CASE 2879: Application of HUMBLE for a waterflood project on its STATE "M" LEASE, Lea County.

Clarence Hinkle 7/17/63; Appl to foam

Appl of Humble Oil & Rfg Co

Approval water flood project

State "M" Lease Queen Fm

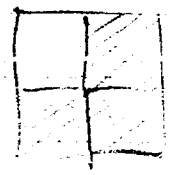
Langlie Mattix & Eumont

2240 acres in 19, 20, 29, 30, 31

T 22S, R37E

6 injs 20, 29, 30

ask to change from Eumont to LM



T 22 S R 37 E

19: All

20: SW/4 SW/4, SE SW, NE SW,

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. 2879
Order No. R-2556
NOMENCLATURE

APPLICATION OF HUMBLE OIL & REFINING
COMPANY FOR A WATERFLOOD PROJECT, LEA
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on August 7, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 23rd day of August, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, 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, Humble Oil & Refining Company, is the owner and operator of the State "M" Lease comprising all of Section 19, the SW/4 SW/4, E/2 SW/4, and W/2 SE/4 of Section 20, the W/2, W/2 NE/4, and NW/4 SE/4 of Section 29, all of Section 30, and the N/2 of Section 31, all in Township 22 South, Range 37 East, NMPM, Lea County, New Mexico.

(3) That the applicant, Humble Oil & Refining Company, seeks permission to institute a waterflood project in the Langlie-Mattix and Eumont Pools by the injection of water into the Queen formation through six wells on said State "M" Lease.

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

(5) That the proposed waterflood project is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, thereby preventing waste.

(6) That the proposed waterflood project should be approved and the project should be governed by the provisions of Rule 701 of the Commission Rules and Regulations.

(7) That all water injection should be through 1.9-inch OD internally plastic-coated tubing with a permanent type packer set at approximately 3400 feet in the 2 7/8-inch casing. The annulus between the casing and the tubing of each injection well should be filled with an inhibited liquid, and a pressure gauge should be installed on the tubing-casing annulus to indicate the presence of any packer or tubing leaks.

(8) That the applicant further proposes that the Eumont Pool be contracted by the deletion therefrom of all of Section 19 and the SW/4 SW/4 and E/2 SW/4 of Section 20, Township 22 South, Range 37 East, and that the Langlie-Mattix Pool be extended to include said acreage.

(9) That the proposed extension and contraction of said pools will be in the interest of better administration of the State "M" Lease and the proposed waterflood project inasmuch as all of said project would be within one pool.

IT IS THEREFORE ORDERED:

(1) That the applicant, Humble Oil & Refining Company, is hereby authorized to institute a waterflood project by the injection of water into the Queen formation through the following-described six wells in Township 22 South, Range 37 East, NMPM, Lea County, New Mexico:

State "M" Well No. 37, 330 feet from the South line and 330 feet from the West line of Section 20;

State "M" Well No. 23, 660 feet from the North line and 1980 feet from the West line of Section 29;

State "M" Well No. 26, 1980 feet from the North line and 660 feet from the West line of Section 29;

State "M" Well No. 28, 1980 feet from the South line and 660 feet from the East line of Section 30;

State "M" Well No. 31, 660 feet from the North line and 660 feet from the East line of Section 30;

State "M" Well No. 38, 1800 feet from the North line and 1980 feet from the East line of Section 30.

(2) That all injection shall be through 1.9-inch OD internally plastic-coated tubing with a permanent type packer set at approximately 3400 feet in the 2 7/8-inch casing. The annulus between the casing and the tubing of each injection well shall be filled with an inhibited liquid, and a pressure gauge shall be installed on the casing-tubing annulus.

(3) That the subject waterflood project shall be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(4) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1119 of the Commission Rules and Regulations.

(5) That the Eumont Gas Pool is hereby contracted by the deletion therefrom of all of Section 19 and the SW/4 SW/4 and E/2 SW/4 of Section 20, Township 22 South, Range 37 East. The Langlie-Mattix Pool is hereby extended to include all of said acreage.

(6) 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

Jack M Campbell
JACK M. CAMPBELL, Chairman

E. S. Walker
E. S. WALKER, Member

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

esr/

Case 2879
Heard 8-7-63
Rec. 8-16-63.

1. Grant Humble the waterflood requested in the Fremont-Langlie Mattix Pool.
2. Approve injection wells as shown their letter of 8-9-63.
3. injections shall be thru 1.5" I.D. tubing & below a packer set approx 3200' and the annulus shall be filled with inhibited fluid with a pressure gage on the annulus at the surface in order to detect leakage into the annulus.
4. Delete Sec. 19 & the SW/4 of sec. 20 from the Fremont pool and include the same area in the Langlie Mattix pools. All wells in this area are completed in the Langlie Mattix pool (Queen).

Elvis A. Utz.

HUMBLE OIL & REFINING COMPANY

Hobbs, New Mexico
August 9, 1963

Reference: Examiner Hearing,
Wednesday, August 7, 1963
Case 2879 - Humble Oil & Refining Co.,
New Mexico State "M" Lease
Pilot Waterflood

Mr. A. L. Porter, Jr., Secretary-Director
New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention: Mr. Elvis A. Utz

Dear Sir:

Enclosed is the additional information that you requested in the August 7, 1963, Examiner Hearing.

The surface location of the proposed pilot injection wells, all of which are in T-22-S, R-37-E,

Well No. 37, 330' FSL and 330' FWL, Unit M, Section 20
Well No. 23, 660' FNL and 1980' FWL, Unit C, Section 29
Well No. 26, 1980' FNL and 660' FWL, Unit E, Section 29
Well No. 28, 1980' FSL and 660' FEL, Unit I, Section 30
Well No. 31, 660' FNL and 660' FEL, Unit A, Section 30
Well No. 38, 1800' FNL and 1980' FEL, Unit G, Section 30

The injection wells will have 1.5-inch nominal (1.9-inch O.D.) internally plastic coated tubing with a permanent type packer set at approximately 3,400' in the 2-7/8-inch casing. The annulus between the casing and tubing will be filled with inhibited liquid and a pressure gauge will indicate the presence of any packer or tubing leaks. See attachment.

Yours truly,

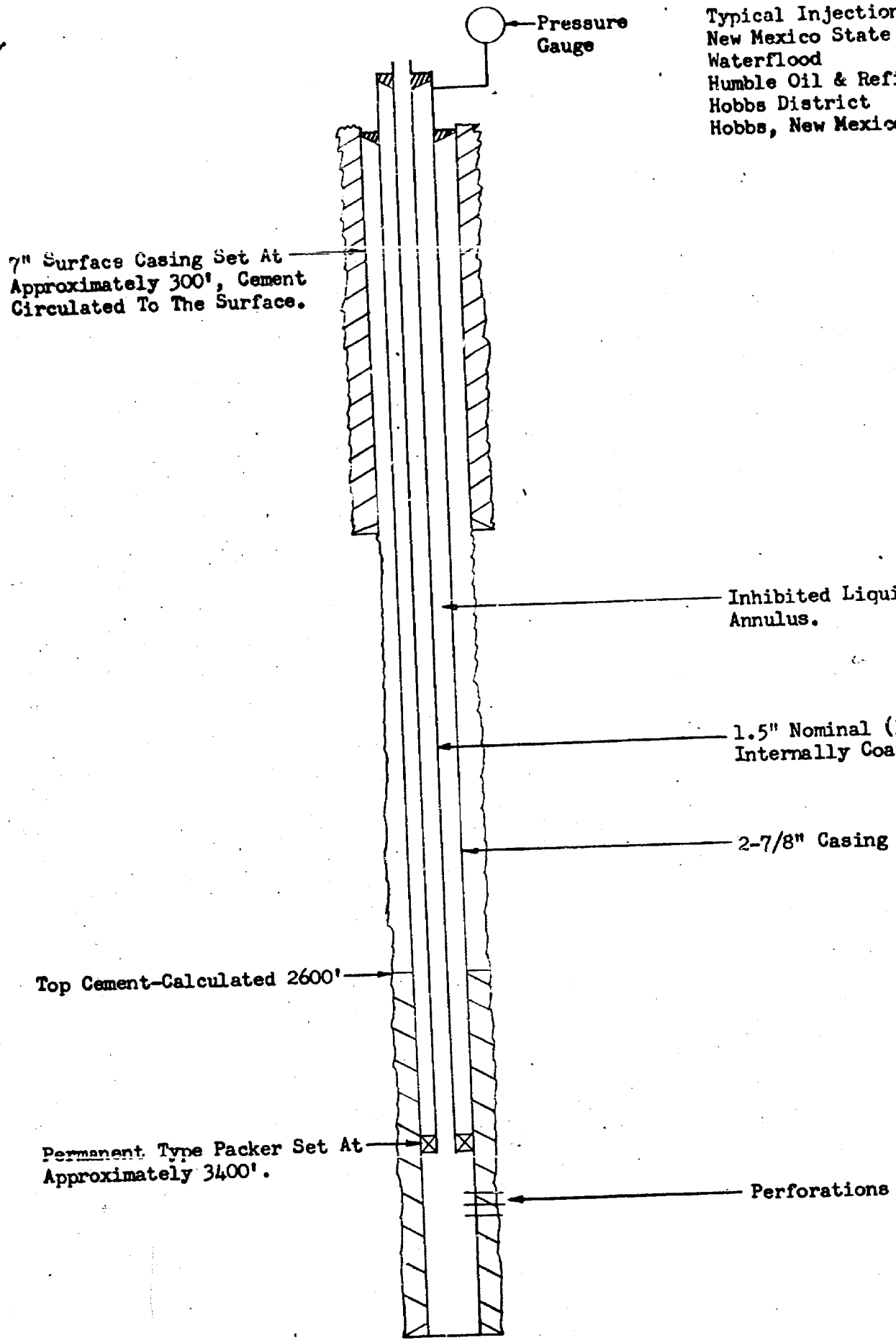
HUMBLE OIL & REFINING COMPANY

R. R. Alworth

R. R. Alworth,
District Superintendent

Attachment
LEG/mcb
cc: Frank Irby, Chief, Water Rights Division, Office of State Engineer
Capitol Building, Santa Fe, New Mexico w/attachment

Typical Injection Well
New Mexico State "M" Lease
Waterflood
Humble Oil & Refining Co.
Hobbs District
Hobbs, New Mexico



STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

August 14, 1963

ADDRESS CORRESPONDENCE TO:
STATE CAPITOL
SANTA FE, N. M.

