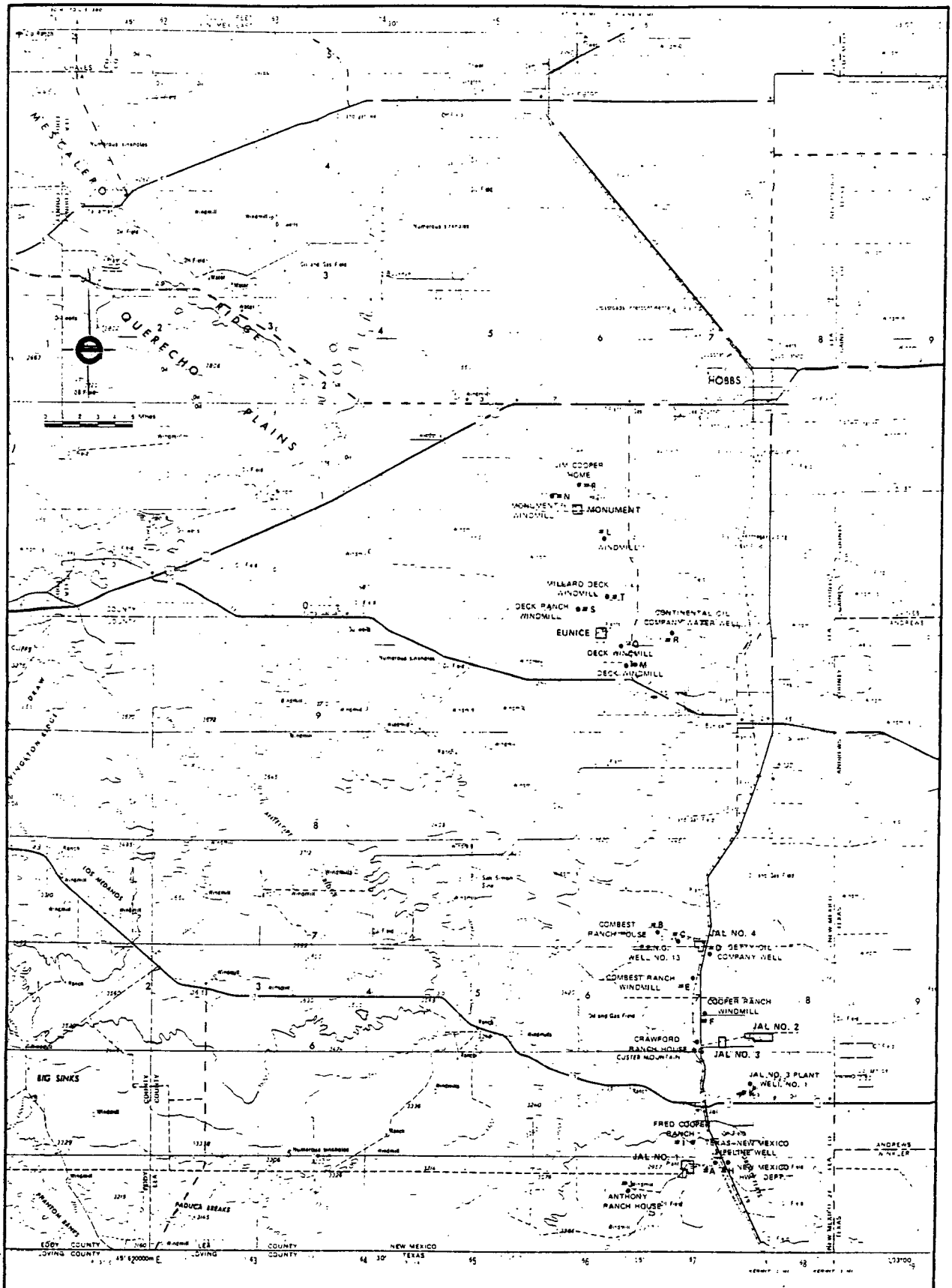
I. Introduction

This document describes a wastewater discharge plan pertaining to El Paso Natural Gas Company's Jal No. 4 Field Plant and is directed to officials of the New Mexico Oil Conservation Division (NMOCD) who in this case are implementing the New Mexico Water Quality Control Commission Regulations. The purpose of this Plan is to set forth the methods and procedures which El Paso proposes to use which will insure that the water quality in the general area is not degraded. Figure 1 shows the general area of the Plant and related El Paso activities in Lea County.

The Plan is arranged in such a manner as to respond in as much detail as possible to Part 3 of the New Mexico Water Quality Control Commission Regulations. El Paso assembled, evaluated and included existing information from all known sources that could be used in defining the hydrogeology of the area. Much of the information presented herein is based on data previously published by the U.S. Geological Survey and New Mexico agencies, including: the State Engineer, the NMOCD and the New Mexico Environmental Improvement Division. Water sampling was conducted by El Paso to characterize existing water quality in the general area of the Plant, and the wastewater discharge of the plant specifically.

II. Background

In the late 1920's Maljamar Oil and Gas Corporation made the first discoveries of oil and gas in Lea County (Mangan, 1977). The Texas Company followed by opening a new producing area with its No. 1 Rhodes well, six miles southeast of the village of Jal. These discoveries were soon followed by successful exploration to the north of Jal in the Eunice area. The communities of Jal, Eunice, and Hobbs profited and grew with the Permian Basin boom and have continued to prosper to this day.



LEGEND

- E.P.N.G. PLANTS
- WATER WELLS
- MONUMENT DRAW DRAINAGE BASIN

El Paso Natural Gas Company

FIGURE

LOCATION OF
EL PASO NATURAL GAS COMPANY
PLANTS AND MONUMENT DRAW
DRAINAGE BASIN
SOUTHERN LEA COUNTY, NEW MEXICO

Originally, oil operations separated the oil and gas at the wellhead and burned the gas in thousands of huge flares that lit up the whole basin. In the Kendrick Field alone, oil operations wasted 200 million cubic feet of gas daily simply because there was nothing else to do with it. In September 1928, surveys for a planned pipeline to El Paso, Texas were begun at Jal. Soon after completion of the pipeline the first treating plant, called Jal No. 1, was constructed near the village of Jal which initially purified up to three million cubic feet of gas per day. As the demand for natural gas increased, Jal Plant No. 2 was constructed in 1940, followed by Jal No. 3, Jal No. 4, Eunice and Monument during and after World War II.

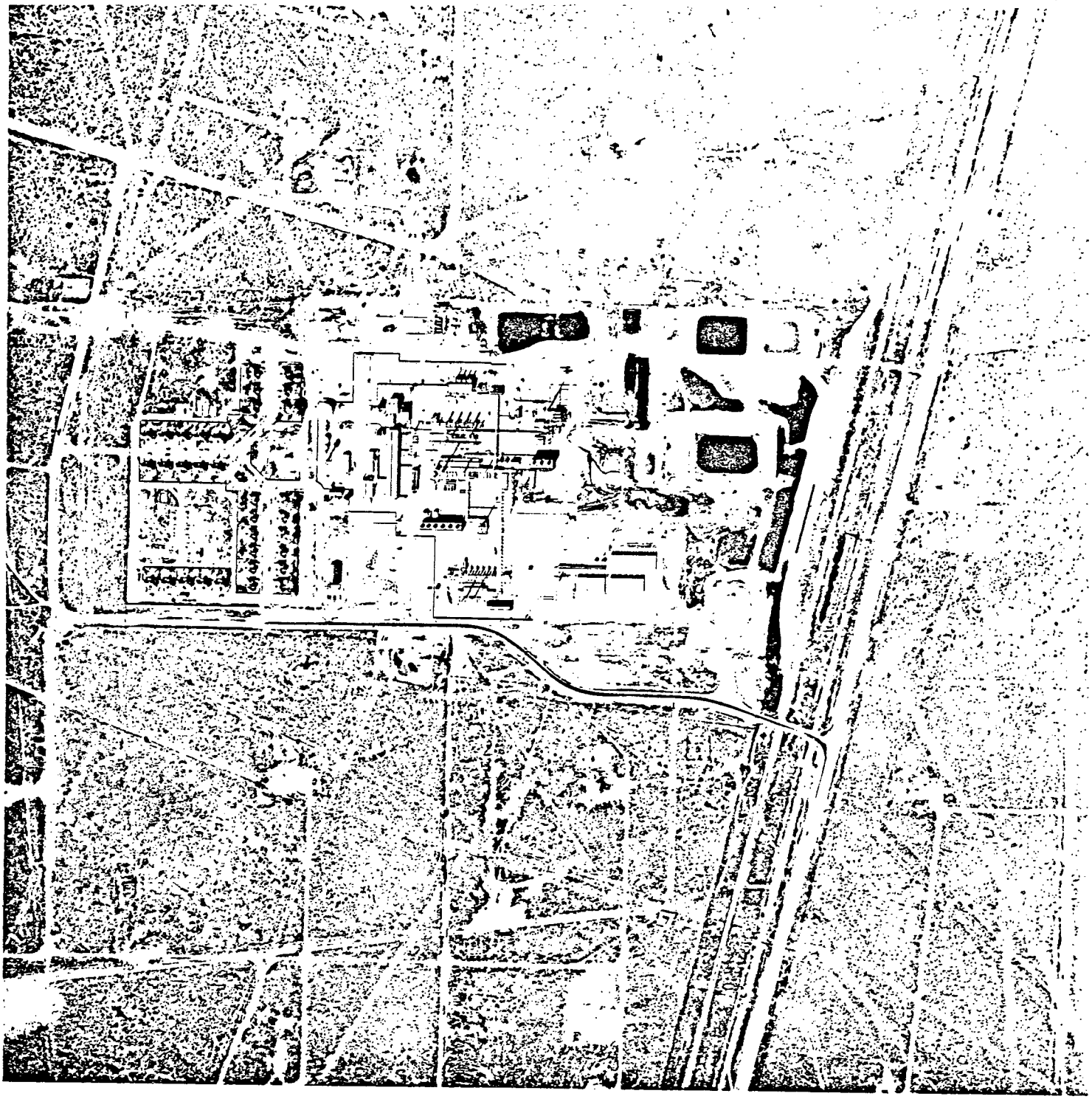
The Jal No. 4 Plant was constructed in 1952 and consisted of a gasoline plant, a purification plant, a dehydration plant and appropriate compression facilities. The plant treated, compressed and transported natural gas to El Paso's main transmission line for consumption further West. The Plant was upgraded in 1959 with the addition of a new fractionating plant and underground storage wells. Other additions to the processes have been added and deleted from time to time but the Plant function has not changed significantly since construction.

