

CASE 2982: Application of GULF OIL
CORP. for a waterflood project,
Lea County, New Mexico.

CASE No.

2982

Application,
TRANSCRIPTS,
SMALL Exhibits
ETC.

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. 2982
Order No. R-2659

APPLICATION OF GULF OIL CORPORATION
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 February 5, 1964, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 4th day of March, 1964, 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, Gulf Oil Corporation, seeks authority to institute a waterflood project in its Northwest Eumont Area in the Eumont Pool by the injection of water into the Queen formation through 15 wells in Sections 11, 14, 15, 22, and 23, Township 19 South, Range 36 East, NMPM, Lea 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 is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, thereby preventing waste.

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

IT IS THEREFORE ORDERED:

(1) That the applicant, Gulf Oil Corporation, is hereby authorized to institute a waterflood project in its Northwest

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CASE No. 2992

Order No. R-2659

Eumont Unit Area, Eumont Pool, by the injection of water into the Queen formation through the following-described wells in Township 19 South, Range 36 East, NMPM, Lea County, New Mexico:

SECTION 11

Gulf Lea State D-A Well No. 7, Unit I
Gulf Lea State D-A Well No. 8, Unit O

SECTION 14

Gulf Lea State D-A Well No. 5, Unit A
Gulf Lea State D-A Well No. 9, Unit C
Gulf Lea State D-A Well No. 10, Unit E
Gulf Lea State D-A Well No. 2, Unit G
Phillips Bern State Well No. 2, Unit K
Phillips Bern State Well No. 6, Unit M

SECTION 15

Amerada State WMD Well No. 2, Unit I

SECTION 22

Texaco State "C" (NCT-5) Well No. 2, Unit A
Texaco State "C" (NCT-5) Well No. 4, Unit G
Texaco State "C" (NCT-5) Well No. 6, Unit K
Amerada WMC Well No. 1, Unit I
Shell State "R" Well No. 2, Unit O

SECTION 23

Southern Petroleum Exploration State Well
No. 1, Unit E

(2) 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.

(3) 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.

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

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CASE No. 2982

Order No. R-2659

DONE at Santa Fe, New Mexico, on the day and year herein-
above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell

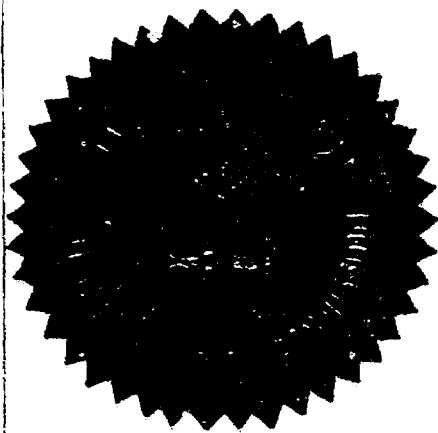
JACK M. CAMPBELL, Chairman

E. S. Walker

E. S. WALKER, Member

A. L. Porter, Jr.

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



est/

DSN/esr
Feb. 28, 1964

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

Order No. R- 2657
2659



BY THE COMMISSION:

NOW, on this _____ day of March, 1964, the Commission,
a quorum being present, having considered the ~~application, the~~ testimony,
the record, ~~and the recommendations of the Examiner,~~
_____, and being fully advised in the premises,

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

(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 is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, thereby preventing waste.

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

IT IS THEREFORE ORDERED:

(1) That the applicant, Gulf Oil Corporation, is hereby authorized to institute a waterflood project ~~on~~ⁱⁿ its Northwest Eumont Unit Area, Eumont Pool, by the injection of water into the Queen formation through the following-described wells in Township 19 South, Range 36 East, NMPM, Lea County, New Mexico:

SECTION 11

Gulf Lea State D-A Well No. 7, Unit I
Gulf Lea State D-A Well No. 8, Unit O

SECTION 14

Gulf Lea State D-A Well No. 5, Unit A
Gulf Lea State D-A Well No. 9, Unit C
Gulf Lea State D-A Well No. 10, Unit E
Gulf Lea State D-A Well No. 2, Unit G
Phillips Bern State Well No. 2, Unit K
Phillips Bern State Well No. 6, Unit M

SECTION 15

Amerada State WMD Well No. 2, Unit I

SECTION 22

Texaco State "C" (NCT-5) Well No. 2, Unit A
Texaco State "C" (NCT-5) Well No. 4, Unit G
Texaco State "C" (NCT-5) Well No. 6, Unit K
Amerada WMC Well No. 1, Unit I
Shell State "R" Well No. 2, Unit O

SECTION 23

Southern Petroleum Exploration State Well
No. 1, Unit E

(2) 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.

(3) 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.

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CASE No. 2982

(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 herein-above designated.

GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER



P. O. BOX 871
SANTA FE

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

Mr. Bill Kastler
Mr. M. I. Taylor
Gulf Oil Corporation
Post Office Box 1938
Roswell, New Mexico

_____, 19____

Gentlemen:

Enclosed herewith is Commission Order No. R- 2657, entered in Case No. 2982, approving the Northwest 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 1596 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 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,

cc: Mr. Frank Irby

A. L. PORTER, Jr.
Secretary-Director

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North, Range 13 West, and authorizing the drilling of a well for said unit at an unorthodox location 1625 feet from the South line and 1250 feet from the West line of said Section 15, Town of Farmington, San Juan County, New Mexico.

CASE 2981: Application of Gulf Oil Corporation for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Northwest Eumont Unit Area comprising 2,760 acres, more or less, of State and fee lands in Township 19 South, Range 36 East, Lea County, New Mexico.

CASE 2982: Application of Gulf Oil Corporation for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Eumont Gas Pool by the injection of water into the Queen Formation through 15 wells in Sections 11, 14, 15, 22 and 23, Township 19 South, Range 36 East, Lea County, New Mexico.

CASE 2983: Application of The Pure Oil Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Brinninstool Unit Area comprising 17,237 acres, more or less, of Federal and State lands in Townships 23 and 24 South, Ranges 32 and 33 East, Lea County, New Mexico.

CASE 2984: Application of The Pure Oil Company and Continental Carbon Company to utilize natural gas in a carbon black plant, Lea County, New Mexico. Applicants, in the above-styled cause, seek authority to utilize approximately 7 MCF of Devonian gas per day in the Continental Carbon Company carbon black plant near Eunice, New Mexico, said gas to be produced from The Pure Oil Company Wilson Deep Unit Well No. 1, located in the SE/4 NW/4 of Section 13, Township 21 South, Range 34 East, Lea County, New Mexico.

CASE 2985: Application of Shell Oil Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Bootleg Ridge Unit Area comprising 10,818 acres, more or less, of State and Federal lands in Townships 22 and 23 South, Ranges 32 and 33 East, Lea County, New Mexico.

