

PHILLIPS EXHIBIT #3

PHILLIPS PETROLEUM COMPANY

Economics for development based on 80 acre units recovering 210,000 BO per well, and for 40 acre units recovering 105,000 BO per well are as follows:

80 acre unit ultimate average primary recovery 210,000 BO per well.

Initial investment 10,400 ft. development well	\$200,000.
Net reserves 183,750 BO	
Value of net oil @ \$2.85/BO less OH & Tax	\$475,913.
Less 11 years lease expenses & initial investment	\$244,000.
Profit before tax	\$231,913.
Pay out 18 months @ 163 BOPD (av. 35 BOPD/unit)	
Est. ARR 43%	

40 acre unit development

Initial investment per well	\$200,000.
Gross reserves 105,000 BO	
Net reserves 91,875 BO	
Value of net oil (Less OH & Tax)	\$237,956.
Less investment & 11 years lease expenses	\$244,000.
Loss per well	\$ 6,044.

40 acre development would call for a recovery of 108,000 BO to be a break even proposition.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Phillips EXHIBIT No. 3
CASE 1668



Mobil Oil Company

A Division of Socony Mobil Oil Company, Inc.

Box 2406
Hobbs, New Mexico

July 12, 1960

Phillips Exh 16

Re: Hearing on
Ranger Lake Pennsylvanian

Phillips Petroleum Co.
Mr. L. E. Fitzjarrald
Vice President, Production Department
Bartlesville, Oklahoma

Dear Mr. Fitzjarrald:

We have been included by mistake on your mailing list of operators in the Ranger Lake - Pennsylvanian Pool, Lea County, New Mexico. We have no interest at all in this pool.

We are sorry that we cannot assist you in this matter.

Yours very truly,

SOCONY MOBIL OIL COMPANY, INC.

C H Samples (705)

C. H. Samples
Producing Superintendent

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Cop. EXHIBIT No. 16
CASE 1668

JCGordon/jwh

Bokow
Boyer
410 WEST OHIO
MIDLAND, TEXAS

JOSEPH I. O'NEILL, JR.
OIL PROPERTIES

RECEIVED
JUL 28 1960
PRODUCTION
DEPARTMENT

TELEPHONE
MUTUAL 3-2771

Phillips Exh 14

New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Re: Ranger Lake - Pennsylvanian Pool - Lea County,
New Mexico - Phillips Petroleum Company

Gentlemen:

We have been advised that a hearing is set for August 17, 1960, to consider a transfer of the present temporary special rules and regulations to a permanent basis.

Please be advised that we, as holders of oil and gas leases within the field, agree with the request of Phillips Petroleum Company and believe bottom hole pressure information has indicated this field should continue to be developed on 80-acre proration units. However, we do not agree with Rule No. 3 which states that the initial well on any 80-acre unit in said pool must be located within 150 feet of the center of either the NW/4 or the SE/4 of the quarter section on which the well is located. We believe that because of the wide spacing the operator should be permitted to stake his location on either of the two 40's comprising his 80-acre unit. We feel this change would more adequately protect the rights of all operators.

Very truly yours,

JOSEPH I. O'NEILL, JR.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Cep EXHIBIT No. 14
CASE 1668

E. T. Anderson

ETA/nb

CC: Mr. L. E. Fitzjarrald
Phillips Petroleum Company
Bartlesville, Oklahoma

Ex. 14

PAN AMERICAN PETROLEUM CORPORATION

Box 268
Lubbock, Texas
July 26, 1960

RECEIVED
AUG 01 1960
PRODUCTION
DEPARTMENT

File: JET-4262-986.510.1

Subject: NMOCC Order R-1418-B
Temporary 80-Acre Spacing
Ranger Lake Field
Lea County, New Mexico

Mr. L. E. Fitzjarrald
Phillips Petroleum Company
Bartlesville, Oklahoma

P Phillips Gth. 15

BEFORE THE
OIL COMMISSION
SANTA FE, NEW MEXICO
Case No. 15
CASE 1668

Dear Sir:

This will have reference to your letter of July 8, 1960, which requested bottom hole pressure and core data from the Ranger Lake Field for use in the forthcoming permanent 80-acre spacing case before the NMOCC.