The Jal No. 4 Plant occupies approximately 181 acres as shown in the 1981 aerial photography on Figure 2.

III. Description of the Environment

Geology

The Jal No. 4 Plant is located in the Pecos Valley section of the Great Plains Physiographic Province in southeastern New Mexico and more specifically within the Eunice Plain Subdivision. The plain is a practically flat and featureless alluvial plain which slopes eastward toward Monument Draw. The elevation of the plant is 3,310 feet above mean sea level. The total relief of the county is about 1,300 feet with relief of no more than 22 feet in the Plant area.



El Paso Natural Gas Company

FIGURE 2

AERIAL VIEW OF
EL PASO NATURAL GAS COMPANY'S
JAL NO. 4 PLANT
SOUTHERN LEA COUNTY, NEW MEXICO

N

SCALE: 1" = 570'±

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

The physiographic subdivisions of southern Lea County are shown in Figure 3.

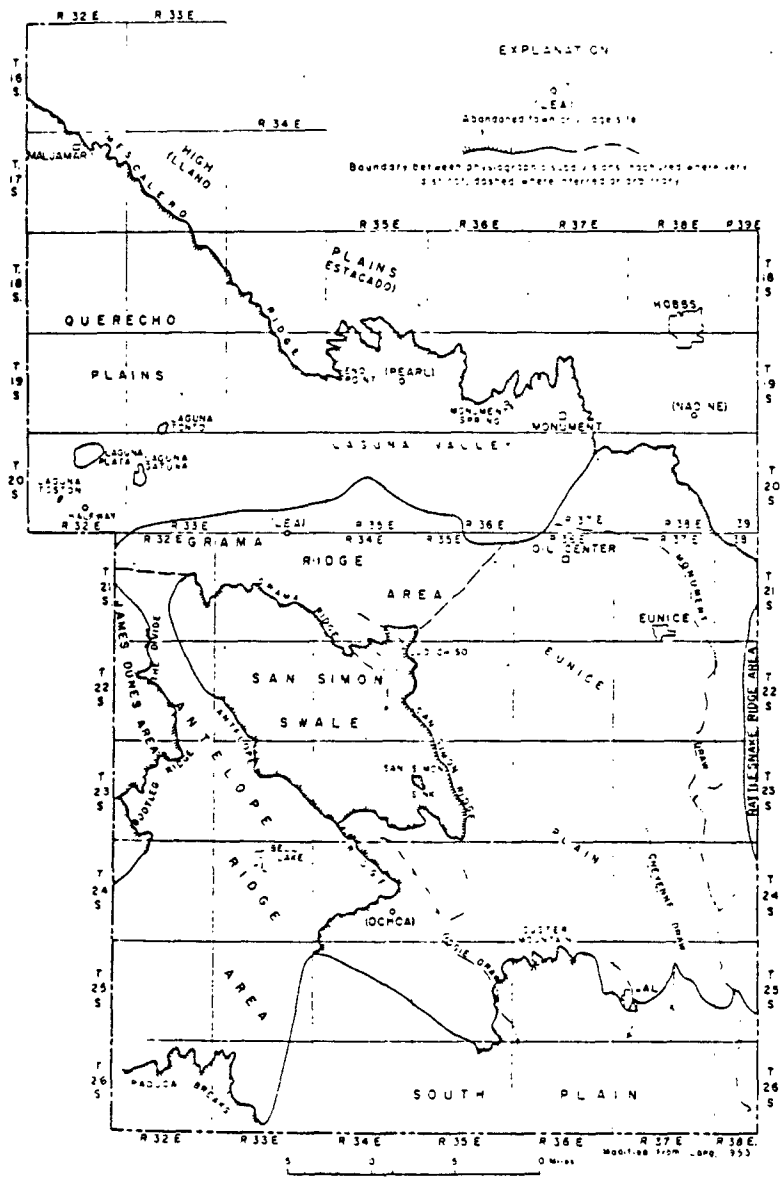
Geomorphology

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

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

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

By the end of Permian time, the basin received stream sediments from higher land areas surrounding the basin. These sediments accumulated to great thicknesses of non-marine sands and clays. Today, these layers are relatively shallow subsurface formations commonly referred to as the "Red Beds."



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

El Paso Natural Gas Company

FIGURE 3

PHYSIOGRAPHIC SUBDIVISION
SOUTHERN LEA COUNTY,
NEW MEXICO

L284 17038121

Prepared By
Pipeline Services Division

Following the Permian Period, the Lea County area was emergent and subject to erosion during early Triassic time, then subject to deposition of sediments during late Triassic time. The deposits of this period are termed the Dockum Groups. In Jurassic time the area was again subject to erosion. During Cretaceous time a large part of the interior of North America was submerged and southeast New Mexico was again the site of a large sea in which thick layers of rocks were deposited. These rocks, including some Triassic materials, were subsequently stripped off during the upthrusting of the Rocky Mountains. In Pliocene time terrestrial deposits of the Ogallala formation were laid down as a thick mantle which obliterated the irregular surface and replaced it with the even surface of the High Plains.

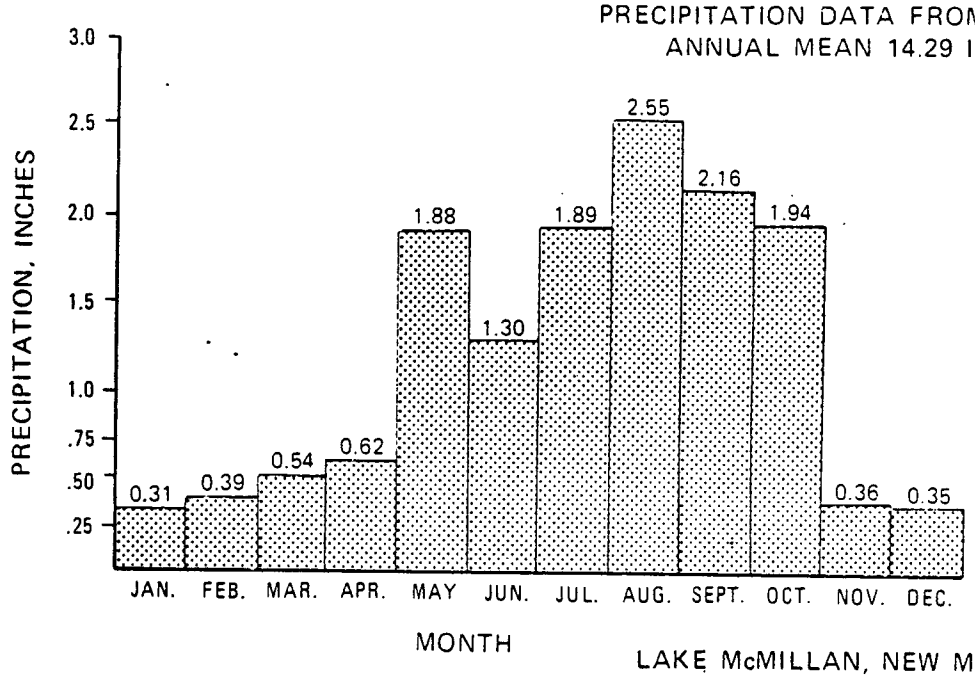
Subsequently, beginning in Quaternary time, a new cycle of erosion began which continues to the present day. Monument Draw in early Quaternary time was probably a perennial stream fed by water from the Ogallala formation of the High Plains. Today, Monument Draw is ephemeral and does not have a throughgoing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

Climate

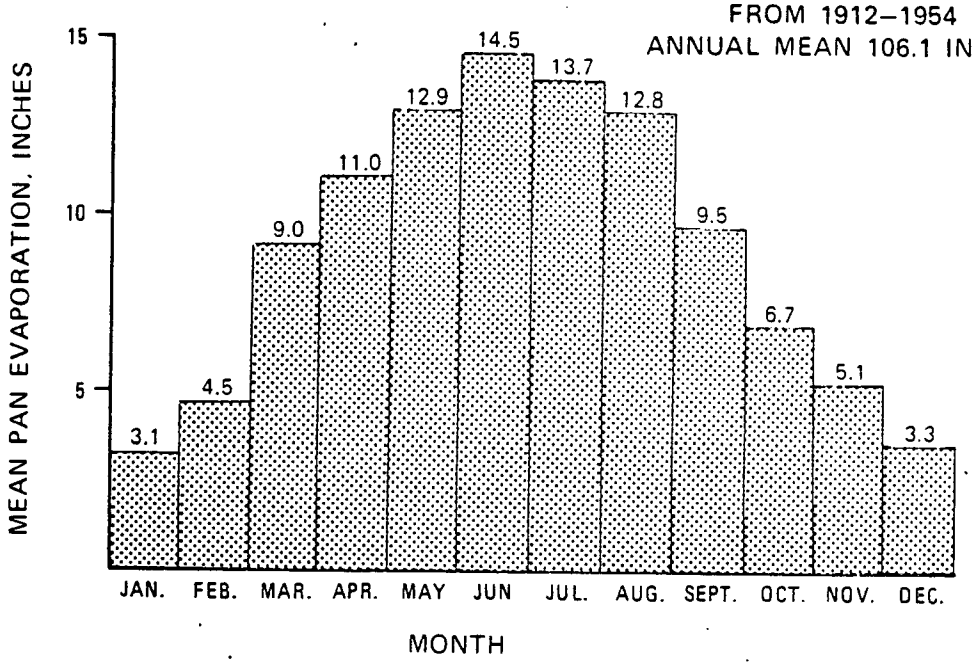
Today, the climate of southern Lea County is semiarid; average annual precipitation varies from about 8 inches in the southwest corner to 14 inches in the northeast corner (Reynolds, 1956). Most of the precipitation is received during May through October as thundershowers. Temperatures vary considerably, exceeding 100°F in summer and dropping below 0°F in the winter. The average monthly precipitation for Hobbs, New Mexico is shown in Figure 4.