DOCKET NO. 4-64

DOCKET: EXAMINER WEARING - WEDNESDAY - FEBRUARY 5, 1964

9:00 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 Elvis A. Utz, Alternate Examiner:

- CASE 2976: Application of Midland Production Corporation for directional drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to directionally drill its Hill & Meeker Phillips Cryer Well No. 34-2 located 2310 feet from the South and West lines of Section 34, Township 10 South, Range 36 East, to bottom in the Devonian formation 1980 feet from the North and West lines of said Section 34, Lea County, New Mexico.
- CASE 2977: Application of Cities Service Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its Brunson C Well No. 4, located in Unit J of Section 3, Township 22 South, Range 37 East, Lea County, New Mexico, to produce oil from the Blinebry and Drinkard Oil Pools through parallel strings of 1 1/2 inch and 2 1/16 inch tubing, respectively.
- CASE 2978: Application of Union Oil Company of California for a waterflood expansion, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand its South Caprock Queen Unit Waterflood Project, Caprock Queen Pool, Chaves County, New Mexico, by the conversion of nine additional wells located in Sections 28, 29, and 33, Township 14 South, Range 31 East, and Sections 3 and 4, Township 15 South, Range 31 East, to water injection.
- CASE 2979: Application of Pan American Petroleum Corporation 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 through its U. S. A. Malco Refineries 'G' Well No. 13, located 2302 feet from the South line and 1650 feet from the West line of Section 10, Township 18 South, Range 27 East, Empire Abo Pool, Eddy County, New Mexico.
- CASE 2980: Application of Pioneer Production Corporation for force-pooling and an unorthodox location, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order force-pooling all mineral interests in the Basin-Dakota Pool underlying the W/2 of Section 15, Township 29

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CASE 2986: Application of Shell Oil Company to establish a GOR limit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the establishment of a special gas-oil ratio limitation of 5,000 cubic feet of gas for each barrel of oil produced in the Mesa-Queen Pool, Lea County, New Mexico.

CASE 2987: Application of Shell Oil Company for a waterflood project, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pilot waterflood project in the South Bitter Lake-San Andres Pool, by the injection of water into the San Andres formation through three wells at unorthodox locations in Sections 27 and 34, Township 10 South, Range 25 East, Chaves County, New Mexico.

CASE 2480 (Reopened):

In the matter of Case No. 2480 being reopened pursuant to the provisions of Order No. R-2182-A which continued for a period of one year the temporary 80-acre proration units established by Order No. R-2182, Henshaw-Wolfcamp Pool, Eddy County, New Mexico. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

CASE 2988: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit George E. Willett and all other interested parties to appear and show cause why the SDD Hare Well No. 7, located 600 feet from the South line and 1360 feet from the East line of Section 14, Township 29 North, Range 11 West, San Juan County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.

Gulf Oil Corporation

ROSWELL PRODUCTION DISTRICT

W. B. Hopkins
DISTRICT MANAGER
M. I. Taylor
DISTRICT PRODUCTION
MANAGER
F. O. Mortlock
DISTRICT EXPLORATION
MANAGER
H. A. Rankin
DISTRICT SERVICES MANAGER

P.O. Drawer 1938
Roswell, New Mexico

January 9, 1964

Secretary Director
New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Re: Application of Gulf Oil Corporation for the
Approval of the Northwest Eumont Unit Agree-
ment providing for secondary recovery opera-
tions in a portion of the Eumont Gas Pool,
Lea County, New Mexico.

Dear Sir:

Gulf Oil Corporation as the proposed Unit Operator respect-
fully herein requests the Commission's approval of the Northwest
Eumont Unit Agreement, on the grounds that the proposed unit plan
will in principle tend to promote the conservation of oil and gas
and the prevention of waste. In support of its application, Gulf
states as follows:

1. That the Unit Area shall be

T. 19 S., R. 36 E.,

Sec. 11: E/2 SE/4 and SW/4 SE/4
Sec. 12: SW/4 NW/4
Sec. 14: NE/4, NW/4 SE/4, SW/4, E/2 NW/4
and SW/4 NW/4
Sec. 15: E/2 SE/4
Sec. 22: E/2 and E/2 SW/4
Sec. 23: W/2 SW/4, NE/4 SW/4 and NW/4
Sec. 26: W/2 NW/4
Sec. 27: E/2, SW/4 and E/2 NW/4
Sec. 33: E/2 NE/4, E/2 SE/4 and NW/4 SE/4
Sec. 34: W/2 NE/4, NE/4 NE/4, W/2 SE/4
and W/2

containing 2,760 acres, more or less, more fully
shown on the enclosed plat marked "Enclosure A".

2. That the project area described above includes all producing
Eumont oil wells North of Township 20 South, and West of Range 37 East,
except four oil wells situated on tracts in Section 1, Township 19
South, Range 36 East, which are not contiguous to the above-described
Unit Area.



DOCKET MAILED

Date

1-24-64

Secretary Director
New Mexico Oil Conservation Commission
Santa Fe, New Mexico
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3. That the average daily production for the wells in the proposed Unit Area has declined to approximately 6 barrels per day and that said wells have reached an advanced stage of depletion as is described in Rule 701 (E) (1).

4. That applicant proposes to initially convert 15 wells to water injection wells, all of which together with each well's casing program are shown on the enclosed plat marked "Enclosure B". Copies of the logs of the proposed injection wells are also enclosed marked "Enclosure C".

5. That applicant plans to explore for and develop brackish water from either the San Andres Formation or the Santa Rosa Formation in sufficient quantities to inject approximately 500 barrels per day into each injection well.

6. Prior to any expansion of the Unit, Applicant will request that the expansion be authorized by administrative approval. Unit Operator will agree to file with the Commission an executed original or an executed counterpart of the Northwest Eumont Unit Agreement within 30 days after the effective date thereof.

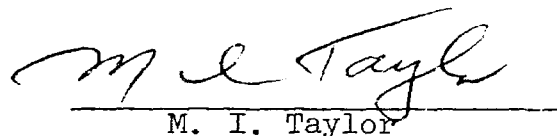
7. That the order of the Commission should become effective upon the final approval of said Unit Agreement by the Commissioner of Public Lands of the State of New Mexico and shall terminate ipso facto upon the termination of said Unit Agreement.

Gulf Oil Corporation has previously obtained a preliminary approval of the Unit Agreement from the Commissioner of Public Lands.

It is requested that this matter be set for hearing before an examiner.