The following initial bottom hole pressures were obtained on Pan American wells in this field:

<u>Well</u>	<u>Date</u>	<u>BHP</u>	<u>Datum</u>	<u>Shut-In Time</u>
		2945	-6050	
State "AZ" No. 1	November, 1959	2945 psig	-6179'	48 hrs.
State "AZ" No. 2	December, 1959	2795 psig	-6050'	24 hrs.
State "AZ" No. 3	December, 1959	2860 psig	-6050'	48 hrs.

We plan to have a representative present at this hearing to make a verbal statement in support of your application for permanent 80-acre spacing.

Yours very truly,

Neil S. Whitmore
Neil S. Whitmore
District Superintendent

BJS:ab

Baker

RECEIVED
JUL 19 1960
PRODUCED
BY
AMERADA PETROLEUM CORPORATION

AMERADA PETROLEUM CORPORATION

P. O. BOX 2040

TULSA 2, OKLA.

July 18, 1960

Phillips Exh 13

Mr. L. E. Fitzjarrald
Phillips Petroleum Company
Bartlesville, Oklahoma

Dear Mr. Fitzjarrald:

Tabulated below is the bottom-hole pressure information requested on the Amerada Petroleum Corporation State WR "A" No. 1 well in the Ranger Lake-Pennsylvanian Pool, Lea County, New Mexico.

<u>Date</u>	<u>Depth</u>	<u>Observed Pressure</u>	<u>Gradient Psi/100'</u>	<u>Calculated Pressure @ 10,209' (-6050)</u>	<u>Hours Shut In</u>
12-5-59	10,038	2761	28.8	2810	27
12-7-59	10,038	2767	28.4	2816	74
2-3-60	10,072	2598	23.4	2630	49
5-18-60	10,072	2471	26.4	2507	48

Amerada will appear at the hearing on August 17, and will make a statement in support of your application.

Yours very truly,

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Cesp EXHIBIT No. 13
CASE 1668

O. C. McBryde, Jr.
O. C. McBryde, Jr.

OCM:mtl

Ex. 13

EXHIBIT "A"

Texas Pacific Coal and Oil Company
P. O. Box 2110
Fort Worth, Texas

Amerada Petroleum Corporation
P. O. Box 312
Midland, Texas

Barnes Oil Company
P. O. Box 505
Midland, Texas

Gordon M. Cone
P. O. Box 1148
Lovington, New Mexico

Pan American Petroleum Corporation
P. O. Box 68
Hobbs, New Mexico

Tidewater Oil Company
P. O. Box 547
Hobbs, New Mexico

Continental Oil Company
825 Petroleum Building
Roswell, New Mexico

Mobil Oil Company
P. O. Box 2406
Hobbs, New Mexico

Ralph Lowe
P. O. Box 832
Midland, Texas

Sunray Mid-Continent Oil Company
P. O. Box 128
Hobbs, New Mexico

F. J. Danglade
P. O. Box 675
Lovington, New Mexico

Monsanto Chemical Company
602 West Missouri
Midland, Texas

Pacific Western Oil Company
c/o Tidewater Oil Company
P. O. Box 547
Hobbs, New Mexico