The rate of evaporation of water in southeastern New Mexico has been estimated using evaporation pan measurements. Due to differences between actual and experimental data, a reduction coefficient from 0.67 to 0.81 is selected to obtain an estimated lake evaporation value; a

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



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



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

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

El Paso Natural Gas Company

FIGURE 4

MEAN PRECIPITATION AND EVAPORATION SUMMARY
SOUTHERN LEA COUNTY, NEW MEXICO

L285 1703812I

Prepared By
Pipeline Services Division

coefficient of 0.75 usually provides an estimate of annual lake evaporation within about 15 percent. The average monthly pan evaporation is shown in Figure 4 for Lake McMillan, New Mexico. The average annual lake evaporation is 79 inches per year. This rate of evaporation is considered ideal for the use of evaporation ponds in typical wastewater disposal operations.

IV. Surface Hydrology

Jal No. 4 Plant Drainage Basin

The Jal No. 4 Plant is situated in the Pecos River Basin. The basin in Southern Lea County has no perennial streams, but a few intermittent streams and broad shallow drainages may flow following the thunderstorms which are common during July and August. Most precipitation soon infiltrates the soil or evaporates. The land surface in the area of the Plant has little relief, falling approximately 30 feet per mile. Runoff from the plant flows east to southeast to provide water to Cheyenne Draw, a north to south trending wash within the Monument Draw drainage basin. Monument Draw drainage basin, ending near the Texas-New Mexico boundary, encompasses 1,320 square miles. The Basin boundaries are shown in Figure 1. San Simon Swale, a geologic sink, is also shown as a portion of the drainage basin. However, it is very unlikely that the swale area would contribute water to Monument Draw. Monument Draw flows into west Texas near the southeastern corner of New Mexico. Here, Monument Draw enters a very irregular topographic area that does not have an integrated drainage. From available maps, it appears that the draw fans out and terminates a few miles south of the Texas state line. This area is essentially a closed sub-basin, where surface flows are generally toward the center of the basin to a series of intermittent playas.

Cheyenne Draw, located to the southeast of the Jal No. 4 Plant, is not well-defined. The draw is partly filled, primarily by dune sand and alluvium, and is densely overgrown in many places with vegetation. The watershed and drainage system in and around the Jal No. 4 Plant is shown in Figure 5.


SURGE TANK (LOCATED NEAR DISPOSAL WELL)
21'-7" O.D. X 24'-0" HEIGHT
1500bbl CAPACITY
1/4" CARBON STEEL PLATE
SALT WATER DISPOSAL LINE TO WELL SDW-214
PROPERTY LINE
POND No. 1 1.16 Ac.±
POND No. 2 0.17 Ac.±
POND No. 3 0.69 Ac.±
POND No. 4 0.18 Ac.±
POND No. 5 0.64 Ac.±
POND No. 6 .37 Ac.±
POND No. 7 1.58 Ac.±
POND No. 8 0.89 Ac.±
POND No. 9 0.98 Ac.±
POND No. 10 0.92 Ac.±
POND No. 11 0.87 Ac.±
POND No. 14 0.45 Ac.±
POND No. 15 0.16 Ac.±
POND No. 17 0.05 Ac.±
POND No. 18 0.03 Ac.±
POND No. 19 0.05 Ac.±
POND No. 20 0.27 Ac.±
CLASSIFIER
20'-4" O.D. X 16'-4" HEIGHT
925bbl CAPACITY
1/4" CARBON STEEL PLATE W/40 MIL EPOXY COATING
OIL STORAGE TANK
12'-3" O.D. X 16'-4" HEIGHT
335bbl CAPACITY
1/4" CARBON STEEL PLATE W/30 MIL EPOXY COATING
CONTINGENCY POND
12,980bbl CAPACITY
4" DIAMETER DISCHARGE LINE TO TRUCK STAND
PLANT WASTEWATER INFLOW
A
B
MISSOURI-PACIFIC RAILROAD (TEXAS-NEW MEXICO R.R.)
NEW MEXICO HIWAY 18
—LEGEND—
A DRAINAGE AREA PREDICTION POINT
DRAINAGE DIVIDE FOR PLANT AREA
CLASSIFIER (JAL No. 4)
EXISTING CONTOURS TO BE REGRADED
PROPOSED CONTOURS
CULVERTS
Proposed 36" Culvert S = .010
REV. B - 2/3/84 REVISED DRAINAGE CULVERTS TO CONFORM WITH TERRAIN
ENGINEERING RECORD
DRAWN BY Aero-Graphics
TRACED BY
CHECKED BY J. T. C.
APPROVED F. S.
DATE
PHOTO DATE 2-12-81
CONTOUR INTERVAL 2'
El Paso NATURAL GAS COMPANY
PIPELINE SERVICES DIVISION
EL PASO, TEXAS
PLANT AREA AND PROPOSED DRAINAGE PATTERN
JAL NO. 4 PLANT
SEC. 5,6,31,32, TWS. 23-S & 24-S, RANGE 37-E
LEA COUNTY, NEW MEXICO
0 100 200 400
SCALE IN FEET
DWG. NO. 5004.19-1
B REV.
Contour Lines Have Been Adjusted To Match Rectified Photo Base

Drainage Basin Study

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

Precipitation is a primary factor in estimating the surface runoff and peak discharge from ephemeral streams. The mean annual precipitation in the area is 9.75 inches (NOAA, 1980). Table 1 shows precipitation data for depth-frequency for the Jal No. 4 Plant Area (Miller, et at., 1973).

Table 1

Precipitation Data for Depth-Frequency for
El Paso Natural Gas Company's Jal No. 4 Plant
32° 16'N, 103° 12'W

Recurrence Interval In Years	Storm Duration in Hours				
	1	2	3	6	24
	(P, values in inches)				
2	1.25	1.40	1.55	1.75	2.10
5	1.75	2.00	2.20	2.35	3.00
10	2.05	2.40	2.60	2.90	3.60
25	2.50	2.80	3.10	3.62	4.50
50	2.80	3.30	3.60	4.08	5.10
100	3.27	3.70	4.10	4.65	5.80

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

$$Y_2 = 0.218 + 0.709 \frac{(1.75 \times 1.75)}{2.1} = 1.25$$

$$Y_{100} = 1.897 + 0.439 \frac{(4.65 \times 4.6)}{5.8} - 0.008 \ (33.00)^{1/} = 3.27$$

1/ Elevation 3,300 feet mean sea level.

Soil Groupings

The hydrologic soil grouping is generally determined by the surface texture. The grouping is a four step rating of how much of a given rain will enter the soil profile and not run off. A general guide for the hydrologic soil groups by texture is shown in Table 2.

TABLE 2

Hydrologic Soil Grouping Guide

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

Description of Soils

The Jal No. 4 plant site is located on the Berino-Cacique loamy fine sands soil association and the Pyote and Maljamar soil series. All ponds are located on the Berino-Cacique association with the exception of an overflow area that extends along the Texas-New Mexico Railroad right-of-way on the southeastern edge of the plant which consists of Pyote and Maljamar fine sandy soils.

Pyote and Maljamar fine sands are well-drained soils with moderately rapid permeability formed in wind-deposited materials. The Pyote soil is fine sand over sandy loam subsoil to a depth of 48 to 60 inches where a fine sandy loam C horizon is encountered. The Maljamar fine sand soil series has a sandy clay loam subsoil with an indurated caliche horizon at approximately 50 inches.

The Berino-Cacique association consists of approximately 50% Berino loamy fine sand and 40% Cacique loamy fine sand. Cacique soils occur only in association with Berino soils. Both Berino and Cacique soils are moderately permeable and have very slow runoff. The Berino soil has a light sandy clay loam subsoil with caliche at depths ranging from 29 to 60 inches. Cacique loamy fine sand is a shallow soil with indurated caliche at 20 to 34 inches.

Soil Limitations

A tabular presentation of engineering interpretations and limitations for the use of these soils as sites for ponds and sewage lagoons is shown in Table 3. These soils all have low to moderate shrink-swell potential, which relates to the potential hazard to impermeable liners that may be used in ponds on these soils.

TABLE 3

Engineering Properties of Soils
in Jal No. 4 Plant Area

Soil Series	Degree of Limitation[1/] for Sewage Lagoons	Soil Features affecting[2/] use as Ponds	Hydrologic[3/] Rating
Pyote	Severe; moderately rapid permeability	Moderately rapid permeability	A
Maljamar	Moderate; moderate permeability	Moderate permeability below depth of 2 feet; moderate seepage	B
Berino	Moderate; moderate permeability	Pervious material requires compaction; moderate seepage	B
Cacique	Severe; indurated caliche at 1 1/2-3 feet	Indurated caliche at 1 1/2-3 feet; moderate seepage	C

1/ Ratings for sewage lagoons based on soil permeability, slope, soil texture and depth to impervious material.

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

3/ Hydrologic rating obtained from U.S. Soil Conservation Service, 1974.

Some items of concern for locating ponds or sewage lagoons on these soils are that the Pyote soil presents the greatest potential hazard due to seepage, while the Cacique soil may present construction difficulties due to the shallow depth to indurated caliche.

The antecedent moisture condition in the area, soil moisture due to precipitation occurring in the five days preceeding a major rainfall, is typical of arid soils. The SCS Engineering Field Manual for Conservation Practices (McDougal and Jackson, 1973) defines curve numbers (CN) which are used to describe the hydrologic soil groups as well as the vegetation cover in relation to potential runoff. A CN of 80 was used for the poor residue cover, Hydrologic Rating B, of the area which produces the maximum expected runoff rate and is considered to be conservatively high.

Runoff q (in inches) is determined by substituting precipitation values shown in Table 1 and the selected CN into equation 1:

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

From equation 1, for example, the 100-yr, 24-hour storm is estimated to produce 3.6 inches of runoff in the Jal No. 4 Plant area.

A summary of the expected runoff volumes from the Jal No. 4 Plant area is presented in hydrologic data sheets in Appendix A.

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

Findings

The hydrologic characteristics of the plant site are shown in Table 4.

TABLE 4

Hydrologic Characteristics of Jal No. 4 Plant
at Selected Prediction Points for the
2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour Storm

Prediction Point	Storm Year	Estimated Drainage Area (acres)	Slope (%)	Peak Flow (cfs)	Volume (acre-feet)
A	2	60	0.75	36	3.0
	5	60	0.75	78	6.5
	10	60	0.75	100	8.5
	25	60	0.75	140	12
	50	60	0.75	180	15
	100	60	0.75	220	18
B	2	48	0.96	53	4.0
	5	48	0.96	69	5.2
	10	48	0.96	90	6.8
	25	48	0.96	110	7.9
	50	48	0.96	160	12
	100	48	0.96	190	14

Surface runoff estimates for the plant site are shown in Appendix A which assumes no runoff waters will be captured and retained by any structures. The existing ponds located in the plant area do, however, capture the majority if not all of the storm runoff. The original berms of the ponds constructed by El Paso have eroded due to wind, rain and maintenance activities. These old ponds with the exception of a portion of Pond No. 3 will be reclaimed. Pond No. 3 is proposed to be reconstructed as a contingency pond in the Discharge Plan scenario. The scenarios will be described in more detail in the following sections.

