STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

12-21-93

BRUCE KING
GOVERNOR

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88241-1980
(505) 393-6161

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

SWD-549

RE: Proposed:
MC _____
DHC _____
NSL _____
NSP _____
SWD X
WFX _____
PMX _____

Gentlemen:

I have examined the application for the:

Southland Royalty Co. Vaca Ridge 30 Fed #1-K 30-24-34
Operator Lease & Well No. Unit S-T-R

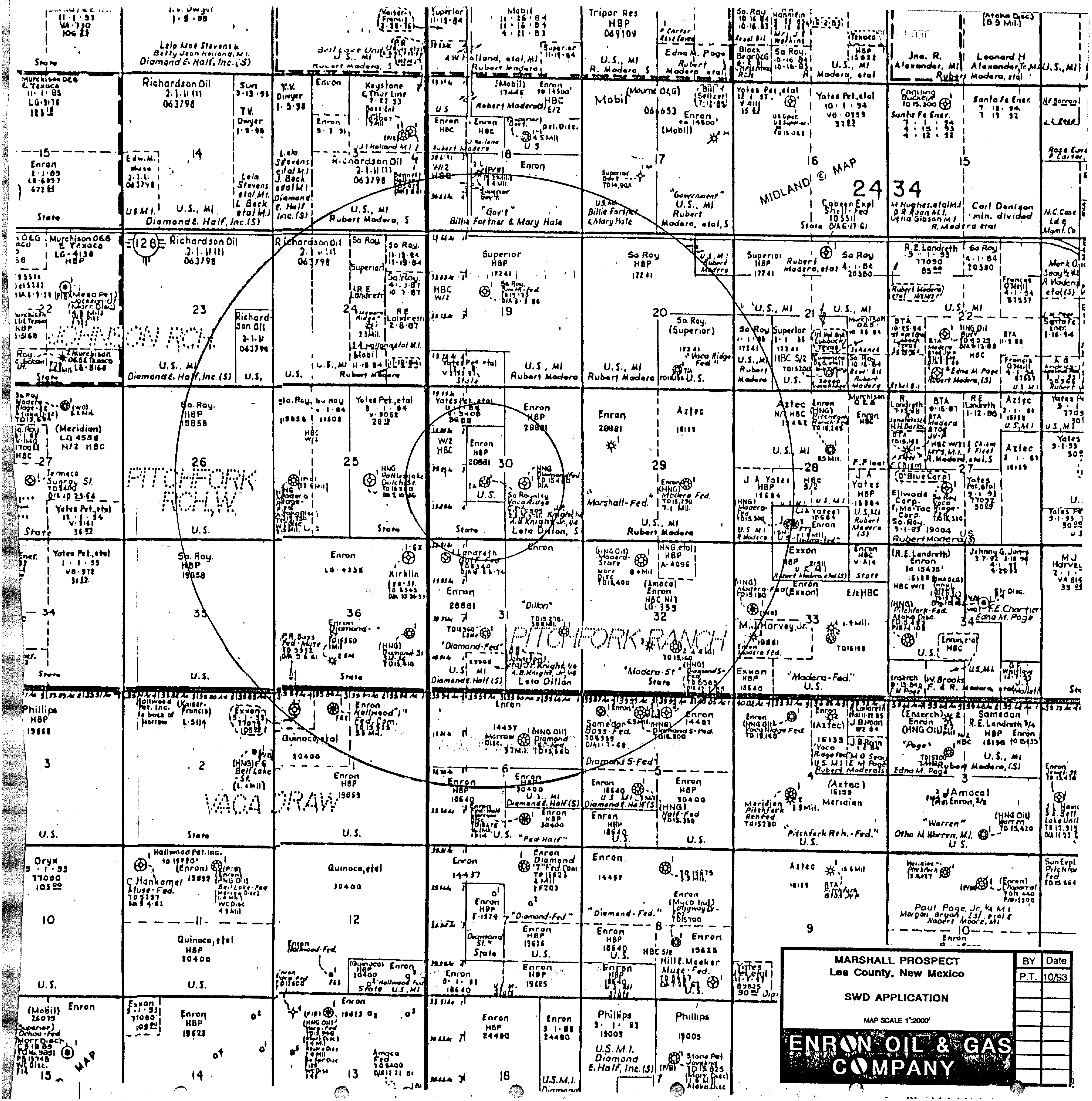
and my recommendations are as follows:

OK

Yours very truly,

Jerry Sexton
Supervisor, District 1

/ed



MARSHALL PROSPECT
Lea County, New Mexico
SWD APPLICATION
MAP SCALE 1":2000'
ENRON OIL & GAS COMPANY
BY
Date
P.T.
10/93
MIDLAND © MAP
24 34
PITCHFORK RCH.W.
PITCHFORK RANCH
VACA DRAW
Richardson Oil
Diamond E. Half, Inc.(S)
Rubert Madera, S
Billie Fortner & Mary Hale
Lela Mae Stevens & Betty Jean Holland, M.I.
"Gov't"
"Government"
Tripor Res
Edna M. Page
Jno. R. Alexander, MI
Leonard H Alexander,Tr.
Carl Denison min. divided
Superior
So Roy
Enron
Yates Pet.,etal
Aztec
Exxon
"Marshall-Fed."
"Dillon"
"Diamond-Fed"
Leta Dillon, S
"Madera-St"
"Madera-Fed."
Diamond 5-Fed
Samedon
R.E. Landreth
"Warren"
Otho N. Warren, M.I.
"Pitchfork Rch.-Fed."
Quinoco, etal
C Hankamer Muse-Fed.
Hallwood Pet. Inc.
"Diamond-Fed."
Paul Page, Jr.
Phillips
Oryx
Amoco

ENRON
Oil & Gas Company

P. O. Box 2267 Midland, Texas 79702 (915) 686-3600

December 15, 1993

New Mexico Oil Conservation Division
P.O. Box 2088
Hobbs, New Mexico 88241-1980

Re: Application for Authority to Inject
Form C - 108
Vaca Ridge "30" Federal Com. No. 1
Section 30-T24S-R34E
Lea County, New Mexico

Dear Mr. Jerry Sexton,

Please find attached a copy of Enron Oil & Gas Company's application Form C - 108 and attachments requesting approval to inject water into the Delaware formation in the above referenced well.