Respectfully submitted,

GULF OIL CORPORATION


M. I. Taylor

WVK:ejl

Enclosures

DATA FOR
PROPOSED NORTHWEST EUMONT UNIT
OIL CONSERVATION COMMISSION HEARING
CASE NUMBER 2982

Operator Gulf Oil Corporation Date February 5, 1964

Project Northwest Eumont Unit Waterflood

Pool Eumont County Lea

Reservoir Queen

Other Operators Injecting into this Reservoir None

I. RESERVOIR CHARACTERISTICS

A. Information on Reservoir

1. Name of Reservoir Queen (See Exhibit No. 1)
2. Composition Fine-grained argillaceous gray sand interbedded with gray finely crystalline dolomite.
3. Structure Monocline located on the west flank of the large Monument uplift. Dip is a westerly and northwesterly direction at a rate of approximately 350 to 400 feet per mile as shown on Exhibit No. 2.

B. Information on Proposed Project Area

1. Number of Productive Acres in Project Area to be Flooded Unitized area is 2,760 acres as shown on Exhibit No. 1.
2. Average Depth to Top of Pay 4,000 feet (See Exhibit No. 3).
3. Estimated Average Gross Thickness 55 feet.
4. Estimated Average Effective Thickness 12 feet.
5. Estimated Average Effective Porosity 14.18%
6. Average Horizontal Permeability 2.61 mds. Range 0.10 to 62.0 mds.

II. PRIMARY PRODUCTION HISTORY AND PRESENT STATUS OF PROJECT AREA

- A. Date First Well Completed August 29, 1937.
- B. Oil and Water Production History by Months See Performance Curves on Exhibit No. 4 and Production Data on Exhibit No. 5.
- C. Type of Depletion Solution gas drive.
- D. Original Reservoir Pressure 1,323 psig.

- E. Oil Gravity 35.6° API.
- F. Stage of Depletion of Project Area Late.
- G. Number of Wells in Project Area 69.
- H. Average Daily Oil Production Per Well at Present Time 6.8 barrels.
- I. Cumulative Oil Production as of November 1, 1963 from Area to be
Flooded 3,293,559 barrels.

III. INJECTION INFORMATION

- A. Source of Injected Water From source wells to be completed in the
San Andres formation.
- B. Type of Water Brackish - Injection system will be corrosion-resistant.
- C. Treatment of Injected Water None is anticipated; however, if water
analysis after development indicates treatment is needed, appropriate
action will be taken.
- D. Pattern and Spacing 80-acre 5-spot patterns as shown on Exhibit No. 6.
- E. Initial Injection Pressure to be Used Maximum pressure expected will
be in the range of 1,500 to 2,000 psig, after increasing from 500 psig.
- F. Estimated Initial Per Well Rate of Injection 500 barrels per day.
- G. Additional Injection and Producing Wells to be Drilled None.
- H. Injection Well Geometry Water will be injected through internally
plastic coated tubing below a tension packer situated about 50 feet
above the bottom of the oil string as shown on Exhibit No. 6.

IV. RESULTS EXPECTED

It is believed that the proposed waterflood will provide recovery of additional oil in the magnitude of 60% of the reservoir's ultimate primary recovery. In terms of barrels, the increased recovery due to waterflooding should be about 2,250,000 barrels of oil.

V. REASONS AND RECOMMENDATIONS

The Eumont Oil Pool produces by a solution gas drive mechanism and as a result, a considerable quantity of oil will remain unrecovered at the end of primary depletion unless some type of fluid injection project is inaugurated to increase the ultimate oil recovery.

Production from the wells in the proposed unit area has declined to an average daily oil production of about 6.8 barrels per well per day. At the existing rate of decline, these wells have only a few years remaining to produce prior to depletion and abandonment. Therefore, in order to prolong the productive life of these wells and to increase the ultimate recovery, some type of secondary recovery project should be inaugurated. The available data indicate that the Queen formation underlying the proposed Northwest Eumont Unit is susceptible to waterflooding operations and that the proposed plan should increase ultimate recovery.

In view of the above considerations, Gulf, in association with Amerada, Cities Service, Continental, Marathon, Phillips, Shell, Skelly, Texaco and others, has concluded that the best course of action is the unitization of the 69 wells completed in this portion of the Eumont Pool as shown on Exhibit No. 1 so that a joint waterflood project can be undertaken. Therefore, Gulf Oil Corporation, as the Northwest Eumont Unit Operator, respectfully requests that the Oil Conservation Commission approve the installation of the proposed waterflood facilities and grant a Unit oil allowable equal to the sum of the current allowables for the 30 Unit wells not offset by water injection wells plus the allowable earned by the 39 wells in the waterflood area as provided in Rule 701 (E) Subparagraph 3 of the Commission Rules and Regulations.

See Back Envelope

EXHIBIT NO. 5
MONTHLY OIL, WATER AND GAS PRODUCTION
NORTHWEST EUMONT UNIT

MONTH AND YEAR	OIL BARRELS	WATER BARRELS	GAS MCF	MONTH AND YEAR	OIL BARRELS	WATER BARRELS	GAS MCF
<u>1963</u>				<u>1962</u>			
Jan.	13,493	2,719	97,984	Jan.	16,848	2,404	92,222
Feb.	13,018	2,111	89,022	Feb.	16,345	2,750	101,354
Mar.	13,918	2,797	100,566	Mar.	16,942	2,804	98,692
Apr.	13,051	3,095	94,063	Apr.	15,995	2,493	104,219
May	13,139	2,571	100,982	May	15,286	2,284	102,438
June	12,346	2,170	98,143	June	13,938	2,068	108,187
July	12,253	2,210	101,476	July	15,203	1,999	114,301
Aug.	13,055	3,340	99,153	Aug.	14,136	2,695	112,689
Sept.	11,631	2,452	89,147	Sept.	13,963	3,280	110,134
Oct.	12,141	2,625	91,288	Oct.	15,743	6,323	120,245
Nov.				Nov.	14,186	2,879	100,233
Dec.				Dec.	14,469	2,700	105,101
				Total	183,054	34,679	1,269,815

MONTH AND YEAR	OIL BARRELS	WATER BARRELS	GAS MCF	MONTH AND YEAR	OIL BARRELS	MONTH AND YEAR	OIL BARRELS
<u>1961</u>				<u>1960</u>		<u>1959</u>	
Jan.	20,707	2,220	128,922	Jan.	26,784	Jan.	31,153
Feb.	17,585	1,818	110,064	Feb.	24,871	Feb.	25,776
Mar.	19,110	2,235	125,570	Mar.	27,255	Mar.	27,983
Apr.	18,632	2,454	121,650	Apr.	24,227	Apr.	29,156
May	18,950	2,176	126,912	May	23,325	May	29,221
June	19,064	2,591	126,627	June	22,528	June	27,035
July	19,082	2,454	117,121	July	22,459	July	28,757
Aug.	17,890	2,059	112,738	Aug.	22,545	Aug.	28,101
Sept.	17,113	2,108	109,973	Sept.	21,342	Sept.	24,818
Oct.	17,133	1,744	108,810	Oct.	20,829	Oct.	29,061
Nov.	17,324	2,919	107,929	Nov.	20,151	Nov.	26,718
Dec.	17,625	2,850	106,151	Dec.	20,370	Dec.	26,820
Total	220,215	27,628	1,402,467	Total	276,686	Total	334,599