V. Hydrogeology

General Subsurface Description

The Jal No. 4 plant is located in an area underlain by clastic and chemical sedimentary rocks ranging in age from Ordovician through

Triassic, and by alluvial sediments of Quaternary age. The sedimentary rocks consist predominantly of shale, sandstone, siltstone, dolomite, gypsum, anhydrite and salt. As discussed in previous sections, the deeper Permian Formation is an important source of oil and gas. The alluvial cover over the area consisting of sand, gravel, silt and clay is called the Ogallala Formation.

The Ogallala beds are the principal source of potable groundwater in the area for both domestic and industrial users. Triassic age Formations have also yielded acceptable potable water but in low-to-moderate quantities and of poorer quality than the Ogallala. The Permian Formation contains water of saline to brine quality. A summary of the stratigraphic units in southern Lea County is shown in Table 5.

The Ogallala overlies the relatively impermeable Chinle Formation. Hence, water movement downward is slight and the water must therefore flow outward, downslope over the Chinle. The Ogallala aquifer slopes to the southeast, generally parallel to the underlying Pre-Ogallala and present clay subsurface. The hydraulic gradient of about 10-12 feet per mile imparts an easterly or southeasterly movement to the groundwater (Cronin, 1969). Pleistocene alluvium forms a continuous aquifer with the Ogallala Formation and occurs west of the Jal No. 4 Plant. The movement of groundwater in this aquifer is also easterly or southeasterly. A general potentiometric surface map is shown in Figure 6. The movement of water down this slope has been estimated to range from two inches per day (Cronin, 1969) to no more than one foot per day (Minton, n.d.).

VI. Water Quality

Surface Water

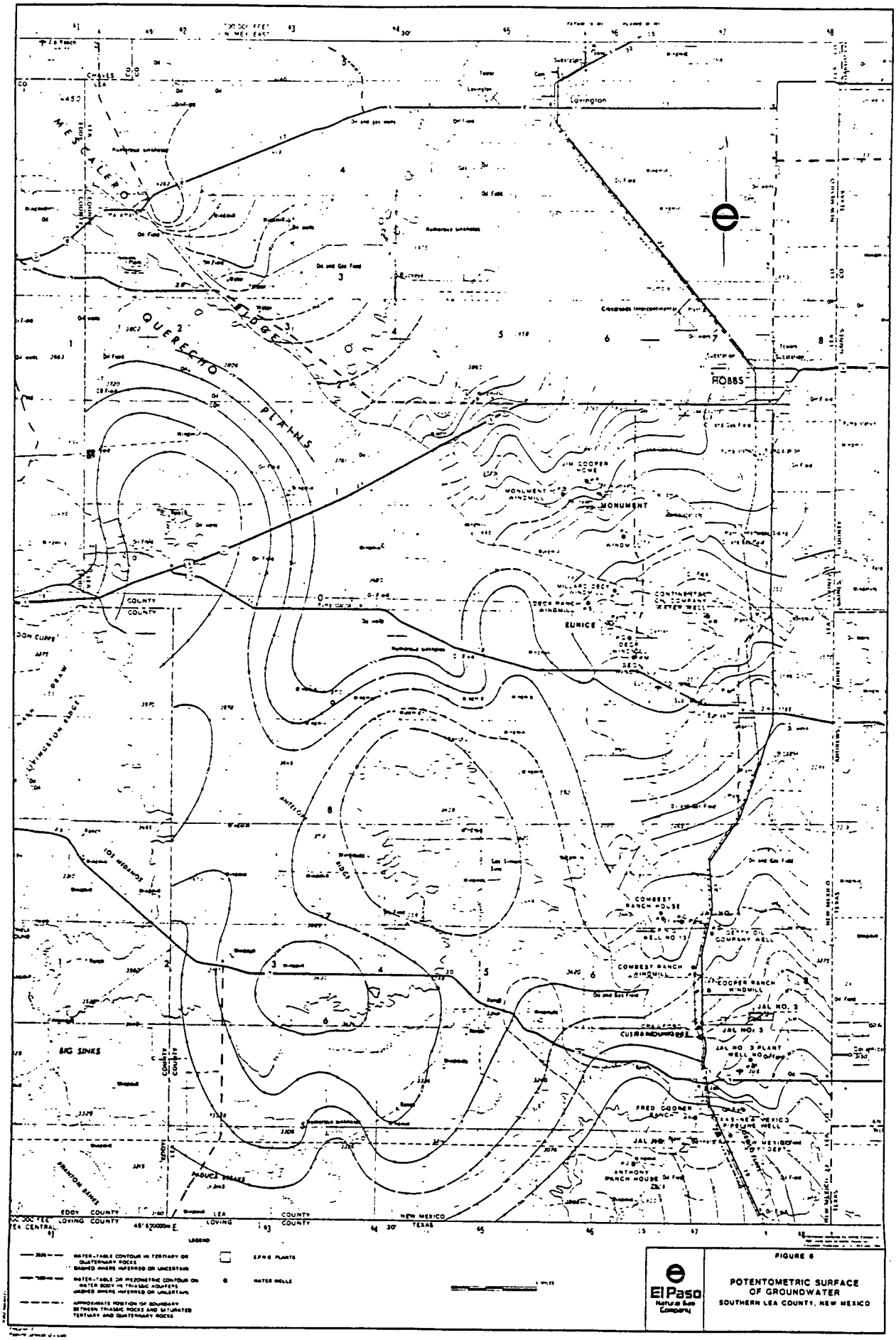
Surface water quality data have not been collected in the general area due to the ephemeral nature of the draws. Runoff in and around the plant was not collected for analysis.

TABLE 5

Stratigraphic Units in Southern Lea County, New Mexico[1/]

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

1/ Nicholson, A. and A. Clebsch, Geology and Ground-water Conditions in Southern Lea County, New Mexico, State Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Socorro, NM, 1961.


Lovington
MESCALERO
QUERECHO PLAINS
ROBBS
MONUMENT
EUNICE
COMBEST RANCH HOUSE
COOPER RANCH WINDMILL
JAL NO. 3
JAL NO. 3 PLANT WELL NO. 2
FRED COOPER RANCH
ANTHONY RANCH HOUSE
BIG SINKS
LOVINGTON ESCARPMENT
MONUMENT DRAW
PADUCA DRAW
PHANTOM BANKS
LEA COUNTY
EDDY COUNTY
LOVING COUNTY
NEW MEXICO
TEXAS
LEGEND
WATER-TABLE CONTOUR IN TERTIARY OR QUATERNARY ROCKS
WATER-TABLE OR PIEZOMETRIC CONTOUR ON WATER BODY IN TRIASSIC AQUIFERS
APPROXIMATE POSITION OF BOUNDARY BETWEEN TRIASSIC ROCKS AND SATURATED TERTIARY AND QUATERNARY ROCKS
EPNG PLANTS
WATER WELLS
El Paso Natural Gas Company
FIGURE 6
POTENTOMETRIC SURFACE OF GROUNDWATER
SOUTHERN LEA COUNTY, NEW MEXICO

Groundwater

As mentioned above, the principal groundwater source in the area is the Ogallala Formation. According to the New Mexico State Engineer, groundwater in this formation is deteriorating in quality. There are several reasons for the deteriorating quality. First, the soils in Lea County contain salts that are being leached downward by rainfall. Man's activities have also caused some deterioration as has been documented by New Mexico Agencies (Boyer et. al., 1980). Groundwater levels are also declining throughout the area (State Engineer, 1976). This is due to the groundwater being mined to meet the present requirements for municipal, industrial and farm use. Large withdrawal of the better quality water for human consumption can cause some intrusion of poorer quality water from strata below or adjacent to wells into the cones of depression.

Electrical Conductivity (EC) is a measure of the ability of the water to conduct an electrical current; as such it is a direct measure of the total ionizable solids (salts) in the water. Therefore, the higher the EC the poorer the water quality. An EC isogram map prepared from data supplied by the New Mexico State Engineer for 1976-77 is shown in Figure 7.

Figure 7 shows in general the quality of water in Southern Lea County. Water samples were also collected by El Paso from five privately owned wells surrounding the plant in January 1981. To the best knowledge of the owner, these are shallow wells withdrawing water from the Ogallala. The analyses of these samples are shown in Table 6. The water quality of the Ogallala in the Plant area is brackish. Brackish is defined as water ranging from 1,000 to 35,000 mg/l of total dissolved solids (Clark et. al., 1977).

Groundwater from water-bearing formations below the Ogallala contain higher concentrations of dissolved solids, primarily chlorides and sulfate salts (Bureau of Reclamation, 1976). Although these waters are not used for domestic purposes they may be used for flooding of oil