The original and one copy has been sent to the NMOCD in Santa Fe. If you have any questions or require additional information please call me at (915) 686-3698.

Sincerely,

Randall S. Cate
Project Reservoir Engineer

m:\misc\se025rcw

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPART. .NT

OIL CONSERVATION DIVISION
POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501

FORM C-108
Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: ☐ Secondary Recovery ☐ Pressure Maintenance ☒ Disposal ☐ Storage
Application qualifies for administrative approval? ☒ yes ☐ no

II. Operator: Enron Oil & Gas Company

Address: 4000 N. Big Springs, Suite 500 Midland, Texas 79705

Contact party: Randall Cate Phone: (915) 686-3698

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? ☐ yes ☒ no
If yes, give the Division order number authorizing the project _____.

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

• VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

•VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

• X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)

• XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification

I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: Randall Cate Title Project Reservior Engineer

Signature: _____ Date: 12-16-93

• If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal. _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate Division district office.

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No.; location by Section, Township, and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) the intended purpose of the injection well; with the exact location of single wells or the section, township, and range location of multiple wells;

(3) the formation name and depth with expected maximum injection rates and pressures; and

(4) a notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, P. O. Box 2088, Santa Fe, New Mexico 87501 within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

Enron Oil & Gas
Application for Injection
Attachments to Form C - 108

Part III. Well Data

A. 1. See attached injection well data sheet.

2. See attached injection well data sheet.

* 3. This will install ± 5,300' 2 3/8" integral joint 1 PC tubing.

* 4. Packer will be a Baker loc-set (or equivalent) set @ ± 5,300'. A teflon coated on/off tool assembly will be run on top of the packer.

B. 1. The injection formation is the Bell Canyon portion of the Delaware Mountain group.

2. See attached injection well data sheet.

3. This well was originally drilled as a 15,500' Morrow test.

4. The well produced 88,478 MCF, 388 BBL condensate, and 1,662 BBL water through Morrow perforations 14,854' - 15,166'. Last reported production was September 1985. A CIBP was set @ 14,700'. Currently well is temporally abandoned. EOG plans to plug back to the Delaware according to the attached sundry notice filed with the BLM.

5. There is no oil or gas zone higher than the Delaware formation. The next lower oil or gas zone is the Morrow formation at ± 14,800'.

* Tubing and packer assembly will be set @ ± 6,200' if the zone from 6,304' - 6,360' has sufficient injectivity.