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
Santa Fe, New Mexico

Attn. Mr. Elvis A. Utz

Dear Mr. Utz:

Reference is made to the August 9, 1963 letter addressed to you by Humble Oil & Refining Company with reference to Oil Conservation Commission Case 2879 and to the attached diagrammatic sketch.

After studying the letter and the diagrammatic sketch, it appears that no threat of contamination to the fresh waters which may exist in the area will occur if injection is made in the manner set forth. Therefore, this office offers no objection to the granting of the subject application.

Yours truly,

S. E. Reynolds
State Engineer

By: Frank E. Irby
Frank E. Irby
Chief
Water Rights Division

FEI/ma
cc-Humble Oil & Refining Co.
F. H. Hennighausen

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

APPLICATION OF HUMBLE OIL & REFINING COMPANY FOR APPROVAL OF WATERFLOOD PROJECT PURSUANT TO RULE 701 COVERING HUMBLE'S STATE "M" LEASE IN THE LANGLIE-MATTIX AND EUMONT POOLS EMBRACING 2240 ACRES IN SECTIONS 19, 20, 29, 30 and 31, TOWNSHIP 22 SOUTH, RANGE 37 EAST, LEA COUNTY, NEW MEXICO; FOR APPROVAL OF PILOT WATERFLOOD INJECTION INTO QUEEN FORMATION; FOR ADMINISTRATIVE AUTHORITY TO EXPAND THE PROJECT AND TO TRANSFER LANDS WITHIN THE PROJECT AREA WHICH ARE WITHIN THE EUMONT POOL LIMITS TO THE LANGLIE-MATTIX POOL.	Case No. 2879

APPLICATION

Comes the Humble Oil & Refining Company and hereby makes application for approval of a waterflood project pursuant to Rule 701 covering Humble's State "M" lease in the Langlie-Mattix and Eumont Pools embracing lands situated in Sections 19, 20, 29, 30 and 31, Township 22 South, Range 37 East, Lea County, New Mexico and for the inauguration of a pilot waterflood injection into the Queen formation at a depth of approximately 3600 feet in the wells hereinafter referred to and to provide for administrative approval of the expansion of said project and to transfer lands within the project area which are within the Eumont Pool limits to the Langlie-Mattix Pool, and in support thereof respectfully shows:

1. That there is filed herewith and made a part hereof and for purposes of identification marked Exhibit "A", a plat showing the State "M" lease of Humble covering All of Sections

19 and 30, and portions of Sections 20, 29 and 31, Township 22 South, Range 37 East, N.M.P.M. embracing approximately 2240 acres, Lea County, New Mexico, and also showing the location of the proposed injection wells and the location of all other wells within a radius of two miles from said proposed injection wells and the formation from which said wells are producing or have produced. The plat also shows the respective owners of the oil and gas leases within a radius of two miles of the proposed project area.

2. There are thirty-seven (37) wells located within the proposed project area, all of which are producing from the Queen formation at a depth of approximately 3600 feet. All of said wells have reached an advanced state of depletion and are regarded as what is commonly referred to as "stripper" wells.

It is proposed to inaugurate a pilot injection project by the injection of water into the Queen formation in the following wells:

State M 23 - C-29-22-37
State M 26 - E-29-22-37
State M 28 - I-30-22-37
State M 31 - A-30-22-37
State M 37 - M-20-22-37
State M 38 - G-30-22-37

There is filed herewith electrical logs of each of the initial injection wells above referred to and for purposes of identification marked Exhibits "B", "C", "D", "E", "F" and "G", respectively.

There is also filed herewith and made a part hereof Exhibit "H" giving a description of the proposed injection wells casing program.

3. It is contemplated that approximately 2000 barrels of water per day will be initially injected into the pilot area. The water will be obtained from a San Andres water well located

in the SE¼NW¼ Section 29, Township 22 South, Range 37 East and there is filed herewith as Exhibit "I" a water analysis of the water which will be produced from said well.

4. That it is contemplated that if the pilot project above referred to is successful and that if response to water injection is experienced in offset wells, that the project will be expanded from time to time to embrace the entire project area, and it is believed to be in the interest of sound conservation practices that approval of such expansions from time to time by the Oil Conservation Commission be granted by administrative action.

5. That all of the lands in the proposed project area are within the limits of the Langlie-Mattix Pool limits except the following described lands which are within the Eumont Pool limits, to-wit:

Township 22 South, Range 37 East, N.M.P.M.

Section 19: All
Section 20: SW¼SW¼, SE¼SW¼, NE¼SW¼

It is believed that it will simplify administration of the project for both applicant and the Commission to transfer the above described lands into the Langlie-Mattix Pool limits.

6. Applicant proposes to operate the pilot project as well as the entire project as the same may be expanded to include the entire project area as far as the allowable production is concerned as provided by Rule 701 of the Statewide Rules of the Oil Conservation Commission.

DATED this 16th day of July, 1963.

Respectfully submitted,

HERVEY, DOW & HINKLE

By _____
P. O. Box 10
Roswell, New Mexico
Attorneys for Humble Oil & Refining Company

HUMBLE OIL & REFINING COMPANY

By _____

FORM APPROVED
Hervey, Dow & Hinkle
By: _____

J. M. HERVEY 1874-1953
HIRAM M. DOW
CLARENCE E. HINKLE
W. E. BONDURANT, JR.
GEORGE H. HUNKER, JR.
HOWARD C. BRATTON
S. B. CHRISTY IV
LEWIS C. COX, JR.
PAUL W. EATON, JR.
CONRAD E. COFFIELD
HAROLD L. HENSLEY, JR.

LAW OFFICES
HERVEY, DOW & HINKLE
HINKLE BUILDING
ROSWELL, NEW MEXICO

TELEPHONE 622-6510
AREA CODE 505
POST OFFICE BOX 10

Case 2819

July 17, 1963

Mr. A. L. Porter, Jr.
Secretary-Director
New Mexico Oil Conservation Commission
Box 871
Santa Fe, New Mexico

Dear Mr. Porter:

We enclose in triplicate application of Humble Oil & Refining Company for approval of waterflood project covering Humble State "M" Lease in the Langlie-Mattix and Eumont Pools. You will also find enclosed as Exhibit "A" a plat showing the lease involved and Exhibits "B", "C", "D", "E", "F" and "G" respectively and being electrical logs of the six initial injection wells, also Exhibit "H" giving a description of the proposed injection wells casing program, and Exhibit "I" constituting a water analysis of the water which will be produced from the well from which water will be obtained for injection purposes.

We are anxious to have this matter set down for the first Examiner Hearing in August which we understand will be on August 7. Please let us have copy of Notice published in connection with the hearing.

Yours sincerely,

HERVEY, DOW & HINKLE

By

CEH: ev

Encls.

cc: R. R. McCarty
Manager
Production Department
Midland Area - Humble

cc: W. S. Davis - Humble

DOCKET MAILED

Date 7/29/63

CASE 2355: (Reopened) In the matter of Case 2355 being reopened pursuant to the provisions of Order No. R-2051-A, which order extended the temporary 320-acre proration units for the Bluitt-Wolfcamp Gas Pool, Roosevelt County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 160-acre proration units.

CASE 2635: (Reopened) In the matter of Case 2635 being reopened pursuant to the provisions of Order No. R-2325, which order established temporary 80-acre proration units for the Inbe-Pennsylvanian Oil Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

CASE 2878: Application of Humble Oil & Refining Company for a triple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the triple completion (tubingless) of its New Mexico State "S" Well No. 25, located in Unit N of Section 2, Township 22 South, Range 37 East, Lea County, New Mexico, to produce oil from the Penrose-Skelly and Wantz Abo Pools and an undesignated Granite Wash zone through parallel strings of 2-7/8 inch casing cemented in a common well bore.

CASE 2879: Application of Humble Oil & Refining Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project on its State "M" lease in Sections 19, 20, 29, 30 and 31, Township 22 South, Range 37 East, Lea County, New Mexico, by the initial injection of water into the Queen formation of the Langlie Mattix and Eumont Pools through six wells located in Sections 20, 29, and 30. Applicant further seeks the contraction of the Eumont Pool by the deletion therefrom of all of Section 19 and the S/2 SW/4 and NE/4 SW/4 of Section 20, Township 22 South, Range 37 East, and the extension of the Langlie-Mattix Pool to include said acreage.

CASE 2880: Application of Marathon Oil Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Box Canyon Unit Area comprising 10,560.48 acres of State, Federal and Fee lands in Townships 21 and 22 South, Range 21 East, Eddy County, New Mexico.

No. 22-63

DOCKET: EXAMINER HEARING - WEDNESDAY - AUGUST 7, 1963

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

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, as alternate examiner:

CASE 2871: Application of Bolack-Greer, Inc. for a unit agreement, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Canada Ojitos Unit Area comprising 35,829.84 acres of Federal and Fee lands in Townships 25 and 26 North, Ranges 1 East and 1 West, Rio Arriba County, New Mexico.

CASE 2872: Application of Texaco Inc. for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Woolley Unit Area comprising 2,080 acres of State and Federal lands in Township 17 South, Range 30 East, Eddy County, New Mexico.

CASE 2873: Application of Texaco Inc. for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Barry Unit Area comprising 2427.24 acres of State land in Township 21 South, Ranges 33 and 34 East, Lea County, New Mexico.

CASE 2874: Application of Murphy H. Baxter for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the East Rocky Arroyo Unit Area comprising 2560 acres of Federal, State and Fee lands in Township 21 South, Range 25 East, Eddy County, New Mexico.