MONTH AND YEAR	OIL BARRELS	MONTH AND YEAR	OIL BARRELS	MONTH AND YEAR	OIL BARRELS	MONTH AND YEAR	OIL BARRELS
<u>1958</u>		<u>1957</u>		<u>1956</u>		<u>1955</u>	
Jan.	37,180	Jan.	49,047	Jan.	42,778	Jan.	8,755
Feb.	34,935	Feb.	43,348	Feb.	47,206	Feb.	9,415
Mar.	35,086	Mar.	47,984	Mar.	52,729	Mar.	11,238
Apr.	32,002	Apr.	44,500	Apr.	49,593	Apr.	11,559
May	32,271	May	43,541	May	53,322	May	13,607
June	30,929	June	41,376	June	50,717	June	13,860
July	32,096	July	40,486	July	52,264	July	16,162
Aug.	33,945	Aug.	40,193	Aug.	50,962	Aug.	19,363
Sept.	32,390	Sept.	35,727	Sept.	49,404	Sept.	25,636
Oct.	32,232	Oct.	36,668	Oct.	50,970	Oct.	32,190
Nov.	30,909	Nov.	35,122	Nov.	47,762	Nov.	34,000
Dec.	31,519	Dec.	34,870	Dec.	48,317	Dec.	34,130
Total	395,494	Total	492,862	Total	596,024	Total	229,915

EXHIBIT NO. 5

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MONTHLY OIL, WATER AND GAS PRODUCTION

NORTHWEST EUMONT UNIT

<u>MONTH AND YEAR</u>	<u>OIL BARRELS</u>
<u>1954</u>	
Jan.	1,907
Feb.	1,804
Mar.	2,390
Apr.	1,886
May	2,060
June	2,021
July	1,860
Aug.	3,131
Sept.	3,037
Oct.	5,172
Nov.	6,179
Dec.	7,344
Total	38,791

<u>MONTH AND YEAR</u>	<u>OIL BARRELS</u>
<u>1953</u>	
Jan.	1,354
Feb.	1,098
Mar.	1,066
Apr.	1,078
May	1,039
June	988
July	2,855
Aug.	2,350
Sept.	2,391
Oct.	2,128
Nov.	1,964
Dec.	1,873
Total	20,184

<u>MONTH AND YEAR</u>	<u>OIL BARRELS</u>
<u>1952</u>	
Jan.	938
Feb.	1,018
Mar.	1,075
Apr.	1,106
May	1,042
June	1,306
July	1,095
Aug.	1,182
Sept.	1,007
Oct.	785
Nov.	1,117
Dec.	1,475
Total	13,146

<u>MONTH AND YEAR</u>	<u>OIL BARRELS</u>
<u>1951</u>	
Jan.	1,156
Feb.	507
Mar.	1,099
Apr.	1,405
May	1,449
June	1,284
July	1,122
Aug.	1,124
Sept.	726
Oct.	1,347
Nov.	979
Dec.	1,415
Total	13,613

<u>MONTH AND YEAR</u>	<u>OIL BARRELS</u>
<u>1950</u>	
Jan.	230
Feb.	741
Mar.	693
Apr.	397
May	945
June	394
July	782
Aug.	396
Sept.	780
Oct.	401
Nov.	717
Dec.	217
Total	6,693

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

March 5, 1964

C
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Mr. Bill Kastler
Mr. M. I. Taylor
Gulf Oil Corporation
Post Office Box 1938
Roswell, New Mexico

Gentlemen:

Enclosed herewith is Commission Order No. R-2659, entered in Case No. 2982, approving the Northwest Eumont Unit Waterflood 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 1596 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 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.

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

-2-

Mr. Bill Kastler
Mr. M. I. Taylor
Gulf Oil Corporation
Roswell, New Mexico

March 5, 1964

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/ir

cc: Oil Conservation Commission - Hobbs, New Mexico
Mr. Frank Irby - State Engineer Office, Santa Fe, N.M.

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DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.
PHONE 325-1182

SANTA FE, N. M.
PHONE 983-3971

ALBUQUERQUE, N. M.
PHONE 243-6691

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 5, 1964

EXAMINER HEARING

IN THE MATTER OF:

Application of Gulf Oil Corporation for a
unit agreement, Lea County, New Mexico.

&
Application of Gulf Oil Corporation for a
waterflood project, Lea County, New Mexico.

Case No. 2981 &
2982

BEFORE: DANIEL S. NUTTER, EXAMINER

TRANSCRIPT OF HEARING



DEARNLEY, MEIER, WILKINS and CROWNOVER

General Court Reporting Service

Suite 1120 Simms Building Albuquerque, New Mexico Phone 243-6691

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

IN THE MATTER OF:

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&

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New Mexico.

CASE NO. 2981

&

CASE NO. 2982

BEFORE: DANIEL S. NUTTER, EXAMINER

TRANSCRIPT OF HEARING

MR. NUTTER: Call Case 2981.

MR. DURRETT: Application of Gulf Oil Corporation for
a unit agreement, Lea County, New Mexico.

MR. KASTLER: If the Examiner please, I am Bill Kastler,
from Roswell, New Mexico, appearing on behalf of the Gulf Oil
Corporation. For the purpose of this hearing, I would like to have
Case No. 2981 and Case No. 2982 combined.

MR. NUTTER: Well, now, we will call Case No. 2982.

MR. DURRETT: Application of Gulf Oil Corporation for a



waterflood project, Lea County, New Mexico.

MR. NUTTER: It is your motion, Mr. Kastler, for the consolidation, for the purposes of this hearing, Case 2981 and 2982, correct?

MR. KASTLER: Yes, sir.

MR. NUTTER: They will be consolidated.

MR. KASTLER: We have prepared most of our exhibits in the brochure form here, and they are marked, but we have also for introduction some 14 logs, three copies of each, which will have to be separately marked as they are introduced.

J. L. HUTCHISON,

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

DIRECT EXAMINATION

BY MR. KASTLER:

Q Will you please state your name, position and employer?

A My name is J. L. Hutchison, I am District Production Geologist, Gulf Oil Corporation, Roswell, New Mexico.

Q Have you previously appeared and qualified as an expert production geologist and testified before the New Mexico Oil Conservation Commission?