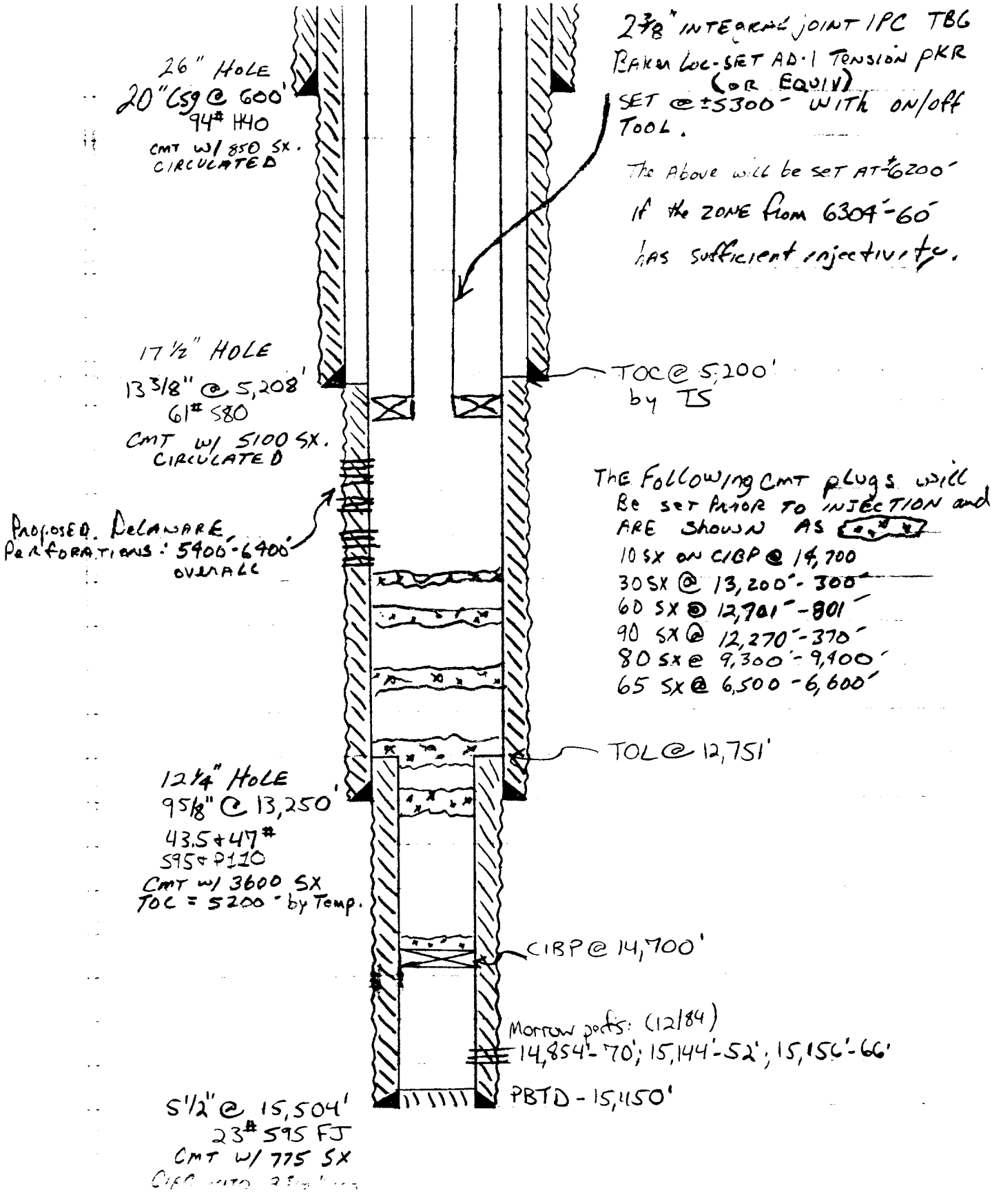
PART III

ELLBORE SCHEMATIC

VACA RIDGE "30" FED. COM. NO. 1

1980' FSL & FWL of Section 30 - T24S - R34E

LEA County, New Mexico



INJECTION WELL DATA SHEET

SIDE 1

Enron Oil & Gas Company	Vaca Ridge "30" Federal			
OPERATOR	LEASE			
1	1,980' FSL & 1,980' FWL	30	24	34
WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE

Lea County, New Mexico

Schematic ATTACHED

REMARKS

CIBP @ 14,700'
CMT plugs will be set in accordance with NMOCD Rules to plug back and isloate Delaware interval for injection.

Original USGS Well Completion Report included

Tabular Data

Surface Casing

Size 20" @ 600' " Cemented with 850 sx.

TOC Surface feet determined by Circ. CMT

Hole size 26"

Intermediate Casing

Size 13 3/8 @ 5,208' " Cemented with 850 sx.

TOC Surface feet determined by Circ. CMT

Hole size 17 1/2"

Long string

Size 9 5/8 @ 13,250" " Cemented with 5,100 sx.

TOC 5,200 feet determined by Temp. Log (Attached)

Hole size 12 1/4"

Total depth 13,250

5 1/2 Liner from 12,751 - 15,504'

Injection interval

5,400 feet to 6,400 feet Overall If needed

(perforated or ~~XXXXXXXXXXX~~ indicate which)

perforations will be from 6304' - 60' if sufficient injectivity is obtained

Enron Oil & Gas
Application for Injection
Attachments to Form C - 108

Part VI. Tabulation of data on wells within the area of review

Diamond "30" Federal No. 1 (0.3 mile east of proposed injector)

Status:	P & A'd Morrow completion attempt
Previous operator:	Enron Oil & Gas Company
Date Drilled:	6/18/1985
Location:	1980' FSL & 1980' FEL , Section 30-24S-34E, Lea County, New Mexico
Depth:	15, 480'
Record of completion:	Perforated Morrows 14,695' - 15,374' overall. squeezed.
Construction:	13 3/8" csg set @ 609' cmt circulated. 9 5/8" csg set @ 5,200' cmt circulated. 7" csg 6,500' - 13,250' cmt w/1,200 sx. est TOC 7,000' Pulled 6,500' of 7" csg during P&A
Plugs:	25 sx squeeze @ 14,400'; 50 sx @ 12,960'; 50 sx @ 12,200'; 30 sx @ 9,300'; 65 sx @ 6,550'; 75 sx @ 5,250'; 35 sx @ 2,500'; 35 sx @ 610'; 20 sx surface.

Part VII.

