

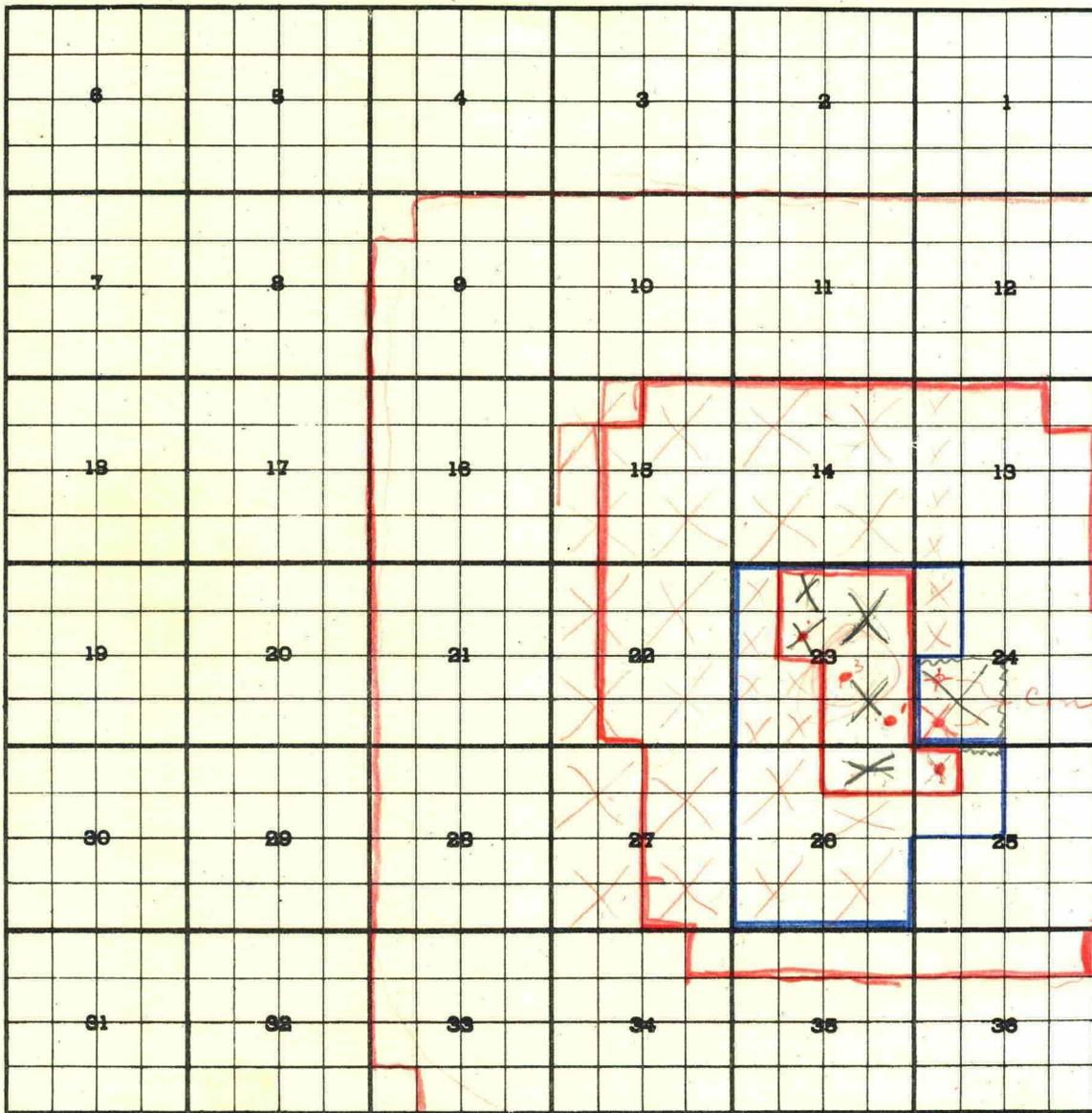
FIELD RULES HEARING
RANGER LAKE (PENNSYLVANIAN) FIELD
FEBRUARY 18, 1959

The information contained in this report has been assembled by Phillips Petroleum Company. The interpretation of these data and recommendations represents the views of Phillips Petroleum Company, and are not necessarily concurred in by the other operators in the field.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Appl. EXHIBIT No. 4
CASE 1598

County _____ Pool _____

TOWNSHIP 12 South, RANGE 34 East, NEW MEXICO PRINCIPAL MERIDIAN



• Ranger Lake Penn
x registered addition

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
 - 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 5
 - e. Spacing Pattern Staggered 80-Acre Units
 - f. State of Depletion 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.