A Yes, sir, I have.

Q Are you familiar with the geological aspects of Case No. 2981 and 2982 in which Gulf seeks the approval of the Northwest



waterflood project, Lea County, New Mexico.

MR. NUTTER: It is your motion, Mr. Kastler, for the consolidation, for the purposes of this hearing, Case 2981 and 2982, correct?

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A Yes, sir, I have.

Q Are you familiar with the geological aspects of Case No. 2981 and 2982 in which Gulf seeks the approval of the Northwest



Eumont Unit?

A Yes, sir, I am.

Q All right.

MR. KASTLER: Are the qualifications of the witness satisfactory?

MR. NUTTER: Yes, sir, they are.

Q (By Mr. Kastler) Will you please state why the leases in the Northwest Eumont should be unitized?

A Well, in looking at Exhibit One, we feel like that the wells in their late stages of primary production can be waterflooded, and in order to recover more oil by secondary means.

Q Would you state what Exhibit One is and what it shows, please?

A Exhibit One is a map in central Lea County, New Mexico, depicting the area of the proposed Northwest Eumont waterflood area. The area in yellow on our exhibit shows the area of the proposed Eumont unit.

Q What are the geological characteristics of the reservoir to be waterflooded?

A Well, the Northwest Eumont area is in the oil section of the Eumont Gas. The Eumont Gas field includes the Yates, Seven Rivers and Queen sections. These wells are on the west flange of the Eumont structure or Monument structure, more commonly called, and the oil is produced in a down dip section from the Monument-Eumont Gas Pool.



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PAGE 5

Q I take it that gas is produced in the higher portion of the structure and oil is produced around the periphery?

A Yes, sir.

Q Have you prepared a structure map showing the Northwest portion of the Eumont Pool, which is involved in that proposed unit?

A Yes, I have.

Q Is that Exhibit No. Two?

A That is Exhibit No. Two.

Q Will you please describe what is shown on Exhibit Number Two?

A On Exhibit Number Two is the hachured area, that is the proposed Northwest Eumont area. It is a structure map on the top of the Penrose marker and this map shows a west by northwest dip, at a rate of approximately 350 to 400 feet per mile. The contour interval on this map is 20 feet.

Q And what does that dashed line depict?

A That depicts a datum of minus 150 feet. This is more or less the datum at which the gas-oil contact is established in this field.

Q And substantially all of your oil wells exist in this depiction, north and west of this dashed line; is that correct?

A That's correct, yes, sir.

Q And that then constitutes the unitized interval below the dashed line?



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A Yes, sir, in the area there. The unitized unit will be from the top of the Queen to the top of the Grayburg. This includes the zones where the oils are produced in these wells.

Q How many injection wells are proposed for the unit?

A At the outset, we are proposing 15 injection wells in the Phase One portion of the north part of the unit.

Q Now, do you have copies of all logs for all 15 wells to be introduced in evidence at this hearing?

A No, sir. I have 14 of the 15 logs. One log was not available through the West Texas Electric Log Service, but I do have three copies of each of the other 14 wells and I think these should be marked as Exhibit Number Three, and probably sub-titled "A" through "O", I suppose.

Q Now, Mr. Hutchison, realizing that Mr. Hendrick will later on testify and identify the particular wells- -

A Yes.

Q - -they will be as shown on Exhibit No. 7 to be introduced later; is that correct?

A Yes, sir, that's correct.

Q And would you please review again or state again which well it is that you don't have a log for, which of the injection wells?

A (No answer)

Q Would you have to eliminate all the other wells to get this?



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A No, just a moment, and I think I can find it here.

It is the Southern Petroleum No. One State. It is in the Unit "E" of Section 23.

Q Section 23, Township 19 South, Range 36 East?

A Yes, sir.

Q That constitutes the Southwest Quarter of the Northwest Quarter where that well is located; is that correct?

A Yes, that is correct.

Q Were Exhibits One through Three prepared by you or at your direction and under your supervision?

A Under my supervision, yes, sir.

MR. KASTLER: This concludes the questions I have for this witness on direct examination, Mr. Nutter. And later on, I would propose to introduce all exhibits into evidence.

MR. NUTTER: That will be fine.

MR. KASTLER: But, these may be marked.

MR. NUTTER: Are there questions of Mr. Hutchison?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Hutchison, is the Gulf planning to flood all production or productive zones in the Eumont here?

A Yes, sir, all zones that are productive of oil within the interval, yes, sir, they are.

Q Now, what formations is it that constitute the Eumont,



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Yates, Seven Rivers and Queen?

A Queen, yes, sir, Eumont Gas Pool.

Q Are all three of those formations open in some of these wells?

A No, sir. I think most of them open over here will be low. We are going off very steep structurally. Most of the sections will be the Queen primarily. It will be open in this area.

Q Almost all of the flooding will be in the Queen formation?

A Yes, sir.

Q All right.

MR. NUTTER: Are there other questions of Mr. Hutchison?

MR. DURRETT: Mr. Kastler, will your other witness testify concerning the unit agreement and progress?

MR. KASTLER: Yes, he will.

MR. NUTTER: The witness may be excused.

VANCE HENDRICK,

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

DIRECT EXAMINATION

BY MR. KASTLER:

Q Will you please state your name and your position?

A Vance Hendrick, Petroleum Engineer for Gulf Oil Corporation.



Q Have you previously appeared before the New Mexico Oil Conservation Commission and qualified as an expert witness and given testimony?

A Yes, sir, I have.

Q Are you familiar with the technical and unitization aspects pertinent to this case?

A Yes, sir.

Q All right.

MR. KASTLER: The witness' qualifications acceptable?

MR. NUTTER: Yes, sir.

Q (By Mr. Kastler) Have you prepared or supervised the preparation of an exhibit showing the production history and present status of the wells in the Northwest Eumont Pool?

A Yes, sir, I have, Exhibit Number Four.

Q Please explain Exhibit Number Four?

A Exhibit Number Four is a group of curves showing the performance of 69 Eumont wells in the proposed unit, the uppermost line on the curve shown in green is nothing more than a well count showing that most of the wells were drilled in 1955 and 1956. Of the unit's 69 wells, there are two Eumont gas wells, 58 producing oil wells, and eight wells are shut in, and there is one dry hole.

Q What does the orange line in the middle of Exhibit Number Four depict?

A The orange line immediately below is a plot of the average reservoir pressure. You can see that the pressure has



dropped from 1323 pounds to about 300 pounds. Below the pressure curve drawn in red is the producing gas-oil ratio. October, 1963, the average gas-oil ratio was 7515 cubic feet per barrel of oil.

Q How were these curves obtained; what was the data for this?

A The New Mexico Oil and Gas Engineering Committee.