1. Proposed average daily injection rate - 1,000 BPD. Proposed maximum daily injection rate - 2,000 BPD

2. The system will be open. Water will be trucked from field batteries.

3. Proposed average daily injection pressure - 300 PSIG. Proposed maxium daily injection pressure - 600 PSIG.

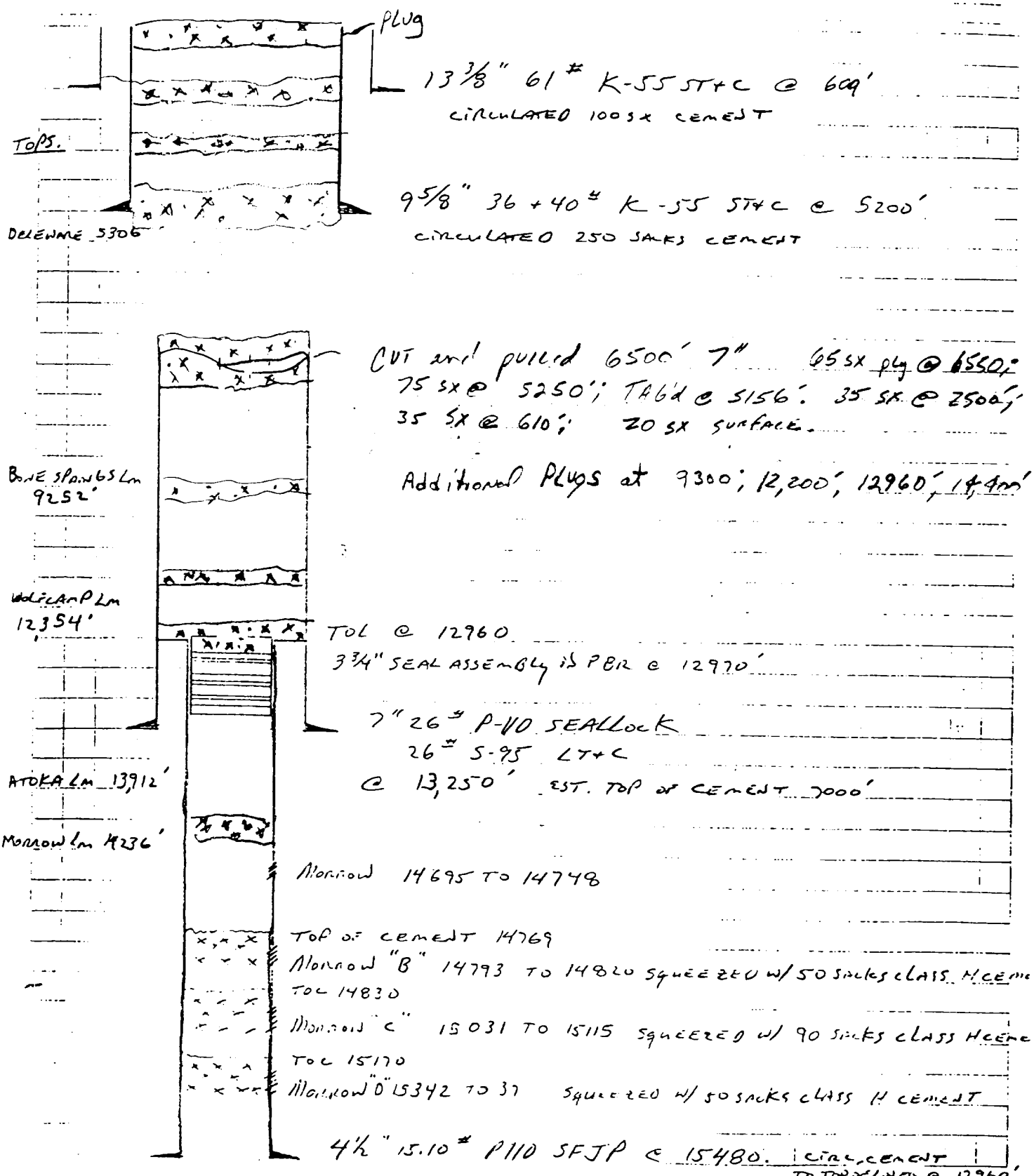
4. Primarily Morrow water from the Pitchfork Ranch Field will be injected into the Delaware zones identified. Minor amounts of Atoka and Wolfcamp waters will also be injected. Produced waters have been tested and found compatible with each other and with the receiving formation. See attached analyses and lab report.

ENRON OIL & GAS APPLICATION TO INJECT

PART VI

WELL WITHIN .5 mile AREA OF REVIEW

DIAMOND 30 FEDERAL No. 1
0.3 MILE EAST



PART VI

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

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

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

RECEIVED
FEB 13 1986
DIST. 6 N.M.
Carlsbad, New Mexico
BUREAU OF LAND MANAGEMENT

5. LEASE DESIGNATION AND SERIAL NO.: NM 28881

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: Diamond 30 Federal

9. WELL NO.: 1

10. FIELD AND POOL, OR WILDCAT: Pitchfork Ranch /Morrow/

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 30, T24S, R34E

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ DRY ☐ Other

b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other

2. NAME OF OPERATOR: HNG OIL COMPANY

3. ADDRESS OF OPERATOR: P. O. Box 2267, Midland, Texas 79702

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: 1980' FSL & 1980' FEL
At top prod. interval reported below: Same
At total depth: Same

14. PERMIT NO.	DATE ISSUED	12. COUNTY OR PARISH	13. STATE
-	4/10/85	Lea	New Mexico

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
4-28-85	6-18-85	8-13-85	3532.1' GR	3532.1'

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
15,480'	14,775'		→	X	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 14,695' - 14,748' (Morrow)

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN: Comp. Neutron-Litho Density, BHC Sonic, Composite of Dual Laterolog & Dual Induction

27. WAS WELL CORED: No

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

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	61#	609'	17-1/2"	275 HLC & 250 Cl C	Circulated
9-5/8"	36# & 40#	5200'	12-1/4"	2000 HLC & 475 Cl C	Circulated
7"	26#	13250'	8-3/4"	850 TLC & 350 Cl H	-

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
4-1/2"	12960	15480	325 Cl H	-

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2-7/8"	12,960'	12,960 PRB & MSL

31. PERFORATION RECORD (Interval, size and number)
15342 - 15374 (.30" 18)
15031 - 15115 (.30" 24)
14793 - 14820 (.30" 16)
14695 - 14748 (.32" 12)

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

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
15342-15374	sq. w/50 sx Cl H tested to 6000 p
15031-15115	sq. w/50 sx Cl H tested to 6000 ps
14793-14820	sq. w/50 sx Cl H tested to 8000 ps
14695-14748	4000 gals mor flo BC acid

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
		Shut-in waiting on P&A

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
					ACCEPTED FOR RECORD		

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.)

FEB 13 1986

WITNESSED BY

CARLSBAD, NEW MEXICO

35. LIST OF ATTACHMENTS: Logs

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

SIGNED Betty Gildon (Betty Gildon) TITLE Regulatory Analyst DATE 2/12/86

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

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

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE (Other instructions on reverse side)

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

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. OIL WELL ☐ GAS WELL ☐ OTHER Dry Hole
2. NAME OF OPERATOR: HNG OIL COMPANY
3. ADDRESS OF OPERATOR: P. O. Box 2267, Midland, Texas 79702
4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980' FSL & 1980' FEL
5. LEASE DESIGNATION AND SERIAL NO.: NM 28881
6. IF INDIAN, ALLOTTEE OR TRIBE NAME:
7. UNIT AGREEMENT NAME:
8. FARM OR LEASE NAME: Diamond 30 Federal
9. WELL NO.: 1
10. FIELD AND POOL, OR WILDCAT: Pitchfork Ranch /Morrow/
11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 30, T24S, R34E
12. COUNTY OR PARISH: Lea
13. STATE: NM
14. PERMIT NO.: API # 30-025-29210
15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3532.1' GR

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

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

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

5-8-86 - Squeezed perfs 14695 to 14748 feet with 25 sacks Class H. Top of cement at 14400'.
50 sack plug at 12960'
50 sack plug at 12200'
30 sack plug at 9300'

5-10-86 - Cut and recovered 6500 feet of 7" 26# casing.
5-11-86 - 65 sack plug at 6550'
75 sack plug at 5250'. Tagged cement at 5156'.
35 sack plug at 2500'
35 sack plug at 610 feet

5-12-86 - Cut off bradenhead and set 20 sack plug 90' to surface.
Rig released.