Monterey Oil Company
6th Floor, Wilco Building
Midland, Texas

The Pure Oil Company
204 $\frac{1}{2}$ West Taylor
Hobbs, New Mexico

The Ohio Oil Company
P. O. Box 2107
Hobbs, New Mexico

Tennessee Gas & Oil Company
Hobbs, New Mexico

H. J. Porter
Gulf Building
Houston, Texas

Gulf Oil Corporation
Petroleum Building
Roswell, New Mexico

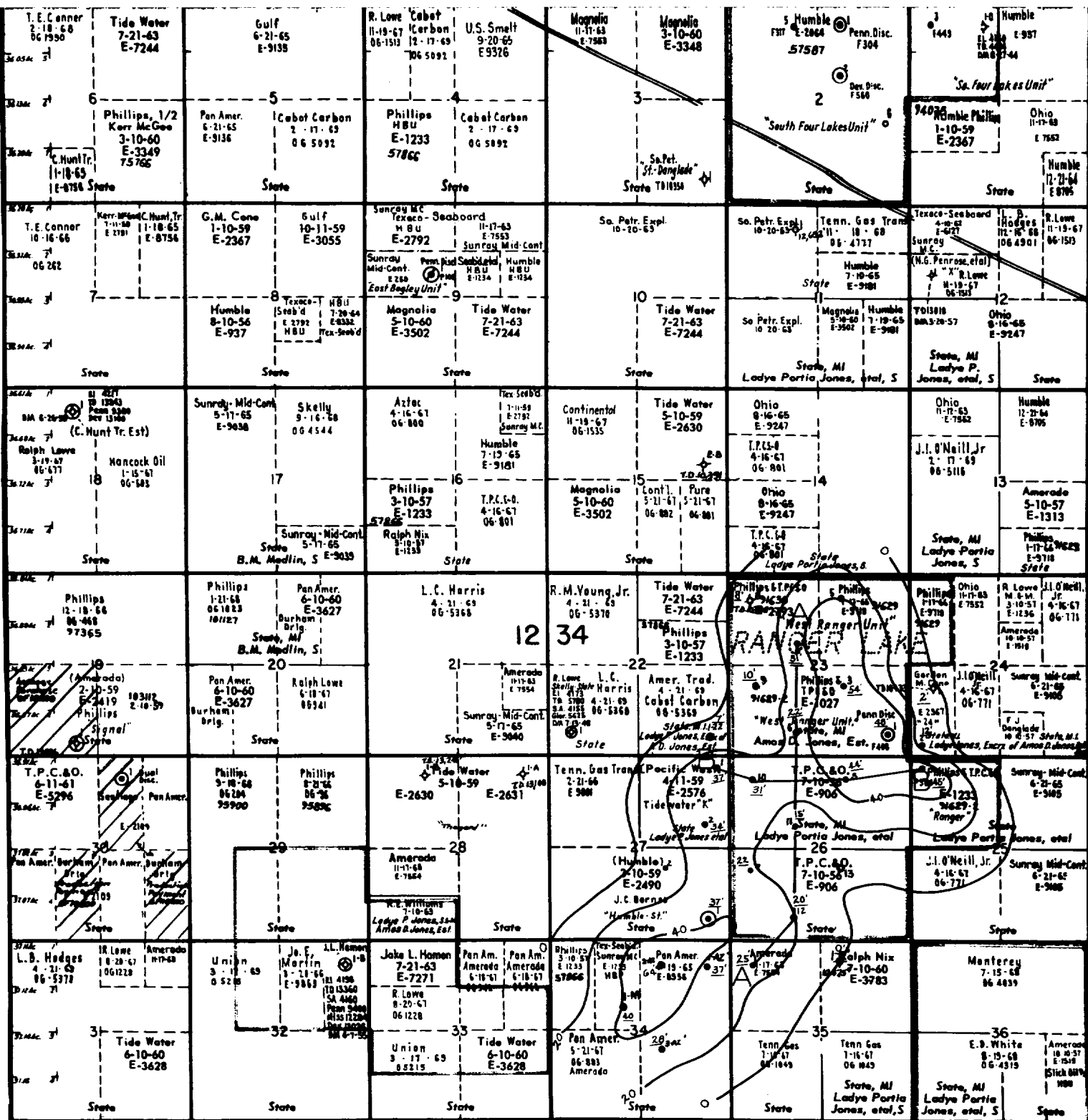
Humble Oil & Refining Company
P. O. Box 2347
Hobbs, New Mexico

Joseph I. O'Neill, Jr.
410 West Ohio
Midland, Texas

Nix & Curtis
P. O. Box 605
Artesia, New Mexico

Emmett D. White
P. O. Box 146
Roswell, New Mexico

Texaco Seaboard, Inc.
Doscher Building
Sweetwater, Texas



PHILLIPS PETROLEUM COMPANY
LAND & GEOLOGICAL DEPARTMENT
MIDLAND, TEXAS
WEST RANGER PENN
LEA COUNTY, NEW MEXICO
SCALE 1"=2000'