Q Was it an average of - -

A Of several wells, yes, sir.

Q - -several wells, and they were exemplified wells, just as a sample?

A Yes, sir.

Q Is the blue curve a plot of the aggregate monthly production for all wells in the unit?

A Yes, sir. You can see that it has been steady decline since 1956. The current monthly oil production in October, 1963, was 12,141 barrels. This monthly figure represents an average daily rate as shown of 6.8 barrels per day.

Q Per well?

A Yes. The lower curve which is yellow is a water production curve. It shows that the water production is now averaging 1.5 barrels per well per day, and accumulative oil production, all of the wells in the unit as of November 1, 1963, 3,293,559 barrels. From this exhibit, it can be concluded that the wells in this area are in the late stages of primary depletion.

Q That is by assuming all of this information, that there is a decline in reservoir pressure, that is, there is a decline of



production to 6.8 barrels average daily oil production during the month of October?

A That is correct.

Q And one and a half barrels daily average water production?

A That's correct.

Q Have you prepared an exhibit showing the proposed injection wells and the waterflood pattern to be used?

A Yes, I might add that Exhibit Number Five is a tabulation of the production of water, oil and gas for the wells shown on Exhibit No. 4. In answer to your question, I have prepared Six.

Q In other words, Exhibit Number Five is really a verification proving the data shown on Exhibit Number Four?

A That's correct.

Q Now, would you refer to Exhibit No. Six and tell me what it shows?

A Yes, Exhibit No. Six is a combination map and diagrammatic sketch of the proposed injection wells. First, the proposed 80 acre five spot water injection pattern, as shown, and the line connections of the proposed injection wells, which have been circled or enclosed with a square. Phase Number One are the ones circled, It will be installed immediately after unitization and approval of this application. Phase Number Two are the wells that have squares around them, after Phase One has shown satisfactory performance.

Q You say for each of your 15 proposed injection wells, in



Phase Number One. you have shown diagrammatically the other data pertaining to that well?

A Yes, a diagram that is depicting the down hole equipment that will exist when the wells are prepared for injection. I might state that the yellow, which is in the upper right-hand corner, is Gulf's lease, State DA No. 2. As you can see, the oil string is 9 5/8ths inch set at 342 feet with 275 sacks of cement circulated, seven inch OD casing, which is set at 3889 feet, with 1200 sacks of cement, temperature surface indicated the top outside of seven inch casing to be at 1500 feet. The wells will be equipped with internally plastic coated tubing with a tension packer so that the injection will be underneath the packer, and those packers will be set about 50 feet from the casing shoe or top of perforations.

Q And for each well of your injection wells, you have used a corresponding color?

A Yes, sir.

Q And the color corresponds with the data over here?

A That's correct. The color on the map corresponds with the color of the diagrammatic sketch.

Q What will be the source of the injection water and what type of water will be used and state any other matters?

A Well, referring back to Exhibit Number One, you will see a well circled in Section 19 of 19 South, R-37 East. This well is an abandoned Monument Unit exploratory well. It is our hope



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that the working interest owners can re-enter this well and recomplete it in the San Andres formation, and produce the water from that well to provide the necessary water for Phase One. It is estimated that the daily injection per well will be about five hundred barrels per day, so that the initial water needs will be 7500 barrels per day. The surface equipment will be corrosion resistant. The initial injection pressure is estimated to be about 500 pounds rising to about 2,000 pounds as it floods.

Q You say this is going to be brackish water?

A Yes, sir.

Q Is this in a water restricted area?

A Yes, this is in the Lea County Water Basin.

Q And all fresh water is already appropriated?

A That is my understanding.

Q But, at any event, Gulf, as the proposed unit operator, does not plan to make any application or purchase or use of fresh water?

A That's correct.

Q But, to develop a source of brackish water preferably on Section 19 and secondarily, what are your plans, if this should fail?

A We have secured water easements within the unit boundary in Sections 14, 22 of 19 South, Range 36 East.

Q You have gotten these water easements from the State of New Mexico?



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A We have, yes, sir, and in the event the working interest owners choose, we may develop the Santa Rosa water source under these easements in the Santa Rosa, the water is also brackish.

Q Do you intend to use any of the brine or water that is produced with oil as a source of water or supplemental source?

A Only in a cycling method once that the return water comes.

Q What results are expected from the project?

A It is believed that the proposed waterflood unit will add additional oil in a magnitude of 60 percent of what was produced in primary. In terms of barrels, there would be two and a quarter million barrels of oil.

Q What other reasons for the project, and what recommendation does Gulf, as the unit operator, have to make?

A Since the oil reservoir is in a late stage of depletion, Gulf, in association with Amerada, Cities Service and Continental, Marathon, Phillips, Shell, Skelly and Texaco, and others, has concluded that the best course of action is the unitization of these 69 wells in this portion of the Eumont Pool. Therefore, Gulf Oil Corporation, as the proposed Northwest Eumont Unit operator, respectfully requests that the Oil Conservation Commission approve the application and grant a unit allowable equal to the sum of current allowable for 30 wells not offset by water injection, plus the allowable earned by the 39 wells in the waterflood area as provided in Rule 701.

Q In other words, you want to proceed strictly under 701



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to receive the maximum allowable there?

A That's correct.

Q Mr. Hendrick, what is Exhibit Number Seven?

A Exhibit Number Seven was prepared to show the unit in an enlarged map. It has all of the wells in the unit and all wells that offset the unit to the east. There are no wells that offset the unit to the west, only dry holes.

Q Were Exhibits Four, Five, Six and Seven prepared by you or at your direction and under your supervision?

A They were.

MR. KASTLER: Mr. Nutter, this concludes the direct testimony insofar as the engineering and technical aspects of it are concerned. Would you prefer to cross examine now or have me go on through?

MR. NUTTER: This witness can testify to the unit, too?

MR. KASTLER: Yes.

MR. NUTTER: I have got a couple of questions. Are there any questions of Mr. Hendrick?

MR. DURRETT: I have one or two.

CROSS EXAMINATION

BY MR. DURRETT:

Q Mr. Hendrick, am I correct now that you are just seeking approval of the first stage of your project as presented here?

A Yes, and I have designated that Phase One.



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Q Phase One.

A And those are wells that are circled on Exhibit No. 7, and that is essentially the northern half of the unit.

Q Then, you would propose to proceed with the expansion of your project by administrative approval?

A If possible, yes.

Q Is that correct? Now, did you testify concerning the average production per well?

A Yes.

Q If you did, will you do it again?

A Very well. I might have mislead you. For all of the wells that are producing within the unit, average production is 6.8 barrels per day per well. For the wells that are in Phase One that we just discussed, it is about three barrels per well per day.