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

SIGNED Betty Gildon Betty Gildon TITLE Regulatory Analyst DATE 5/13/86

(This space for Federal or State office use)

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

*See Instructions on Reverse Side

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

Enron Oil & Gas
Application for Injection
Attachments to Form C - 108

5. Injection is for disposal purposes into a zone not productive of oil or gas within one mile of the proposed well. A fluid analysis indicative of Delaware formation water in this area is attached from the Enron Oil & Gas Madera "10" Federal No. 1. The well is located in drilling unit M, Section 10-26S- 33E. See attached lab report.

Part VIII.

Lithologic detail:	Sand/Shale Sequence
Geologic name:	Delaware Mountain Group - Bell Canyon Formation
Thickness:	2,560'
Depth:	5,310' - 7,860'
Overlying underground sources of drinking water:	The red bed formation found between surface and 600'
Underlying underground drinking water:	none

Part IX. Proposed stimulation program: Perforations will be cleaned up with 4,000 gals 15% HCL acid. Near wellbore damage may require a gelled water and sand fracture treatment consisting of 18,000 gallons and 30,000 lbs. 20-40 sand.

Part X. The well logs are on file with the OCD. The Morrow formation was production tested from perforations at 14,854' - 15,152'. See attached well completion report.

Part XI. There is one fresh water well at or within one mile from the proposed injection well. See the attached topographic map. An analysis of the water is attached.

Part XII. EOG has examined available geologic and engineering data and has found no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

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

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

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

December 1, 1993

Mr. Randy Cate
Enron Oil & Gas Company
P.O. Box 3229
Midland, TX 79702

Dear Mr. Cate:

The objective herein is to provide an interpretation regarding the compatibility between Morrow, Wolfcamp, and Atoka. This evaluation is provided based on our records of Morrow reported on laboratory #109273 (10-14-92) and #892188 (8-31-92). The records of Wolfcamp and Atoka are based on chemical company analyses that you provided us. It should be clarified that our interpretations provided herein are based on the assumption that their records of Wolfcamp and Atoka are representative. It is further the objective herein to evaluate the possibility of injecting Morrow, Wolfcamp, and Atoka into the Delaware, which is represented on laboratory #12836 (12-5-83). It should be noted that this Delaware is also very similar to other Delaware records we have in the Pitchfork Ranch field.

In comparing the above analyses of waters represented, we have identified no evidence of any potential precipitation or scaling potential that would result from any combination of waters from the Morrow, Wolfcamp, or Atoka. Therefore, we would classify these waters as being compatible in any combination.

Our study of the Delaware water compatibility with the Morrow, Wolfcamp, and Atoka has revealed no evidence of any need for concern in injecting one or more of these waters into the Delaware interval.

It is noted in studying the waters herein that all of the produced waters involved from the Morrow, Wolfcamp, and Atoka could be anticipated to contain some soluble iron. This renders the water sensitive to air contamination; therefore, any oxygen that gets into the waters would be expected to result in iron oxide precipitation somewhat proportionate to the amount of oxygen that gets into the water. Therefore, maximum efforts should be applied to avoiding any air contamination in these waters to prevent as much of this precipitation as feasible.

Yours very truly,

Waylan C. Martin

WCM/mo

Copy to WF Prod file
Bill Thomas

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

Martin Water Laboratories, Inc.

709 W INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

LABORATORY NO. 12836
SAMPLE RECEIVED 12-2-83
RESULTS REPORTED 12-5-83

TO: Mr. Jim Kimbrow
P.O. Box 2267, Midland, Texas

COMPANY HNG Oil Company LEASE Madera 10
FIELD OR POOL
SECTION ___ BLOCK ___ SURVEY ___ COUNTY Lea STATE NM
SOURCE OF SAMPLE AND DATE TAKEN:
NO. 1 Produced water - taken from Madera 10 #1, 11-30-83
NO. 2
NO. 3
NO. 4
REMARKS:

DELAWARE

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.1889			
pH When Sampled				
pH When Received	5.81			
Bicarbonate as HCO_3	56			
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	96,500			
Calcium as Ca	32,200			
Magnesium as Mg	3,888			
Sodium and/or Potassium	74,659			
Sulfate as SO_4	387			
Chloride as Cl	183,229			
Iron as Fe	38.2			
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	294,419			
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen, Winkler				
Hydrogen Sulfide	0.0			
Resistivity, ohms/m at 77° F.	0.047			
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				
Calcium Sulfate Scaling Tendency	NONE			

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks: We are not familiar with the location of this well or the zone being produced, but the characteristics of the water are typical of natural connate Delaware water in southeast Lea county.

Form No. 3

cc: Mr. Dan Honeyfield, BrakeSol
Mr. J. W. Clifford, Pyote
Mr. Robert Builta, Pyote

By _____
Waylan C. Martin, M. A.

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

Martin Water Laboratories, Inc.