7. RECOMMENDATIONS

Develop the subject reservoir on a well spacing of 80 acres with well locations to be not more than 150 feet from the centers of the NW/4 and SE/4 of each governmental quarter section.

RANGER LAKE (PENNSYLVANIAN) FIELD

LEA COUNTY, NEW MEXICO

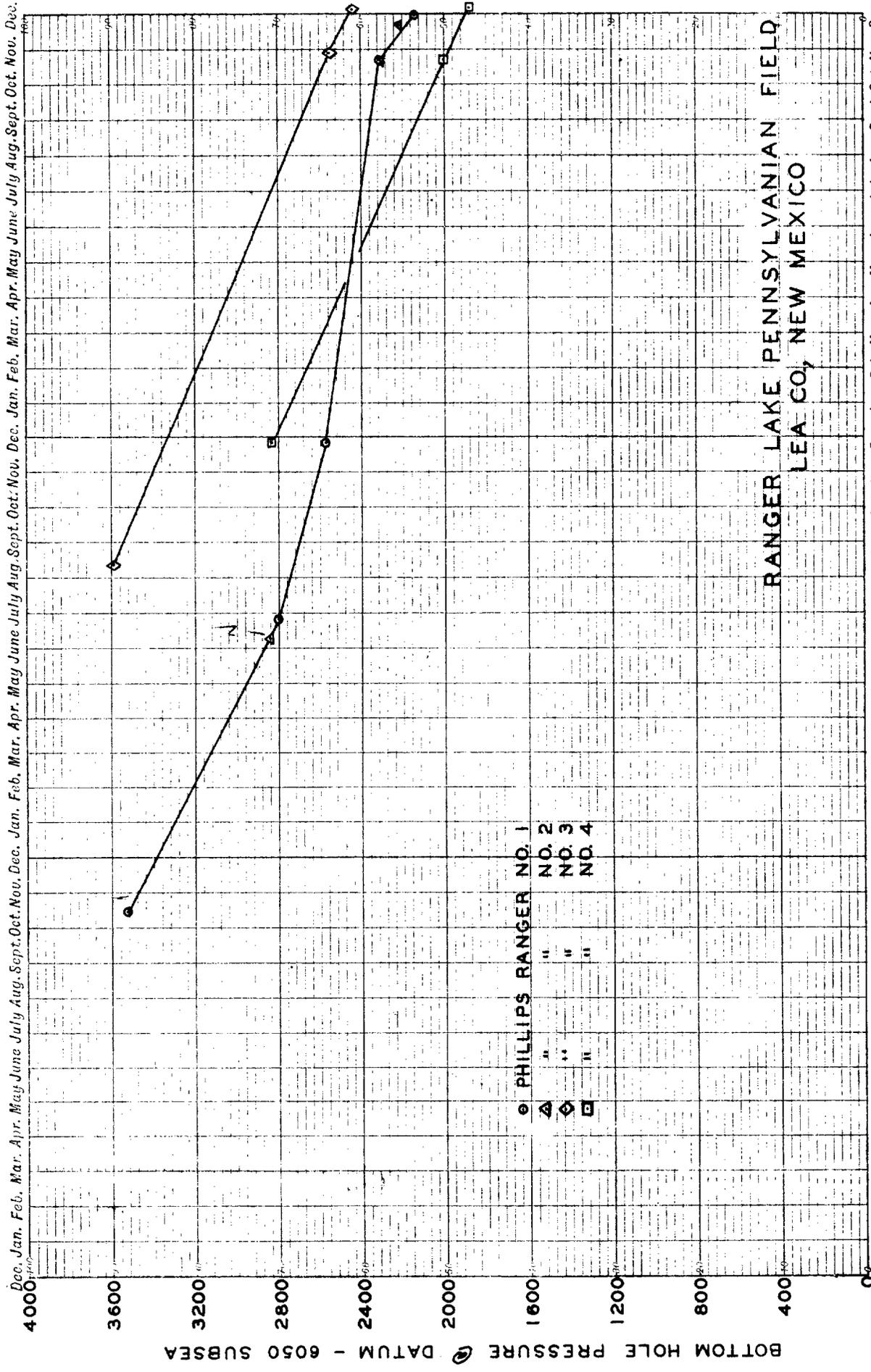
61

65

BOTTOM HOLE PRESSURE DATA
DATUM -6050 SUBSEA

<u>RANGER NO. 1</u>			<u>RANGER NO. 2</u>			<u>RANGER NO. 3</u>			<u>RANGER NO. 4</u>		
<u>DATE</u>	<u>HRS</u>	<u>BHP</u>									
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									
12-29-58	24	2144									