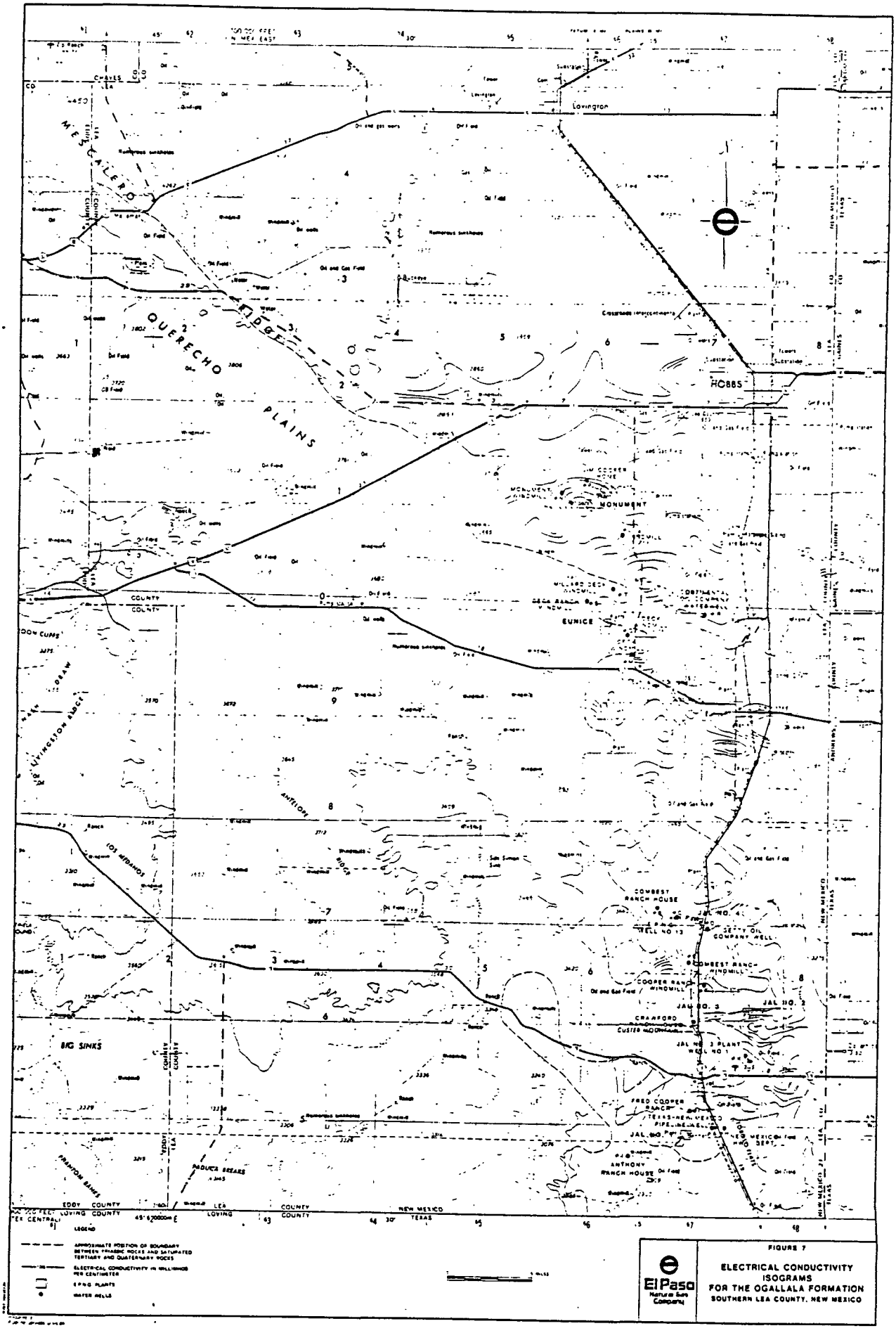


FIGURE 7

ELECTRICAL CONDUCTIVITY ISOGRAMS FOR THE OGALLALA FORMATION SOUTHERN LEA COUNTY, NEW MEXICO

Table 6

Analyses of Well Water from the Ogallala Formation
located near El Paso Natural Gas Company's Jal No. 4 Plant

Constituent	Well Designation[1]			
	B[2]	C[3]	D[4]	E[5]
Sulfate (SO_4), mg/l	42	54	50	94
Chloride (Cl), mg/l	68	32	36	36
Nitrate (NO_3 as N), mg/l	0.52	0.76	0.98	1.5
Specific Conductance, mmhos/cm	608	531	542	601
pH	7.5	7.5	7.4	7.9
Total Dissolved Solids, mg/l	478	454	458	512
Chromium (Cr), mg/l	0	0	0	0
Copper (Cu), mg/l	0.02	0	0	0
Iron (Fe), mg/l	0.05	0.015	0.015	0.042
Manganese (Mn), mg/l	0.005	0	0	0
Zinc (Zn), mg/l	0.065	0.005	0.28	0.03

[1] Source of the water samples was private wells surrounding Jal No. 4 Plant noted on Figure 1.

[2] Combast Ranch House two miles west of Jal No. 4 Plant.

[3] Well No. 13 1/2 mile west of Jal No. 4 Plant.

[4] Getty Oil Company well 1/2 mile southeast of Jal No. 4 Plant.

[5] Combast Ranch windmill 1 1/2 miles south of Jal No. 4 Plant.

and gas fields for secondary recovery. Further evaluation of these waters was not considered necessary for this report due to their great depth and known poor quality.

Discharge Water

Quality of the Plant discharge waters was determined by compositing samples from each evaporation pond. The composite samples include all industrial and domestic wastewaters. The results of the analyses of the ponds are shown in Table 7 along with the New Mexico Water Quality Control Commission Standards.

Pond Construction

The evaporation ponds shown in Figure 5 cover approximately 9.45 acres. Each pond embankment was constructed using borrow material from the center of the pond and soils surrounding the pond site. The material is generally a fine sandy loam. The ponds are located over the Ogallala aquifer which generally consists of semiconsolidated fine-grained calcareous sand capped with a layer of caliche containing some clay, silt and gravel. There are no known contract specifications or drawings in existence describing the construction phase of the ponds. The discharge pipes and ponds were constructed as the need arose. Therefore, there are no as-built drawings detailing the present flow patterns through the system. This makes it difficult to evaluate the composite samples analyses with any degree of certainty.

Aquifer Recharge

The recharge to the Ogallala is from direct precipitation upon the surface of the southern High Plains. The total amount of rainfall that reaches the aquifer probably averages no more than 25,000 acre-feet per year for all of Lea County. This recharge quantity was estimated using an average annual rainfall of 15 inches per year and assuming that

only four inches of the 15 inches occurs as showers of sufficient intensity to overcome evapotranspiration to provide runoff to ponds (Minton, n.d.). However, it has been suggested that the average annual recharge for southern Lea County is less than half an inch (Cronin, 1969).

VII. Water Use and Disposal

Jal No. 4 Plant and associated facilities utilize approximately 300 acre-feet of water per year obtained from nine wells located approximately 12 miles north of the Plant in Section 13, Township 19-S, Range 36-E. An estimated 68 acre-feet per year has been discharged to evaporation ponds located to the north and west of the Plant facilities. Considerable loss of water is due to evaporation in the industrial process, irrigation of lawns and other activities not directly tied to the wastewater collection system. El Paso will refine the discharge quantities upon full implementation of the discharge plan. The measurements will be derived from actual metered flow and the findings furnished to NMOCD if requested.

The original objective of the evaporation ponds was to allow total evaporation of wastewater to the atmosphere. The major design consideration was to provide sufficient surface area to accomplish the required discharge through evaporation. The standard method used to estimate the required surface area is to use climatologic data developed over a statistically reliable period. Unfortunately, such information was not readily available when the plant was constructed in the 1940's. Evaporation rates for southeastern New Mexico have been obtained from the U.S. Weather Service and are presented under Section III of this report. Although this measured evaporation rate is considered excellent for disposal of wastewater by evaporation, oil is the one variable that inhibits accurate estimation of disposal by evaporation. Oil has coated most of the ponds, significantly reducing the surface area of the water available to permit evaporation. This has occurred in spite of the use of skimmers and the placement of effluent culverts beneath the water surface to retard the movement of oil from one pond to the next. Oils

Table 7

Water Quality Analyses of Composite Samples from Evaporation Ponds
at El Paso Natural Gas Company's Jal No. 4 Plant

Constituent	Sample Location[1] #1	#2	#3	#4	#5	#6	#7	#8	NMWQCC[2] Standards
Sulfate (SO_4), mg/l	55	60	279	110	1947	150	60	55	600
Chloride (Cl), mg/l	1751	1829	1127	1319	79053	1652	1347	1064	250
Nitrate (NO_3 as N), mg/l	0	0	2	2	2	2	2	2.5	44
Specific Conductance, mmhos/cm	6300	6900	3750	3900	124000	5400	4100	3900	--
pH	7.65	7.2	11.1	10.7	7.68	8.9	9.75	10.9	6-9
Total Dissolved Solids, mg/l	4791	4830	3245	3795	152501	5118	4013	3480	1000
Chromium (Cr), mg/l	1.05	1.10	0.15	0.15	0.25	0.10	0.10	0.10	0.05
Copper (Cu), mg/l	0	0	0	0	0.15	0	0	0	--
Iron (Fe), mg/l	0.10	0.2	0.05	0.05	0.05	0.05	0.075	0.075	1.0
Manganese (Mn), mg/l	0.125	0.125	0	0	0.625	0	0	0	--
Zinc (Zn), mg/l	0.025	0.025	0	0	0.50	0	0	0	10

1/ Pond designations are shown on Figure 5.
2/ New Mexico Water Quality Control Commission.

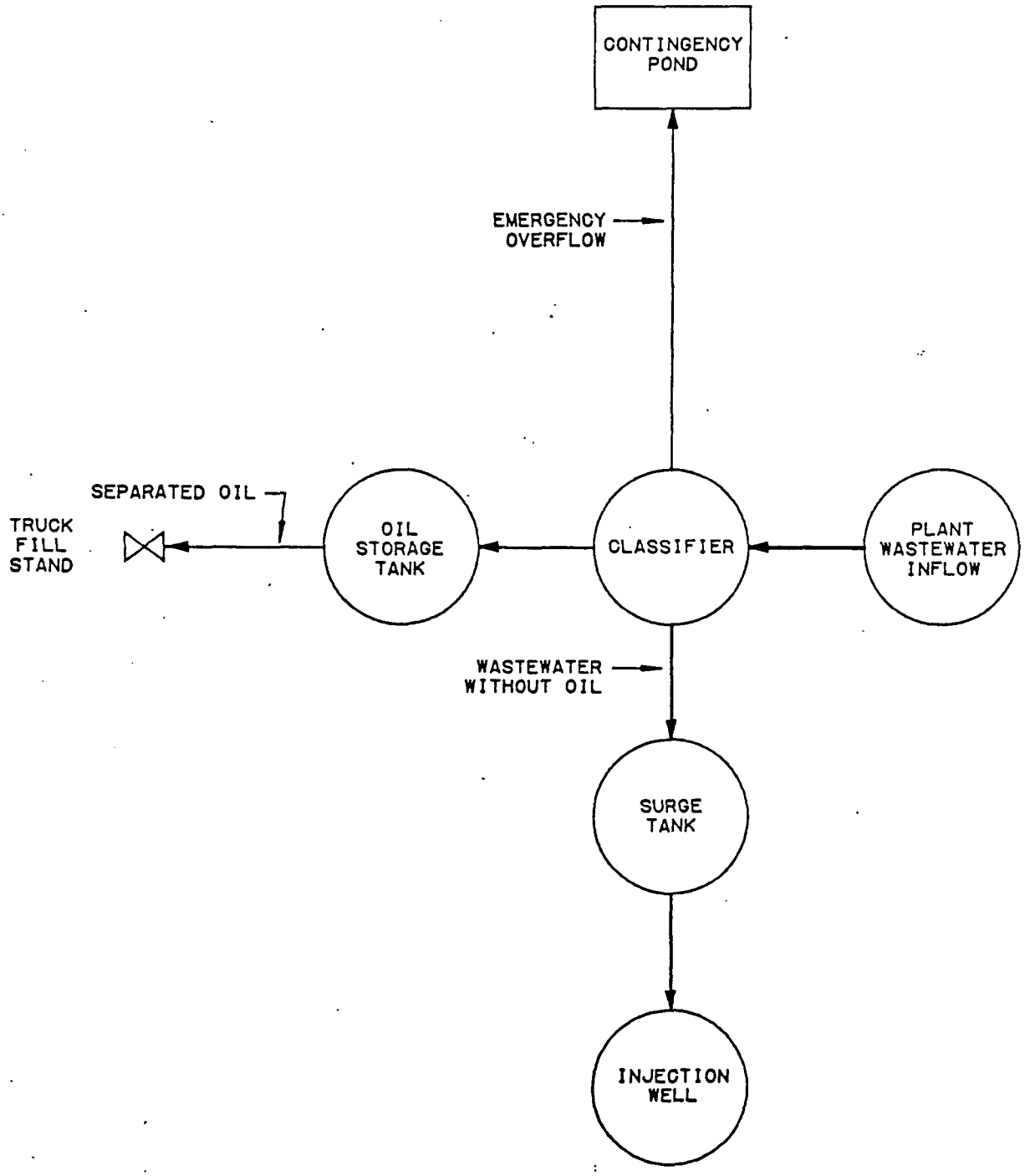
usually contain components that are soluble or will diffuse in water so that they can pass through the culverts to the next pond in series. The diffused components then surface further downstream, thus inhibiting evaporation in the downstream ponds.