CONTOURED ON: ISOPACH: NET PAY
CONTOUR INT. 20'
TYPE INFO. SUBSURFACE
GEOLOGY BY: C. F. LAWRENCE
DATE 8-8-60 REVISED

NET PAY DATA BASED ON: 4% POROSITY
35% BASE SHALE

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

1. PHYSICAL PROPERTIES OF THE RESERVOIR ROCK
 - a. Approximate Average Porosity 8.7%
 - b. Maximum Measured Permeability 28 md.
 - c. Average Connate Water 25%
2. STRUCTURAL FEATURES OF THE RESERVOIR
 - a. Structure Map) See Geological Exhibits
 - b. Cross Sections)
 - c. Original Gas-Oil Contact Not Applicable
 - d. Original Water-Oil Contact -6210 ft. subsea
3. CHARACTERISTICS OF RESERVOIR FLUID
 - a. Average Gravity of S.T. Oil 40.4° API
 - b. Estimated Saturation Pressure 2250 psia
 - c. Formation Volume Factor
At Original Pressure 1.409
At Saturation Pressure 1.430
 - d. Solubility
At Original Pressure 754 cf/b
At Saturation Pressure 754 cf/b
4. PRESSURE AND TEMPERATURE
 - a. Original Reservoir Pressure 3530 psi
 - b. Reservoir Temperature 162°f 6-7-87
 - c. Reservoir Pressure History See Attachment 3-6
 - d. Average Shut-In Time Prior to Pressure Survey 48 hours
 - e. Productivity Indices Data
Range - Bbl/Day/psi Pressure Drop .793 to 1.553
5. STATISTICAL DATA
 - a. Accumulated Production to 12-1-58
Oil 368,711 bbls. 2
Gas 285,088 MCF
Water 0 bbls.
 - b. Monthly Oil Production) See Attachment
 - c. Monthly Producing Gas Oil Ratio)
 - d. Number of Producing Wells 5
 - e. Spacing Pattern Staggered 80-Acre Units
 - f. State of Depletion still above bubble point Early or Development
6. GENERAL RESERVOIR MECHANICS

To date the primary source of reservoir energy has been the expansion of oil above the saturation pressure. The future reservoir mechanism will be a solution gas drive which may or may not be aided by a partial water drive. To date there has been no evidence of a water drive.

PRODUCTION DATA

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Phillips EXHIBIT No. 5
CASE 7668

<u>YEAR AND MONTH</u>	<u>NUMBER OF WELLS</u>	<u>OIL PRODUCTION</u>		<u>GAS PRODUCTION</u>		<u>GAS OIL RATIO</u>
		<u>MONTHLY</u>	<u>ACCUMULATED</u>	<u>MONTHLY</u>	<u>ACCUMULATED</u>	
<u>1956</u>						
October	1	5,669	5,669	6,217	6,217	1,097
November	1	5,360	11,029	5,628	11,845	1,050
December	1	5,812	16,841	6,087	17,932	1,047
Yearly Total		16,841		17,932		
<u>1957</u>						
January	1	5,299	22,140	5,562	23,494	1,050
February	1	6,369	28,509	5,070	28,564	796
March	1	6,069	34,578	4,831	33,396	796
April	1	5,988	40,566	4,766	38,161	796
May	2	6,773	47,339	5,545	43,706	819
June	2	10,736	58,075	8,847	52,553	824
July	2	11,276	69,351	9,292	61,845	824
August	2	10,674	80,025	8,795	70,640	824
September	3	15,780	95,805	12,949	83,589	821
October	3	16,296	112,101	14,279	97,868	876
November	3	15,075	127,176	13,211	111,079	876
December	4	22,211	149,387	14,665	125,744	660
Yearly Total		132,546		107,012		
<u>1958</u>						
January	4	21,648	171,035	14,294	140,038	660
February	4	19,665	190,700	12,984	153,022	660
March	4	20,665	211,365	15,209	168,231	736
April	4	18,809	230,174	13,843	182,074	736
May	4	19,344	249,518	14,237	196,311	736
June	4	18,689	268,207	13,755	210,066	736
July	4	19,170	287,377	14,108	224,174	736
August	4	20,512	307,889	16,173	240,347	788
September	4	20,130	328,019	14,816	255,163	736
October	4	19,965	347,984	14,695	269,858	736
November	5	20,727	368,711	15,230	285,088	736
December	4	19,876		16,780		844
Yearly Total						
<u>1959</u>						
January	4	19,810		16,724		844
February	5	22,680		15,199		670

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

BOTTOM HOLE PRESSURE DATA
DATUM -6050' SUBSEA

RANGER NO. 1			RANGER NO. 2			RANGER NO. 3			RANGER NO. 4		
DATE	HRS		DATE	HRS		DATE	HRS		DATE	HRS	
	SI	BHP		SI	BHP		SI	BHP		SI	BHP
11-15-56	48	3530	7-10-57	48	2843	9-13-57	48	3597	12-26-57	48	2838
7-24-57	48	2800	11-18-58	48	2305	11-28-58	48	2551	11-18-58	48	2004
12-26-57	48	2569	12-19-58	72	2212	1-5-59	24	2440	1-6-59	48	1882
11-21-58	48	2311	3-29-59	53	2025	3-29-59	51	2360	3-29-59	49	1795
12-29-58	24	2144									
3-29-59	49	2009									