65



BOTTOM HOLE PRESSURE @ DATUM - 6050 SUBSEA

○ PHILLIPS RANGER NO. 1
 ▲ " " " " NO. 2
 ◆ " " " " NO. 3
 □ " " " " NO. 4

RANGER LAKE PENNSYLVANIAN FIELD
LEA CO., NEW MEXICO

Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Year of 1956

Year of 1957

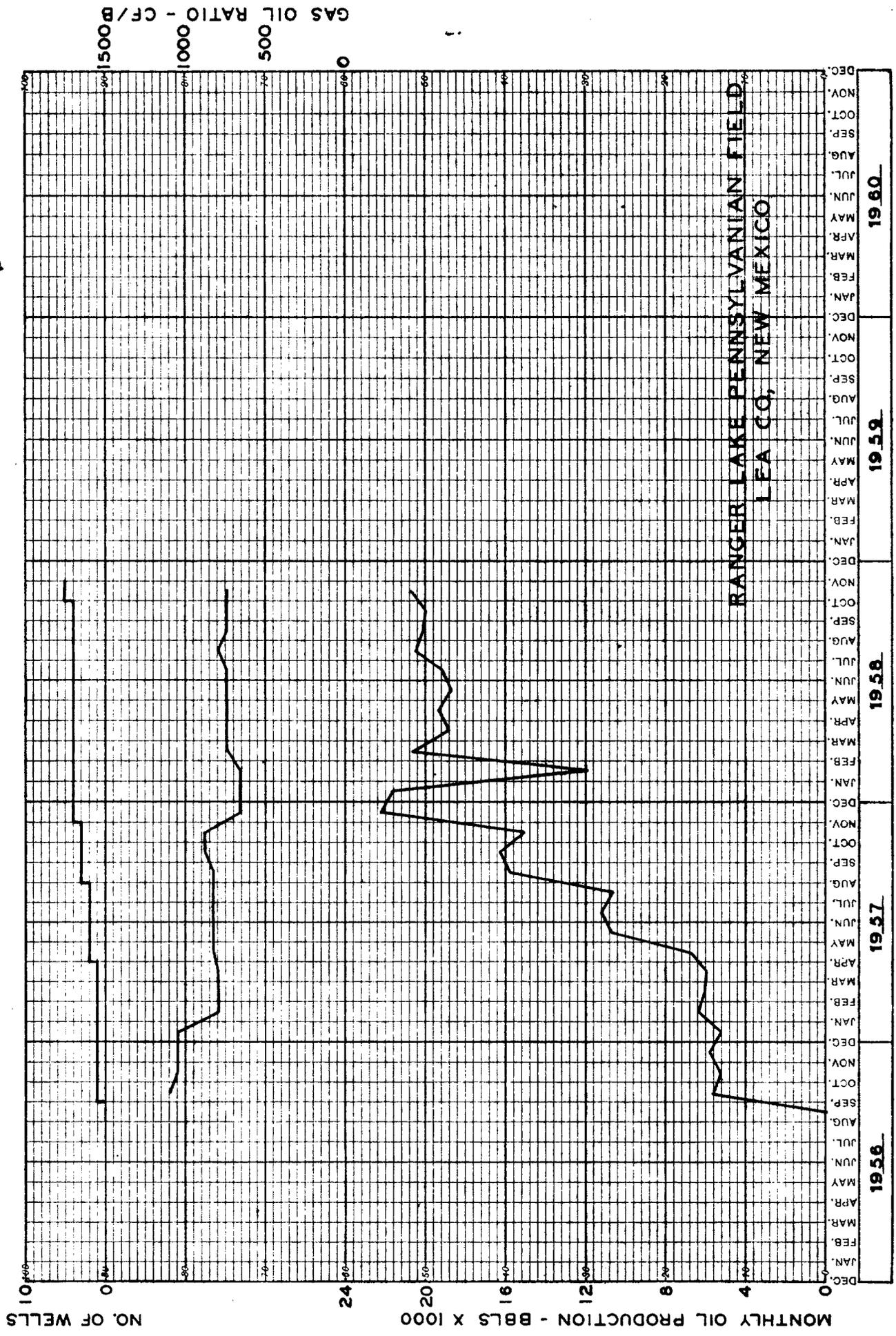
Year of 1958

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>						
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		107,312		
<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



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:

$$N = \frac{dNB}{B-B_0} = \frac{137,000 \times 1.429}{1.429 - 1.409} = \frac{195,773}{.02} = 9,788,650 \text{ bbls.}$$

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:

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

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.

$$dN/N = B-B_0/B = 1.429-1.409/1.429 = .02/1.429 = 1.4\%$$

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.

$$\begin{aligned} \text{Original oil in place per acre foot} &= \frac{7758 \times (1-S_w)}{B_0} \\ &= \frac{7758 \times 0.087 \times (1-.25)}{1.409} = 359 \text{ bbls.} \end{aligned}$$

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

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.

PROPOSED SPECIAL FIELD RULES
RANGER LAKE (PENNSYLVANIAN) POOL
LEA COUNTY, NEW MEXICO

IT IS THEREFORE ORDERED:

(1) That the Ranger Lake (Pennsylvanian) Pool be and the same is hereby extended, and that the vertical limits thereof shall consist of the entire Pennsylvanian formation.

(2) That the horizontal limits of said Ranger Lake (Pennsylvanian) Pool shall be that area described as follows:

"W/2 W/2 of Section 13; all of Sections 14, 15, 22, 23, W/2 of NW/4 and SW/4 of SW/4 of Section 24, W/2 of W/2 of Section 25, and all of Sections 26 and 27, Township 12 South, Range 34 East, Lea County, New Mexico."

IT IS THEREFORE ORDERED:

That special pool rules applicable to the Ranger Lake (Pennsylvanian) Pool be and the same are hereby promulgated as follows:

RULE 1 That any well drilled to or completed in the Pennsylvanian formation within one mile of the boundary of the Ranger Lake (Pennsylvanian) Pool as it is now defined or may hereafter be defined, shall be located, spaced, drilled, operated, and prorated in accordance with the rules and regulations in effect in said Ranger Lake (Pennsylvanian) Pool.

RULE 2 That 80-acre drilling and proration units be and the same are hereby established for the Ranger Lake (Pennsylvanian) Pool; further, that any well projected to or completed in the Ranger Lake (Pennsylvanian) Pool shall be assigned a tract comprising one-half of a governmental quarter section.

RULE 3 (a) That any well projected to or completed in the Ranger Lake (Pennsylvanian) Pool shall be located within 150 feet of the center of the Southeast Quarter (SE/4) or the Northwest Quarter (NW/4) of a governmental quarter section.

(b) The Secretary of the Commission shall have authority to grant an exception to the requirements of Rule 3 (a) above without notice and hearing where application has been filed in due form and the necessity for the unorthodox location is based on topographical conditions.

Applicants shall furnish all operators within a 1320-foot radius of the subject well a copy of the application to the Commission, and applicant shall include with his application a list of names and addresses of all operators within such radius, together with a stipulation that proper notice has been given said operators at the addresses given. The Secretary of the Commission shall wait at least 20 days after receipt of application before approving any such unorthodox location, and shall approve such unorthodox location only in the absence of objection by any offset

operator. In the event an operator objects to the unorthodox location, the Commission shall consider the matter only after proper notice and hearing.