CASE 2875: Application of Perry R. Bass for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks permission to drill a gas well at an unorthodox location 1980 feet from the South line and 660 feet from the West line of Section 21, Township 19 South, Range 32 East, Lusk Morrow Gas Pool, Lea County, New Mexico.

CASE 2876: Application of Consolidated Oil & Gas,Inc. for an unorthodox location, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks permission to recomplete its Jicarilla No. 4-8 at an unorthodox Blanco-Mesaverde Pool location 1550 feet from the North line and 890 feet from the West line of Section 8, Township 26 North, Range 5 West, Rio Arriba County, New Mexico.

CASE 2877: Application of Continental Oil Company for an extension of the provisions of Order R-2476, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an extension of the provisions of Order R-2476 which authorized certain interference tests and transfer of allowables between wells during the tests in the Oil Center Blinebry Pool.

SL-27-A (11-61)

HUMBLE OIL & REFINING COMPANY

SOUTHWEST REGION

SERVICE LABORATORY

Laboratory No. 45920-A

WATER ANALYSIS

4

Houston, Texas
November 29, 1962

COUNTY Lea, New Mexico

FIELD Langlie-Mattix

WELL New Mexico State M-20

DEPTH 4,170-4,260, 4,534-4,544, 4,551-4,556

FORMATION San Andres

OWNER Humble Oil & Refining Co.

DATE SAMPLED November 12, 1962

DATE RECEIVED November 13, 1962

SUBMITTED BY A. L. Carpenter

WORKED BY Ann B. Pearson

SOURCE Reda pump after 20,000 bbls. continuous production

Analysis

Radicals	*Parts Per Million*
Sodium	1,800
Calcium	706
Magnesium	290
Chloride	3,030
Sulfate	2,110
Bicarbonate	740
Carbonate	None
TOTAL	8,756
Hydrogen Sulfide	371
Iron, Total	4
Calcium Carbonate Stability	
Turbidity	10

Suspended matter

Comparison Data

	Percent
Primary Salinity	55.36
Secondary Salinity	36.06
Primary Alkalinity	None
Secondary Alkalinity	8.58
Chloride Salinity	66.00
Sulfate Salinity	34.00

Ratios

Chloride: Bicarbonate	7.0
Bicarbonate: Sulfate	0.3
Calcium: Magnesium	1.6
Sodium: Calcium & Magnesium	1.2
Specific Gravity at 79 °F.	1.006
Resistivity, ohm meters at 79 °F.	0.83
pH	6.5

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 9
CASE NO. 2879

D14827 (8-60)

SL-37

HUMBLE OIL & REFINING COMPANY

HUMBLE DIVISION

SERVICE LABORATORY

WATER ANALYSIS

Houston, Texas

November 29, 196

Laboratory No. 45920-B 9

COUNTY Lea, New Mexico

FIELD Langlie-Mattix

WELL New Mexico State "M" Lease

DEPTH 3,680-3,710

FORMATION Queen

OWNER Humble Oil & Refining Co.

DATE SAMPLED November 12, 1962

DATE RECEIVED November 15, 1962

SUBMITTED BY A. L. Carpenter

WORKED BY Ann B. Pearson

SOURCE Produced water by pump.

Analysis

Radicals	*Parts Per Million*
Sodium	3,034
Calcium	175
Magnesium	131
Chloride	3,600
Sulfate	57
Bicarbonate	2,907
Carbonate	None
TOTAL	9,907
Hydrogen Sulfide	207
Iron, Total	8
Calcium Carbonate Stability	
Turbidity	6

Comparison Data

	Percent
Primary Salinity	67.70
Secondary Salinity	None
Primary Alkalinity	19.34
Secondary Alkalinity	12.96
Chloride Salinity	98.85
Sulfate Salinity	1.15

Ratios

Chloride: Bicarbonate	2.1
Bicarbonate: Sulfate	41.1
Calcium: Magnesium	0.8
Sodium: Calcium & Magnesium	6.7
Specific Gravity at 79 °F.	1.006
Resistivity, ohm meters at 79 °F.	0.72
pH	6.9

cc: Mr. R. R. McCarty
Mr. J. W. Craybeal (3)
Mr. R. R. Alworth
Mr. A. L. Carpenter

mb

D14527 (6-60)

ORIGINAL MAILED

NOV 30 1962

By.....

Laboratory Supervisor

Thomas C. Crawford

Form SL-23A (6-62)

HUMBLE OIL & REFINING COMPANY

HOUSTON ENGINEERING LABORATORIES

GENERAL ANALYTICAL LABORATORY

Laboratory No. 45920 A & B 9

Houston, Texas
November 29, 1962

SAMPLE OF Salt Waters

FROM Langlie-Mattix Field, Lea County, New Mexico

SUBMITTED BY A. L. Carpenter

DATE RECEIVED November 15, 1962

WORKED BY Ann B. Pearson

OTHER DESCRIPTION
Sample A - San Andres water from New Mexico State "M" 20
Sample B - Queen water from New Mexico State "M" Lease

COMPATIBILITY TEST

Turbidity, parts per million

Mixture	Immediately After Mixing	1 Hour after Mixing	24 Hours after Mixing
100% A	10	10	24
75% A 25% B	6	10	26
50% A 50% B	10	16	34
75% B 25% A	8	12	12
100% B	6	6	6

Humble Oil & Refining Company

New Mexico State "M" Lease

PROPOSED INJECTION WELLS' CASING PROGRAM

7

Well No.	Surface Casing Seat	Top Cement	Oil String Seat	Top Cement
23	7" Set @ 338'	Circulated	2-7/8" Set @ 3686'	Calculated 2600'
26	7" Set @ 329'	Circulated	2-7/8" Set @ 3685'	Calculated 2600'
28	7" Set @ 328'	Circulated	2-7/8" Set @ 3749'	Calculated 2600'
31	7" Set @ 299'	Circulated	2-7/8" Set @ 3740'	Calculated 2600'
37	7" Set @ 305'	Circulated	2-7/8" Set @ 3700'	Calculated 2600'
38	7" Set @ 310'	Circulated	2-7/8" Set @ 3758'	Calculated 2600'

2270

6 1/8 Hole

2000 330

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 7
CASE NO. 2879

Humble Oil & Refining Company
New Mexico State "K" Lease Waterflood

LEASE INDIVIDUAL WELL DATA

Exhibit 6

Well	Total Depth	Plugged Back Depth	Completion Date	Initial Completion[a] Interval	Initial Completion[a] Zone	Current Completion Interval	Current Completion Zone	Original Potential Test Barrels of Oil Per Day	Original Potential Test GOR Cubic Feet Per Barrel	April 1963 Production Rate Barrels of Oil Per Day	April 1963 Production Rate GOR Cubic Feet Per Barrel	Cumulative Oil Prod. to 5-1-63 Barrels	May 1963 Allowable B/D
4	3714	3714	10-25-40	3578 - 3714	Grayburg & 7, 8,9,10,11	Same		636	677	6	73,978	82,120[b]	6
5	3719	3715	11-16-40	3540 - 3715	2 - 10	Same		334	547	8	14,601	119,019	9
6	3717	3712	3-26-44	3645 - 3704	Grayburg	3649 & 3654	Grayburg	1,584	585	6	5,468	152,431[c]	6
7	3728	3720	4-26-44	3670 - 3710	Grayburg	Plugged & Abandoned 3-25-47		137	-	-	-	Approx. 15,000[c]	-
11	3698	3675	7-16-56	3530 - 3580	1,2,3,4	3637 & 3646	7	39	25,469	4	13,017	18,030	4
				3625 - 3650	7	3660 - 3670	8						
				3665 - 3670	8								
14	3850	3700	7-19-59	3655 - 3667	2	3655 - 3667	2	4	24,469	2	10,167	8,563	2
				3682 - 3688	4	3672 - 3676	3						
				3709 - 3725	6	3682 - 3688	4						
				3736 - 3756	7								
				3775 - 3785	8								
				3790 - 3800	9								
15	3718	3708	9-23-59	3624 - 3630	6	Same		202	1,829	13	4,615	26,252	13
				3646 - 3666	7								
16	3690	3680	10-12-59	3570 - 3578	6	Same		54	4,862	7	7,700	27,551	7
				3590 - 3610	7								
17	3725	3714	10-29-59	3670 - 3690	7	Same		376	983	11	4,994	26,904	11
				3702 - 3712	8								
18	3715	3701	10-29-59	3636 - 3646	8	Same		70	2,349	5	9,153	27,883	5
				3660 - 3666	9								
19	3784	3717	12-30-59	3694 - 3714	5,6	3551 - 3556	3	20	1,955	3	4,067	10,212	3
				3726 - 3746	7	3652 - 3660	4						
						3694 - 3714	5,6						
20	6850	3697	5-28-60	3622 - 3632	9	Same		80	5,854	6	11,528	18,938	6
				3642 - 3650	10								
21	3680	3657	8-11-60	3594 - 3604	8	Same		374	2,326	9	7,911	20,441	9
				3616 - 3626	9								
22	3678	3635	9-28-60	3576 - 3586	8	3559 - 3564	7	25	6,767	3	20,000	8,433	3
				3600 - 3605	9	3576 - 3586	8						
						3600 - 3605	9						
23	3686	3673	9-21-60	3584 - 3594	8	Same		51	11,608	3	19,667	10,724	3
				3605 - 3612	9								
24	7005	3794	10-31-60	3704 - 3726	7	Same		303	1,321	16	4,908	21,909	16
				3742 - 3746	8								
25	3735	3726	9- 4-60	3664 - 3674	8	Same		309	1,950	7	9,590	18,555	7
				3689 - 3695	9								
26	3685	3676	9-10-60	3628 - 3638	8	Same		261	2,624	10	6,917	22,360	10
				3651 - 3658	9								
27	3730	3722	10- 6-60	3692 - 3702	7	Same		274	3,700	13	4,303	21,022	13
				3712 - 3722	8								
28	3750	3741	10-28-60	3696 - 3710	7	Same		943	771	14	5,957	21,435	14
				3723 - 3733	8								
29	3765	3755	1-22-61	3724 - 3754	6	Same		240	882	10	3,597	16,926	10
30	3790	3780	2- 2-61	3665 - 3675	8	Same		180	2,300	7	6,781	15,556	7
				3685 - 3695	9								
31	3740	3735	2- 9-61	3678 - 3688	8	Same		374	1,337	12	4,153	17,774	12
				3698 - 3708	9								
32	3863	3832	4-22-61	3738 - 3740	2	Same		28	1,143	5	2,800	6,667	5
				3746 - 3748	2								
				3758 - 3762	3								