VIII. Discharge Plan

El Paso identified all wastewater sources entering the evaporation ponds. The discharging culverts were located, disconnected and routed to a recently constructed classifier located within the Jal No. 4 Plant facility. The location of the classifier is shown on Figure 5. El Paso has been providing Jal No. 4 Plant cooling tower blowdown to Conoco for use in secondary oil recovery. Reuse of the blowdown water will continue in this manner as it is the best method of disposal available at this time.

The classifier is used to remove oil and solids which are not suitable for injection into the subsurface. The principal function of the classifier is to allow the lower density oil to float to the surface of the water and the oil to overflow continuously into a separate oil tank. The classifier is a circular tank designed to provide for at least 15 minutes detention time. The waste water outlet, which is submerged, is opposite the inlet and near the floor of the classifier. The waste water is pumped to the surge tank and injection well facility where it is disposed of into the Greyburg Formation. The separated oil is temporarily stored in an underground oil tank. Periodically, the oil will be sold to a local oil refiner for reclamation and reuse. The solids that collect in the Classifier will also be periodically removed and disposed of in an environmentally acceptable manner. A block flow diagram showing a typical classified injection well layout is shown on Figure 8.

Domestic sewage will be collected from El Paso's camp area and industrial buildings, treated with chlorine and transported to the Classifier. The Chlorination equipment is to be budgeted and installed in 1982. Some problems may be experienced, in the capacity of the disposal well, when the septic effluent is added to the system. These



					ENG.	REC.	DATE
					DRAWN	HG	3/81
					CHECK	FRS	3/81
					CHECK		
					PROJ.		
PRT	SEP	DATE	TO	WO	DESIGN		
PRINT RECORD					WO		

El Paso Natural Gas Company

TYPICAL CLASSIFIER AND INJECTION WELL BLOCK FLOW DIAGRAM

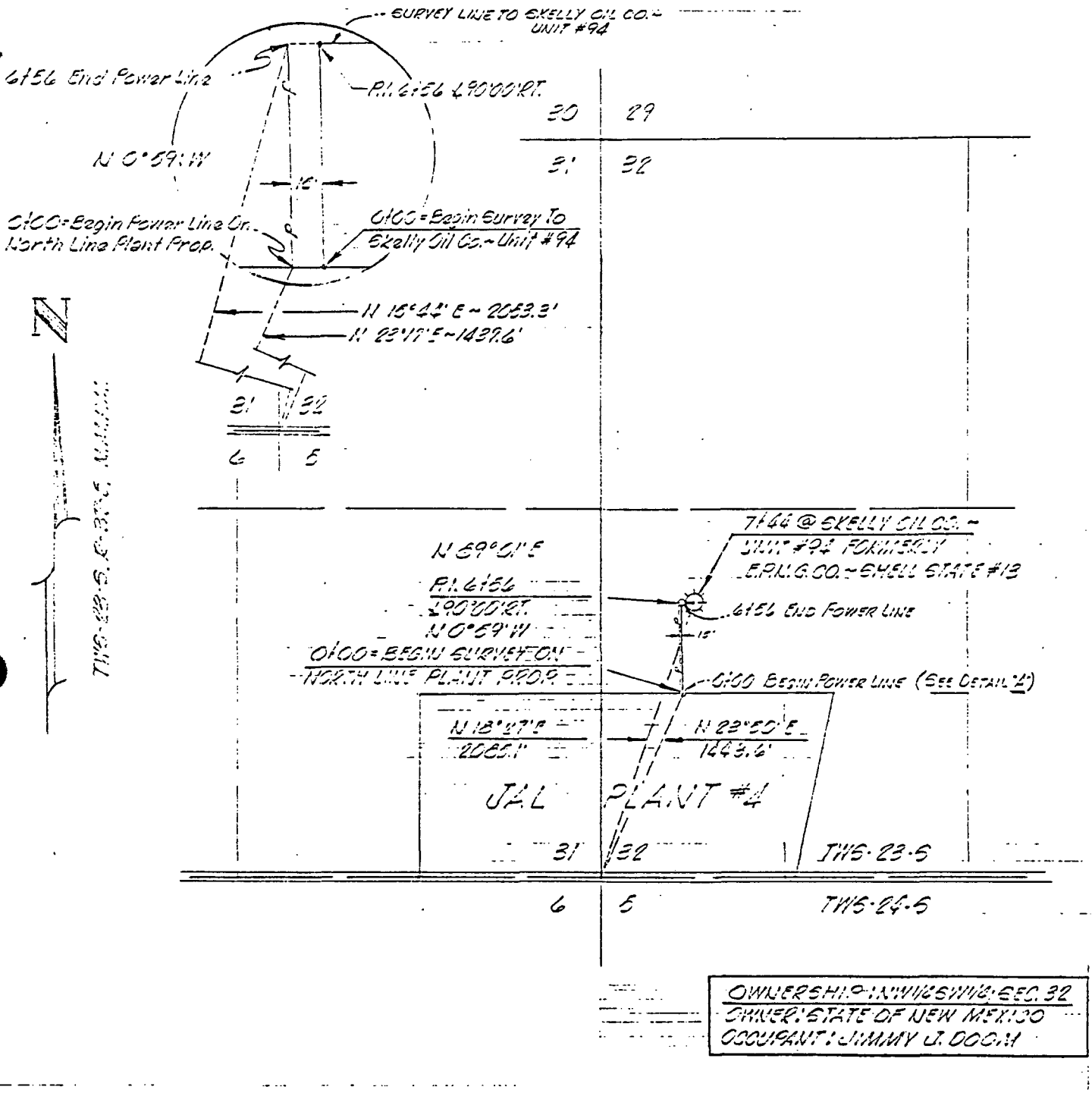
FIGURE 8

SCALE	NA	DWG. NO.	SK-SPECIAL-A666	REV.
CGC NO.	SPE720			

problems will not be known until the system is placed in operation and an accurate test of the Greyburg Formation porosity is made.

The injection well was designed and constructed in accordance with NMOCD requirements. The approved application (SWD-214) to dispose of salt water by injection into a porous formation is shown in Appendix B. The disposal system shown in Figure 8 was operational on March 7, 1981. The injection well is located north of the Jal No. 4 Plant as shown in Figure 9.

DETAIL "A"
NO SCALE



OWNERSHIP: NW¼SW¼ SEC. 32
OWNER: STATE OF NEW MEXICO
OCCUPANT: JIMMY J. DOCKH

POWER LINE R/W #80229

FIGURE 9

REV.	BY	DATE	DESCRIPTION
"E"	L.M.	5-10-80	Added Power Line Ties & Detail "A"
"D"	L.M.	2-14-80	Added Power Line & Corrected Title Block.
16		2-10-80	P.R.
6		2-14-80	T.G.
10		2-14-80	R/W
		10-5-79	T.G.
10		10-5-79	R/W
6		10-3-79	R/W Prel.

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

ENG. REC.	DATE
DRAWN	L.M. 10-3-79
CHECKED	
R/W NO.	791343
REF. DWG.	
SURVEY	9-11-79
W.O.	

El Paso Natural Gas Company

SURVEY OF SALT WATER DISPOSAL LINE AND POWER LINE FROM JAL PLANT #4 TO EXELLY OIL CO. ~ UNIT #94. FORMERLY E.R.N.G. CO. ~ SHELL STATE #13
SEC. 32, TWS-23-S, R-37-E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SCALE: 1" = 1000' | DWG. NO. 5004-7-X-76 | REV. "B"

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Appendix A

Hydrology Data Sheets for Jal No. 4 Plant

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET

CALCULATED BY: F. R. Sprester

DATE: March 18, 1981

AREA DESCRIPTION: Drainage area A[1/] at Jal No. 4 Plant, Lea County, New Mexico

DRAINAGE AREA: (by planimeter)[2/]		A = 60	(Acres)
LENGTH: (Longest waterway)		L = 2,800	(Ft)
ELEVATION DIFFERENCE: 3,322 ft. minus 3,301 ft		H = 21	(Ft)
	S = 0.75 %		
RUNOFF CURVE NUMBER: Table 2-1[3/]		CN = 80	
TIME OF CONCENTRATION: Figure 2-2		Tc = 0.38	
	Yr. Freq.		
RAINFALL, 24 HR. Exhibit 2-2	10	P = 3.6	(In.)
	25	P = 4.5	(In.)
	100	P = 5.8	(In.)
DIRECT RUNOFF: Figure 2-4	10	Q = 1.7	(In.)
	25	Q = 2.4	(In.)
	100	Q = 3.6	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3		DC = 65 (SD-3)	
RATE OF RUNOFF: Figure 2-5		I = 1.0	(CFS/AC In.)
PEAK DISCHARGE: q = AxQxI	10	q = 102	(CFS)
	25	q = 144	(CFS)
	100	q = 216	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	10	V = 8.5	(Ac.Ft)
	25	V = 12	(Ac.Ft.
	100	V = 18	(Ac.Ft.