MR. DURRETT: All right, sir. Thank you.

* * * *

MR. NUTTER: Mr. Irby.

CROSS EXAMINATION

BY MR. IRBY:

Q Mr. Hendrick, the questions and answers concerning the source of your water leads me to believe you may not be well informed.

A That may very well be the case, Mr. Irby.

Q I am going to get in the legal aspects, and I don't have



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any objection to your talking to your attorney about this, but since this is in a declared basin, I hope you realize that any well you drill for water must be drilled by a driller licensed by the State Engineer's Office.

A I was not aware of that specific fact. I am aware that the administrative regulations regarding the drilling for water, regardless of whether it is in the shallow water basin, has to be under the jurisdiction of the State Engineer's Office.

Q Well, that is what the next thing I want to bring to your attention is, and may I ask if you have filed an application to drill or appropriate in this area?

A In Section No. 19?

Q Yes.

A Referring back to Exhibit Number One, we have not done so in Section 19, the reason being that this well is an abandoned well at the present time, and Gulf plans to attempt a Monument-Blinbry completion in this well. In the event that this well is capable of producing in the Monument-Blinbry, then its candidacy as a water source well will not be available. We will have to use some other well, preferably without drilling a new well, for that reason, we have not made any effort to obtain a water lease in this section.

MR. KASTLER: Drilling permit.

A A drilling permit at this time.

Q (By Mr. Irby) Then, if your oil test at this location is



unsuccessful, you would want to preforate in the San Andres for water; is that the idea?

A That's correct. And before doing that, we would, of course, seek your approval.

Q Then, you say this well is drilled to what formation?

A This was a - - it was drilled to 10,900 feet, in that neighborhood, so it was a deep test. I am not well versed as to the formation, but it would be a very deep test.

Q Is this well plugged and abandoned now?

A It is, sir.

Q And then, you first intend to try to - - Well, you will re-enter the well, try to complete it as an oil producer, and if that is unsuccessful, then is this oil test to be below the San Andres or above?

A It will be below it, sir.

Q Below. Then, if this is unsuccessful, you would plug back to the San Andres, perforate there in the hopes of getting water?

A And recognizing all regulations that will have to be observed.

Q Now, do you have a good record of this well construction?

A We do, sir, yes, sir.

Q Now, if you determine that you are going to use this well for water production for this flood, we would require a complete construction record of the well, and the same would be true in case



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you use some other existing well.

A Yes. Now, that was my previous statement, that we are aware that we have to have your approval when we are dealing in the water basin, even though we are going below it. In regard to the record, we have excellent records on the abandonment of the well. We will be re-entering the well, any work that is done in the re-entering will be provided to you at that time. Also, I might add that the reason we haven't done this, is that in obtaining these water easements, the Sections 14 and 22, it is very possible that we will not use those, even though that we made the application for them. So, what we want to do is find out if the well is available before we make any effort to seek all the administrative necessities.

Q Well, I didn't realize to begin with that this proposed water well was an abandoned well. This is what brought about my confusion.

MR. KASTLER: May I ask a question to clear up my own mind about this, about the legality of it? Is it true that Gulf will have to make a contract with a licensed driller in order to go farther in the event we deem it necessary to test this well for water?

(IRBY) I wouldn't say yes or no without consulting my attorney. My personal opinion is that since this well was originally drilled for oil and not for water, that if we have a good clean construction record on the well, we can back up and perforate without Gulf having to employ a licensed water well driller. Now, this is,



understand, is my personal opinion.

MR. KASTLER: Well, we will certainly be agreeable to confer with you before we do anything further toward completing this well or testing it as a water well.

MR. IRBY: Thank you.

MR. NUTTER: Do you have anything further, Mr. Irby?

MR. IRBY: No, sir, that is all.

MR. NUTTER: Does anyone have any further questions of Mr. Hendrick?

MR. KASTLER: I would like to clear up one point for the future testimony. You have spoken of Phase One and Phase Two of the project, Mr. Hendrick, and I also notice that in the unit agreement you have a primary phase participation and a secondary phase participation. There is no correlation between Phase One and Phase Two of your technical aspects and the primary and secondary participation formulas, is there?

A None whatsoever. They are entirely two different matters.

MR. KASTLER: That is all. May I proceed now?

MR. NUTTER: No, sir. I want to ask him some questions.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Hendrick, in taking this map which shows the gas-oil contact, and transposing the locations of the injection wells onto that, I find that in some places, the injection wells appear to be



fairly close to the gas-oil contact and other places they are some distance from it. I wonder if you have given consideration to the possibility of this injected water forcing oil up into the drier sand?

A We have- -

Q Above the gas-oil contact?

A Yes, sir, we have given this consideration. We have prepared cross sections through each tier of wells of east-west cross sections. And we have studied each individual row and have correlated this section from its lowest point up to the minus 150 feet, which is the gas-oil contact and it is our intention to inject water into these Penrose members of the Queen formation well below the gas-oil contact. Now, as you progress to the east, or up structure, as you pointed out, this well- - this member approaches the gas-oil contact. We have in Exhibit No. 7 made an attempt to pick a waterflood pattern that will effectively waterflood this oil rim and yet give reasonable protection to the gas cap.

Now, we have spaced the injection wells in a five spot pattern down structure, and we have in every case a producing oil well, between the gas cap and the injection well, and in some cases, we actually have two wells. And it is joint thinking of the working interest owners that this waterflood can be inaugurated and that these wells that are to the east can be produced and afford protection to the gas cap.



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Q Well, now, how about up here on Gulf's- - is it the Lee State?

A Yes, sir.

Q You don't have an injection well between Two and Five and the gas cap.

A The well that you have reference to is the Lee State No. One, and it is a Eumont Gas well. This well has been for most years a Eumont Oil well, and recently been reclassified as a Eumont Gas well by virtue of the gas-oil ratio.

Q This well formerly had a low GOR?

A Well, sir, not low. It was the first well completed in this general area before this development began, and- -

MR. KASTLER: Completed as an oil well.

A It was completed as an oil well, but initially, there was some- - the initial gas-oil ratio was in excess of 100,000 to one, but the well was fracture treated, and subsequent to that fracture treatment of the open hole, it had a gas-oil ratio of well below 100,000, so it was completed as an oil well, after the fracture treatment.

Q (By Mr. Nutter) And was produced as an oil well?

A Until just these last two or three months.

Q It has since been reclassified then as a gas well?

A Yes, sir.

Q Is there any producing wells in the Southwest Quarter of Section 12 up in the far north end of your exhibit?



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A There are none, sir.

Q And that area is entirely outside of the unit area here, isn't it?

A Yes, sir.

Q Is the sand thinning as you get up into that northern area or just tightening up or what; what are the characteristics of the reservoir up there?