RULE 4 That any well which is completed in the Ranger Lake (Pennsylvanian) Pool and to which is dedicated less than 79 acres [REDACTED] shall be granted an allowable in the proportion that the total number of acres assigned to the well bears to 80 acres.

RULE 5 That no well shall be assigned an allowable until Commission Form C-128 has been filed with the Commission indicating [REDACTED] is dedicated to the well. *the tract which*

RULE 6 The casing program of all wells hereafter drilled in the Ranger Lake (Pennsylvanian) Pool shall include at least two (2) strings of pipe set in accordance with the following program:

(a) The surface casing shall be of new or reconditioned pipe of proper weight and test to withstand the known pressures in said field, set and cemented at a depth not less than three hundred (300) feet; said amount of surface casing to be adequate to protect all fresh water sands. Cementing shall be by the pump and plug method with a sufficient volume of cement used to fill the annular space back of the casing to the surface of the ground, or to the bottom of the cellar. Cement shall be allowed to stand a minimum of twelve (12) hours under pressure before drilling the plug or initiating tests. Before drilling the plug, pump pressure of at least one thousand (1,000) pounds per square inch shall be applied. If at the end of thirty (30) minutes the pressure shows a drop of one hundred (100) pounds per square inch, or more, the casing shall be condemned. After corrective operations, the casing shall be tested again in the same manner.

(b) The producing, or oil string, shall be new or reconditioned pipe of proper weight and test to withstand the known pressures in said field, set and cemented no higher than the top of the producing formation. Cementing shall be by the pump and plug method, and sufficient cement shall be used to fill the calculated annular space behind the pipe to the surface of the ground, or at least one hundred (100) feet above the shoe of the intermediate string, if one is set. Cement shall be allowed to stand a minimum of twelve (12) hours before drilling the plug or initiating tests. The casing shall be tested by pump pressure of at least one thousand (1000) pounds per square inch applied. If at the end of thirty (30) minutes the pressure shows a drop of one hundred (100) pounds per square inch, or more, the casing shall be condemned. After corrective operations, the casing shall be tested again in the same manner.

RULE 7 The permitted gas-oil ratio for all wells shall be two thousand (2,000) cubic feet of gas per barrel of oil produced. Any oil well producing with a gas-oil ratio in excess of two thousand (2,000) cubic feet of gas per barrel of oil shall be allowed to produce daily only that volume of gas obtained by multiplying the daily oil allowable of such well as determined by the applicable rules of the Commission by two thousand (2,000) cubic feet. The gas volume thus obtained shall be known as the daily gas limit of such well. The daily oil allowable of such well shall be determined and assigned by dividing its daily gas limit by its producing gas-oil ratio.

RULE 8 The datum reservoir pressure of all flowing wells in the Ranger Lake

(Pennsylvanian) Pool shall be determined once a year during the months of April and May, and the results reported to the Commission by the first (1st) day of July of each year. The datum reservoir pressure shall be obtained by the use of a subsurface pressure gauge, and the pressure observations shall be made at or corrected to a datum of 6050 feet below sea level after a continuous shut-in period of not less than forty-eight (48) hours, nor more than seventy-two (72) hours.

Transcript of Hearing, Case No. 1598, dated
February 19, 1959, mailed to Ada Dearnley on
August 5, 1959.

vem

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.
ROBERT C. BLEDSOE

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

TELEPHONE MAIN 2-6510
POST OFFICE BOX 547

April 1, 1959

New Mexico Oil Conservation Commission
Capitol Building
Santa Fe, New Mexico

Attention: Mr. Dan Nutter

Re: Case No. 1598
Order No. R-1343
Ranger Lake Pool

Dear Dan:

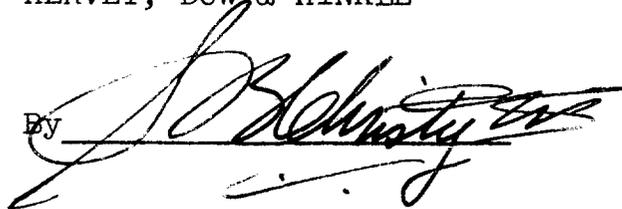
In line with our letter of March 12, we would appreciate borrowing a copy of the transcript and any extra exhibits in the above case, and will return them to you in about ten days after receipt.