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

RESULT OF WATER ANALYSES

LABORATORY NO. 109273
SAMPLE RECEIVED 10-10-92
RESULTS REPORTED 10-14-92

TO: Mr. Rick Schatz
P.O. Box 3229, Carlsbad, NM 88220

COMPANY Enron Oil & Gas Company LEASE Madera 33
FIELD OR POOL Pitchfork Ranch
SECTION ____ BLOCK ____ SURVEY ____ COUNTY Lea STATE NM
SOURCE OF SAMPLE AND DATE TAKEN:
NO. 1 Produced water - taken from Madera 33 #1. Morrow
NO. 2 Produced water - taken from Madera 33 #2. Morrow
NO. 3
NO. 4
REMARKS: Morrow

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0166	1.0190		
pH When Sampled				
pH When Received	7.07	7.12		
Bicarbonate as HCO_3	769	1,037		
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	1,100	800		
Calcium as Ca	424	280		
Magnesium as Mg	10	24		
Sodium and/or Potassium	7,776	9,797		
Sulfate as SO_4	915	17		
Chloride as Cl	11,647	15,056		
Iron as Fe	14.0	82.8		
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	21,540	26,212		
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	0.0	0.0		
Resistivity, ohms/m at 77° F	0.370	0.295		
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks The above results show the water from well #1 to have a high level of sulfate similar to what we encountered on laboratory #129055 (12-8-90). This is the only discrepancy in the characteristics of this water as compared to what we would expect from natural Morrow. However, we are not confident that this is suggesting a foreign water is involved. The water from well #2 correlates well with natural Morrow. This water has also not changed significantly since the above mentioned previous analysis.

Form No. 3

By Waylan C. Martin, M.A.

Champion Chemicals, Inc.

.BOX 2187
)BBS, N.M. 88240

PHONE: (505) 393-7726

W A T E R A N A L Y S I S R E P O R T

Report for: RICK SCHATZ
cc: GARLAND PORTER
cc:
cc:
Company: ENRON
Address:
Service Engineer: DONNY SELMAN

Date sampled: 6-7-88
Date reported: 6-8-88
Lease or well # : MADERA 33 FED COM 4
County: State:
Formation: ATOKA
Depth:
Submitted by: DONNY SELMAN

CHEMICAL COMPOSITION :	mg/L	meq/L
Chloride (Cl)	11000	310
Iron (Fe) (total)	238.0	
Total hardness	7000	
Calcium (Ca)	2406	120
Magnesium (Mg)	243	20
Bicarbonates (HCO3)	732	12
Carbonates (CO3)	n/a	
Sulfates (SO4)	89	2
Hydrogen sulfide (H2S)	0	
Carbon dioxide (CO2)	n/a	
Sodium (Na)	4245	185
Total dissolved solids	18715	
Barium (Ba)	n/a	
Strontium (Sr)	n/a	

Specific Gravity	1.013
Density (#/gal.)	8.442
pH	6.250
IONIC STRENGTH	0.39

Stiff-Davis (CaCO3) Stability Index :
SI = pH - pCa - pAlk - K

SI @ 86 F = +0.09
104 F = +0.31
122 F = +0.57
140 F = +0.85
158 F = +1.16

This water is 1684 mg/l (-93.04%) under ITS CALCULATED CaSO4 saturation value at 82 F.
SATURATION= 1810 mg/L PRESENT= 126 mg/L

REPORTED BY RANDOLPH SCOTT

CHEMIST

Champion Chemicals, Inc.
PHONE: (505) 393-7726
.BOX 2187
BBS, N.M. 88240

WATER ANALYSIS REPORT

Report for: RICK SCHATZ
cc: GARLAND PORTER
cc:
cc:
Company: ENRON
Address:
Service Engineer: DONNY SELMAN

Date sampled: 6-7-88
Date reported: 6-8-88
Lease or well # : MADERA 33 FED COM 3
County: State:
Formation: ATOKA
Depth:
Submitted by: DONNY SELMAN

CHEMICAL COMPOSITION :	mg/L	meq/L
Chloride (Cl)	1000	28
Iron (Fe) (total)	29.0	
Total hardness	600	
Calcium (Ca)	200	10
Magnesium (Mg)	24	2
Bicarbonates (HCO3)	61	1
Carbonates (CO3)	n/a	
Sulfates (SO4)	58	1
Hydrogen sulfide (H2S)	0	
Carbon dioxide (CO2)	n/a	
Sodium (Na)	425	18
Total dissolved solids	1769	
Barium (Ba)	n/a	
Strontium (Sr)	n/a	

Specific Gravity	1.001
Density (#/gal.)	8.342
pH	5.600
IONIC STRENGTH	0.04

Stiff-Davis (CaCO3) Stability Index :
SI = pH - pCa - pAlk - K

SI @ 86 F = -1.77
104 F = -1.55
122 F = -1.32
140 F = -1.08
158 F = -0.83

This water is 2085 mg/l (-96.17%) under ITS CALCULATED CaSO4 saturation value at 82 F.
SATURATION= 2168 mg/L PRESENT= 83 mg/L

REPORTED BY RANDOLPH SCOTT

CHEMIST

P.O.BOX 2187
OBBS, N.M. 88240

Champion Chemicals, Inc.

PHONE: (505) 393-7726

W A T E R A N A L Y S I S R E P O R T

Report for: RICK SCHATZ
cc:
cc:
cc:
Company: ENRON
Address:
Service Engineer:

Date sampled: 4-14-89
Date reported: 4-18-89
Lease or well # : 25 FED COM #1
County: State:
Formation: MADERA RIDGE
Depth:
Submitted by: RICK SCHATZ

Wolfcamp

CHEMICAL COMPOSITION :	mg/L	meq/L
Chloride (Cl)	9000	254
Iron (Fe) (total)	15.0	
Total hardness	5000	
Calcium (Ca)	1203	60
Magnesium (Mg)	486	39
Bicarbonates (HCO3)	134	2
Carbonates (CO3)	n/a	
Sulfates (SO4)	168	4
Hydrogen sulfide (H2S)	0	
Carbon dioxide (CO2)	n/a	
Sodium (Na)	3692	161
Total dissolved solids	14683	
Barium (Ba)	n/a	
Strontium (Sr)	n/a	

Specific Gravity	1.010
Density (#/gal.)	8.417
pH	7.000
IONIC STRENGTH	0.31

Stiff-Davis (CaCO3) Stability Index :
SI = pH - pCa - pAlk - K

SI @ 86 F = -0.10
104 F = +0.12
122 F = +0.37
140 F = +0.65
158 F = +0.94

This water is 2325 mg/l (-90.71%) under ITS CALCULATED CaSO4 saturation value at 82 F.
SATURATION= 2563 mg/L PRESENT= 238 mg/L

REPORTED BY RANDOLPH SCOTT

CHEMIST

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

Martin Water Laboratories, Inc.