Table I
Page 2

Well	Total Depth	Plugged Back Depth	Completion Date	Initial Completion[a] Interval	Initial Completion[a] Zone	Current Completion Interval	Current Completion Zone	Original Potential Test Barrels of Oil Per Day	Original Potential Test GOR Cubic Feet Per Barrel	April 1963 Production Rate Barrels of Oil Per Day	April 1963 Production Rate GOR Cubic Feet Per Barrel	Cumulative Oil Prod. to 5-1-63 Barrels	May 1963 Allowable B/D
33	3776	3770	3-14-61	3716 - 3732 3743 - 3752	7 8	Same		221	1,391	8	10,283	14,984	8
34	3690	3681	2-21-61	3621 - 3631 3641 - 3647	8 9	Same		250	1,750	9	7,700	15,115	7
35	3763	3755	3-23-61	3732 - 3742	7	Same		428	548	12	3,475	14,414	12
36	3732	3721	4-19-61	3621 - 3626 3632 - 3642 3651 - 3656	3 4 5	3621 - 3626 3632 - 3642 3651 - 3656 3672 - 3677 3682 - 3684 3714 - 3716	3 4 5 6 6 7	184	1,979	7	7,248	10,473	7
37	3707	3702	4-14-61	3626 - 3636 3649 - 3655	8 9	Same		244	393	13	6,246	15,215	13
38	3759	3748	4-25-61	3733 - 3733 3742 - 3743	6 6	Same		280	1,640	13	2,573	15,848	17
39	3752	3747	5- 1-61	3726 - 3731 3735 - 3741	6 6	Same		57	1,544	14	3,269	14,590	14
40	3786	3779	5-12-61	3710 - 3713 3728 - 3732	5 6	Same		192	1,833	8	5,596	10,665	8
41	3750	3739	5-21-61	3693 - 3699 3703 - 3709	3 4	Same		402	597	12	5,086	13,741	12
42	3770	3760	6- 7-61	3654 & 3660 3691 3709	6 7 3	Same		129	4,349	8	28,713	10,402	8
43	3721	3709	6-14-61	3684 - 3688	Grayburg	3630 - 3633	8	35[d]	16,114	8	463	4,701	9
44	3699	3691	5-27-61	3606 - 3616 3619 - 3622 3640 - 3644	7 7 8	Same		254	358	12	11,892	15,595	12
45	3765	3745	6-28-61	3723 3736	3 4	Same		61	789	10	2,340	9,976	10
											TOTAL	732,993	312

[a] All completions are perforated except Well 4, which is open hole.
[b] Well 4 - Total production was from the Grayburg and the Queen. Cumulative from the Queen was taken as one-half the total well cumulative.
[c] Well 6 - Total cumulative is from the Grayburg
[d] Well 43 - Original potential test is for current Queen interval.
NOTE: Total cumulative and May 1963 allowable totals are only for Queen production.

DAILY OIL PRODUCTION: BBLS.

0 100 200 300 400 500 600 700 800 900 1000

GAS-OIL RATIO: CU. FT. PER BBL.

0 10000 20000

1959 DEC. MAR. JUNE SEPT.
1960 DEC. MAR. JUNE SEPT.
1961 DEC. MAR. JUNE SEPT.
1962 DEC. MAR. JUNE SEPT.
1963 DEC. MAR. JUNE SEPT.
1964 DEC. MAR. JUNE SEPT.
1965 DEC. MAR. JUNE SEPT.
1966 DEC. MAR. JUNE SEPT.
1967 DEC.

GAS-OIL RATIO: CU. FT. PER BBL.

DAILY OIL PRODUCTION

CUMULATIVE PRODUCTION

PERCENT WATER

Humble Oil & Refining Company
New Mexico State "M" Lease
Waterflood

LEASE PERFORMANCE DATA

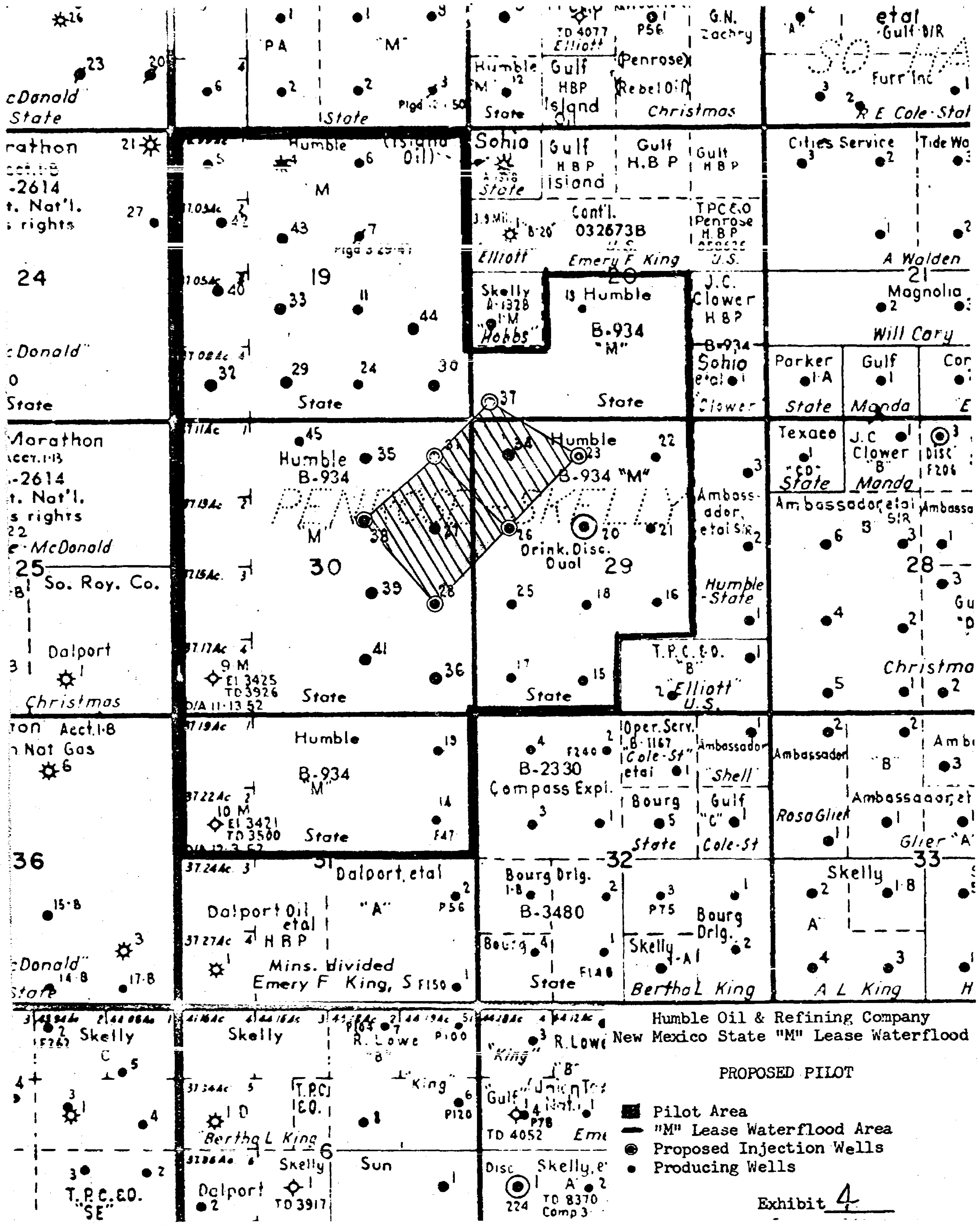
Exhibit 5

0 100 200 300 400 500 600 700 800 900 1000

CUMULATIVE OIL PRODUCTION: M BBLS.

0 10 20 30 40

PERCENT WATER



Humble Oil & Refining Company
New Mexico State "M" Lease Waterflood

PROPOSED PILOT

- Pilot Area
- "M" Lease Waterflood Area
- Proposed Injection Wells
- Producing Wells

Exhibit 4

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Humble Oil & Refining Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project on its State "M" lease in Sections 19, 20, 29, 30 and 31, Township 22 South, Range 37 East, Lea County, New Mexico, by the initial injection of water into the Queen formation of the Langlie Mattix and Eumont Pools through six wells located in Sections 20, 29 and 30.

Case No. 2879

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

August 7, 1963

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 7, 1963

EXAMINER HEARING

IN THE MATTER OF:

Application of Humble Oil & Refining Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project on its State "M" lease in Sections 19, 20, 29, 30 and 31, Township 22 South, Range 37 East, Lea County, New Mexico, by the initial injection of water into the Queen formation of the Langlie Mattix and Eumont Pools through six wells located in Sections 20, 29, and 30. Applicant further seeks the contraction of the Eumont Pool by the deletion therefrom of all of Section 19 and the S/2 SW/4 and NE/4 SW/4 of Section 20, Township 22 South, Range 37 East, and the extension of the Langlie-Mattix Pool to include said acreage.

Case 2879

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: The hearing will come to order, please. Case 2879.

MR. DURRETT: Application of Humble Oil & Refining Company for a waterflood project, Lea County, New Mexico.

MR. BRATTON: Howard Bratton on behalf of the Applicant. We have one witness.

(Witness sworn.)

LARRY E. GLASGOW

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q State your name, by whom you are employed and what capacity.