Ranger No. 6

4-25-59 48 SI 2591

BEFORE THE
OIL CONS. & PROD. COMMISSION
SANTA FE, NEW MEXICO
11-11-59 EXHIBIT No. *6*
CASE *11-11-59 / 668*

63

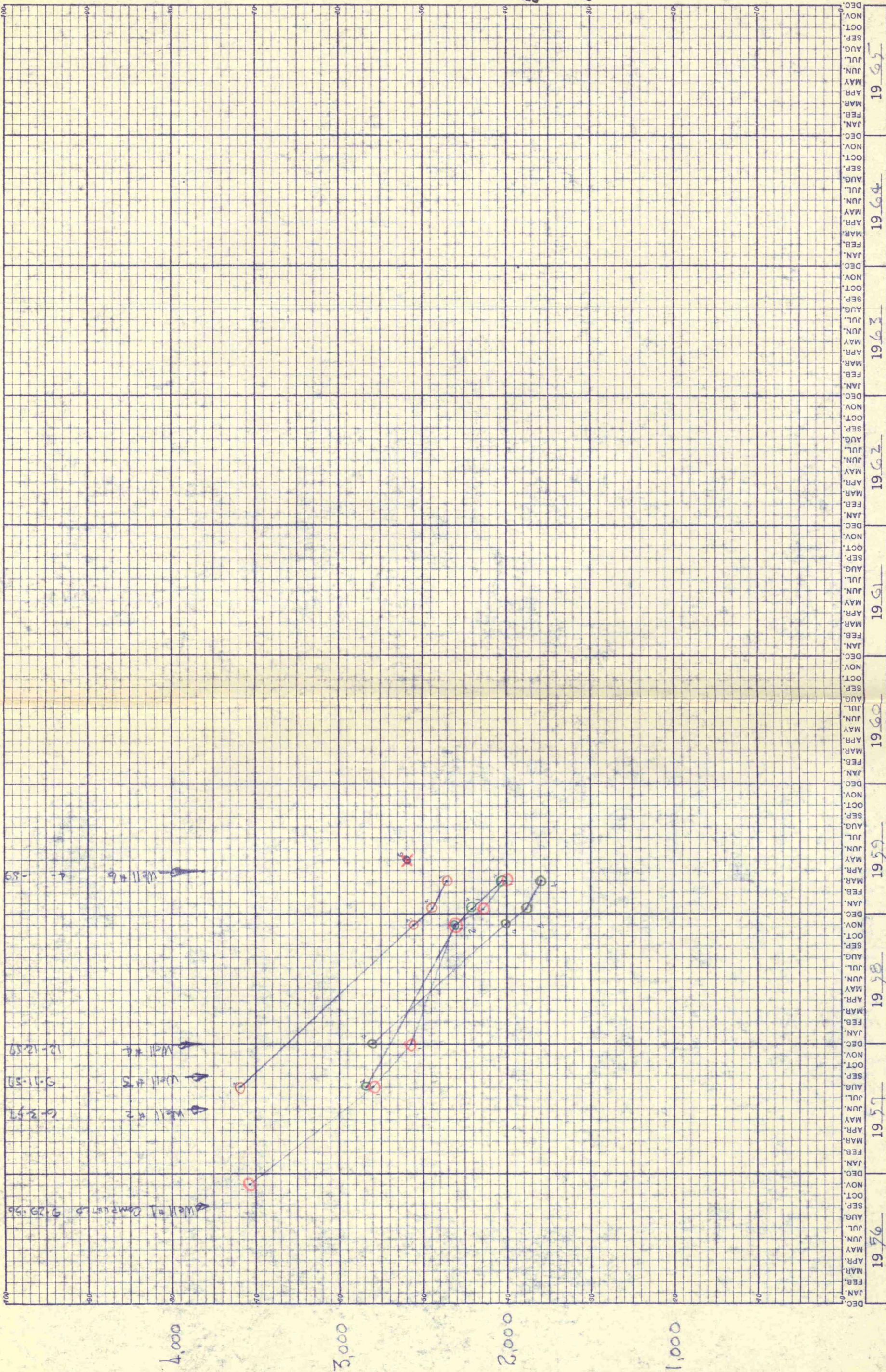
7

RANGER LEASE

Lease Operating Statements

<u>MONTH</u>	<u>PRODUCTION</u>	<u>CUMULATIVE PRODUCTION</u>
1956		
September	596	596
October	5,643	6,239
November	5,365	11,604
December	5,822	17,426
1957		
January	5,311	22,737
February	6,570	29,307
March	6,068	35,375
April	5,987	41,362
May	6,849	48,211
June	10,315	58,526
July	11,572	70,098
August	10,793	80,891
September	15,086	95,977
October	16,394	112,371
November	14,673	127,044
December	24,509	151,553
1958		
January	19,775	171,328
February	20,578	191,906
March	20,680	212,586
April	17,857	230,443
May	20,280	250,723
June	17,735	268,458
July	19,193	287,651
August	20,507	308,158
September	20,118	328,276
October	19,850	348,126
November	18,910	367,036
December	18,264	385,300
1959		
January	19,368	404,668
February	18,445	423,113
March	19,556	442,669

RAUGER LAKE PENNSYLVANIAN FIELD RANGER LEASE - PRESSURE HISTORY



OIL CONSERVATION COMMISSION
 BEFORE THE
 SANTA FE, NEW MEXICO
 CASE 11725
 EXHIBIT No. 8

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C.

ILLEGIBLE

BEFORE THE
UNITED STATES
DISTRICT COURT
SOUTHERN DISTRICT
OF NEW YORK
CASE NO. 1668

EXHIBIT NO. 1668
FILED
1968
JUL 10
CLERK OF COURT
UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

ILLEGIBLE

ILLEGIBLE

ILLEGIBLE

ILLEGIBLE

11

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

DETERMINATION OF DRAINAGE AREA FOR PHILLIPS RANGER NO. 1

On November 21, 1958 the BHP was determined to be 2311 psi.
Accumulated production to this date was 137,000 barrels.
Assuming this well to be the only one in the reservoir, then
the original oil in place contributing to the performance of
this well can be calculated from the following formula:

$$N = \frac{dNB}{B-B_o} = \frac{137,000 \times 1.429}{1.429 - 1.409} = \frac{195,773}{.02} = 9,788,650 \text{ bbls.}$$

The original oil in place per acre can be determined as follows:

$$\text{Oil in place} = \frac{7758 \times .087 \times (1 - .25)}{1.409} \times 32 = 11,488 \text{ bbls. per acre}$$