A There is no seeming thinning of the section.

Q I am wondering about the injection well, No. 7, moving oil to the east that would not be recovered because there is no producing well to the east.

A That is correct. There is no producing well in the Southwest Quarter of Section 12; that particular 40 acre tract, that is, the 40 acres on which No. 7 is producing, produced only 13,000 barrels of oil.

Q For the three wells?

A No, sir, just for No. 7.

Q No. 7 produced 13,000 barrels. You must be getting into the tight section of the reservoir up in there then.

A Yes, sir. I have looked at some of the pressures, I can't come to any firm conclusion, but there seems to be something between the oil rim and the gas cap.

Q What about that Phillips No. 2 well up there, has it produced very much oil?

A Yes. May I answer you in generality? It has not. I can



give you the specific number, if you like.

Q Well, it is in our records. Do you anticipate that Phillips No. 2 will receive any response from water injection into your No. 7?

A It is unlikely. It was included in the unit because it was there and it was the last well in the pool and if it had been omitted, it would have been outside the project, and that was why it was included.

Q Has that little 40 acre tract been non-contiguous, except on a point, been approved by the land office or whoever- -

A There is no federal land, but we have preliminary approval from the State Land Commission.

Q I see. I believe that is all on this phase of the testimony, Mr. Kastler.

* * * *

REDIRECT EXAMINATION

BY MR. KASTLER:

Q Now, Mr. Hendrick, do you have for introduction into evidence in this case an executed copy or three executed copies of the proposed unit agreement, designated as Exhibit Number Eight, and three executed copies of the proposed unit operating agreement, designated as Exhibit Number Nine, executed by Gulf Oil Corporation?

A I do, sir.

Q You have testified that there is no federal acreage in



this proposed unit; is that correct?

A I believe that is right.

Q Is there only State and fee acreage in this unit?

A That's correct.

Q Has the unit been submitted for preliminary approval to the office of the State Land Commissioner and been approved by the division unit preliminarily?

A Yes, it has.

Q Does Exhibit Eight of the unit agreement show what portion of the unit land ownership is State land and what amount is private land?

A Yes, sir, it does on Page Three of Exhibit "B", of the unit agreement. There is a summary that shows the State of New Mexico leases of 1720 acres in the unit and the fee leases represent 1,040 acres for a total of 2760 acres.

Q What percentage of the working interest owners have executed counterparts and ratification and joinders to the unit instruments at this time?

A 95 percent of the working interests have executed the instruments, and I might add that 100 percent of the working interest owners in the State leases have executed.

Q And the five percent of working interest owners who have not executed the instrument, have they tentatively agreed to go along, have they attended your meetings, and so forth, shown some interest in this?



A Yes, they have.

Q Are negotiations pending for the purchase of those - - of some of the interests which have not yet been committed?

A Purchase is under consideration, however, those - - nothing has definitely been decided.

Q Yes. Have all the royalty interest owners of record been invited to join the unit?

A Yes, sir, they have.

Q What percentage of the royalty owners have now signed the unit agreement?

A 66 percent of the royalty ownership have executed.

Q And you have already stated you have the preliminary approval of the State Land Office for the State acreage?

A Yes, sir.

Q Does the unit agreement provide for enlargement or constriction of the unit only after the approval by the State Land Commissioner and the Oil Conservation Commission?

A Yes, sir, it does.

Q How were the percentages of participation arrived at?

A The tract participation, which is shown on Article Five of the unit agreement, on Page Nine, shows that there is a primary phase and a secondary phase participation. The primary phase participation was determined on the basis of one-half the total tract remaining primary reserves subsequent to February 1, 1962 as that bore to the total unit remaining primary reserves, and



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the other half was the tract producing revenue for six months period prior to February, 1962, as it bore to the producing revenue for the previous six months to February, '62. This secondary phase participation, which will become effective after 752,551 barrels have been produced, after 7 A. M. on the first day of February, 1962, is based on 100 percent primary ultimate.

Q And what was the figure, 761,000, what does that represent?

A That represents the estimated remaining primary oil reserves for oil wells in the proposed unit.

Q Calculated as of what date?

A February 1, 1962.

Q That was what remained to be primarily recovered without any secondary recovery project?

A That's correct.

Q And until that amount of barrels of oil has been recovered, this unit will be in the primary phase of participation?

A That's correct.

Q When do the working interest owners plan to initiate the installation of needed equipment and start waterflooding?

A As soon as possible after the effective date.

Q Recognizing that you still have to locate a source of water?

A That's correct.

Q Were Exhibits Four through Nine prepared under your



direction or supervision for introduction into evidence?

A They were prepared under my direction.

Q Mr. Hendrick, if approved, would this unit agreement not prevent waste and protect correlative rights?

A Yes, sir, it would.

Q This concludes my direct examination and I would like at this time to offer Exhibits One through Nine into evidence.

MR. NUTTER: Gulf's Exhibit One through Nine will be admitted in evidence. Are there any questions of Mr. Hendrick?

RECROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Hendrick, during your previous testimony, you stated that the unit area here had produced 3,293,000 barrels, and that was through December of 1963; is that correct?

A Yes, sir. If you are wanting to know how many remaining barrels of oil are remaining now, it is approximately 460 thousand barrels.

Q Of remaining primary oil?

A Yes, as of November 1, 1963.

Q I see. And you anticipate that there would be - - How many total primary barrels were estimated to exist?

A 751,000.

Q Well, that was as of February 1, 1962. I mean all totaled?

A I beg your pardon. Primary ultimate?



Q The ultimate primary?

A Yes, sir. Be the sum--- I have it here. The estimated primary ultimate for all the wells within the proposed unit is 3,751,859 barrels.

Q That is ultimate primary, and you are predicting 60 percent of this, or two and a quarter million barrels of secondary?

A That's correct.

MR. NUTTER: I believe that is all. Are there any further questions of Mr. Hendrick? He may be excused. Do you have anything further, Mr. Kastler?

MR. KASTLER: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case 2981 or 2982? If there is nothing, we will take the cases under advisement.

MR. STOKES: D. D. Stokes appearing for Sheel Oil Company, owner of 17 percent of this unit, and agrees with Gulf's proposal in these two cases.

MR. NUTTER: Thank you. Anything further? Take the cases under advisement.

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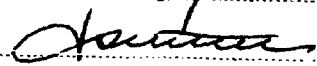
STATE OF NEW MEXICO {
COUNTY OF BERNALILLO {

I, ROY D. WILKINS, 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 of Office, this 17th day of February, 1964.


NOTARY PUBLIC

My Commission Expires:
September 6, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2981-2982 heard by me on 2/5, 1964.
 Examiner
New Mexico Oil Conservation Commission