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

RESULT OF WATER ANALYSES

TO: Mr. Dewey Smeltzer
P. O. Box 2267, Midland, TX 79702

LABORATORY NO. 129322
SAMPLE RECEIVED 12-7-93
RESULTS REPORTED 12-7-93

COMPANY Enron Oil & Gas Company LEASE Vaca Ridge 30 Fed. Com. #1 (proposed disposal well)
FIELD OR POOL
SECTION 25 BLOCK ____ SURVEY T-25S&R-34E COUNTY Lea STATE NM
SOURCE OF SAMPLE AND DATE TAKEN:
NO. 1 Raw water - taken from Rancher's water well (holding tank). 12-7-93 Fresh H_2O
NO. 2 Raw water - taken from Rancher's water well (dirt pit). 12-7-93 WELL
NO. 3 WITHIN
NO. 4 1 MILE
REMARKS:

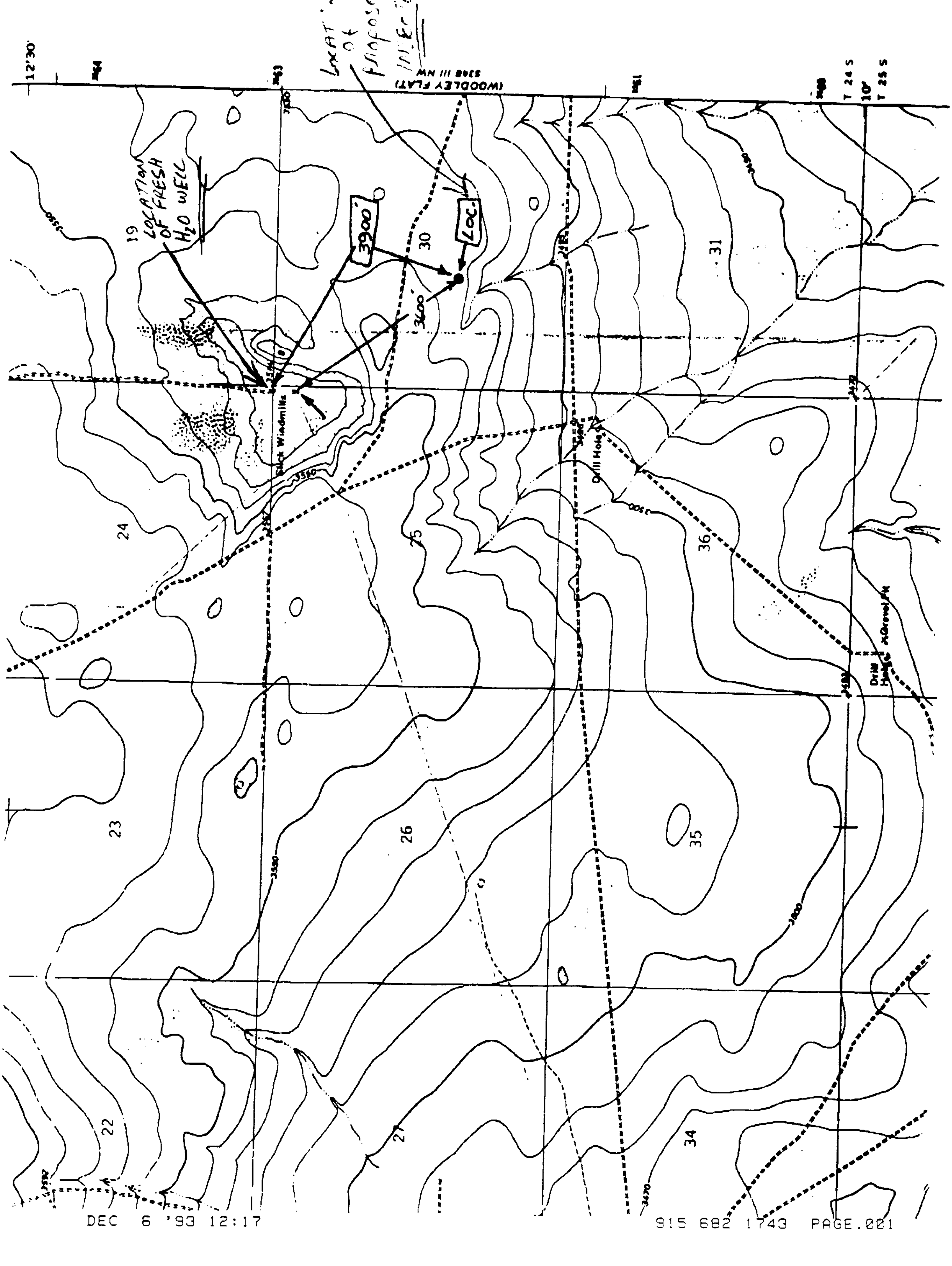
CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0038	1.0034		
pH When Sampled				
pH When Received	7.16	7.13		
Bicarbonate as HCO_3	254	256		
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	2,150	2,150		
Calcium as Ca	600	600		
Magnesium as Mg	158	158		
Sodium and/or Potassium	364	258		
Sulfate as SO_4	2,377	2,164		
Chloride as Cl	185	178		
Iron as Fe	0.03	0.06		
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	3,937	3,613		
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	0.0	0.0		
Resistivity, ohms/m at 77° F.	2.02	2.02		
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				
Nitrate, as N	4.5	4.1		

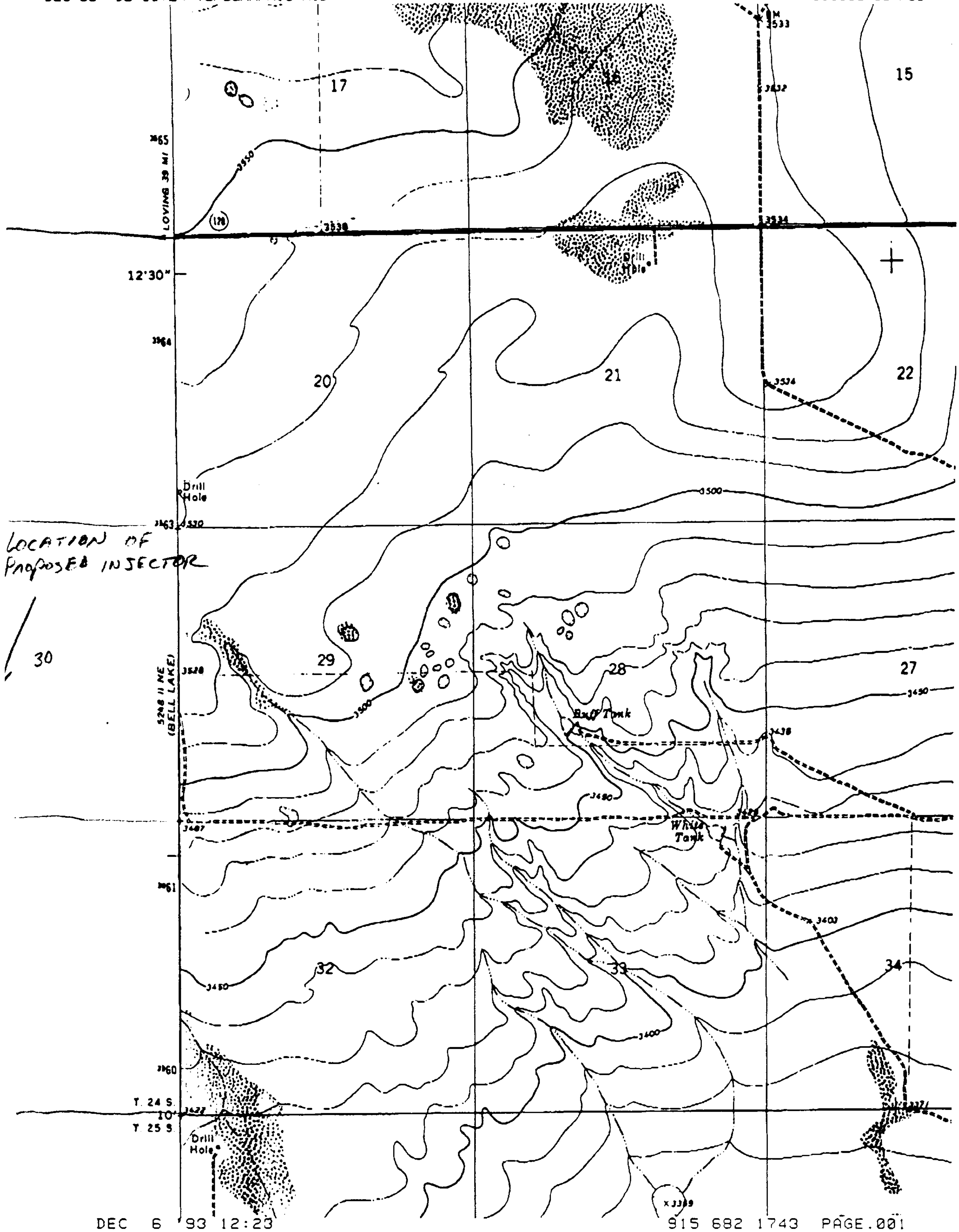
Results Reported As Milligrams Per Liter

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

Form No. 3

By Waylan C. Martin, M.A.


(WOODLEY FLAT)
5308 III NW
12'30"
T 24 S
T 25 S
10'
LOCATION OF FRESH H_2O WELL
3900'
LOC.
3600'
Slick Windmills
Drill Hole
19
30
31
24
25
36
23
26
35
22
27
34


17
16
15
3550
3538
3534
3533
LOVING 39 MI
12'30"
20
21
22
Drill Hole
3500
3520
LOCATION OF PROPOSED INJECTOR
30
29
28
27
3450
Buff Tank
White Tank
3438
3480
5268 II NE (BELL LAKE)
32
33
34
3400
3403
T. 24 S.
T. 25 S.
Drill Hole
x 3389

Enron Oil & Gas
Application for Injection
Attachments to Form C - 108

Part XIII. Proof of Notice

Surface Owner:

1. Leta Dillon Trust
   1514 S. Indianapolis
   Tulsa, Oklahoma 74135

Leasehold owners or operators on adjacent property or within one-half mile of the diposal well location:

1. Enron Oil & Gas Company
   P.O. Box 2267
   Midland, Texas 79702

2. Yates Petroleum Corporation
   105 South 4th Street
   Artesia, New Mexico 88210

As a courtesy, the following nearby leasehold and surface owners are also being notified:

3. Meridian Oil Inc.
   P.O. Box 51810
   Midland, Texas 79710

4. New Mexico State Land Office
   P.O. Box 1148
   Santa Fe, New Mexico 87504-1148

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