A I'm Larry E. Glasgow, Humble Oil & Refining Company, and an associate petroleum engineer in Hobbs, New Mexico.

Q Are you familiar with the matters under consideration in this application?

A Yes, sir.

Q State briefly your professional and educational background, Mr. Glasgow.

A I have a Bachelor of Science degree from the University of Oklahoma, I have attended Humble's Reservoir Engineering School, in the last fourteen months I have been employed in the reservoir section in the Hobbs District in Hobbs, New Mexico.

MR. BRATTON: Are the witness's qualifications acceptable?

MR. UTZ: Yes, sir, they are.

Q What is Humble seeking in this application?

A Humble is seeking permission to institute a pilot water-

flood and also contraction of part of the Eumont Pool and extension of the Langlie-Mattix in its place.

Q The reason for that is that the flood area, the Humble State "M" lease covers wells that are classified in both pools?

A Right.

Q But they will be operated in the one flood, is that correct?

A Yes, sir, that's correct.

(Whereupon, Applicant's Exhibit No. 1 was marked for identification.)

Q Refer then to your Exhibit No. 1, Mr. Glasgow. Does this show in yellow the area of the State "M" lease?

A Yes, sir.

Q And what are the various wells and what's the legend there?

A This is an area plat of approximately two mile radius of our injection wells. The different colored circles, the legend tells what particular pool they have produced from or are currently producing from. The outer ring is the current production or producing horizon. Inside the yellow tape is the New Mexico State "M" lease and the little triangles around those six wells in the middle are the proposed injection wells.

Q The one well circled, is that the water source well?

A Yes, sir, it is.

Q And this shows that some of the wells are, even in the pilot, are in the Langlie-Mattix and some are in the Eumont?

A Right.

Q This is the Queen formation, is that correct?

A Yes, sir.

Q Where is this area with relation to the pool as a whole?

A This area is approximately 25 miles southwest of Hobbs, or about five miles southwest of Eunice. It's the northernmost part of the Langlie-Mattix Pool and the southernmost part of the Eumont Pool, right on the edge.

Q Is there anything else you care to point out with reference to Exhibit No. 1?

A I don't believe so.

(Whereupon, Applicant's Exhibit No. 2 was marked for identification.)

Q Turn to your Exhibit No. 2 then. I believe that's a structure map of the area, is that correct?

A Yes, sir.

Q What does it show as to the area of the State "M" lease?

A It's a structure on top of the Queen formation and it shows the continuity from the Langlie-Mattix into the Eumont Pools in this particular area.

Q Now, does Ambassador have a pilot flood going in this same general area?

A Yes, sir, they do.

Q Where is that?

A It's easier to see, well, it's underneath my legend block on Appendix 1. It's a pilot in which Humble is cooperating by injecting water into one well.

Q So it's about two miles south and east of this area?

A Here it is, I was mistaken.

Q About a mile and a half to the east of it, and it will tie into this area eventually?

A Right, sir, in Section 27.

Q Does your structure map indicate the continuity of the formation throughout the entire proposed project area?

A Yes, sir. It also indicates that we're pretty much right on the edge of both pools.

Q Is there anything else you care to point out in connection with Exhibit 2?

A No, sir.

(Whereupon, Applicant's Exhibit No. 3 was marked for identification.)

Q Turn then to your Exhibit No. 3. What is your Exhibit No. 3?

A It's a core analysis and a log analysis comparison of the Queen formation of Well No. 43 on the New Mexico State "M" lease. It shows how the permeability has decreased from the main part of the Langlie-Mattix Pool, showing that we're right on the edge as far as the permeability, it shows the lenses that are prevalent in our lease and because of these lenses Humble proposes to install pilot initially to determine injection rates and injection profiles.

Q That's the reason you are proposing the six-well pilot?

A Right, to evaluate those.

Q To see how it operates in this edge area?

A Yes.

Q And this lenticular portion of the pool. Turn to your Exhibit No. 4. Is this a map of the pilot area showing the injection wells and the two enclosed producing wells?

A Yes, sir, it is.

(Whereupon, Applicant's Exhibit No. 4 was marked for identification.)

Q Once again, talking about the Ambassador flood to the east, is this designed so that you can tie in on the edge of this at a future date?

A Yes, sir. We specifically made allowance so we can make our pattern match up with Ambassador so we could fully

cooperate with them when they met us. Also I would like to point out there that that Well 37 is up in the Eumont Pool and the other five are in the Langlie-Mattix.

Q Of your injection well?

A Yes.

Q You would propose, depending on the reaction, to use the standard administrative procedures of Rule 701, is that correct?

A Right.

(Whereupon, Applicant's Exhibit No. 5 was marked for identification.)

Q Turn to your Exhibit No. 5, Mr. Glasgow. What is that, sir?

A This is a lease performance data and the green is our daily oil production. It shows the beginning in 1959 when it started developing the lease. It reached its maximum in '61 and has since fallen off and as Humble feels, is in the stripper stage of production, approximately 258 barrels of oil a day.

Q Is your current production down from approximately what, a thousand?

A Yes, sir, 900.

(Whereupon, Applicant's Exhibit No. 6 was marked for identification.)

Q Turn to your Exhibit No. 6 then, Mr. Glasgow. How many wells are on this lease?

A Thirty-five. We propose to recomplete one and drill another one, make thirty-seven in all.

Q Your average production per well per day on the lease is about seven barrels now, is that correct?

A That's right.

Q Continuing this decline curve on your total production from the lease, Mr. Glasgow, by the time you get this flood into operation your daily production will be considerably below seven, won't it?

A Yes, sir. We anticipate it will be considerably below.

Q Turn to your Exhibit No. 6. What is it?

A This is an exhibit of our lease individual well data. It gives the specific information about each individual well that's going to be on the New Mexico State "M" lease project, ard it gives original potential tests which are interesting to see what tremendous potentials they had of coming in up to 900 barrels a day, and then they've fallen off now. I have the May allowable over here on the right. This particular well, 949 barrels of oil original potential is now 14 barrels of oil per day.

Q The great bulk of this was developed from 59 through

61, is that correct?

A Yes, sir.

Q And, of course, the figures speak for themselves, but most of them came in potentialed at several hundred barrels per day and they're now down to two, three, seven, ten, thirteen barrels a day, is that right?

A Yes, sir.

Q And they have not flattened off anywhere along the line?

A No, sir, they sure haven't.

Q Is there anything else you care to point out in connection with that exhibit?

A No, sir.

(Whereupon, Applicant's Exhibit No. 7 was marked for identification.)

Q Turn to your Exhibit No. 7, Mr. Glasgow. Are these the six proposed injection wells and the casing program?

A Yes, sir, they are.

Q What do they reflect now?

A They show that our surface casing we circulated cement so we feel that cement is to the surface, and on the oil string we've calculated that it came up to 2600 feet, the top.

Q Are there any fresh waters in this area, and if so, what and where are they?

A Yes, sir, we feel that probably the Santa Rosa is a fresh water and the base of the Santa Rosa is about 1120.

Q What do you feel, your casing is safe that you are going to be able to protect all fresh water sources?

A Yes, sir.

(Whereupon, Applicant's Exhibit No. 8 was marked for identification.)

Q Exhibit No. 8 A through G are the logs of these various wells, is that correct?

A Yes, sir.

Q The water source well and the various injection wells?

A Yes, sir.

Q And I believe you've actually already turned those in in connection with the application, is that correct?

A Yes, sir.

Q And have furnished a copy to the engineer?

A Yes, sir.

(Whereupon, Applicant's Exhibit No. 9 was marked for identification.)

Q Turn to your Exhibit No. 9 now, Mr. Glasgow. Is that your water analysis of your source water that you are going to use for the flood, the pilot flood?

A Yes, sir, the water analysis of the source water and

also of the Queen which is the produced water, and also the compatibility of the two is mixed.

Q You have shown your source well on your Exhibit No. 1. As I understand, you are going to use how much water in your pilot flood?

A Approximately 2,000 barrels a day.

Q And that will be from this well and from the water as analyzed here, is that correct?

A Right.

Q Will it produce the 2,000 barrels a day?

A Yes, sir.

Q In layman's language, is this potable water?

A No, sir, it is not.

Q What is it?

A It's highly corrosive, contains a lot of hydrogen sulphite and is a highly salty water.

Q It would be fit for almost no other use, is that correct?

A Yes, sir.

Q What steps do you intend to take, Mr. Glasgow, in connection with the corrosive element of the water?

A Well, as far as above surface, Humble is going to considerable expense in getting different metals that will with-

stand the different corrosion properties of the water, and we'll propose some kind of inhibitor system in the source well itself.

Q In the source well itself?

A Right.

Q Are you satisfied that you will be able to inhibit any corrosive action of this salt water?

A Yes, sir, to the best of my knowledge.

Q Your proposal is to inject approximately 2,000 barrels a day into the six injection wells?

A Right.

Q As the flood reacts, you will seek administrative approval to expand, depending upon your results of your pilot?

A Yes, sir.

Q At that time will you have another source well for water?

A Yes, sir. We have to drill another San Andres source well to provide the water.

Q It will be the same water from the same formation?

A Yes, sir.

Q Have you made any calculations as to what you might hope out of this pilot flood by way of reaction, if it were to work successfully, Mr. Glasgow, by way of additional recovery?

A Well, we make calculations to hope what we would get

out of it, but the reason for the pilot is to see how good our calculations are.

Q If it were to work to the best possible reaction, could you recover an additional hundred per cent over primary recovery?

A Well, we figure it is probably about two-thirds of what the primary was.

(Whereupon, Applicant's Exhibit No. 10 was marked for identification.)

Q Go to your Exhibit No. 10, please. Does this reflect the pool boundaries of the Langlie-Mattix and the Eumont Pool?

A Yes, sir, it does.

Q Showing how it cuts right through this lease, and the proposed flood area? The fact that it is classified in the two pools, you feel it would be difficult administratively, it would be easier to go ahead and combine this area into the one pool for the purposes of administering this flood?