Area being drained by Phillips Ranger No. 1 then is:

$$\frac{\text{Total oil contributing}}{\text{Oil in place per acre}} = \frac{9,788,650}{11,488} = 852 \text{ acres}$$

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Pl: 11.75 EXHIBIT No. 1
CASE 1668

RANGER LAKE (PENNSYLVANIAN) FIELDLEA COUNTY, NEW MEXICOPhillips Ranger No. 1 - Comparison of actual and theoretical recoveries.

Based on the assumption that only 80 acres is contributing to the production of a well, what would the theoretical recovery be from original conditions to 2311 psi? Inasmuch as the pressure of 2311 psi is still above the saturation pressure, the recovery expressed in per cent of original oil in place can be calculated from the following formula.

$$dN/N = B-B_o/B = 1.429-1.409/1.429 = .02/1.429 = 1.4\%$$

If only this eighty-acre tract were contributing to the production of the Phillips Ranger No. 1, then its actual recovery would approximate the theoretical of 1.4%. If the actual recovery efficiency is greater, it means that more than 80 acres are contributing to the performance of this well. If the recovery is less, then less than eighty acres are contributing to the performance of this well.

$$\begin{aligned} \text{Original oil in place per acre foot} &= \frac{7758 \times (1-S_w)}{B_o} \\ &= \frac{7758 \times 0.087 \times (1-.25)}{1.409} = 359 \text{ bbls.} \end{aligned}$$

$$\text{Original oil in place per 80 acres} = 359 \times 32 \times 80 = 918,000 \text{ bbl.}$$

Recovery to November 21, 1958 and a BHP of 2311 psi is 137,000 bbls.

$$\text{Actual recovery} = 137,000/918,000 = 14.9\%$$

Obviously, a much larger area than 80 acres is contributing to the performance of the Phillips Ranger No. 1.

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
Phillips
12/668

GRANTHAM, SPANN AND SANCHEZ
ATTORNEYS AT LAW
904 SIMMS BUILDING
POST OFFICE BOX 1031
ALBUQUERQUE, NEW MEXICO

EVERETT M. GRANTHAM
CHARLES C. SPANN
MAURICE SANCHEZ
FRED M. STANDLEY

TELEPHONE
CHAPEL 3-3525

July 18, 1960

Case 1668

Mr. A. L. Porter, Secretary
Oil Conservation Commission
P. O. Box 871
Santa Fe, N. M.