COMMENTS:

1/ Area drainage to point A east of Jal No. 4 Plant. There is no structure to retain runoff. The majority of the ponds shown do capture surface runoff.

2/ See Figure 5 of this report for area topo.

3/ (McDougal, 1973).

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET

CALCULATED BY: F. R. Sprester

DATE: March 18, 1981

AREA DESCRIPTION: Drainage area A[1] at Jal No. 4 Plant, Lea County, New Mexico

DRAINAGE AREA: (by planimeter) [2] — A = 60 (Acres)

LENGTH: (Longest waterway) — L = 2,800 (Ft)

ELEVATION DIFFERENCE: — H = 21 (Ft)

3,322 ft. minus 3,301 ft

S = 0.75 %

RUNOFF CURVE NUMBER: Table 2-1[3] — CN = 80

TIME OF CONCENTRATION: Figure 2-2 — Tc = 0.38

	Yr. Freq.		
RAINFALL, 24 HR. Exhibit 2-2	2	P =	2.1 (In.)
	5	P =	3.0 (In.)
	50	P =	5.1 (In.)
DIRECT RUNOFF: Figure 2-4	2	Q =	0.6 (In.)
	5	Q =	1.3 (In.)
	50	Q =	3.0 (In.)

DISTRIBUTION CURVE NO.: Exhibit 2-3 — DC = 65 (SD-3)

RATE OF RUNOFF: Figure 2-5 — I = 1.0 (CFS/AC In.)

PEAK DISCHARGE: q = AxQxI	2	q =	36 (CFS)
	5	q =	78 (CFS)
	50	q =	180 (CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	3 (Ac.Ft)
	5	V =	6.5 (Ac.Ft.
	50	V =	15 (Ac.Ft.

COMMENTS:

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET

CALCULATED BY: F. R. Sprester

DATE: March 18, 1981

AREA DESCRIPTION: Drainage Area B[4/] at Jal No. 4 Plant, Lea County, New Mexico

DRAINAGE AREA: (by planimeter)[2/]		A = 48	(Acres)
LENGTH: (Longest waterway)		L = 2,400	(Ft)
ELEVATION DIFFERENCE: 3,322 ft. minus 3,299 ft		H = 23	(Ft)
	S = 0.96 %		
RUNOFF CURVE NUMBER: Table 2-1[3/]		CN = 80	
TIME OF CONCENTRATION: Figure 2-2		Tc = 0.31	
	Yr. Freq.		
RAINFALL, 24 HR. Exhibit 2-2	10	P = 3.6	(In.)
	25	P = 4.5	(In.)
	100	P = 5.8	(In.)
DIRECT RUNOFF: Figure 2-4	10	Q = 1.7	(In.)
	25	Q = 2.4	(In.)
	100	Q = 3.6	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3		DC = 65 (SD-3)	
RATE OF RUNOFF: Figure 2-5		I = 1.1	(CFS/AC In.)
PEAK DISCHARGE: q = AxQxI	10	q = 90	(CFS)
	25	q = 105	(CFS)
	100	q = 190	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	10	V = 6.8	(Ac.Ft)
	25	V = 7.9	(Ac.Ft.
	100	V = 14	(Ac.Ft.

COMMENTS:

[4/] Area drainage to point B east of Jal No. 4 Plant. There is no structure to retain runoff.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET

CALCULATED BY: F. R. Sprester

DATE: March 18, 1981

AREA DESCRIPTION: Drainage area B[4/] at Jal No. 4 Plant, Lea County, New Mexico

DRAINAGE AREA: (by planimeter)[2/] A = 48 (Acres)

LENGTH: (Longest waterway) L = 2,400 (Ft)

ELEVATION DIFFERENCE: H = 23 (Ft)

3,322 ft. minus 3,299 ft

S = 0.96 %

RUNOFF CURVE NUMBER: Table 2-1[3/] CN = 80

TIME OF CONCENTRATION: Figure 2-2 Tc = 0.31

	Yr. Freq.		
RAINFALL, 24 HR. Exhibit 2-2	2	P = 2.1	(In.)
	5	P = 3.0	(In.)
	50	P = 5.1	(In.)
DIRECT RUNOFF: Figure 2-4	2	Q = 0.6	(In.)
	5	Q = 1.3	(In.)
	50	Q = 3.0	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3		DC = 65 (SD-3)	
RATE OF RUNOFF: Figure 2-5		I = 1.1	(CFS/AC In.)
PEAK DISCHARGE: q = AxQxI	2	q = 52.8	(CFS)
	5	q = 68.6	(CFS)
	50	q = 158	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V = 4	(Ac.Ft)
	5	V = 5.2	(Ac.Ft.
	50	V = 12	(Ac.Ft.

COMMENTS:

Appendix B

Application and Approval
for Jal No. 4 Injection Well

Corrected

Form C-108
Revised 3-1-68

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR		ADDRESS	
El Paso Natural Gas Company		P. O. Box 1492, El Paso, Texas 79978	
LEASE NAME	WELL NO.	FIELD	COUNTY
El Paso Nat. Gas Co.-Shell State	13	Langlie - Mattox	Lea

LOCATION

UNIT LETTER "L" ; WELL IS LOCATED 660 FEET FROM THE West LINE AND 1980 FEET FROM THE

South LINE, SECTION 32 TOWNSHIP 23-S RANGE 37-E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETENMINED BY
SURFACE CASING	7-5/8	256	180	Circulated	
INTERMEDIATE	None				
LONG STRING	4-1/2	3719	200	2600' ~~1995~~	Cmt Bond log ~~Calculated~~
TUBING	2-3/8	3219	NAME, MODEL AND DEPTH OF TUBING PACKER		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Greyburg	3820	3995 T.D.

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Perfs.	3930 to 3990

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	Queen - Oil	Yes

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH

Yates - 3000 to 3184 and Queen 3537 to 3684 - Will squeeze both

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
1600	Queen 3770	Glorieta - 5130

AVERAGE DAILY INJECTION VOLUME (BBLS.)	MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSIG
	75	500	Closed	Gravity	Hydrostatic

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE -	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
	Yes	Yes	Yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)

State Owned

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

Getty Oil Company, Box 1231, Midland, Texas 79702

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	
	Yes	Yes	
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
	Yes	Yes	Yes

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

(Signature) Senior Engineer (Title) 9-25-79 (Date)

NOTE: *Should waivers from the surface owner and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests.* SEE RULE 701.

COPIES RECEIVED		
DISTRIBUTION		
SANTA FE		
FILE		
U.S.G.S.		
LAND OFFICE		
OPERATOR		

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-103
Supersedes Old C-102 and C-103
Effective 1-1-65

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: NMB 1167

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 —" (FORM C-101) FOR SUCH PROPOSALS.)

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

7. Unit Agreement Name:

2. Name of Operator: El Paso Natural Gas Company

8. Farm or Lease Name: Shell State

3. Address of Operator: 1800 Wilco Bldg. Midland, TX 79701

9. Well No.: 13

4. Location of Well: UNIT LETTER L, 660 FEET FROM THE West LINE AND 1980 FEET FROM THE South LINE, SECTION 32 TOWNSHIP 23 South RANGE 37 East NMPM.

10. Field and Pool, or Wildcat: Jalmat

15. Elevation (Show whether DF, RT, GR, etc.): 3303.9 GR

12. County: Lea

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

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK [ ]	PLUG AND ABANDON [ ]	REMEDIAL WORK [ ]	ALTERING CASING [ ]
TEMPORARILY ABANDON [ ]		COMMENCE DRILLING OPNS. [ ]	PLUG AND ABANDONMENT [ ]
PULL OR ALTER CASING [ ]	CHANGE PLANS [ ]	CASING TEST AND CEMENT JOB [ ]	
		OTHER [ ]	
OTHER Recomplete as SWD in Grayburg [X]			

17. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

1. MOL & RU Workover Unit
2. Pull & lay down 2 3/8" tubing.
3. Nipple up BOP & GIH w/drill string w/3 7/8" bit.
4. Drill out CI bridge plug w/19' cement plug @ 3331'.
5. Clean out to PBTD 3696'.
6. POH w/work string & bit. Set cmt. retainer @ 2950' & squeeze Yates & at 3450'+ squeeze Queen perfs. Sting out of retainer, reverse tubing clean. WOC.
7. GIH w/drill string & bit. Drill retainer & cement to 3695'.
8. Pressure test 4½" casing. Then drill to 3995'.
9. Run logs from 3700' to 3995'.
10. Run 2 7/8" tubing to TD 2/back-off collar @ 2800' & cement back to 2900'. WOC.
11. Run perf gun & shoot injection interval.
12. Back off 2 7/8" @ 2800' & POH.
13. Run 2 3/8" plastic lined tubing w/casing pkr. to be set @ 2750'. Displace casing fluid w/inhibitor before setting pkr.
14. Break down Grayburg w/acid & water frac. Run injection tests.
15. RD & release WU. Tie well into disposal system.

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

SIGNED [signature] TITLE Div. Prod Engineer DATE 10/4/79

APPROVED BY Orig. Signed By John Runyan Geologist TITLE DATE NOV 5 1979

CONDITIONS OF APPROVAL, IF ANY:

Shell State No 13
well File

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

October 23, 1979

El Paso Natural Gas Co.
P. O. Box 1492
El Paso, Texas 79978

Re: Administrative Order No. SWD-214

Gentlemen:

Enclosed herewith please find Administrative Order SWD-214 for your Shell State No. 13 located in Unit L of Section 32, Township 23 South, Range 37 East, NMPM, Lea County, New Mexico.

Very truly yours,

JOE D. RAMEY
Division Director

JDR/CU/og

cc: Oil Conservation Division
Box 1980
Hobbs, New Mexico

ORDER No. SWD-214

That the operator shall immediately notify the Supervisor of the Division Hobbs District Office of the failure of the tubing, casing, or packer in said well or the leakage of water from or around said well and shall take such steps as may be timely or necessary to correct such failure or leakage.