Thanking you in advance for your courtesies in this connection, we are,

Yours very truly,

HERVEY, DOW & HINKLE

By



SBC:jy

PHILLIPS PETROLEUM COMPANY
WELL TABULATION CHART, RANGER LAKE PENNSYLVANIAN POOL
LEA COUNTY, NEW MEXICO

201, 113

WELL NAME	LOCATION	ELEV.	COMP. DATE	TD PB	TOP PAY	INITIAL POTENTIAL	PERF.	TREATMENT	DST'S CISCO	CISCO PROD. TEST	
Phillips & T.P.C. & O. #1 West Ranger Unit	660' F&S&L Sec. 23, 125, 34E, Lea Co.	KB 4153'	9-29-56	PB10, 563'	10, 266 (-5767)	F 406 BO, no wtr., 24 hrs, 1/4" ch, 41.3 sty, GOR 1096, TP 750#.	10, 312-51'	A/500	10, 270-385', TO 2 hrs. TBTS 45 min., GTS 47 min., OTS 55 min. Flwd 28 BO 1 hr., GOR 1264, rev. out 24 BO.		
Phillips & T.P.C. & O. #2 West Ranger Unit	330' F&S&L, Sec. 25, 125, 34E, Lea Co.	KB 4150'	5-27-57	PB10, 395' PB10, 350' (-6133)	10, 283' (-6133)	F 304 BO, no wtr., 24 hrs., 5/16" ch, 40.3 sty, GOR 552, TP 325#	10, 282-303 10, 310-37'	A/1250 F/10, 282-326 A/500 F/10, 326-37'		P/10, 361- 71', A/500, Swbd 50 BWT 12 hrs. Sq. perfs. w/ 22 sacks.	
Phillips & T.P.C. & O. #3 West Ranger Unit	1979 F&S&L & 1978 F&L Sec. 23, 125, 34E, Lea County	KB 4160'	9-3-57	PB10, 371' PB10, 360' (-6078)	10, 238' (-6078)	F 586 BO, no wtr., 24 hrs., 3/8" ch, 40.4 sty, GOR 755, TP 300#	10, 238-74' 10, 296-310' 10, 322-23' 10, 334-44'	A/1000 F/10, 238- 323' A/500		BEFORE THE OIL CONSERVATION COMMISSION SANITA FE, NEW MEXICO EXHIBIT No. 28 CASE 1588	
Phillips & T.P.C. & O. #1 West Ranger Unit	1980 F&L & 1978 F&L Sec. 23, 125, 34E, Lea County	KB 4163'	9-11-57	PB 10, 367' PB 10, 355' (-5744)	10, 240' (-5744)	F 319 BO, no wtr., 24 hrs., 3/8" ch, 40.4 sty, GOR 984, TP 260#	10, 240-86' 10, 304-313' 10, 323-50'	A/1500 F/10, 240-338' A/500			
Gordon W. Cone #1 State 24-1	1980 F&L, 660' F&L Sec. 24, 125, 34E, Lea County	KB 4152'	2-20-57	PB 10, 433'	10, 317' (-6165)	PSA					10, 357-397' Op. 1 hr. 5 min. Rec. 1840' WB 30' mud. NS. 10, 346-433' Op. 1 hr. Rec. 1840' WB 39' X. 10' mud. NS.
Gordon M. Cone #2 State 24	330' F&S&L, Sec. 24, 125, 34E, Lea Co.	KB 4151'	11-5-58	PB10, 375' PB10, 344' (-6148)	10, 299' (-6148)	F 376 BOPD, no wtr., 20/64" ch, sty 40.	10, 310-320'	A/500	10, 307-375' Op. 4 hrs. GTS 1 hr. Rec. 1300' WB 6262' oil 7 919' KM.		

Case No.

1598

Large Exhibits

LARGE FORMAT
EXHIBIT HAS
BEEN REMOVED
AND IS LOCATED
IN THE NEXT FILE

LARGE FORMAT
EXHIBIT HAS
BEEN REMOVED
AND IS LOCATED
IN THE NEXT FILE