Dear Mr. Porter:

I enclose herewith for filing, original and 2 copies of Application of Phillips Petroleum Company for establishment of special rules and regulations to provide for 80-acre units for the Ranger Lake Pennsylvania Pool, Lea County, New Mexico

Very truly yours,

GRANTHAM, SPANN AND SANCHEZ

By

Charles C. Spann

CCS:MI

encl 3

Robert M. Miller Aug 4, 1960

1665

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. _____
CASE _____

4

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

1. PHYSICAL PROPERTIES OF THE RESERVOIR ROCK

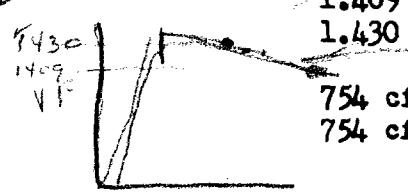
- | | | |
|----------------------------------|--------|-------------|
| a. Approximate Average Porosity | 8.7% | <i>core</i> |
| b. Maximum Measured Permeability | 28 md. | 14 md |
| c. Average Connate Water | 25% | |

2. STRUCTURAL FEATURES OF THE RESERVOIR

- | | |
|-------------------------------|-------------------------|
| a. Structure Map) | See Geological Exhibits |
| b. Cross Sections) | |
| c. Original Gas-Oil Contact | Not Applicable |
| d. Original Water-Oil Contact | -6210 ft. subsea |

3. CHARACTERISTICS OF RESERVOIR FLUID

- | | |
|----------------------------------|-----------------------------------|
| a. Average Gravity of S.T. Oil | <i>under saturation</i> 40.4° API |
| b. Estimated Saturation Pressure | 2250 psia |
| c. Formation Volume Factor | |
| At Original Pressure ✓ | 1.409 RB/STB |
| At Saturation Pressure | 1.430 |
| d. Solubility | |
| At Original Pressure | 754 cf/b |
| At Saturation Pressure | 754 cf/b |



4. PRESSURE AND TEMPERATURE

- | | | |
|--|----------------|-----------------------------|
| a. Original Reservoir Pressure | 3530 psi | <i>after 7000 bbls prod</i> |
| b. Reservoir Temperature | 162°F | |
| c. Reservoir Pressure History | See Attachment | |
| d. Average Shut-In Time Prior to Pressure Survey | 48 hours | |
| e. Productivity Indices Data | | |
| Range - Bbl/Day/psi Pressure Drop | .793 to 1.553 | |

5. STATISTICAL DATA

- | | |
|--------------------------------------|--|
| a. Accumulated Production to 12-1-58 | |
| Oil | 368,711 bbls. |
| Gas | 285,088 MCF |
| Water | 0 bbls. |
| b. Monthly Oil Production | See Attachment |
| c. Monthly Producing Gas Oil Ratio | |
| d. Number of Producing Wells | 6 |
| e. Spacing Pattern | 5 |
| f. State of Depletion | Staggered 80-Acre Units Early or Development |

6. GENERAL RESERVOIR MECHANICS

To date the primary source of reservoir energy has been the expansion of oil above the saturation pressure. The future reservoir mechanism will be a solution gas drive which may or may not be aided by a partial water drive. To date there has been no evidence of a water drive.

5

PRODUCTION DATA

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

<u>YEAR AND MONTH</u>	<u>NUMBER OF WELLS</u>	<u>OIL PRODUCTION</u>		<u>GAS PRODUCTION</u>		<u>GAS OIL RATIO</u>
		<u>MONTHLY</u>	<u>ACCUMULATED</u>	<u>MONTHLY</u>	<u>ACCUMULATED</u>	
<u>1956</u>						
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May	2	6,773	47,339	5,545	43,706	819
June	2	10,736	58,075	8,847	52,553	824
July	2	11,276	69,351	9,292	61,845	824
August	2	10,674	80,025	8,795	70,640	824
September	3	15,780	95,805	12,949	83,589	821
October	3	16,296	112,101	14,279	97,868	876
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August	4	20,512	307,889	16,173	240,347	788
September	4	20,130	328,019	14,816	255,163	736
October	4	19,965	347,984	14,695	269,858	736
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<u>1959</u>						
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February	5	22,680		15,199		670