PROVIDED FURTHER: That jurisdiction of this cause is hereby retained by the Division for such further order or orders as may seem necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of applicant to comply with any requirement of this order after notice and hearing, the Division may terminate the authority hereby granted in the interest of conservation. That applicant shall submit monthly reports of the disposal operations in accordance with Rule 704 and 1120 of the Division's Rules and Regulation.

APPROVED at Santa Fe, New Mexico, on this 23rd day of October, 1979.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Division Director

SEAL

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

Form C-105
Revised 10-1-78

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OIL CONSERVATION DIVISION

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

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State [X] Fee [ ]
5. State Oil & Gas Lease No.

1a. TYPE OF WELL: OIL WELL [ ] GAS WELL [ ] DRY [ ] OTHER Salt Water Disposal
b. TYPE OF COMPLETION: NEW WELL [ ] WORK OVER [X] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER
7. Unit Agreement Name
8. Farm or Lease Name: Shell-State
2. Name of Operator: El Paso Natural Gas Company
9. Well No.: 13-L
3. Address of Operator: P. O. Box 1492, El Paso, Texas 79978
10. Field and Pool, or Wildcat
4. Location of Well: UNIT LETTER L LOCATED 660 FEET FROM THE West LINE AND 1980 FEET FROM THE South LINE OF SEC. 32 TWP. 23-S RGE. 37-E NMPM
12. County: Lea

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Casinghead
WOU 10-30-79	11-20-79		3304' G. L.	

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
3996'			→		

24. Producing Interval(s), of this completion — Top, Bottom, Name: 3866' to 3982' Grayburg
25. Was Directional Survey Made

26. Type Electric and Other Logs Run: Welex-cement Bond Log; N. L. McCullough-Gamma Ray-Compensated Nuetron
27. Was Well Cored

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

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
7-5/8"	24.0	256'		180 sxs. circ. to surf.	
4-1/2"	9.5	3720'		200 sxs. log - 2600' top	
2-7/8"	6.5	3987'		200 sxs. circ. to surf.	

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET

31. Perforation Record (Interval, size and number)
3866' to 3870', 3872' to 3876', 3880' to 3888'
3900' to 3906', 3932' to 3938', 3940' to 3948'
3974' to 3982'. All shot w/4 shots/foot.

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

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
3450' - 3684'	Squeeze w/300 sxs
2884 - 3200'	Squeeze w/350 sxs

33. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
		shut-in Nov. 20, 1979

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas — Oil Ratio

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)

34. Disposition of Gas (Sold, used for fuel, vented, etc.)
Test Witnessed By

35. List of Attachments: Welex Cement Bond Log and N. L. McCullough Gamma Ray-Nuetron

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED James R. Ruth TITLE Senior Engineer DATE November 30, 1979

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. This form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy		T. Canyon		T. Ojo Alamo		T. Penn. "B"	
T. Salt		T. Strawn		T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt		T. Atoka		T. Pictured Cliffs		T. Penn. "D"	
T. Yates	2658'	T. Miss		T. Cliff House		T. Leadville	
T. 7 Rivers	3152'	T. Devonian		T. Menefee		T. Madison	
T. Queen	3527'	T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg	3782'	T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs		T. Wingate		T.	
T. Wolfcamp		T.		T. Chinle		T.	
T. Penn.		T.		T. Permian		T.	
T Cisco (Bough C)		T.		T. Penn. "A"		T.	

OIL OR GAS SANDS OR ZONES

No. 1, from _____ to _____ No. 4, from _____ to _____

No. 2, from _____ to _____ No. 5, from _____ to _____

No. 3, from _____ to _____ No. 6, from _____ to _____

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from _____ to _____ feet. _____

No. 2, from _____ to _____ feet. _____

No. 3, from _____ to _____ feet. _____

No. 4, from _____ to _____ feet. _____

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

Form C-105
Revised 10-1-78

OIL CONSERVATION DIVISION

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

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

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LAND OFFICE	
OPERATOR	

5a. Indicate Type of Lease: State [X] Fee [ ]
5. State Oil & Gas Lease No.:

1a. TYPE OF WELL: OIL WELL [ ] GAS WELL [ ] DRY [ ] OTHER Salt Water Disposal
b. TYPE OF COMPLETION: NEW WELL [ ] WORK OVER [X] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER
7. Unit Agreement Name:
8. Farm or Lease Name: Shell-State
2. Name of Operator: El Paso Natural Gas Company
9. Well No.: 13-L
3. Address of Operator: P. O. Box 1492, El Paso, Texas 79978
10. Field and Pool, or Wildcat:
4. Location of Well: UNIT LETTER L LOCATED 660 FEET FROM THE West LINE AND 1980 FEET FROM THE South LINE OF SEC. 32 TWP. 23-S RGE. 37-E NMPM
12. County: Lea

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Casinghead
WOU 10-30-79	11-20-79		3304' G.L.	

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
3996'			→	X	

24. Producing Interval(s), of this completion — Top, Bottom, Name: 3866' to 3982' Grayburg
25. Was Directional Survey Made:

26. Type Electric and Other Logs Run: Welex-cement Bond Log; N. L. McCullough-Gamma Ray-Compensated Nuetron
27. Was Well Cored:

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

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
7-5/8"	24.0	356'		180 sxs. circ. to surf.	
4-1/2"	9.5	3719'		200 sxs. loc - 2600' top	
2-7/8"	6.5	3997'		200 sxs. circ. to surf.	

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET

31. Perforation Record (Interval, size and number)
3866' to 3870', 3872' to 3876', 3880' to 3888'
3900' to 3906', 3932' to 3938', 3940' to 3948'
3974' to 3982'. All shot w/4 shots/foot.

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

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
3450' - 3684'	Squeeze w/300 sxs
2884 - 3200'	Squeeze w/350 sxs

33. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
		shut-in Nov. 20, 1979

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas—Oil Ratio

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)

34. Disposition of Gas (Sold, used for fuel, vented, etc.)
Test Witnessed By:

35. List of Attachments: Welex Cement Bod Log and N. L. McCullough Gamma Ray-Nuetron

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED [signature] TITLE Senior Engineer DATE November 30, 1979

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. This form is to be filed in quadruplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy		T. Canyon		T. Ojo Alamo		T. Penn. "B"	
T. Salt		T. Strawn		T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt		T. Atoka		T. Pictured Cliffs		T. Penn. "D"	
T. Yates	2658'	T. Miss		T. Cliff House		T. Leadville	
T. 7 Rivers	3152'	T. Devonian		T. Menefee		T. Madison	
T. Queen	3527'	T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg	3782'	T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs		T. Wingate		T.	
T. Wolfcamp		T.		T. Chinle		T.	
T. Penn.		T.		T. Permian		T.	
T. Cisco (Bough C)		T.		T. Penn. "A"		T.	

OIL OR GAS SANDS OR ZONES

No. 1, from _____ to _____ No. 4, from _____ to _____

No. 2, from _____ to _____ No. 5, from _____ to _____

No. 3, from _____ to _____ No. 6, from _____ to _____

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from _____ to _____ feet _____

No. 2, from _____ to _____ feet _____

No. 3, from _____ to _____ feet _____

No. 4, from _____ to _____ feet _____

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation

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OIL CONSERVATION DIVISION

P. O. BOX 2088

SANTA FE, NEW MEXICO 87501

Form C-103
Revised 10-1-71

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.

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 —" (FORM C-101) FOR SUCH PROPOSALS.)

7. Unit Agreement Name

OIL WELL [ ] GAS WELL [ ] OTHER- Salt Water Disposal

2. Name of Operator: El Paso Natural Gas Company

8. Farm or Lease Name: Shell-State

3. Address of Operator: Box 1492, El Paso, Texas 79978

9. Well No.: 13-L

4. Location of Well: UNIT LETTER L, 660 FEET FROM THE West LINE AND 1980 FEET FROM THE South LINE, SECTION 32 TOWNSHIP 23-S RANGE 37-E NMPM.

10. Field and Pool, or Wildcat

15. Elevation (Show whether DF, RT, GR, etc.): 3304' G. L.

12. County: Lea

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

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK [ ]	PLUG AND ABANDON [ ]	REMEDIAL WORK [ ]	ALTERING CASING [ ]
TEMPORARILY ABANDON [ ]		COMMENCE DRILLING OPNS. [ ]	PLUG AND ABANDONMENT [ ]
PULL OR ALTER CASING [ ]	CHANGE PLANS [ ]	CASING TEST AND CEMENT JOB [X]	
		OTHER [ ]	
OTHER [ ]			

17. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

2-7/8" Long String Set @ 3996'

Inside 4-1/2" to 3719' and 3-3/4" Hole to 3998'

Cemented back to surface w/200 sxs.

Circulated approx. 15 sxs.

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

SIGNED [signature] TITLE Senior Engineer DATE November 17, 1970

APPROVED BY _____ TITLE _____ DATE _____

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OIL CONSERVATION DIVISION

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

Form C-103
Revised 10-1-73

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.

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 —" (FORM C-101) FOR SUCH PROPOSALS.)

7. Unit Agreement Name

OIL WELL [ ] GAS WELL [ ] OTHER- Salt Water Disposal

2. Name of Operator: El Paso Natural Gas Company

8. Farm or Lease Name: Shell-State

3. Address of Operator: Box 1492, El Paso, Texas 79978

9. Well No.: 13-L

4. Location of Well: UNIT LETTER L, 660 FEET FROM THE West LINE AND 1980 FEET FROM THE South LINE, SECTION 32 TOWNSHIP 23-S RANGE 37-E NMPM.

10. Field and Pool, or Wildcat

15. Elevation (Show whether DF, RT, GR, etc.): 3304' G. L.

12. County: Lea

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

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
PERFORM REMEDIAL WORK	[ ]	PLUG AND ABANDON	[ ]	REMEDIAL WORK	[ ]	ALTERING CASING	[ ]
TEMPORARILY ABANDON	[ ]			COMMENCE DRILLING OPNS.	[ ]	PLUG AND ABANDONMENT	[ ]
PULL OR ALTER CASING	[ ]	CHANGE PLANS	[ ]	CASING TEST AND CEMENT JOB	[X]		
				OTHER			[ ]
OTHER	[ ]						

17. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

2-7/8" Long String Set @ 3996'

Inside 4-1/2" to 3719' and 3-3/4" Hole to 3998'

Cemented back to surface w/200 sxs.

Circulated approx. 15 sxs.

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

SIGNED [signature] TITLE Senior Engineer DATE November 17, 1979

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY: