

CASE 3813: Application of TENNECO  
FOR A WATERFLOOD PROJECT, EDDY  
COUNTY, NEW MEXICO

Case Number

3813

Application

Transcripts.

Small Exhibits

ETC.

DOCKET: EXAMINER HEARING - WEDNESDAY - JULY 24, 1968

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,  
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or  
A. L. Porter, Jr., Alternate Examiner:

CASE 3809: Application of Solar Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion (conventional) of its Travis Well No. 2 located in Unit J of Section 21, Township 23 South, Range 37 East, Lea County, New Mexico, to produce oil from the Teague-Blinebry and undesignated Tubb-Drinkard pools through parallel strings of tubing.

CASE 3810: Application of Bronco Oil Corporation for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion (conventional) of its Saltmount Well No. 2 located in Unit O of Section 21, Township 23 South, Range 37 East, Lea County, New Mexico, to produce oil from the Teague-Blinebry and undesignated Tubb-Drinkard pools through parallel strings of tubing.

CASE 3811: Application of Charles B. Read for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill his Marathon State Well No. 1 at a location 1980 feet from the South line and 660 feet from the West line of Section 7, Township 19 South, Range 35 East, Scharb-Bone Springs Pool, Lea County, New Mexico, in exception to the pool rules which require the first well drilled on a unit to be located in the NE/4 or the SW/4 of the quarter section.

CASE 3812: Application of Tenneco Oil Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Southwest Henshaw (Premier) Unit Area comprising 1720 acres, more or less, of Federal lands in Township 16 South, Range 30 East, West Henshaw-Grayburg Pool, Eddy County, New Mexico.

CASE 3813: Application of Tenneco Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its Southwest Henshaw (Premier) Unit Area by the injection of water into the Premier sand through nine injection wells in Sections 7, 8, 17, 18 and 19, Township 16 South, Range 30 East, West Henshaw-Grayburg Pool, Eddy County, New Mexico.

CASE 3814: Application of Humble Oil & Refining Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Penrose zone of the Queen formation in the perforated interval from 3818 feet to 3838 feet in its New Mexico "G" State Well No. 17 located 330 feet from the South line and 1850 feet from the West line of Section 23, Township 21 South, Range 36 East, Eumont Gas Pool, Lea County, New Mexico. If said Penrose zone does not prove satisfactory, then the applicant proposes to deepen said well and dispose into the San Andres formation.

CASE 3815: Application of Humble Oil & Refining Company for salt water disposal, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Abo formation in the interval from 5670 feet to 6030 feet in its Chalk Bluff Draw Unit (A) Well No. 19 located 990 feet from the South line and 1650 feet from the West line of Section 16, Township 18 South, Range 27 East, Empire Abo Pool, Eddy County, New Mexico.

CASE 3816: Application of Humble Oil & Refining Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Wolfcamp formation in the interval from 10,199 feet to 10,530 feet in its H. A. Townsend Well No. 6 located 1980 feet from the North and East lines of Section 9, Township 16 South, Range 35 East, Townsend Wolfcamp Pool, Lea County, New Mexico.

CASE 3817: Application of Continental Oil Company for reinstatement of cancelled underproduction, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the general rules and regulations for prorated gas pools of Southeastern New Mexico promulgated by Order No. R-1670, as amended, to permit the reinstatement of underproduction accumulated by its Stevens A-35 Well No. 2 located in Unit J of Section 35, Township 23 South, Range 36 East, Jalmat Gas Pool, Lea County, New Mexico, cancelled December 31, 1967. Applicant requests that its Stevens A-35 Well No. 1 located in Unit L and its Stevens A-35 Well No. 2 located in Unit J, both in the aforesaid Section 35 and dedicated to the same non-standard gas proration unit, be permitted to produce the aforesaid cancelled underproduction.

- CASE 3818: Application of Continental Oil Company for an exception to Rule 506, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the statewide limiting gas-oil ratio of 2,000 feet of gas per barrel of oil as promulgated by Commission Rule 506 for its Warren Unit Well No. 11, located in Unit A of Section 35, Township 20 South, Range 38 East, Warren-Drinkard Pool, Lea County, New Mexico.
- CASE 3819: Application of Cities Service Oil Company for the institution of gas prorationing in the Buffalo Valley-Pennsylvanian Gas Pool, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the limitation of gas production from the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to reasonable market demand and to the capacity of gas transportation facilities, and that the subject pool be governed by the general rules and regulations for the prorated gas pools of Southeastern New Mexico insofar as said general rules and regulations are not inconsistent with the special rules and regulations governing the subject pool. Further, the applicant proposes that the allowable production from the pool be allocated among the wells in the pool on a 100% surface acreage basis.
- CASE 3820: Application of El Paso Natural Gas Company for an unorthodox gas well location, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of its Harvey "A" Well No. 3 at a point 890 feet from the South line and 1650 feet from the East line of Section 32, Township 27 North, Range 7 West, Blanco-Mesaverde Pool, Rio Arriba County, New Mexico, in exception to the pool rules which require locations to be in either the Northeast or Southwest quarter of the section.
- CASE 3821: Application of Marathon Oil Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp formation underlying the SE/4 of Section 22, Township 20 South, Range 35 East, Lea County, New Mexico. Said acreage to be dedicated to a well to be drilled 660 feet from the South and East lines of said Section 22, and within one mile of the Southeast Lea-Wolfcamp Gas Pool.

Case 3822: Application of Aztec Oil & Gas Company for commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to commingle San Andres production from its State "AJ" lease comprising the SW/4 and the W/2 NE/4 of Section 1 and its Amerada State lease comprising the N/2 NW/4 of Section 12, all in Township 18 South, Range 36 East, Arkansas Junction-San Andres Pool, Lea County, New Mexico, allocating production to each lease on the basis of periodic well tests.

CASE 3805: CONTINUED FROM THE JULY 10, 1968, EXAMINER HEARING

Application of Benson-Montin-Greer Drilling Corporation and Lloyd B. Taylor for Pressure Interference Tests and Back Allowable, San Juan County, New Mexico. Applicants, in the above-styled cause, seek authority to extend for an additional 60-day period from July 8, 1968, the shut-in test period authorized for one well in the La Plata Gallup Oil Pool, San Juan County, New Mexico, by Commission Order No. R-3399 and to also extend the back allowable make-up period for said well. Applicants further seek authority to drill three additional La Plata oil wells in Section 6 of Township 31 North, Range 13 West, and Sections 31 and 32, Township 32 North, Range 13 West, and to shut said wells in immediately after recovery of load oil and the establishment of initial potentials, for a period of up to 180 days for the purpose of conducting pressure interference tests, and to make-up the production lost during said test period at a later date. Applicants further seek a provision for administrative extension of the shut-in test period and the make-up period.

CLARENCE E. HINKLE  
W. E. BONDURANT, JR.  
S. B. CHRISTY IV  
LEWIS C. COX, JR.  
PAUL W. EATON, JR.  
CONRAD E. COFFIELD  
HAROLD L. HENSLEY, JR.  
MICHAEL R. WALLER  
STUART D. SHANOR

LAW OFFICES  
**HINKLE, BONDURANT & CHRISTY**  
600 HINKLE BUILDING  
ROSWELL, NEW MEXICO 88201

July 17, 1968

MIDLAND, TEXAS OFFICE  
521 MIDLAND TOWER  
(915) MU 3-4691  
OF COUNSEL: HIRAM M. DOW

TELEPHONE (505) 622-6510  
POST OFFICE BOX 10

*Case 3813*

Oil Conservation Commission  
Box 2088  
Santa Fe, New Mexico

68 JUL 18 PM 1 09

Gentlemen:

We enclose herewith in triplicate application of Tenneco Oil Company for a water flood project for the Southwest Henshaw (Premier) Unit Area, together with 3 copies of the exhibits referred to in the application.

The information concerning this case was conveyed to Mr. George Hatch by telephone and has been included as Case No. 3813 on the examiner's docket for July 24.

Yours very truly,

HINKLE, BONDURANT & CHRISTY

By Clarence E. Hinkle  
CS.

CEH:cs  
Enc.

BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

APPLICATION OF TENNECO OIL COMPANY )  
FOR APPROVAL OF A WATER FLOOD PROJECT )  
IN CONNECTION WITH THE SOUTHWEST HENSHAW )  
(PREMIER) UNIT AREA BY THE INJECTION OF )  
WATER INTO THE PREMIER SAND THROUGH 9 )  
INJECTION WELLS LOCATED IN SECTIONS 7, 8, ) No. 3813  
17, 18 AND 19, TOWNSHIP 16 SOUTH, RANGE 30 )  
EAST, N.M.P.M. EDDY COUNTY, NEW MEXICO, )  
WEST HENSHAW - GRAYBURG POOL. )

Oil Conservation Commission  
Box 2088  
Santa Fe, New Mexico 87501

Comes Tenneco Oil Company, with offices at Midland, Texas, acting by and through the undersigned attorneys, and hereby makes application for approval of a water flood project in connection with the Southwest Henshaw (Premier) Unit Area by the injection of water into the Premier Sand through 9 injection wells located in Sections 7, 8, 17, 18 and 19, Township 16 South, Range 30 East, N.M.P.M. Eddy County, New Mexico, West Henshaw - Grayburg Pool, and in support thereof respectfully shows:

1. That applicant has made application to the Oil Conservation Commission for approval of the Southwest Henshaw (Premier) Unit Agreement embracing 1,720 acres of federal lands in Township 16 South, Range 30 East, N.M.P.M. Eddy County, more particularly described as follows:

Section 7 - E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$   
Section 8 - S $\frac{1}{2}$   
Section 17 - N $\frac{1}{2}$ , SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$   
Section 18 - E $\frac{1}{2}$ W $\frac{1}{2}$ , E $\frac{1}{2}$   
Section 19 - NE $\frac{1}{4}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$   
Section 20 - NW $\frac{1}{4}$ NW $\frac{1}{4}$

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2. That the primary objective of the unit agreement is to carry on a water flood project, said unit agreement being limited to the formation commonly referred to as the Premier zone and which is specifically defined in the unit agreement as being "that interval occurring between the depths of 2,744 feet and 2,788 feet as shown on the Gamma Ray-Microlaterolog of the Tenneco Oil Company's Hagerty Federal Well No. 5 located 660 feet north from the south line and 660 feet west from the east line of Section 18, Township 16 South, Range 30 East, N.M.P.M."

3. That there are filed herewith plats, referred to for purposes of identification as exhibits 1 and 2, showing the location of the proposed injection wells and the location of all other wells within a radius of 2 miles from the proposed injection wells and the formations from which said wells are producing or have produced. Exhibit 1 also indicates the owners of the oil and gas leases within said radius of 2 miles.

4. That the proposed injection wells are more particularly described as follows:

(a) Tenneco Oil Company (Leonard Oil Co.) Hagerty-Federal No. 3 located 660 feet from the north line and 1980 feet from the east line Section 19.

(b) Tenneco Oil Company (Leonard Oil Co.) Hagerty-Federal No. 4 located 660 feet from the south line and 1980 feet from the west line Section 18.

(c) Tenneco Oil Company (Leonard Oil Co.) Hagerty Federal No. 5 located 660 feet from the south line and 660 feet from the east line Section 18.

(d) Tenneco Oil Company (Leonard Oil Co.) Hagerty Federal No. 7 located 1650 feet from the south line and 1650 feet from the east line Section 7.

(e) Tenneco Oil Company (Leonard Oil Co.) Hagerty Federal No. 11 located 1980 feet from the south line and 1980 feet from the east line Section 18.

(f) Tenneco Oil Company (Leonard Oil Co.) Hagerty Federal No. 12 located 660 feet from the north line and 1980 feet from the east line Section 18.

(g) Mobil Oil Corporation (John H. Trigg) Federal "D" No. 2 located 660 feet from the north line and 660 feet from the west line Section 17.

(h) Mobil Oil Corporation (John H. Trigg) Federal "D" No. 3 located 1980 feet from the east line and 660 feet from the south line Section 8.

(i) Mobil Oil Corporation (John H. Trigg) Federal "D" No. 8 located 1980 feet from the south line and 660 feet from the west line Section 17.

Diagrammatic sketches, referred to as Exhibits 4, 6, 8, 10, 12, 14, 16, 17 and 19, are filed herewith showing all casing strings, including diameters and setting depths, quantities used and tops of cement, perforated or open hole intervals, tubing strings, including diameters and setting depths, and location of packers.

5. That there are also filed herewith electrical logs of each of the injection wells except the Mobil Oil Corporation Federal "D" No. 2 and the Mobil Oil Corporation Federal "D" No. 8 wells, the logs of which are not available; said electrical logs are identified as Exhibits 5, 7, 9, 11, 13, 15 and 18.

6. That applicant desires that a project allowable be assigned to the Southwest Henshaw (Premier) water flood project in accordance with Rule 701(E) of the rules and regulations of the Oil Conservation Commission.

7. Applicant also seeks the right to have approved administratively by the Commission any additional injection wells which may be necessary or required to effectively and efficiently carry on said water flood project.

8. That a copy of this application, together with copies of all exhibits herein referred to, is being mailed to the State Engineer, Santa Fe, New Mexico.

9. Applicant requests that this matter be set down for hearing at the examiner's hearing to be held on July 24, 1968.

Respectfully submitted,

TENNECO OIL COMPANY,

By 

Member of the Firm of  
HINKLE, BONDURANT & CHRISTY  
Attorneys for Applicant  
Box 10  
Roswell, New Mexico

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO 87501

August 1, 1968

C  
O  
P  
Y

Mr. Clarence Hinkle  
Hinkle, Bondurant & Christy  
Attorneys at Law  
Post Office Box 10  
Roswell, New Mexico 88201

Dear Sir:

Reference is made to Commission Order No. R-3461, recently entered in Case No. 3813, approving the Tenneco Southwest Henshaw Waterflood Project.

Initial injection is to be through the nine authorized water injection wells, each of which is to be equipped with 2 3/8-inch cement- or plastic-lined tubing set in a packer. The packers shall be set approximately 50 feet above the uppermost perforation or in the case of open-hole completions, approximately 50 feet above the casing shoe. The casing-tubing annulus shall be loaded with corrosion-inhibited fluid and left open at the surface or equipped with a pressure gauge to facilitate detection of tubing or packer leaks.

As to allowable, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 630 barrels per day when the Southeast New Mexico normal unit allowable is 42 barrels per day or less.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate district proration office.

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO 87501

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August 1, 1968

Mr. Clarence Hinkle  
Hinkle, Bondurant & Christy  
Attorneys at Law  
Post Office Box 10  
Roswell, New Mexico 88201

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In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.  
Secretary-Director

ALP/DSH/esr

cc: Oil Conservation Commission  
P. O. Box 1980  
Hobbs, New Mexico

Oil Conservation Commission  
Drawer DD  
Artesia, New Mexico

United States Geological Survey  
Drawer U  
Artesia, New Mexico

Mr. D. E. Gray  
State Engineer Office  
Capitol Building  
Santa Fe, New Mexico

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING  
CALLED BY THE OIL CONSERVATION  
COMMISSION OF NEW MEXICO FOR  
THE PURPOSE OF CONSIDERING:

CASE No. 3813  
Order No. R-3461

APPLICATION OF TENNECO OIL COMPANY  
FOR A WATERFLOOD PROJECT, EDDY COUNTY,  
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on July 24, 1968,  
at Santa Fe, New Mexico, before Examiner Daniel S. Mutter.

NOW, on this 1st day of August, 1968, the Commission, a  
quorum being present, having considered the testimony, the record,  
and the recommendations of the Examiner, and being fully advised  
in the premises,

FINDS:

(1) That due public notice having been given as required by  
law, the Commission has jurisdiction of this cause and the subject  
matter thereof.

(2) That the applicant, Tenneco Oil Company, seeks permis-  
sion to institute a waterflood project in its Southwest Henshaw  
(Premier) Unit Area, West Henshaw-Grayburg Pool, by the injection  
of water into the Premier sand of the Grayburg formation through  
nine injection wells in Sections 7, 8, 17, 18, and 19, Township  
16 South, Range 30 East, NMPM, Eddy County, New Mexico.

(3) That the wells in the project area are in an advanced  
state of depletion and should properly be classified as "stripper"  
wells.

(4) That the proposed waterflood project should result in  
the recovery of otherwise unrecoverable oil, thereby preventing  
waste.

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CASE No. 3813  
Order No. R-3461

(5) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

**IT IS THEREFORE ORDERED:**

(1) That the applicant, Tenneco Oil Company, is hereby authorized to institute a waterflood project in its Southwest Henshaw (Premier) Unit Area, West Henshaw-Grayburg Pool, by the injection of water into the Premier sand of the Grayburg formation through the following-described wells in Township 16 South, Range 30 East, NMPM, Eddy County, New Mexico:

<u>LEASE</u>	<u>WELL NO.</u>	<u>UNIT</u>	<u>SECTION</u>
Tenneco Oil Co. Hagerty Federal	7	J	7
Mobil Oil Corp. Federal "D"	3	O	8
Mobil Oil Corp. Federal "D"	2	D	17
Mobil Oil Corp. Federal "D"	8	L	17
Tenneco Oil Co. Hagerty Federal	12	B	18
Tenneco Oil Co. Hagerty Federal	11	J	18
Tenneco Oil Co. Hagerty Federal	4	N	18
Tenneco Oil Co. Hagerty Federal	5	P	18
Tenneco Oil Co. Hagerty Federal	3	B	19

(2) That the subject waterflood project is hereby designated the Tenneco Southwest Henshaw Waterflood Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations;

**PROVIDED HOWEVER,** That the Secretary-Director of the Commission may approve expansion of the Tenneco Southwest Henshaw Waterflood Project to include such additional lands and injection wells in the area of said project as may be necessary to complete an efficient water injection pattern; that the showing of well response as required by Rule 701 E 5 shall not be necessary before obtaining administrative approval for the conversion of additional wells to water injection.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

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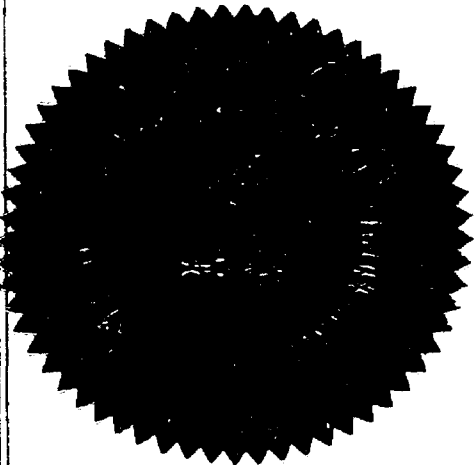
CASE No. 3813

Order No. R-3461

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION



*David F. Cargo*

DAVID F. CARGO, Chairman

*Guyton B. Hays*

GUYTON B. HAYS, Member

*A. L. Porter, Jr.*

A. L. PORTER, Jr., Member & Secretary

esr/

State of New Mexico  
Oil Conservation Commission



**August 1, 1968**

Re: Case No. 3813  
Order No. R-3461  
Applicant:  
**TENNECO OIL COMPANY**

A. L. Porter, Jr.  
A. L. PORTER, Jr.  
Secretary-Director

Other \_\_\_\_\_



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SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-4491 • ALBUQUERQUE, NEW MEXICO

BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
July 24, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of Tenneco Oil Company  
for a unit agreement, Eddy County,  
New Mexico.

Case No. 3812

Application of Tenneco Oil Company  
for a waterflood project, Eddy  
County, New Mexico.

Case No. 3813

BEFORE: Daniel S. Nutter  
Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We'll call Case 3812.

MR. HATCH: Case 3812. Application of Tenneco Oil Company for a unit agreement, Eddy County, New Mexico.

MR. HINKLE: If the Examiner please, Clarence Hinkle of Hinkle, Bondurant and Christy appearing on behalf of Tenneco. We would like to also call Case 3813 and I'd like to move that these two cases be consolidated due to the fact that we have one witness and one set of exhibits for both cases.

MR. NUTTER: We'll call the next case, 3813.

MR. HATCH: Case 3813. Application of Tenneco Oil Company for a waterflood project, Eddy County, New Mexico.

MR. NUTTER: Case 3812 and Case 3813 will be consolidated for the purpose of testimony.

MR. HINKLE: Mr. Examiner, we have one set of exhibits under one cover, and I'd suggest that it be identified as Exhibit A because all the exhibits under the cover are identified from exhibits 1 through 16 so that we can refer to them.

MR. NUTTER: The brochure will be identified as Exhibit A and it relates to both cases, Mr. Hinkle?

MR. HINKLE: Yes.

(Whereupon, Applicants Exhibit A was marked for identification.)

MR. HINKLE: Were you sworn?

MR. LACEY: No.

MR. HINKLE: I'd like to have the witness sworn,  
please.

(Witness sworn.)

JOHN J. LACEY

called as a witness, having been first duly sworn, was examined  
and testified as follows:

DIRECT EXAMINATION

BY MR. HINKLE:

Q State your name.

A John J. Lacey.

Q By whom are you employed?

A By Tenneco Oil Company.

Q In what capacity?

A As District Reservoir Engineer in their Production  
Office in Midland, Texas.

Q Have you heretofore testified before the New Mexico  
Oil Conservation Commission?

A Yes, I have.

Q And your qualifications as a petroleum engineer are  
a matter of record with the Commission?

A Yes, they are.

Q Are you familiar with the applications of Tenneco  
Oil Company in Cases 3812 and 3813?

A Yes, I am.

Q What is Tenneco seeking to accomplish by its application in Case Number 3812?

A Tenneco Oil Company is seeking approval of the Southwest Henshaw (Premier) Unit Agreement in Case 3812.

Q And what is it seeking in Case Number 3813?

A Tenneco Oil Company is seeking approval of a waterflood project which would be co-extensive with the unit.

Q Are you familiar with this proposed unit area?

A Yes, I am.

Q Have you made a study of all the wells in the area?

A Yes, I have.

Q And of all the production history and information, generally?

A Yes, I have.

Q Have you prepared certain exhibits which you would like to present in this case?

A Yes, I have.

Q Refer to Exhibit Number 1 under Exhibit A and explain to the Commission what this is and what it shows.

A Exhibit Number 1 is a plat showing the location of the proposed Southwest Henshaw (Premier) Unit and the locations of the nearby producing wells within a two-mile radius of this unit boundary.

Q Does it also indicate the location of other unit areas in the general area?

A Yes, it does. The West Henshaw (Premier) Unit operated by Mobil, and to the immediate northeast of the Southwest Henshaw Unit, and East High Lonesome Penrose Sand Unit operated by General American Oil Company immediately to the west of the proposed unit.

Q Does it show the ownership of all the leasehold interests in the area?

A Yes, it does.

Q Does it also show the formations from which the various wells are producing?

A Yes, it does. It shows all the wells in the zone from which they are currently producing.

Q What are the character of the lands within the proposed unit area, that is, whether it is Federal, State or private land?

A All of the lands within the proposed unit area are Federal land.

Q Has this area heretofore been designated by the United States Geological Survey as an area logical for unitization?

A Yes, it has.

Q Are you familiar with the proposed form of unit agreement, copies of which have been filed with the application?

A Yes, I am.

Q Is this form in substantially the same form as other unit agreements having the general purpose of secondary recovery that have heretofore been approved by the Oil Conservation Commission?

A Yes, it is.

Q Has this form been approved by the U. S. G. S.?

A Yes, they have. We've obtained preliminary approvals.

Q Who is designated in the unit agreement as the unit operator?

A Tenneco Oil Company has been designated as the operator for the unit.

Q Is this unit agreement, does it cover all formations from the surface on down, or is it limited to a particular formation?

A No. This unit agreement only covers the Premier Sand vertical limits which are described in Article II, Section 6.

Q That is the definition of --

A Of the Premier Sand to be unitized.

Q And that would be the only zone that is unitized in

the area.

A Right.

Q How many working interest owners are there within the unit area?

A Within the unit area, there are only three working interest owners.

Q Who are they?

A Tenneco Oil Company, Mobil Oil Corporation and General American Oil Company.

Q Has Tenneco extended an invitation to Mobil and General American to join in the unit to commit the acreage to the unit?

A Yes. Yes, we have.

Q Have they agreed to commit their interest to the unit?

A Mobil Oil Company has agreed to commit their acreage to the unit; however, General American has indicated that they do not wish to commit their acreage, but would cooperate with the unit.

Q How much acreage does General American have?

A General American has approximately 400 acres within the unit outlined.

Q What's the total acreage within the unit area?

A 1,740, I believe.

Q You said that General American had indicated their cooperation. What do you mean by that?

A Well, in previous discussions with General American, they have indicated that if the unit is formed and the water-flood projects approved, that they would convert some of their producing wells to water injection and work out a cooperative agreement with the unit.

Q Now, what is the status of the commitment of the overriding royalties and production payments of Mobil and Tenneco, that is, on their leases as far as commitment to the unit is concerned?

A At the present time, Tenneco has approximately half of its overriding royalty interest committed and we anticipate that we will obtain complete sign-up of all the production payment interest and overriding interest in both Tenneco and Mobil's acreage.

Q Does this unit agreement contain a participation formula?

A Yes, it does.

Q What is it based on?

A The formula is based on 80% acre feet and 20% cumulative production.

Q Has this been agreed to by Mobil?

A Yes, it has.



Q In your opinion, will this unit be in the interest of protection of correlative rights of all of the leaseowners?

A Yes, it will.

Q As well as the owners of the override and production payments?

A Yes, it will.

Q What is the status of the wells that are within the unit area? Are they stripper wells or in primary production or what?

A At the present time, I think there's several wells that are shut in and all of the -- the wells that are producing in the unit area are at a very low stripper stage, a barrel a day or so.

Q Now, refer to Exhibit Number 2 under Exhibit A and explain what this is and what it shows.

A Exhibit Number 2 of Exhibit A is a plat showing the boundaries of the unit and an isopac of the net pay of the Premier Sand to be waterflooded and the location of the proposed injection wells and it also shows the location of two future injection wells that would be converted by General American.

Q How many injection wells are there all together?

A Tenneco is asking for the approval of a total of seven, converting seven presently producing wells to water injection and the approval of two wells that are presently

plugged and abandoned which we wish to re-enter and convert the water there.

Q Does this indicate the location of General American's acreage and the injection wells that would be on its acreage through the cooperative agreement?

A Yes, it does.

Q Now, refer to Exhibit Number 3 and explain what this shows.

A Exhibit Number 3 of Exhibit A is a pertinent data sheet relative to the proposed unit and waterflood project showing our estimates of secondary oil to be recovered, our source of water which will be purchased from Double Eagle Corporation, and the original -- our estimate of original oil in place and primary recovery which has been unusually low.

Q Also shows the amount you expect to recover on the secondary recovery?

A Yes, it does.

Q And the porosity and permeability and water saturations?

A Porosity and permeability and water saturations, yes, it does.

Q You have your average pay thickness.

A Thickness.

MR. HINKLE: Mr. Examiner, I might state this, that

Exhibits 4 through 19 are diagrammatic sketches of the proposed injection wells and following each diagrammatic sketch is an electrical log of the wells. I'm going to ask the witness to refer to these exhibits, 4 through 19, and explain them, pointing out the differences that are involved in the different injection wells.

A All right. Exhibits 4 through 19 are diagrammatic sketches of the wells that we propose to convert to injection and the subsurface installation we plan to employ. Generally, all of the wells were originally completed of two general categories. They were either open hole completions or with production casing strings set through the pay and perforated. In every case, we plan to install tubing and packer and inject the water down the tubing and down the packer into the pay zone and although it doesn't show on the diagrammatic sketches, we plan to load the annulus sizing of the casing with some type of corrosion inhibited fluid. There were two wells for which we had no logs available.

Q Why was that?

A These two wells are Mobil Oil Company's Federal D-2 and Federal D-8. They were not available in their files nor were they available from commercial reproduction companies.

Q Are these wells located on properties which were

acquired by Mobil?

A Yes, they were. Mobil's properties within the proposed unit were acquired in their purchase of John H. Trigg properties.

Q And there were no logs available to these wells so far as you were able to --

A Right. We've been unable to obtain any logs on them.

Q How did you get the information through which the diagrammatic sketches were made of these two wells?

A The diagrammatic sketches are based on our well files and the well files that we obtained from Mobil Oil Corporation.

Q Anything else that you would like to comment on with respect to any of these exhibits?

A Well, two of the proposed injection wells, as I previously stated, are presently plugged and abandoned. One is the Mobil Oil Company's Federal D-2 which does not now have production casing in it, and the other well is the Tenneco Oil Company's Haggerty Federal Number 4 which does have a production string in it, casing string. We plan to re-enter.

Q Two wells will be re-entered?

A Yes, they will, and converted.

Q And re-converted?

A Recompleted or converted.

Q Now, into what formation do you propose to inject the

water in these injection wells?

A We propose to inject the water and confine it to the Premier Sand or the zone.

Q That's the Henshaw-Grayburg Pool?

A The West Hen -- I believe it's that --

Q The West Henshaw?

A I believe it is. The leases are now included in the West Henshaw.

Q Now, your application and I believe your testimony also shows that you would like to have the Order of approval show that you may obtain administrative approval of additional injection wells. What do you contemplate by this?

A Our plans are once the unit and the project is in operation and we obtain favorable response from a water injection, there is a portion in the center part of this unit that is undeveloped and we plan to drill new injection wells and possibly new producing wells, in which case we would like to be able to obtain administrative approval to complete any new well to convert to injection.

Q Is Tenneco seeking a project allowable for this waterflood project?

A Yes. We would like to obtain a project allowable for all of the acreage that is committed to the unit.

Q And that's in accordance with Rule 71-E of the

Commission?

A Yes.

Q Now, would that project allowable include the acreage of General American?

A If General American does not commit its acreage to the unit, it would not include their acreage.

Q In other words, it would only include the acreage, the working interests, which is committed to the unit?

A Yes, it would. It would be Mobil and Tenneco.

Q Now, if this unit agreement is approved and you go ahead with the waterflood project, in your opinion, would it be in the interest of conservation and the prevention of waste?

A Yes, it would.

Q And it would tend to promote the greatest ultimate recovery of the unitized substances?

A Yes, it would.

MR. HINKLE: We'd like to offer Exhibit A in evidence.

MR. NUTTER: Applicant's Exhibit A will be admitted in evidence.

(Whereupon, Applicant's Exhibit A was admitted in evidence.)

MR. HINKLE: That's all of the direct testimony.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Lacey, first of all, talking about this project allowable since that was about the last thing you were discussing. If General American's acreage remains uncommitted, of course, they would have to stand on their own when they put their flood in?

A Yes.

Q Now, let's see just what we have here. Would you refer to Exhibit 2 in your Exhibit A?

A Yes.

Q Up here in Section 7, it appears we would have three developed forty-acre tracts. In Section 18, we would have one, two, three, four, five, six.

A Right.

Q Section 19, we would have one. Section 8, you have one injection well there on the Mobil lease, correct?

A Right.

Q And Section 17, you would have one, two, three, four, is that correct?

A Right. This is correct.

Q So it appears that you have about fifteen forty-acre tracts in your project area.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Lacey, first of all, talking about this project allowable since that was about the last thing you were discussing. If General American's acreage remains uncommitted, of course, they would have to stand on their own when they put their flood in?

A Yes.

Q Now, let's see just what we have here. Would you refer to Exhibit 2 in your Exhibit A?

A Yes.

Q Up here in Section 7, it appears we would have three developed forty-acre tracts. In Section 18, we would have one, two, three, four, five, six.

A Right.

Q Section 19, we would have one. Section 8, you have one injection well there on the Mobil lease, correct?

A Right.

Q And Section 17, you would have one, two, three, four, is that correct?

A Right. This is correct.

Q So it appears that you have about fifteen forty-acre tracts in your project area.



A That are presently developed and we --

Q Nine of those would be injection wells and six of them would be producers.

A Yes, producers. And like I mentioned previously, we anticipate some additional development.

Q Evidently, that thin spot there in the Mobil dry hole in the northwest northwest of 17 discouraged development up in that area.

A Yes, it did.

Q Now, on your next page, where you mentioned that the required injection volume will be five and a half million barrels --

A Yes.

Q -- is this total water that will be injected over the life of the flood or is this the volume of the new water that will be required?

A This is the total volume of water that would be required. We anticipate that once we obtain response in some produced water that we would reinject it.

Q So the 750,000 barrels is the fill-up water or the initial water that's required?

A Right. I would anticipate that our make-up water would be, maybe, slightly more than that.

Q Now, actually, by comparison with some of the other floods, this anticipated secondary recovery is relatively low. Why would that be, in this case, Mr. Lacey? I mean -- Well, I beg your pardon. I beg your pardon. I was thinking that the 4.9 million was the cumulative production. That was the original oil in place.

A No. Our estimate of secondary recovery is substantially larger than what has been produced by primary.

Q I was comparing 900,000 to 4,900,000. I should compare 900,000 to 400,000.

A Yes. We feel that because of the lack of development in the center portion of this unit, that it's probably been pressure depleted, but oil was left behind.

Q Now, with respect to your schematic diagrams, I notice that the distance there on the first well from the packer down to the casing shoe is forty-four feet. On the next well, it's 48 feet, and so forth. It never exceeds 50 feet except in the case of one well, that is, 59, and I presume that you more or less follow this same pattern on the one well that doesn't have the casing in it at the present time.

A Yes. Yes, we would, Mr. Examiner.

Q I notice here on the exhibit, that is, Exhibit 16, that you show the packer to be set at 2680 and that the top

of the pay would be 2730, so your perforations would be approximately fifty feet below the packer or you'd set the packer approximately fifty feet above the uppermost perforation when this perforation is made.

A Yes.

Q And the annulus will be loaded. Do you plan to use cement or plastic coated tubing?

A I don't know exactly what we will use. I would anticipate that we would probably use cement lined or plastic coated.

Q Now, the annulus then can be either left open or equipped with a pressure gauge to detect leakage in the tubing or packer.

A Yes.

Q Some of these wells don't have any surface pipe in them, is this correct?

A Yes, some. I believe some of these wells are cable tools, were drilled with cable tools and I think some casing was set and pulled. We acquired, the Tenneco Oil Company properties were acquired from Leonard Oil Company and some cases or well records are not very clear, very complete.

Q Most of the wells have from four to 500 feet of surface pipe. However, this Haggerty Number 11, which is an old Leonard well, has no surface pipe. The Haggerty Number 12, an old

Leonard well, has no surface pipe. I guess those are the only two.

A Yes.

Q You don't know the top of the cement on those long strand ---

A Well, like I stated previously, Mr. Examiner, we've calculated a theoretical top of cement. However, the well files that we acquired did not have temperature surveys run and there was no record of any actual measured --

Q The only way to do it would be to calculate the theoretical fill-up and that's using an actual fill-up without any safety factor.

A Now, this is a hundred percent fill factor.

Q Hundred percent fill factor.

A We wouldn't know what to use. But in all probability, the actual top would be somewhat lower than --

Q This is maximum theoretical fill-up?

A Right.

Q We may want to discuss these two wells with you prior to the conversion for water injection. There may be something that will be considered necessary on these two wells.

A Right.

MR. HINKLE: All right.

MR. NUTTER: Are there any other questions of

Mr. Lacey?

MR. HINKLE: I might ask Mr. Lacey another question here.

REDIRECT EXAMINATION

BY MR. HINKLE:

Q You testified that there was a possibility that you would drill additional wells and for production as well as injection in the event you got a good response from the water-flood project, those wells that are being drilled at the undrilled locations toward the center of the unit area.

If you should do this, would you anticipate that the recovery, of secondary recovery would be larger than you anticipated on Exhibit 3?

A No. The recovery estimates shown on exhibit, on the pertinent data sheet have included in them that possibility, these additional injection and producing wells to be drilled.

MR. HINKLE: That's all.

MR. NUTTER: That's based on the per acre feet of pay that you have indicated in here?

MR. LACEY: Yes, sir.

MR. NUTTER: Are there any other questions of the witness? He may be excused. Do you have anything further, Mr. Hinkle?

MR. HINKLE: No, that's all we have in these cases.

MR. NUTTER: Have you offered Exhibit A in these cases?

MR. HINKLE: I believe I did.

MR. NUTTER: Okay. Does anyone have anything they wish to offer in Case 3812 or 3813? We'll take the cases under advisement.

I N D E X

<u>WITNESS</u>	<u>PAGE</u>
JOHN J. LACEY	
Direct Examination by Mr. Hinkle	3
Cross Examination by Mr. Nutter	15
Redirect Examination by Mr. Hinkle	20

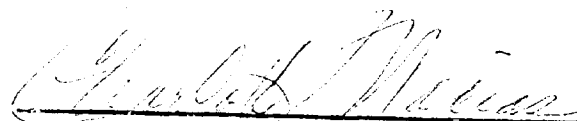
E X H I B I T

<u>Number</u>	<u>Marked for Identification</u>	<u>Received in Evidence</u>
Applicant's Exhibit A	2	14

STATE OF NEW MEXICO )  
 )  
 COUNTY OF BERNALILLO ) ss.

I, CHARLOTTE MACIAS, Notary Public in and for  
 the County of Bernalillo, State of New Mexico, do hereby  
 certify that the foregoing and attached Transcript of  
 Hearing before the New Mexico Oil Conservation Commission  
 was reported by me; and that the same is a true and  
 correct record of the said proceedings, to the best of  
 my knowledge, skill and ability.

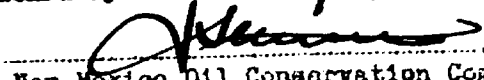
Witness my Hand and Seal this 13th day of  
 September, 1968.

  
 Notary Public

My Commission Expires:

February 10, 1971.

I do hereby certify that the foregoing is  
 a complete record of the proceedings in  
 the Examiner hearing of Case No. 3812-3813  
 heard by me on 7/24, 19 68.

  
 Examiner  
 New Mexico Oil Conservation Commission



NEW MEXICO  
OIL CONSERVATION COMMISSION  
SOUTHWEST HENSHAW (PREMIER) UNIT  
W A T E R F L O O D

BEFORE EXAMINER NUTTER  
OIL CONSERVATION COMMISSION  
EXHIBIT NO. 12  
CASE NO. 3812 & 3813

CASE NO. 3812 & 3813



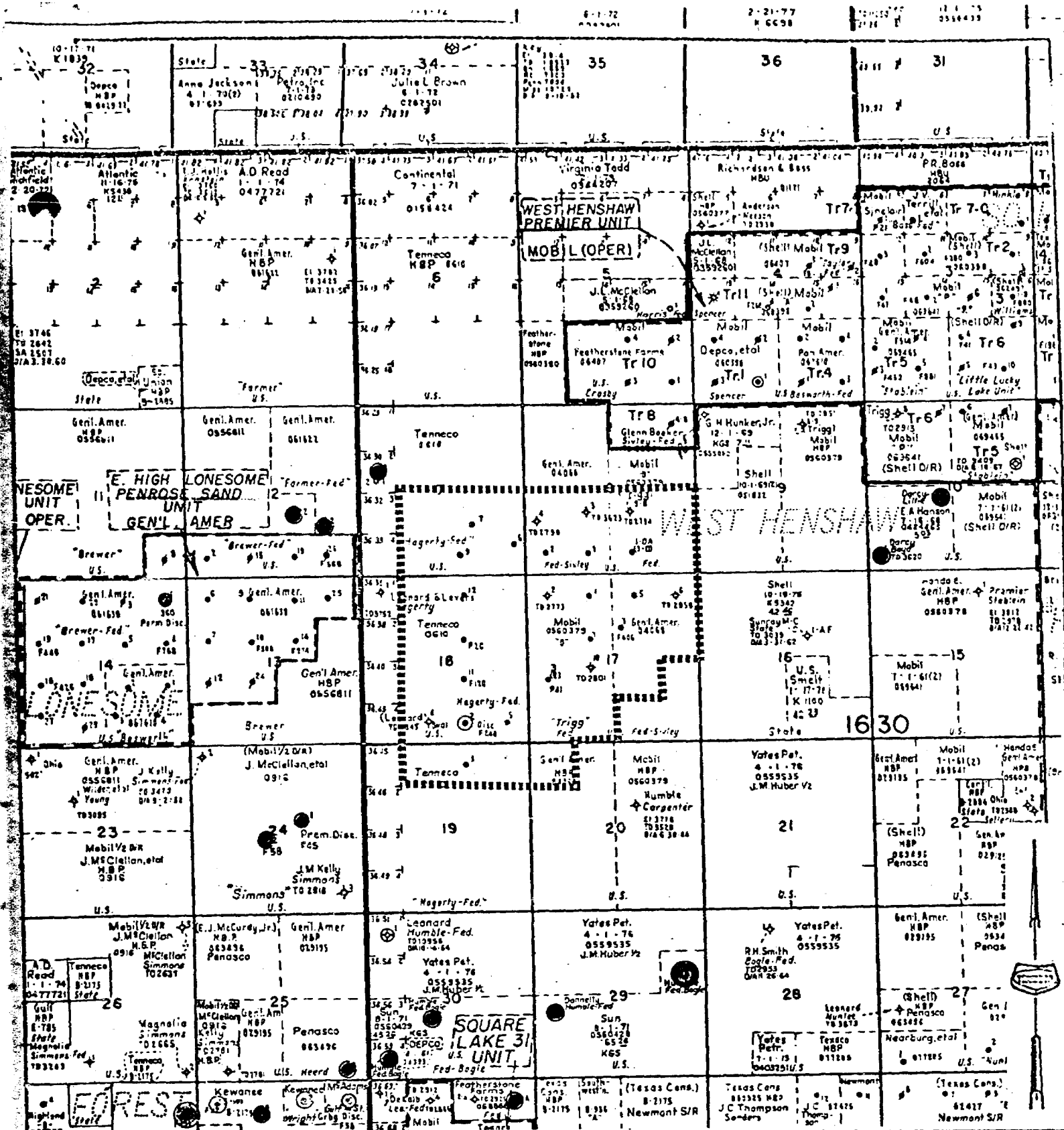
E X H I B I T S

NEW MEXICO OIL CONSERVATION COMMISSION

SOUTHWEST HENSHAW (PREMIER) UNIT

## C O N T E N T S

Exhibit 1	Plat showing unit and surrounding wells
Exhibit 2	Plat showing proposed injection wells
Exhibit 3	Pertinent data sheet
Exhibit 4	Diagrammatic sketch Tenneco Oil Co. Hagerty Federal No. 3
Exhibit 5	Copy of log Tenneco Oil Co. Hagerty Federal No. 3
Exhibit 6	Diagrammatic sketch Tenneco Oil Co. Hagerty Federal No. 4
Exhibit 7	Copy of log Tenneco Oil Co. Hagerty Federal No. 4
Exhibit 7A	Copy of log Tenneco Oil Co. Hagerty Federal No. 4
Exhibit 8	Diagrammatic sketch Tenneco Oil Co. Hagerty Federal No. 5
Exhibit 9	Copy of log Tenneco Oil Co. Hagerty Federal No. 5
Exhibit 9A	Copy of log Tenneco Oil Co. Hagerty Federal No. 5
Exhibit 10	Diagrammatic sketch Tenneco Oil Co. Hagerty Federal No. 7
Exhibit 11	Copy of log Tenneco Oil Co. Hagerty Federal No. 7
Exhibit 12	Diagrammatic sketch Tenneco Oil Co. Hagerty Federal No. 11
Exhibit 13	Copy of log Tenneco Oil Co. Hagerty Federal No. 11
Exhibit 14	Diagrammatic sketch Tenneco Oil Co. Hagerty Federal No. 12
Exhibit 15	Copy of log Tenneco Oil Co. Hagerty Federal No. 12
Exhibit 16	Diagrammatic sketch Mobil Oil Corp. Federal "D" No. 2
Exhibit 17	Diagrammatic sketch Mobil Oil Corp. Federal "D" No. 3
Exhibit 18	Copy of log Mobil Oil Corp. Federal "D" No. 3
Exhibit 19	Diagrammatic sketch Mobil Oil Corp. Federal "D" No. 8



- Proposed Unit Outline
- ⊙ Penrose Sand Wells
  - Grayburg Wells
  - Loco Hills Wells
  - Premier Sand Wells
  - ⊙ San Andres Wells

TENNECO OIL COMPANY  
SUBSIDIARY OF TENNECO CORPORATION

S.W. HENSHAW PREMIER UNIT  
EDDY COUNTY, NEW MEXICO

EXHIBIT 1

4000 0 SCALE IN FEET 4000 8000

### EXHIBIT 3

#### PERTINENT INFORMATION PROPOSED UNIT AREA

1. Formation into which water will be injected	Premier Sand
2. Average depth of pay, ft.	2,750
3. Fluid to be injected	Water
4. Source of injection fluid	Purchase from Double Eagle Corp.
5. Required injection volume (Bbls.)	5,565,500 (Total volume)
6. Fill-up volume (RB)	749,700
7. Vertical coverage (%)	90
8. Areal sweep efficiency (%)	75
9. Porosity (%)	17.4
10. Permeability (md.)	6.5
11. Water saturation (%)	35
12. Original formation volume factor (RB/STB)	1.176
13. Estimated current formation volume factor (RB/STB)	1.05
14. Productive area - isopach map (acres)	1,349
15. Average net pay thickness (feet)	4.9
16. Original oil in place (STB)	4,923,600
17. Cumulative primary recovery to 10-1-67 (STB)	383,837
18. Remaining economical primary reserves	0
19. Primary reservoir volume (Ac.Ft.)	6,600
20. Primary recovery factor (%)	7.8
21. Floodable reservoir volume (Ac.Ft.)	4,992
22. Oil saturation, start of flood (%)	53.5
23. Oil saturation, end of flood (%)	32
24. Secondary reserves (STB)	928,500

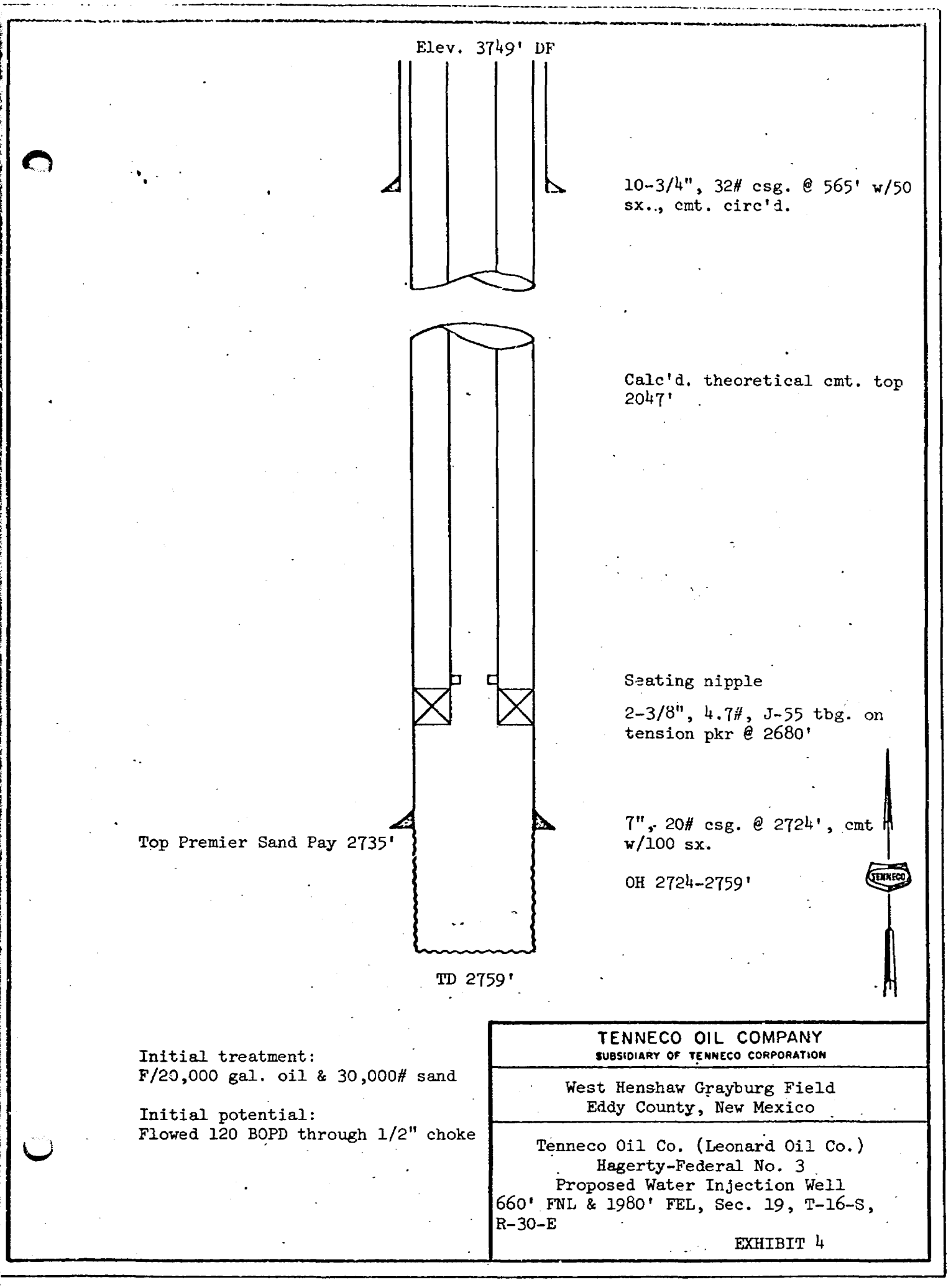
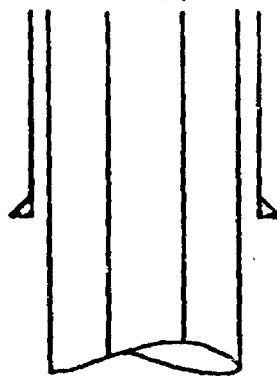
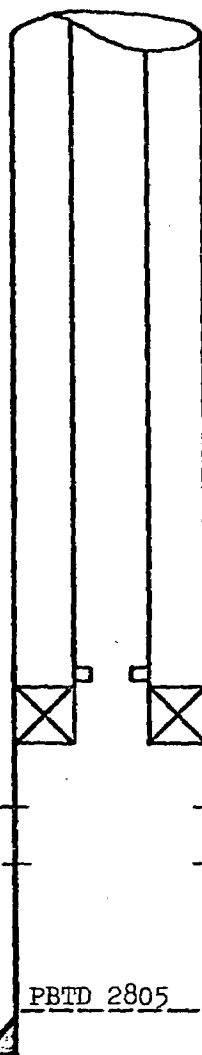


Exhibit 5

Elev. 3760' DF



9-5/8", 32# @ 418'. Cmt'd. w/150 sk.  
Cmt. circ'd.



Calc'd. theoretical cmt. top 1022'

Top Premier Sand Pay 2685'

Seating nipple

2-3/8", 4.7#, J-55 tbg. on  
tension pkr. @ 2640'.

Abrasive jets @ 2688, 2694'

Abrasive jets @ 2786, 2789'

PBTD 2805

TD 2835

5-1/2", 14#, J-55 csg. @ 2822'  
cmt'd. w/250 sx. Cmt vol  
sufficient to circ.



Treatment:

500 gal acid, F/40,000 gal wtr. & 18,000#  
sand

Potential:

None, TA

TENNECO OIL COMPANY  
SUBSIDIARY OF TENNECO CORPORATION

West Henshaw Grayburg Field  
Eddy County, New Mexico

Tenneco Oil Co. (Leonard Oil Co.)  
Hagerty-Federal No. 4  
Proposed Water Injection Well  
660' FSL & 1980' FWL, Sec. 18, T-16-S,  
R-30-E

EXHIBIT 6



COUNTY EDDY  
FIELD or LOCATION WEST HENSHAW  
WELL FEDERAL HAGERMAN  
COMPANY LEONARD OIL COMPANY

COMPANY LEONARD OIL COMPANY  
WELL FEDERAL HAGERMAN  
FIELD WEST HENSHAW  
LOCATION SEC. 18-16S-30E  
COUNTY EDDY  
STATE NEW MEXICO

Other Surveys  
FILE  
Location of Well  
660 f. SE  
1960 f. NW  
Elevation: O.F. 3762  
K.B. 3762  
or G.L. 3754  
FILING No.

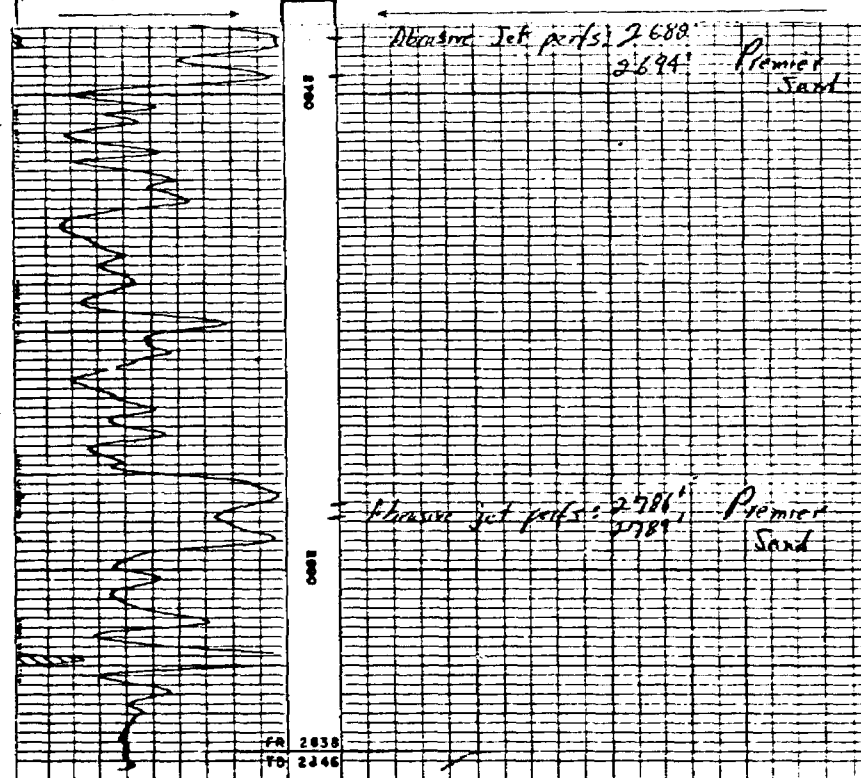
Log Depths Measured From KB 8 ft. above GL

RUN NO.	DATE
12-1-57	12-1-57
First Reading	2838
Last Reading	0
Footage Measured	2838
Max. Depth Reached	2846
Bottom Driller	2845
Maximum Temp. °F.	90
Fluid Nature	Salt-Gel
Fluid Level	Surf
Casing Size	5/8 in.
Casing Weight	10 lb. 0 to 300
Casing Size	in.
Casing Weight	10 lb. 1 to
Bit Size	3/4 in. Csg. to 2795
Bit Size	5/8 in. 2795 to 2846
No. Counters Used	1
Type Equipment	GNAM-4
Type Panel	GNP-6
Op. Rtg. Time	18 Hours
Truck No.	1730-271-616
Observer	W. J. GORDON
Witness	W. J. GORDON

Exhibit 7

REMARKS ON SPOT OR INTERVAL LOGS TEST NO. 2838-2846 DATE 12-1-57 OPERATOR NAME W. J. GORDON

GAMMA RAY MICROGRAMS RA EQ TON	GAMMA RAY MICROGRAMS RA EQ TON
INTERVAL: from 0 ft. to 1800 ft. Sensitivity 300 Time Constant 1 sec. Logging Speed 65 ft. min.	INTERVAL: from 1800 ft. to 2838 ft. Sensitivity 300 Time Constant 2 sec. Logging Speed 35 ft. min.
ZERO 0 divisions to left of this line.	ZERO 0 divisions to right of this line.
ZERO 0 divisions to left of this line.	ZERO 0 divisions to right of this line.
INTERVAL: from 0 ft. to 1800 ft. Sensitivity 300 Time Constant 1 sec. Logging Speed 65 ft. min.	INTERVAL: from 1800 ft. to 2838 ft. Sensitivity 300 Time Constant 2 sec. Logging Speed 35 ft. min.
ZERO 0 divisions to left of this line.	ZERO 0 divisions to right of this line.
ZERO 0 divisions to left of this line.	ZERO 0 divisions to right of this line.



COUNTY EDDY FIELD WEST HENSHAW LOCATION WEST HENSHAW WELL #4	COMPANY LEONARD C. L.	Other Surveys GAL
	COMPANY	Location of Well
	WELL FEDERAL MAG-LATY	660 F SL
	FIELD WEST HENSHAW	1980 F WL
	LOCATION SEC. 18-16S-30E	
	COUNTY EDDY	Elevation D.F.
	STATE NEW MEXICO	K.B. 3762 or G.L. 3754

Log Depths Measured From KB 8 Ft. above GL

RUN No.	ONE
Date	12-7-57
First Reading	2835
Last Reading	1845
Feet Measured	1000
Depth Reached	2846
Bottom Driller	2845
Mud Mot	CC 1-Chem
Dens.	10.6
Visc	136
Mud Resist.	.072
Res. BHT	.047
pH	
Wtr. Loss	14
Emf	.041
Rmc	
Bit Size	8 3/4-2795-6 V8-10
SPCG	9/16x9/16x9/16
Sonde Type	Hydraulic
Pod Type	H
Op. Rig Time	2 Hours
Truck No.	1730-Artesia
Recorded By	Reinders
Witness	Hix

REMARKS

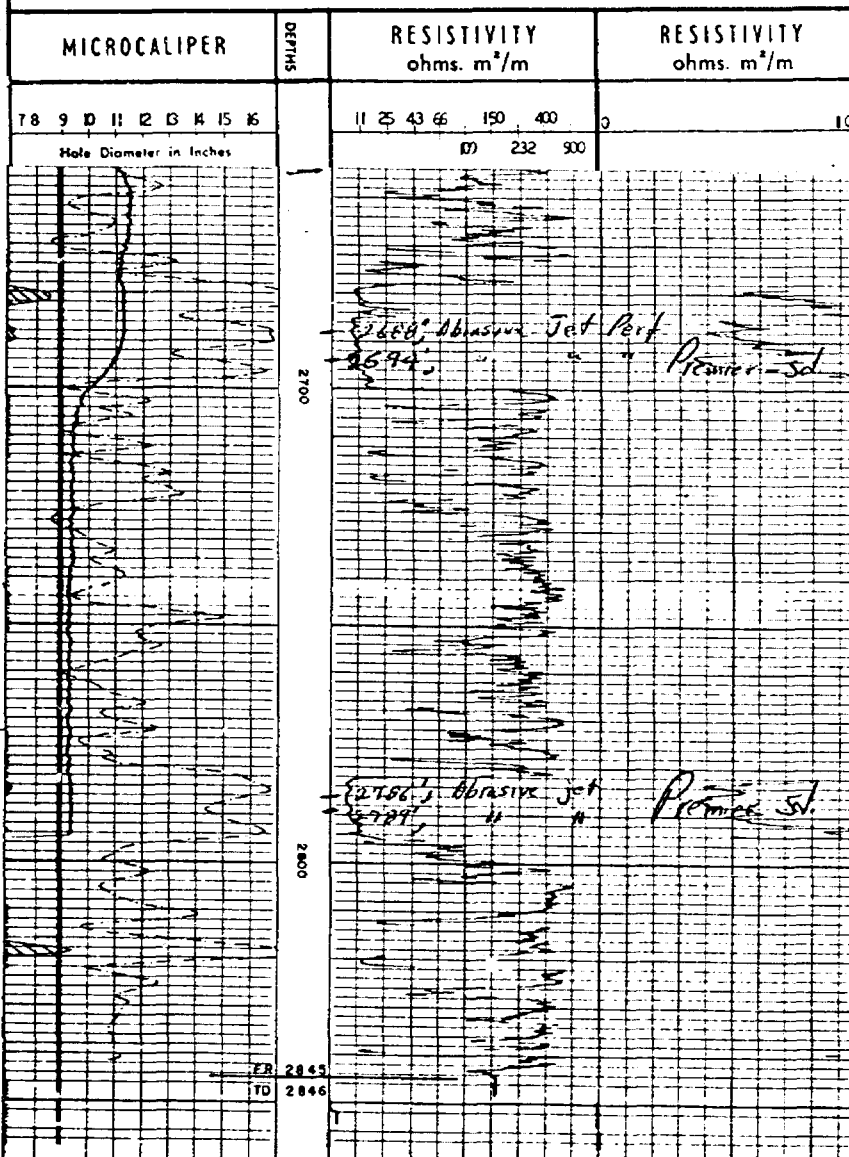
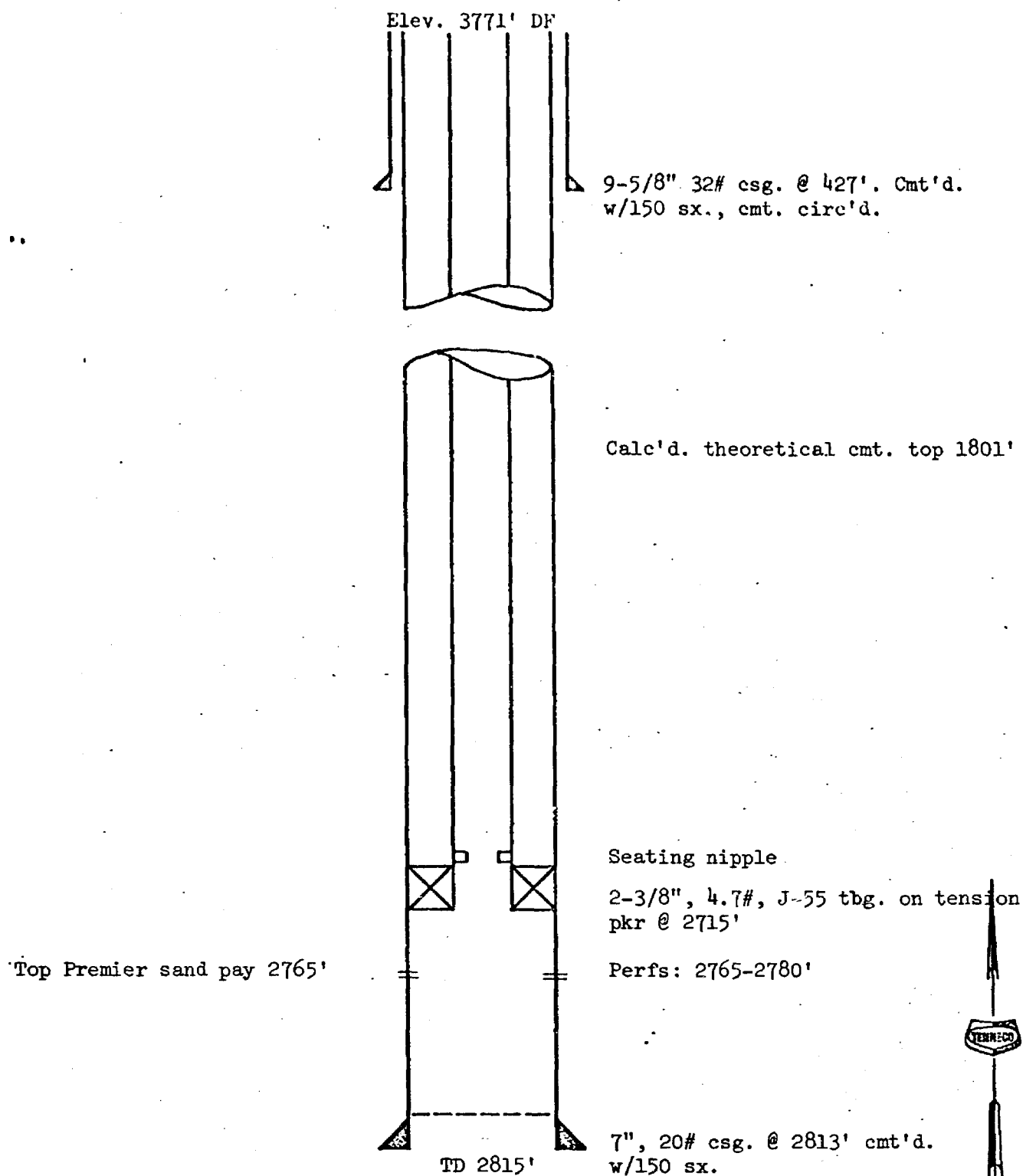


Exhibit 7A  
4A



Treatment:  
F/20,000 gal. oil & 30,000# sd.

Potential:  
Pumped 40 BOPD

TENNECO OIL COMPANY SUBSIDIARY OF TENNECO CORPORATION
West Henshaw Grayburg Field Eddy County, New Mexico
Tenneco Oil Co. (Leonard Oil Co.) Hagerty Federal No. 5.
Proposed Water Injection Well 660' FSL & 660' FEL Sec. 18, T-16-S,R-30-E EXHIBIT 8

Exhibit 9

GAMMA RAY MICROGRAMS RA EQ TON	CASINO CONTAINER	GAMMA RAY MICROGRAMS RA EQ TON
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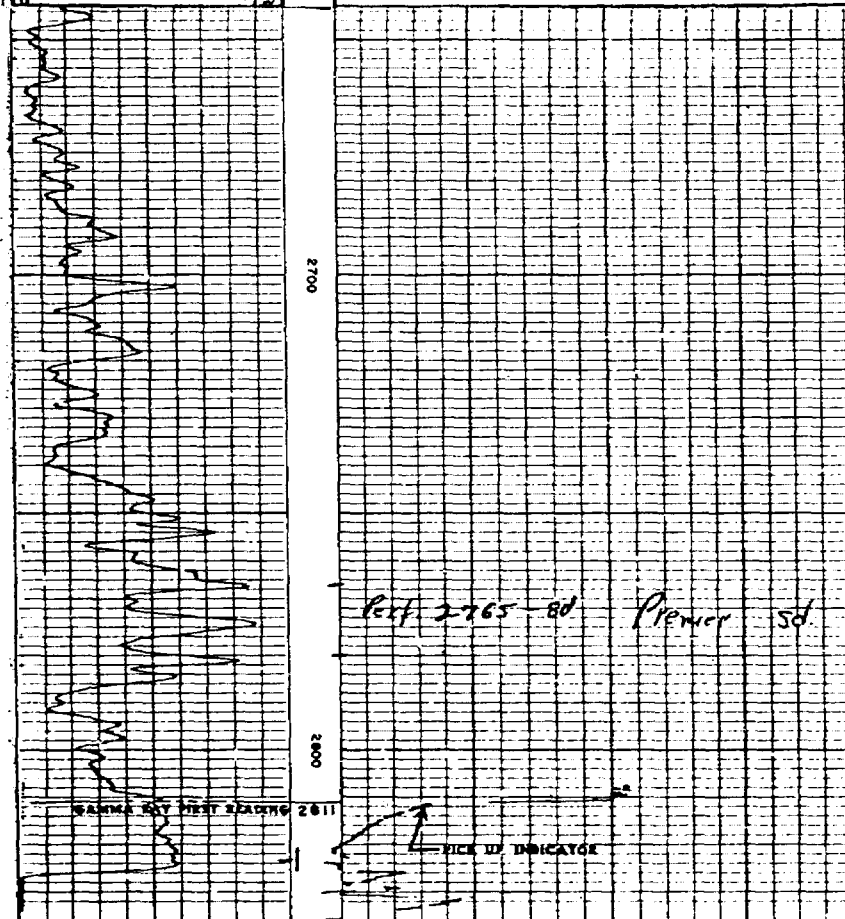
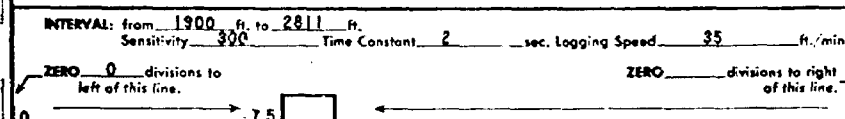
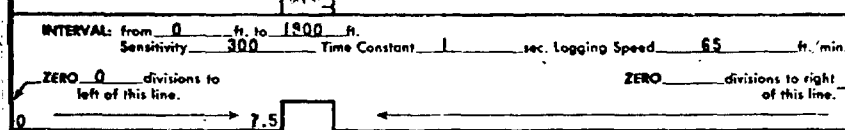
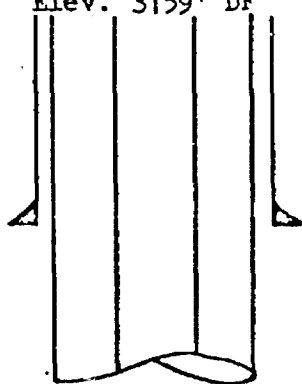


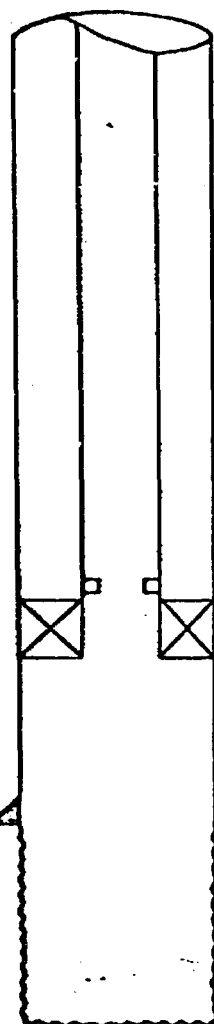
Exhibit 9A

REMARKS																		
FOLD HERE																		
MICROCALIPER																		
DEPTH																		
RESISTIVITY ohms. m <sup>2</sup> /m																		
RESISTIVITY ohms. m <sup>2</sup> /m																		
6	7	8	9	10	11	12	13	14	15	16	0	25	50	100	200	400	800	
Hole Diameter in Inches																		
										<p>Ref: 2765-80'</p> <p>Premix Sand</p>								
2700																		
2800																		
FIRST READING 2812																		
TOTAL DEPTH 2813																		

Elev. 3759' DF



10-3/4", 32#, H-40 csg. @ 446'.



Calc'd. theoretical cm't.  
top 1379'.

Seating nipple

2-3/8", 4.7#, J-55 tbg. on  
tension pkr @ 2600'

Top Premier Sand Pay  
2659'

5-1/2", 15.5#, J-55 csg.  
@ 2659' cmt'd. w/200 sx

OH 2659-2701'

TD 2693



Treatment:  
F/32,046 gal. oil & 57,000# sd.

Potential:  
Flowed 50 BOPD

TENNECO OIL COMPANY  
SUBSIDIARY OF TENNECO CORPORATION

West Henshaw Grayburg Field  
Eddy County, New Mexico

Tenneco Oil Co. (Leonard Oil Company)  
Hagerty Federal No. 7  
Proposed Water Injection Well  
1650' FSL & 1650' FEL, Sec. 7, T-16-S, R-30-E

EXHIBIT 10

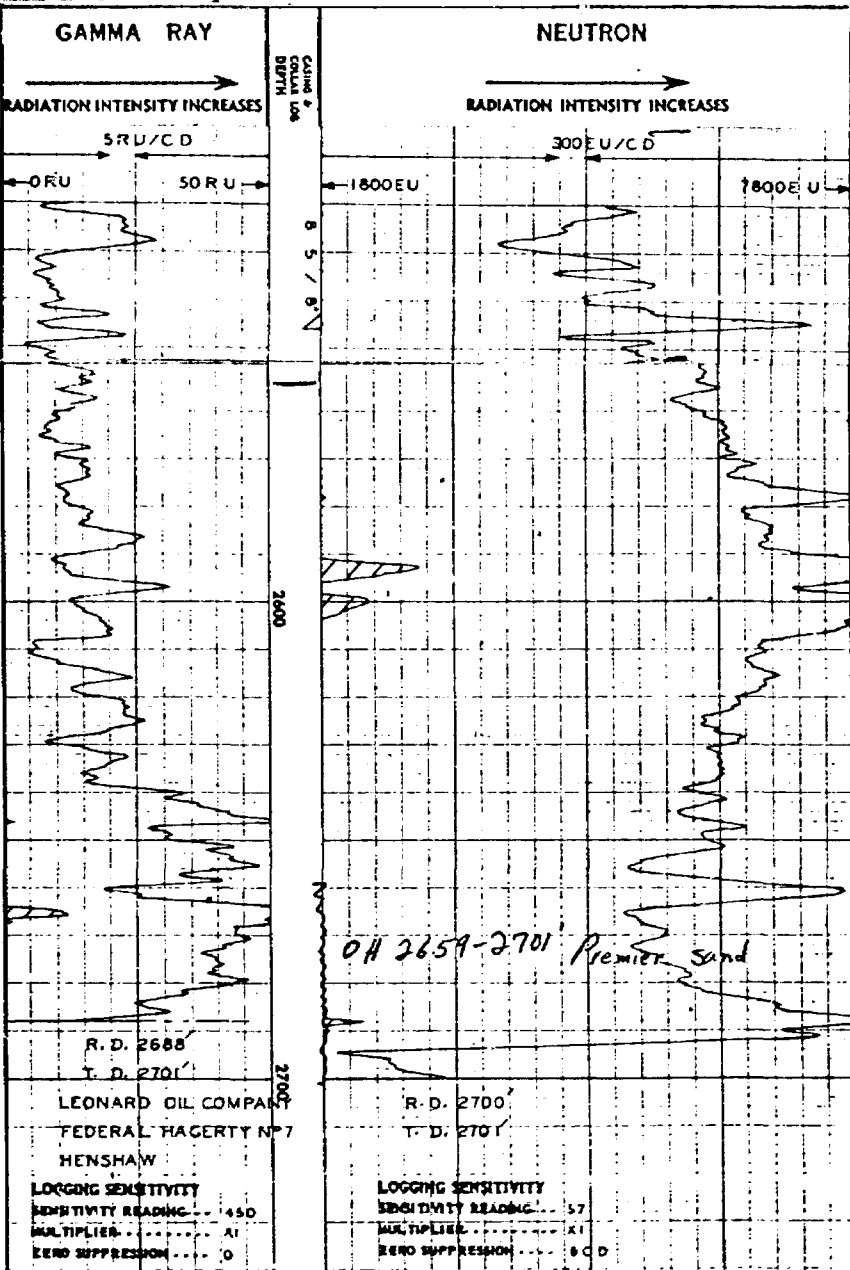
# LANE WELLS

18 *University*  
*Log*

COMPANY: LEONARD OIL COMPANY WELL: FEDERAL HAGERTY NO. 7 LOCATION: 15501 PSL & 15501 PSL OF SEC. 7 COUNTY: 2011 STATE: N. H.	COMPANY: LEONARD OIL COMPANY		Well Location
	WELL: FEDERAL HAGERTY NO. 7		
	FIELD: HENSHAW		
	LOCATION: 15501 PSL & 15501 PSL OF SEC. 7		
	COUNTY: 2011 STATE: N. H.		
LOG ZERO	CABLE TOOL FLOOR	ELEV. 37.4	
DRUG ZERO	CABLE TOOL FLOOR	ELEV. 37.9	
PERM. DATUM	GROUND LEVEL	ELEV. 37.7	
TYPE OF LOG	GAMMA RAY	NEUTRON	
RUN NO.	250-25	250-25	
DATE	1-19-52	1-19-52	
TOTAL DEPTH (DRILLER)	2503	2503	
EFFECTIVE DEPTH (DRILLER)	2503	2503	
TOP OF LOGGED INTERVAL	SURFACE	SURFACE	
BOTTOM OF LOGGED INTERVAL	2503	2503	
TYPE OF FLUID IN HOLE	WT	WT	
FLUID LEVEL			
MAXIMUM RECORDED TEMP.			
SOURCE STRENGTH & TYPE	51203	51203	
SOURCE SPACING - IN.	11.5	11.5	
DETECTOR CLASS	SCINT.	SCINT.	
DETECTOR TYPE	2503	2503	
LENGTH OF MEAS. DEVICE - IN.	3 5/8	3 5/8	
O.S. OF INSTRUMENT - IN.	1-19-52	1-19-52	
TIME CONSTANT - SECONDS	10-50	10-50	
LOGGING SPEED FT./MIN.	RECORDED	RECORDED	
STATISTICAL VARIATION - IN.	2211	2211	
SENSITIVITY REFERENCE	RECORDED	RECORDED	
RECORDED BY	ELLIS	ELLIS	
WITNESSED BY			

Exhibit 11

WELL RECORD			
RUN	BIT SIZE	CASING WT.-LB.	FROM WELL RECORD
ONE	12 1/2	10 3/4	SURFACE TO 115
TWO			SURFACE TO 1276
THREE			1276 TO 2503



Elev. 3758' DF

7", 20#, J-55 cmt'd. at top w/50 sx.

*Minimum 100' up*  
Calc'd. theoretical cmt. top 2073'

Seating nipple

2-3/8", 4.7#, J-55 tbg. on tension  
pkr. @ 2765'

Top premier sand pay 2715'

Perfs: 2715-16'

PB 2744'

TD 2753'

7", 20#, J-55 @ 2750 cmt'd.  
w/100 sx.

Treatment:  
f/25,000 gal. oil & 37,000# sd.

Potential:  
Flowed 120 BOPD on 32/64 choke

**TENNECO OIL COMPANY**  
SUBSIDIARY OF TENNECO CORPORATION

West Henshaw Grayburg Field  
Eddy County, New Mexico

Tenneco Oil Co. (Leonard Oil Co.)  
Hagerty Federal No. 11  
Proposed Water Injection Well

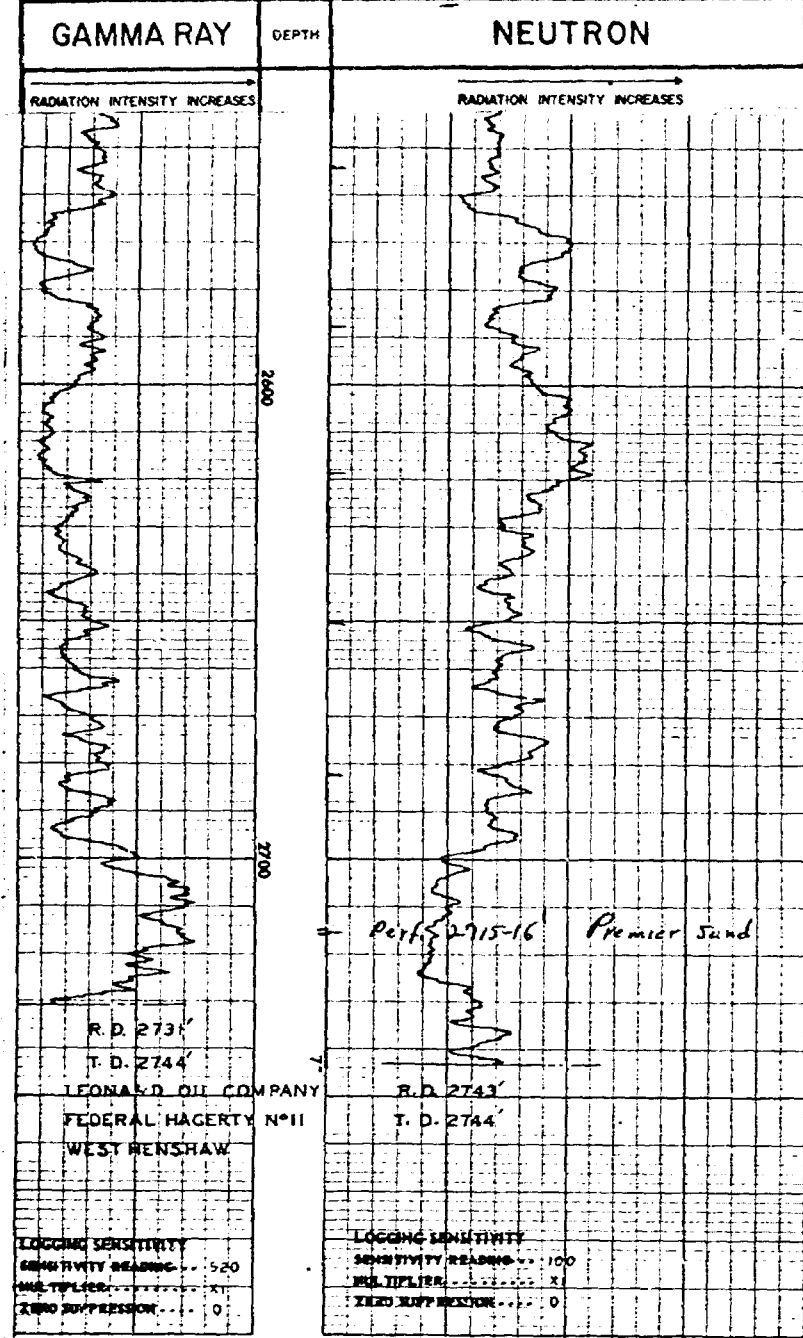
1980' FSL & 1980 FEL, Sec. 18, T-16-S,  
R-30-E

EXHIBIT 12



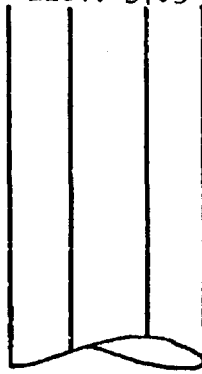
WELL NO.	COMPANY LEONARD OIL COMPANY	
	WELL FEDERAL HAGERTY N°11	
	FIELD WEST HENSHAW	
	COUNTY EDDY	STATE NEW MEXICO
	LOCATION 1200' F.S. & 1200' F.L.	
	SEC 16	TWP 16-S RGE 30-E
Permanent Datum	GRUBB LENSEL R Elev.	
Log Measured from	CABLE TOOL FLOOR 2 Ft. Above Permanent Datum	
Drilling Measured from	CABLE TOOL FLOOR	
Date	2-20-60	2-21-60
Run No.	ONE	ONE
Type Log	GAMMA RAY	N/NEUTRON
Depth Driller	2748	2748
Depth Logger	2744	2744
Bottom Logged Interval	2731	2743
Top Logged Interval	SURFACE	SURFACE
Type Fluid in Hole	WATER	WATER
Salinity Ppm Cl		
Density lb./Gal		
Level	FULL	FULL
Max. Rec. Temp. Deg. F		
Oper. Rig Time	2 HOURS	
Recorded By	REED	REED
Witnessed By		
Run No.	Bore Hole Record	
No.	From	To
1	SURFACE	2748
	Casing Record	
	From	To
	SURFACE	2744

Exhibit 13

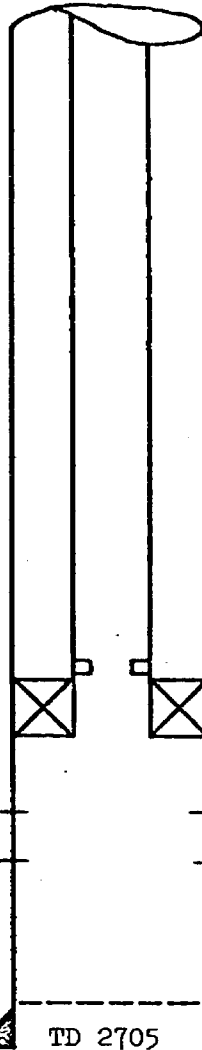


Elev. 3763' DF

5-1/2", 15.5#, J-55 csg. @ 2705 cmt'd.  
at top w/50 sx.



Calc'd. theoretical cmt. top 1744'



Top Premier sand pay 2674'

Seating nipple

2-3/8", 4.7#, J-55 tbg. on tension  
packer @ 2625'

Abrasive jet perf. 2674'

Abrasive jet perf. 2680'

TD 2705

5-1/2", 15.5#, J-55 csg. @  
2705 cmt'd. w/150 sx.



**Treatment:**

24,612 gal. lse. crude & 35,000# sand

**Potential:**

Flowed 60 BOPD on 32/64 Choke

**TENNECO OIL COMPANY**  
SUBSIDIARY OF TENNECO CORPORATION

West Henshaw Grayburg Field  
Eddy County, New Mexico

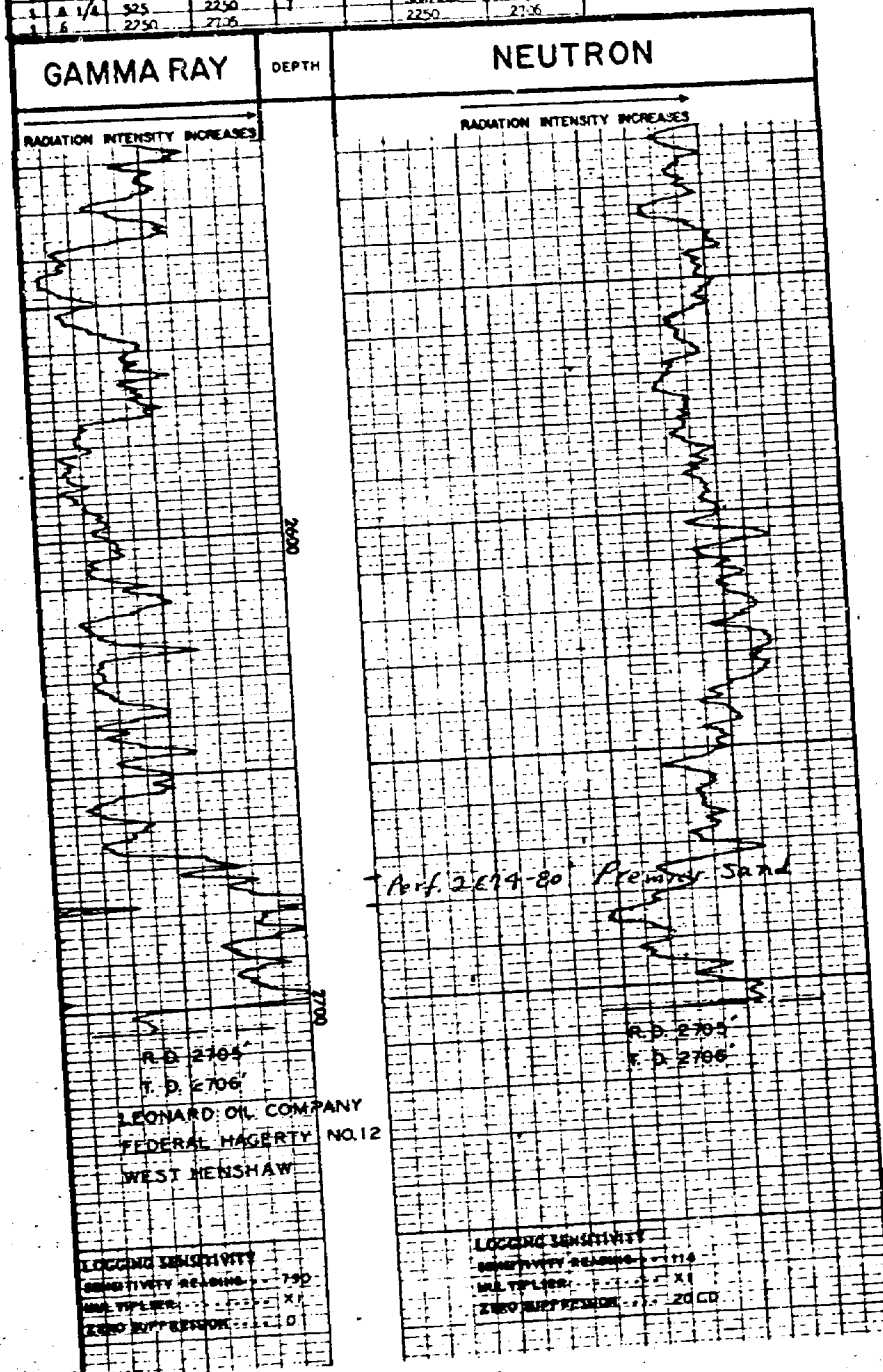
Tenneco Oil Co. (Leonard Oil Co.)  
Hagerty Federal No. 12  
Proposed Water Injection Well  
660' FNL & 1980' FEL, Sec. 18, T-16-S,  
R-30-E

EXHIBIT 14

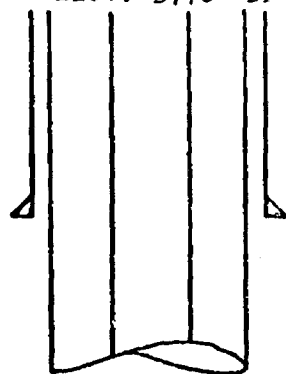
FILE NO. \_\_\_\_\_ COMPANY **LEONARD OIL COMPANY**  
 WELL **FEDERAL HAGERTY NO.12**  
 FIELD **WEST HENSHAW**  
 COUNTY **EDDY** STATE **NEW MEXICO**  
 LOCATION: 6601 FRL & 19001 FLL  
 MC **38** PWP **16-6** PGE **30-6**  
 Permanent Datum **GROUND LEVEL** Elev. **3761**  
 Log Measured from **to I. F.** 1 ft Above Permanent Datum  
 Drilling Measured from **CABLE TOOL FLOOR** Elev. **3761**  
 Date **6-14-60** **A-14-60**  
 Run No. **ONE** **ONE**  
 Type Log **SCALING RAY** **SCALING RAY**  
 Depth Driller **2705** **2705**  
 Depth Logger **2706** **2706**  
 Bottom Logged Interval **2705** **2705**  
 Top Logged Interval **SURFACE** **SURFACE**  
 Test Fluid in Hole **DRY** **DRY**  
 Salinity ppm Cl **DRY** **DRY**  
 Density lb. Gal. **DRY** **DRY**  
 Level **DRY** **DRY**  
 Max Rec. Time Day F **1 1/2 HOURS**  
 Oper. Log Time **REED A. BROWN** **REED A. BROWN**  
 Recorded By **MR. HIX** **MR. HIX**  
 Witnessed By \_\_\_\_\_  

Bore Hole Record				Casing Record			
Run No.	From	To	Size	Wgt.	From	To	Wgt.
1	12 1/4"	SURFACE	525	A 5/8"	SURFACE	527	
2	12 1/4"	525	2250	I	SURFACE	2250	
3	6"	2250	2705		2250	2705	

Exhibit 15



Elev. 3776' DF



8-5/8" csg. @ 572' cmt'd. w/75.  
sx. cmt. circ'd.



Top Premier Sand Pay 2730'  
approx.

NOTE: Log not available

TD 2800\*

Seating nipple

2-3/8", 4.7#, J-55 tbg. on tension  
pkr. @ 2680'.



\* 5-1/2", 15.5#, J-55 csg. @  
2800' cmt. as required.

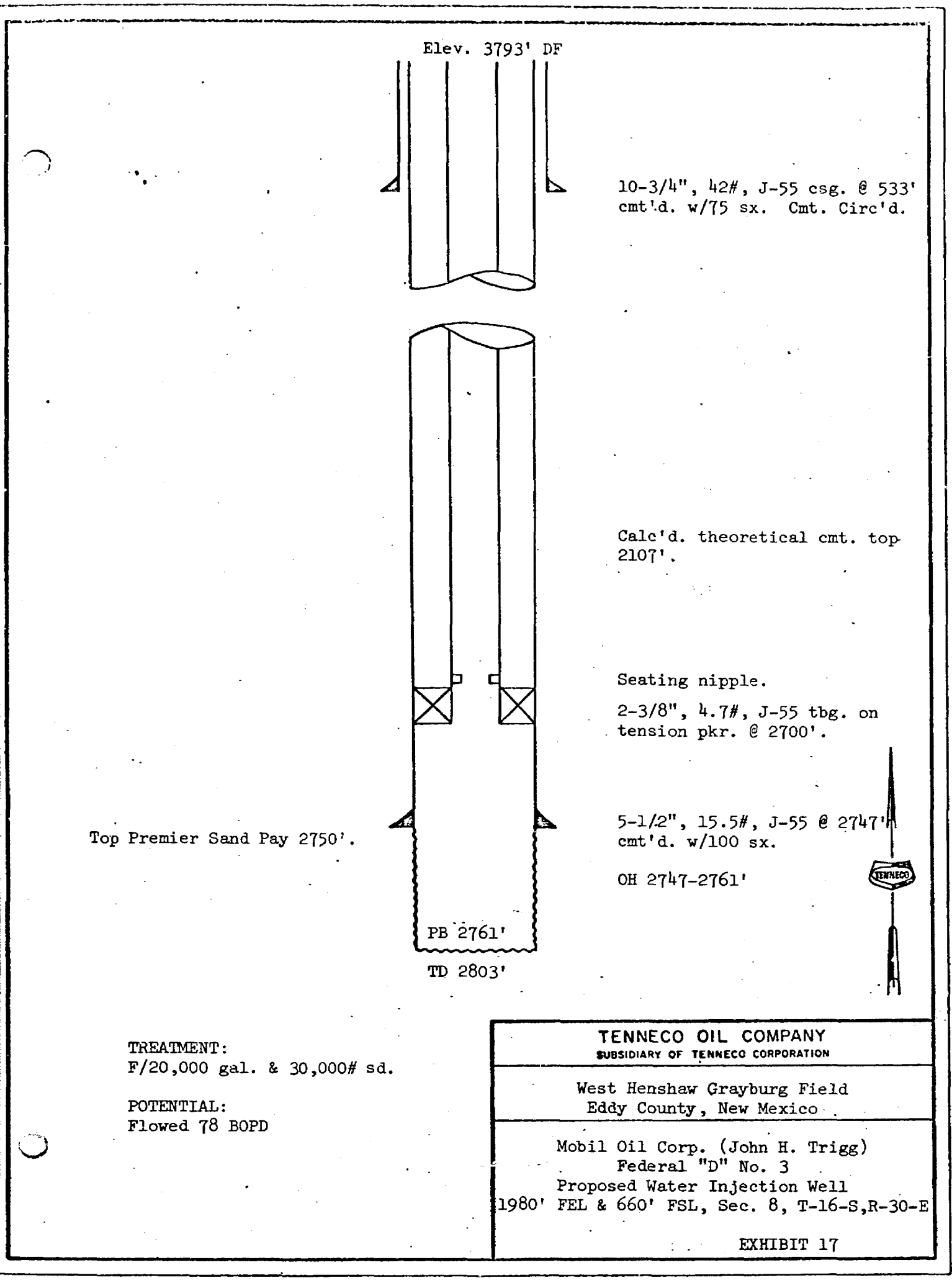
\* Well was D&A. No production string  
presently in well. Plan to re-enter,  
log, & set 5-1/2" csg. through pay and  
perforate.

TENNECO OIL COMPANY  
SUBSIDIARY OF TENNECO CORPORATION

West Henshaw Grayburg Field  
Eddy County, New Mexico

Mobil Oil Corp. (John H. Trigg)  
Federal "D" No. 2  
Proposed Water Injection Well  
660' FNL & 660' FWL, Sec. 17, T-16-S, R-30-E

EXHIBIT 16





# WELLEX JET SERVICES, Inc.

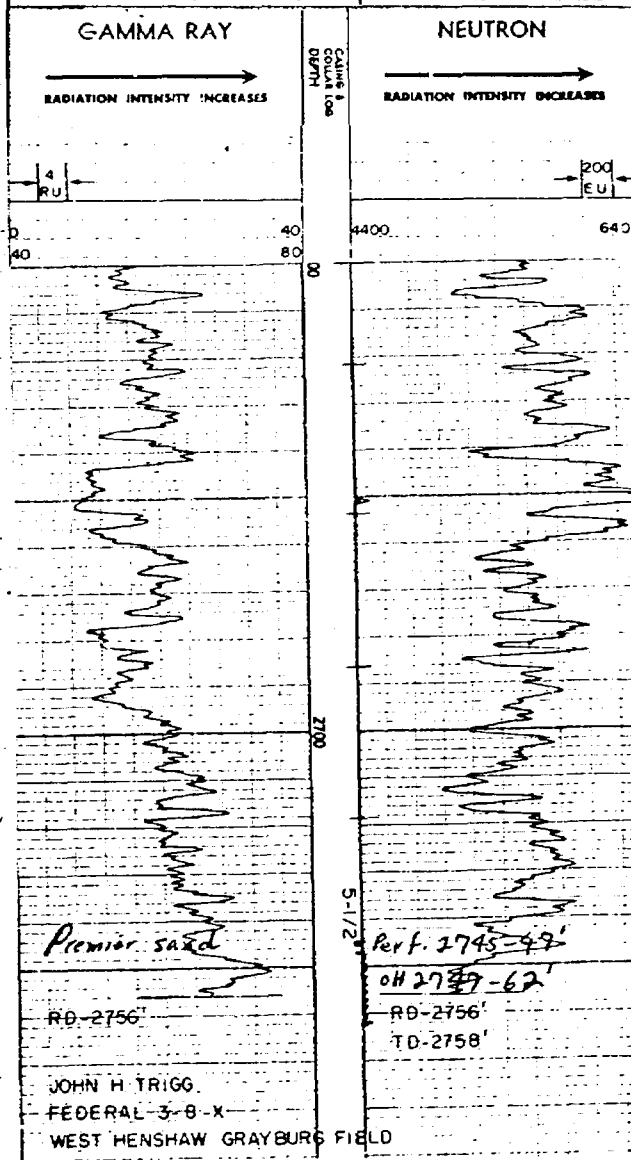
FILE NO.

Location of Well:	COMPANY JOHN H. TRIGG	WELL FEDERAL 3-8-X	FIELD WEST HENSHAW GRAYBURG FIELD	COUNTY EDGE	STATE TEXAS	LOCATION 1980' PSL & 677' PSL OF SEC. 8	T-16-S, R-30-E
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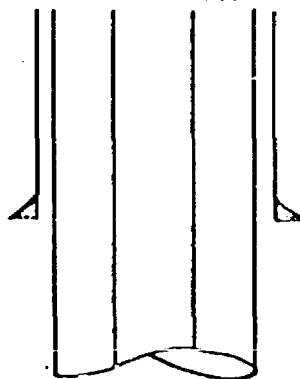
LOG MEAS. FROM	2.5' ABOVE GROUND LEVEL	REV. 3797.5'
DRUG. MEAS. FROM	DERRICK FLOOR	REV. 3797'
PERM. DATUM	GROUND LEVEL	REV. 3795'

TYPE OF LOG	GAMMA RAY	N-1
RUN NO.	-1	-1
DATE	6/26/57	6/26/57
JOB NO.	182-2012	654-693
TOTAL DEPTH (DRILLER)	2803	2803
EFFECTIVE DEPTH (DRILLER)	2762	2762
TOTAL DEPTH (N/A LOG)	2758	2758
TOP OF LOGGED INTERVAL	50	50
BOTTOM OF LOGGED INTERVAL	2756	2756
TYPE OF FLUID IN HOLE	OIL	OIL
FLUID LEVEL		
MAXIMUM RECORDED TEMPERATURE		SL043
NEUTRON SOURCE STRENGTH & TYPE		13.50
SOURCE SPACING-IN.		SCINT.
DETECTOR CLASS	SCINT.	SCINT.
DETECTOR TYPE	D 4 0 1	D 6 8 1
LENGTH OF MEASURING DEVICE-IN.	1	1
O.D. OF INSTRUMENT-IN.	3 5/8	3 5/8
TIME CONSTANT-SECONDS	2.0	1.5
LOGGING SPEED FT./MIN.	20-40	20-40
STATISTICAL VARIATION-IN.	20	20
SENSITIVITY REFERENCE	0.3	0.15
RECORDED BY	C 933	D 368
WITNESSED BY	MOUSER & YATES	MR. H. PUGATT

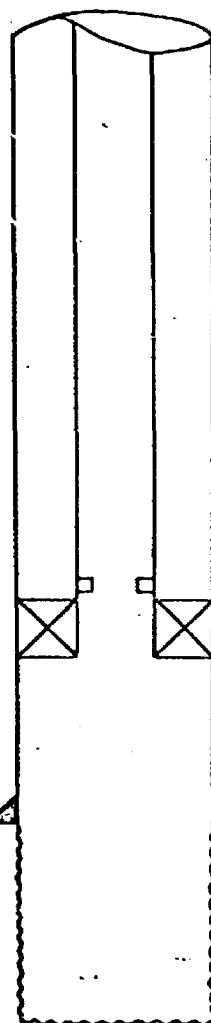
Casing Record			Bore Hole		
SIZE-IN.	WELL RECORD	FROM	SIZE-IN.	WELL RECORD	FROM
10 3/4	0	To 533'	12 1/2	0	To 2748'
5 1/2	0	To 2748'			



Elev. 3775' DF



10-3/4", 32#, J-55 csg. @ 542'  
Cmt'd. w/75 sx. Cmt. circ'd.



Calc'd. theoretical cmt. top  
1805'.

Seating nipple

2-3/8", 4.7#, J-55 tbg. on ten-  
sion pkr. @ 2700'.

7", 20#, J-55 csg. @ 2752'  
Cmt'd. w/140 sx.

Top Premier Sand Pay 2766'.

OH 2752-2783'.

TD 2785



Treatment:  
F/60,000 gal oil & 100,000# sand

Potential:  
Flowed 41 BOPD & 2 BSWPD

NOTE:  
Log on this well is not available.

**TENNECO OIL COMPANY**  
SUBSIDIARY OF TENNECO CORPORATION

West Henshaw Grayburg Field  
Eddy County, New Mexico

Mobil Oil Corp. (John H. Trigg)  
Federal "D" No. 8  
Proposed Water Injection Well  
1980' FSL & 660' FWL, Sec. 17, T-16-S, R-30-E

EXHIBIT 19