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

BOTTOM HOLE PRESSURE DATA DATUM -6050 SUBSEA

RANGER NO. 1			RANGER NO. 2			RANGER NO. 3			RANGER NO. 4		
DATE	HRS		DATE	HRS		DATE	HRS		DATE	HRS	
	SI	BHP		SI	BHP		SI	BHP		SI	BHP
11-15-56	48	3530	7-10-57	48	2843	9-13-57	48	3597	12-26-57	48	2838
7-24-57	48	2800	11-18-58	48	2305	11-28-58	48	2551	11-18-58	48	2004
12-26-57	48	2569	12-19-58	72	2212	1-5-59	24	2440	1-6-59	48	1882
11-21-58	48	2311	3-29-59	53	2025	3-29-59	51	2360	3-29-59	49	1795
12-29-58	24	2144									
3-29-59	49	2009									

Ranger No. 6.

Date Hrs. SI. BHP
4-25-59 48 2591

6

RANGER LEASE

Lease Operating Statements

<u>MONTH</u>	<u>PRODUCTION</u>	<u>CUMULATIVE PRODUCTION</u>
1956		
September	596	596
October	5,643	6,239
November	5,365	11,604
December	5,822	17,426
1957		
January	5,311	22,737
February	6,570	29,307
March	6,068	35,375
April	5,987	41,362
May	6,849	48,211
June	10,315	58,526
July	11,572	70,098
August	10,793	80,891
September	15,086	95,977
October	16,394	112,371
November	14,673	127,044
December	24,509	151,553
1958		
January	19,775	171,328
February	20,578	191,906
March	20,680	212,586
April	17,857	230,443
May	20,280	250,723
June	17,735	268,458
July	19,193	287,651
August	20,507	308,158
September	20,118	328,276
October	19,850	348,126
November	18,910	367,036
December	18,264	385,300
1959		
January	19,368	404,668
February	18,445	423,113
March	19,556	442,669

ILLEGIBLE

ILLEGIBLE

11

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

DETERMINATION OF DRAINAGE AREA FOR PHILLIPS RANGER NO. 1

On November 21, 1958 the BHP was determined to be 2311 psi. Accumulated production to this date was 137,000 barrels. Assuming this well to be the only one in the reservoir, then the original oil in place contributing to the performance of this well can be calculated from the following formula:

$$N = \frac{dNB}{B - B_o} = \frac{137,000 \times 1.429}{1.429 - 1.409} = \frac{195,773}{.02} = 9,788,650 \text{ bbls.}$$

The original oil in place per acre can be determined as follows:

$$\text{Oil in place} = \frac{7758 \times .087 \times (1 - .25)}{1.409} \times 32 = 11,488 \text{ bbls. per acre}$$

Area being drained by Phillips Ranger No. 1 then is:

$$\frac{\text{Total oil contributing}}{\text{Oil in place per acre}} = \frac{9,788,650}{11,488} = 852 \text{ acres}$$

$$\begin{array}{r} 250.0 \quad 1430 \\ \hline 145 \quad 1409 \end{array}$$

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

Phillips Ranger No. 1 - Comparison of actual and theoretical recoveries.

Based on the assumption that only 80 acres is contributing to the production of a well, what would the theoretical recovery be from original conditions to 2311 psi? Inasmuch as the pressure of 2311 psi is still above the saturation pressure, the recovery expressed in per cent of original oil in place can be calculated from the following formula.

$$dN/N = B-B_o/B = 1.429-1.409/1.429 = .02/1.429 = 1.4\%$$

If only this eighty-acre tract were contributing to the production of the Phillips Ranger No. 1, then its actual recovery would approximate the theoretical of 1.4%. If the actual recovery efficiency is greater, it means that more than 80 acres are contributing to the performance of this well. If the recovery is less, then less than eighty acres are contributing to the performance of this well.

$$\begin{aligned} \text{Original oil in place per acre foot} &= \frac{7758 \cancel{x} (1-S_w)}{B_o} \\ &= \frac{7758 \times 0.87 (1-.25)}{1.409} = 359 \text{ bbls.} \end{aligned}$$

$$\text{Original oil in place per 80 acres} = 359 \times 32 \times 80 = 918,000 \text{ bbl.}$$

Recovery to November 21, 1958 and a BHP of 2311 psi is 137,000 bbls.

$$\text{Actual recovery} = 137,000/918,000 = 14.9\%$$

Obviously, a much larger area than 80 acres is contributing to the performance of the Phillips Ranger No. 1.