A Yes, we felt like it would be a convenience not only to Humble, but to the Commission, to have it all in one pool, and we have shown that it's a continuous structure there so the Wells 19 and 20, the No. 37, they are in the same formation.

Q Do you propose to operate this flood under the provisions of Rule 701 as a waterflood project?

A Yes.

Q Subject to all the provisions of that rule?

A Yes.

Q Is there anything further you care to state in connection with this application?

A No, sir, I don't believe there is.

Q In your opinion will the granting of the application result in conservation and the prevention of waste?

A Yes, sir.

Q Were Exhibits 1 through 10 prepared by you or under your supervision?

A Yes, sir.

MR. BRATTON: We would offer in evidence Applicant's Exhibits 1 through 10.

MR. UTZ: Without objection, Exhibits 1 through 10 will be entered into the record.

(Whereupon, Applicant's Exhibits 1 through 10 were offered and admitted in evidence.)

MR. BRATTON: We have nothing further at this time.

CROSS EXAMINATION

BY MR. UTZ:

Q Are all the wells in this unit completed in the Queen?

A Yes, sir, they sure are, except for No. 6 up there, which is an Arrowhead-Grayburg well, the No. 19, Section 19.

It's in Unit B in Section 19.

Q That is Arrowhead what?

A Arrowhead.

Q What formation?

A Grayburg.

Q All the wells that are now in the Eumont are now completed in the Queen zone?

A Yes, sir.

Q They are not completed in the Seven Rivers at all?

A No, sir, it's all Queen.

Q Are there any Eumont gas wells in the area that you request for Eumont?

A No, sir.

Q What is the depth of your San Andres water well?

A 4300 feet. That's about the mean perforation or top perforations at 4170 and the bottom perforations at 4556.

Q And you tested that well?

A Yes, sir.

Q You know that it will furnish you enough whater?

A Right.

Q Most of these wells were drilled in '59 and '60 and '61, were they not?

A Yes, sir.

Q How do you account for the rapid depletion?

A Well, there could be several reasons in that maybe it's just the tight permeability, we just didn't provide for the successful flow of oil to the well bore, or it could have been just pressure depleted when we drilled.

Q Were your pressures pretty well down when you completed these wells initially?

A We don't have any pressure data at all on the wells.

Q You didn't take bottom hole pressures or shut-in pressures when you completed them?

A No, sir.

Q Do you have the foot locations of the six injection wells that you are requesting?

A Yes, sir. You mean the footages in the section?

Q The footages from the section lines.

A I don't have them with me. It would be on the logs.

Q Could you vouch for the accuracy of the foot locations on the logs?

A Yes, sir. They would be reasonably accurate. I could give you more exact location later.

MR. BRATTON: We'll verify that information of the logs and write you a confirmation letter if we could.

MR. UTZ: I wish you would.

Q I note the first log I pulled out you changed the foot location on it.

MR. BRATTON: We had better confirm those.

Q I'm going to expose my ignorance, but I would like to know what turbidity is on No. 9.

A Suspended solids in a water sample. Like on that third page of the appendage you have compatibility test where you mix various percentages of the water together, and that's a precipitant in that particular test.

MR. BRATTON: What do you conclude as a result of that?

A We conclude that mixing the Queen and the San Andres, we estimate it won't deplete the flooding of the reservoir because of the precipitation.

MR. UTZ: Any other questions?

MR. IRBY: Yes, sir. Frank Irby, State Engineer's Office.

BY MR. IRBY:

Q Mr. Glasgow, on page 2 of your application near the bottom it says "there is also filed herewith and made a part hereof Exhibit H, giving a description of the proposed injection well's casing program." Is that what you have now marked Exhibit 9?

MR. BRATTON: It's 7, I believe.

Q Exhibit 7, yes.

A The earlier program that we presented was the casing program of all the wells we had anticipated as injection wells. Since that might be subject to change after the pilot, we subsequently submitted just these six wells here. These six wells are included in that other list.

Q Everybody else exposing their ignorance, I'll expose mine. How did you manage to get the top of your cement to exactly 2600 feet in every case?

A Well, it's kind of theoretical, but in each case we drilled the same size hole so we found out what volume we had and we cemented with the same number of sacks of cement and arrived, well, by calculation it would be the same.

Q On your Exhibit No. 5, your daily oil production is indicated by green?

A Right.

Q And your percentage of water by blue?

A Right.

Q Is this water included in this daily oil production or is this oil production exclusive with water?

A Oil exclusive.

Q Then what is the water a per cent of?

A Per cent of the total liquid produced.

Q Does this exhibit show the total liquid produced?

A No, sir.

Q Isn't that percentage a little bit meaningless?

A Well, it would be other than say if you took what our production was for July and figured what percentage water we had. What we looked at mostly was to see if we had enough produced water to fulfill the requirements for the pilot rather than to have additional source water.

Q I still don't understand, is the oil, daily oil produced a certain per cent of the total fluids which includes water, oil and nothing else?

A Well, say take number 1962, for example, the average water production during that year was approximately, was it 28%?

MR. UTZ: Yes, sir.

A 28% of all the fluid we got out of the ground was water.

Q How can you convert this per cent to volume?

MR. UTZ: Because the volume of oil produced, Mr. Irby, would be 100% less 28%, so the volume of oil produced that month would be 72%. I believe that's correct, isn't it, as I understand it?

A I guess it is. I never had looked at it this way before.

MR. UTZ: I believe your statement was that the 28% water was 28% of total fluid?

A Right. That's right, then, the way you said.

MR. UTZ: That the oil was exclusive of the total fluids?

A That's right.

MR. UTZ: So the oil would represent 72% of your total fluids?

A Yes, sir, for '62.

Q (By Mr. Irby) Did you get into the record what your injection pressure is going to be?

A No, sir, we surely didn't. We have prior pressures from Ambassador's pilot to the south and east, but it would be just a guess at what our pressures would be because of the differences in permeability in our lease and what Ambassador says theirs is.

Q Then you have no idea what they might be?

A No, sir, but we're anticipating probably the maximum about 1700 pounds, the top of the ground.

Q Is injection going to be through tubing?

A I believe it is, yes, sir.

Q Do you know?

A I don't recall what it is.

MR. BRATTON: We will furnish that to you.

MR. IRBY: I submit to the Commission through the Examiner that the casing program is not sufficient to protect the fresh waters in the Santa Rosa unless injection is made through

tubing and under a packer.

MR. UTZ: Let's see, you are referring to Exhibit No. 7, Mr. Irby?

MR. IRBY: Yes, sir.

MR. UTZ: As I understand Exhibit No. 7, 7 inch which is set anywhere from 3-3/8 surface casing is circulated?

MR. IRBY: Yes, sir.

MR. UTZ: The oil string is 2-7/8 tubing and that is cemented below the 7 inch surface, is that correct, Mr. Glasgow?

A To go through it like you said, surface casing is set like the 300 feet and it's circulated, would be totally encased in cement and oil string, this is how much higher it is, the top of the cement in the hole.

MR. UTZ: So that you have open hole behind the two 7 inch between the bottom of the surface casing and the 2600 feet?

A Yes, sir.

MR. UTZ: And in that interval is the Santa Rosa --

A Yes, sir.

MR. UTZ: -- water-bearing formation?

MR. BRATTON: We'll submit that information to you, Mr. Irby, I'm sure we can work that out. I would imagine that is in the scheduled program, I just don't know. If it isn't we'll certainly explain it, what we think about it. If it is, I assume

that will be satisfactory to you.

MR. IRBY: The thing that disturbs me is that your oil string is 2-7/8ths and it looks to me like it would be pretty hard to run something inside there where you'd have any protection through the Santa Rosa other than just this tubing or casing wall.

A If we ran the thin wall tubing down this well like we have in our pumping wells, now assuming that we got a hole in it, we would realize that we had the hole if we had the packer down at the bottom. Then you would have to get two holes simultaneously to affect anything outside the casing in that case.

Q (By Mr. Irby) That's true if you run another string of tubing inside there?

A Right.

MR. BRATTON: I think that's what you wanted.

MR. IRBY: That's what I want, the thing that is disturbing me is that you don't know whether it's part of your plan or not.

A Yes, sir.

BY MR. UTZ:

Q What size hole are you drilling below the surface casing?

A I believe it's about a six-inch hole.

Q Then you would have adequate space for cement then?

A Yes, sir.

MR. IRBY: May I ask another question?

MR. UTZ: Yes, sir.

BY MR. IRBY:

Q These wells are already drilled, aren't they?

A Right.

MR. UTZ: And cemented?

A Yes, sir.

MR. IRBY: That's all I have.

MR. UTZ: You can perforate inside 2-7/8ths, can't you?

A Let me go back. I have been searching through my memory and in cost calculations of our particular waterflood here we did take into account putting tubing into the wells, and we were going to cement line them or plastic line them, one of the two. It's a thin wall tubing with some type of epoxy or cement lining with a packer. I'm sorry I didn't remember.

MR. BRATTON: We'll furnish you a full letter on it and furnish Mr. Utz, with a copy to you, Mr. Irby.

MR. IRBY: May I ask one more question?

MR. UTZ: Yes.

Q (By Mr. Irby) Will these wells be so equipped that if a leak occurs in this tubing that it will show in the annulus between the tubing and the 2-7/8ths at the surface?

A Yes, sir, I'm sure that allowance will be made for that.

Q A pressure gauge or something of that sort?

A Yes, sir.

MR. IRBY: Then I would state to the Examiner that if the wells are equipped with plastic-lined tubing injected under a packer, the State Engineer would offer no objection to the granting of the application.

MR. UTZ: If the annulus is filled with inert fluid with a pressure gauge on the surface?

MR. IRBY: Yes, sir.

A I'll reiterate again, I'm sorry I forgot.

MR. BRATTON: Mr. Irby, the plastic lining isn't essentially --

A Some type of lining.

MR. BRATTON: Some type of lining.

MR. IRBY: Yes.

Q (By Mr. Utz) How much water did you say that you were going to inject down these wells?

A Well, it's 2,000 barrels total.

Q Divided by six would be something like 330 barrels a day?

A Yes, sir.

Q What size tubing can you put inside of 2-7/8ths?

A I'm really not sure about the production part of it. It's a thin-walled tubing, they call it, but I really don't know the dimension.

Q It would seem to me it might be a tight squeeze with the size of tubing you can get in 2-7/8ths total 330 barrels of water down it a day?

A Yes, sir. That's the purpose of the pilot is to find out what the injection rates are, not only into the formation, but down the tubing also.

MR. UTZ: Are there other questions of the witness?

MR. DURRETT: Yes, sir, I have a question.

BY MR. DURRETT:

Q Did you state where the proposed water well would be drilled, or is it drilled now?

A It's already drilled. It's M-20 which is approximately in the center of Section 29 there. It's indicated as a Drinkard discovery dual. What we've done is plug back the Drinkard side to the San Andres.

Q When you complete your pilot, if you find that it's feasible to go ahead with the flood, where do you propose to drill the next water well?

A It will be in the approximate vicinity of our water injection plan.

Q Where is that?

A It probably will be in the center of the pilot.

MR. DURRETT: Thank you.

MR. UTZ: Any other questions? The witness may be excused.

(Witness excused.)

MR. UTZ: Any statements in this case? It's my understanding that you will confirm the fact in writing as to the plan for the completing inside the 2-7/8ths inch?

MR. GLASGOW: Yes.

MR. BRATTON: We'll send you that and the exact footage on those injection wells.

MR. UTZ: The case will be taken under advisement.

STATE OF NEW MEXICO)
) SS
COUNTY OF BERNALILLO)

I, aDA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 22nd day of August, 1963.

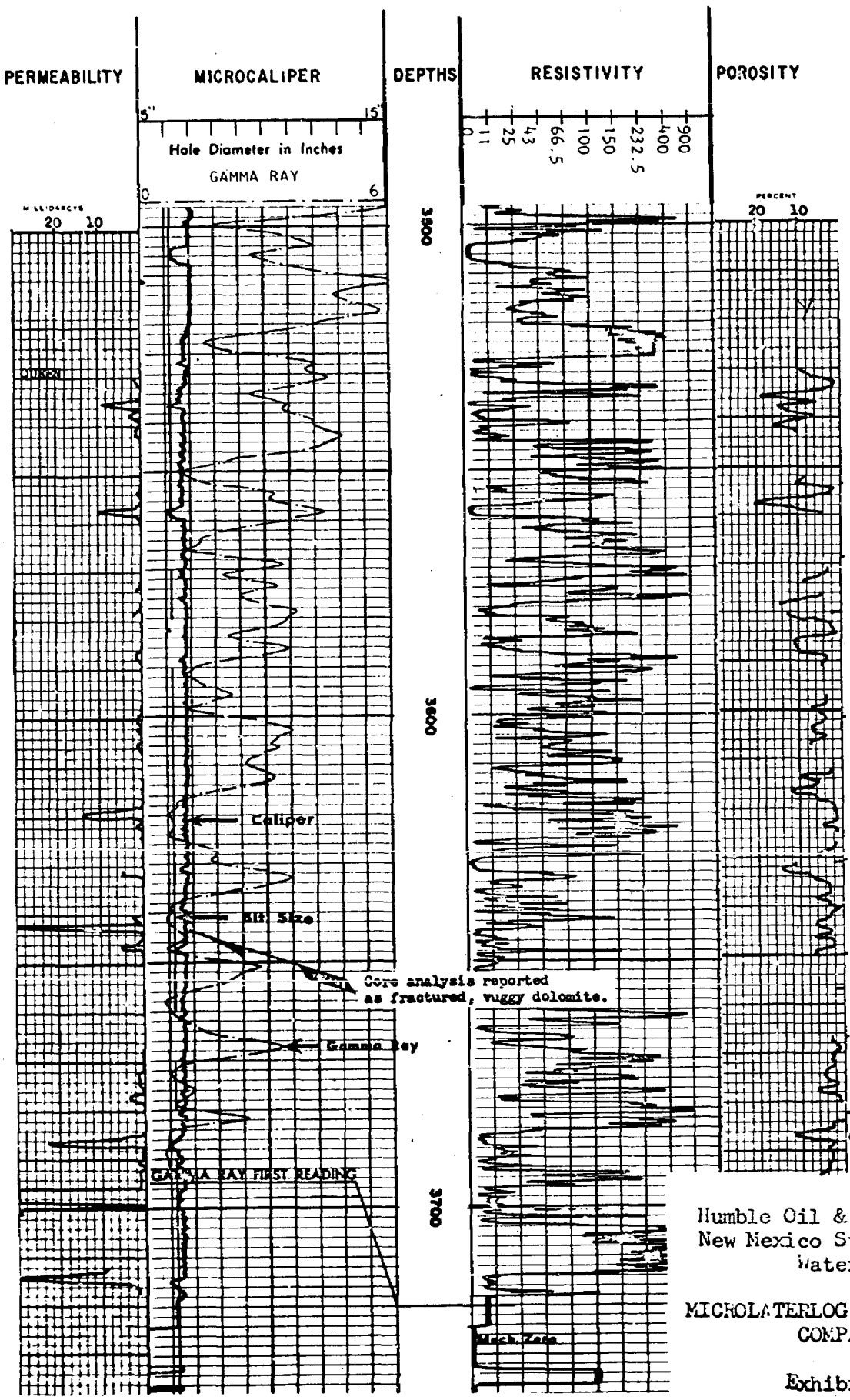
Ada Dearnley
Notary Public-Court Reporter

My commission expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2879, heard by me on Aug 7, 1963.

Examiner
New Mexico Oil Conservation Commission

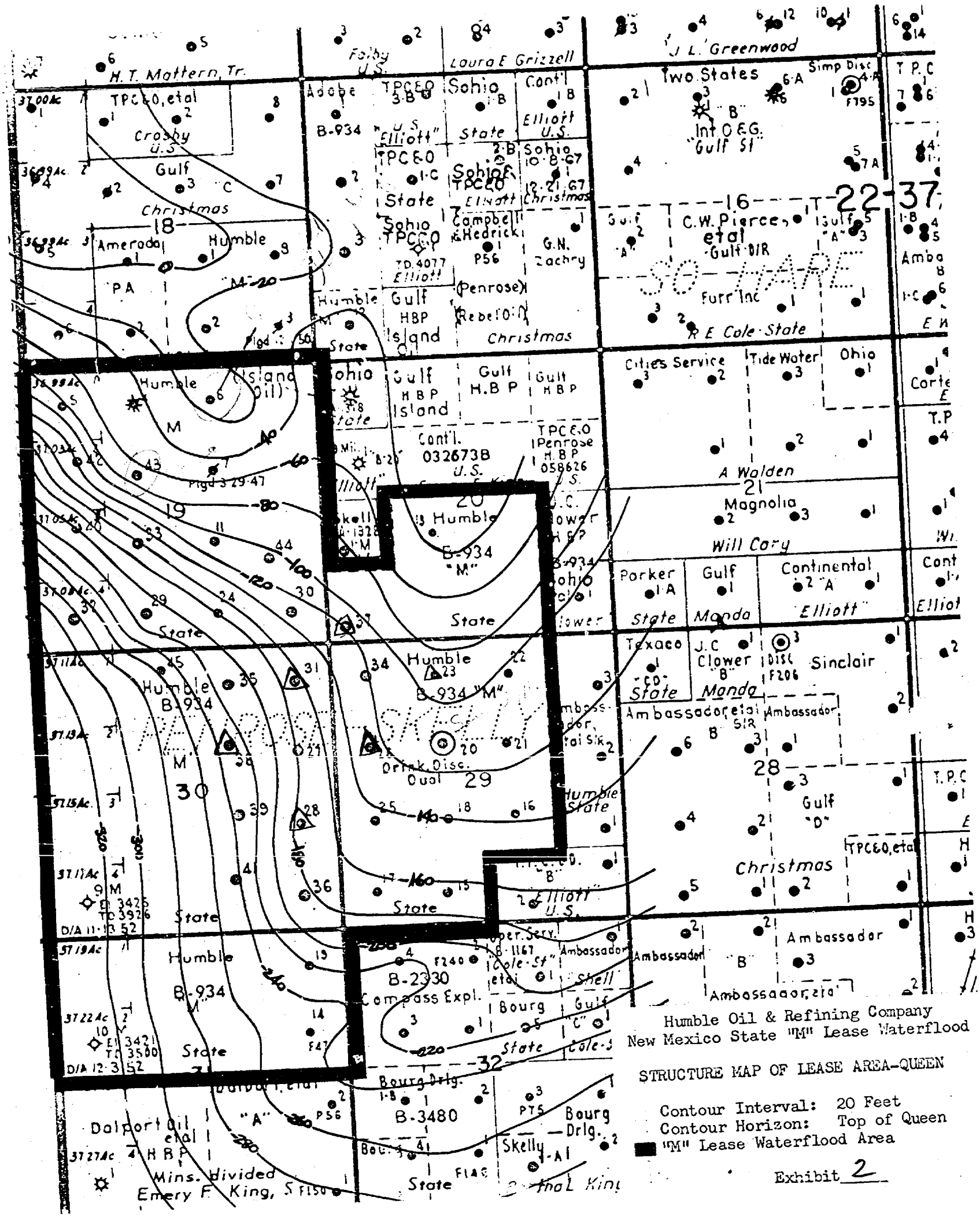


BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 3
CASE NO.

Humble Oil & Refining Co.
New Mexico State "M" Lease
Waterflood

MICROLATERLOG - CORE ANALYSIS
COMPARISON

Exhibit 3



Humble Oil & Refining Company
New Mexico State "M" Lease Waterflood

STRUCTURE MAP OF LEASE AREA-QUEEN

Contour Interval: 20 Feet
Contour Horizon: Top of Queen
"M" Lease Waterflood Area

Exhibit 2

GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY – DIRECTOR

P. O. BOX 871
SANTA FE

Mr. Howard Bratton
Hervey, Dow & Hinkle
P. O. Box 10
Roswell, New Mexico

August 23, 1963

Gentlemen:

Enclosed herewith is Commission Order No. R- 2556, entered in Case No. 2879, approving the Humble Oil & Refining Company's Langlie-Mattix Water Flood Project.

According to our calculations, 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 966 barrels per day.

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.

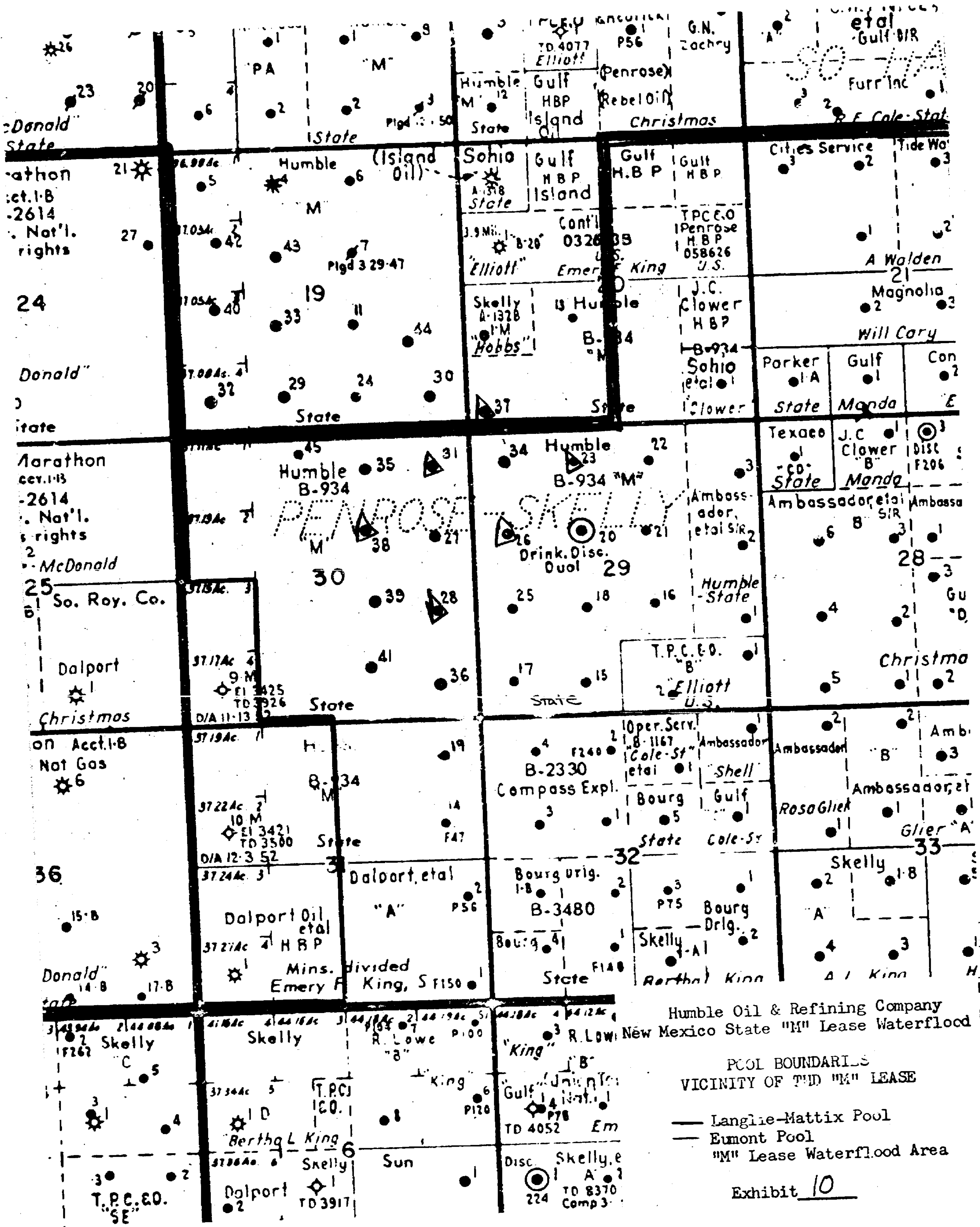
In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project 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

cc: Mr. Howard Bratton



Humble Oil & Refining Company
New Mexico State "M" Lease Waterflood

POOL BOUNDARIES
VICINITY OF THE "M" LEASE

— Langlie-Mattix Pool
— Eumont Pool
"M" Lease Waterflood Area

Exhibit 10

Humble Oil & Refining Company
New Mexico State "M" Lease Waterflood

POOL BOUNDARIES
VICINITY OF THD "M" LEASE

— Langlie-Mattix Pool
— Eumont Pool
"M" Lease Waterflood Area

Exhibit 10

SL-27-A (11-61)

Source water for proposed "M" lease waterflood

HUMBLE OIL & REFINING COMPANY
SOUTHWEST REGION
SERVICE LABORATORY
WATER ANALYSIS

Laboratory No. 45930-A

Houston, Texas
November 29, 1962

COUNTY Lea, New Mexico
FIELD Langlie-Mattix
WELL New Mexico State M-20
DEPTH 4,170-4,260, 4,534-4,544, 4,551-4,556
FORMATION San Andres
OWNER Humble Oil & Refining Co.

DATE SAMPLED November 12, 1962
DATE RECEIVED November 15, 1962
SUBMITTED BY A. L. Carpenter
WORKED BY Ann B. Pearson
SOURCE Reda pump after 20,000 bbls. continuous production

Analysis

Radicals	*Parts Per Million*
Sodium	1,800
Calcium	766
Magnesium	290
Chloride	3,030
Sulfate	2,110
Bicarbonate	740
Carbonate	None
TOTAL	8,736
Hydrogen Sulfide	372
Iron, Total	4
Calcium Carbonate Stability	
Turbidity	10

Comparison Data

	Percent
Primary Salinity	55.36
Secondary Salinity	36.06
Primary Alkalinity	None
Secondary Alkalinity	8.58
Chloride Salinity	66.00
Sulfate Salinity	34.00

Ratios

Chloride: Bicarbonate	7.0
Bicarbonate: Sulfate	0.3
Calcium: Magnesium	1.6
Sodium: Calcium & Magnesium	1.2
Specific Gravity at 79 °F.	1.006
Resistivity, ohm meters at 79 °F.	0.83
pH	6.5

Case 2879
EXHIBIT "H"

D14827 (8-60)

DRAFT

DSN/esr
August 20, 1963

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. 2879

Order No. R- 2556

APPLICATION OF HUMBLE OIL & REFINING
COMPANY FOR A WATERFLOOD PROJECT, LEA
COUNTY, NEW MEXICO.

8/20/63

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on August 7, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this _____ day of August, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, 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, Humble Oil & Refining Company, is the owner and operator of the State "M" Lease comprising all of Section 19, the SW/4 SW/4, E/2 SW/4, and W/2 SE/4 of Section 20, the W/2, W/2 NE/4, and NW/4 SE/4 of Section 29, all of Section 30, and the N/2 of Section 31, all in Township 22 South, Range 37 East, NMPM, Lea County, New Mexico.

(3) That the applicant, Humble Oil & Refining Company, seeks permission to institute a waterflood project in the Langlie-Mattix and Eumont Pools by the injection of water into the Queen formation through six wells on said State "M" Lease.

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

(5) That the proposed waterflood project is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, thereby preventing waste.

(6) That the proposed waterflood project should be approved and the project should be governed by the provisions of Rule 701 of the Commission Rules and Regulations.

(7) That all water injection should be through 1.9-inch OD internally plastic-coated tubing with a permanent type packer set at approximately 3400 feet in the 2 7/8-inch casing. The annulus between the casing and the tubing of each injection well should be filled with an inhibited liquid, and a pressure gauge should be installed on the tubing-casing annulus to indicate the presence of any packer or tubing leaks.

(8) That the applicant further proposes that the Eumont Pool be contracted by the deletion therefrom of all of Section 19 and the SW/4 SW/4 and E/2 SW/4 ~~S/2 SW/4 and NE/4 SW/4~~ of Section 20, Township 22 South, Range 37 East, and that the Langlie-Mattix Pool be extended to include said acreage.

(9) That the proposed extension and contraction of said pools will be in the interest of better administration of the State "M" Lease and the proposed waterflood project inasmuch as all of said project would be within one pool.

IT IS THEREFORE ORDERED:

(1) That the applicant, Humble Oil & Refining Company, is hereby authorized to institute a waterflood project by the injection of water into the Queen formation through the following-described six wells in Township 22 South, Range 37 East, NMPM, Lea County, New Mexico:

State "M" Well No. 37, 330 feet from the South line and 330 feet from the West line of Section 20;

State "M" Well No. 23, 660 feet from the North line and 1980 feet from the West line of Section 29;

State "M" Well No. 26, 1980 feet from the North line and 660 feet from the West line of Section 29;

State "M" Well No. 28, 1980 feet from the South line and 660 feet from the East line of Section 30;

State "M" Well No. 31, 660 feet from the North line and 660 feet from the East line of Section 30;

State "M" Well No. 38, 1800 feet from the North line and 1980 feet from the East line of Section 30.

(2) That all injection shall be through 1.9-inch OD internally plastic-coated tubing with a permanent type packer set at approximately 3400 feet in the 2 7/8-inch casing. The annulus between the casing and the tubing of each injection well shall be filled with an inhibited liquid, and a pressure gauge shall be installed on the casing-tubing annulus.

(3) That the subject waterflood project shall be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(4) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1119 of the Commission Rules and Regulations.

(5) That the Eumont Gas Pool is hereby contracted by the deletion therefrom of all of Section 19 and the ~~S/2 SW/4 and NE/4 SW/4~~ SW/4 and E/2 SW/4 of Section 20, Township 22 South, Range 37 East. The Langlie-Mattix Pool is hereby extended to include all of said acreage.

(6) 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.