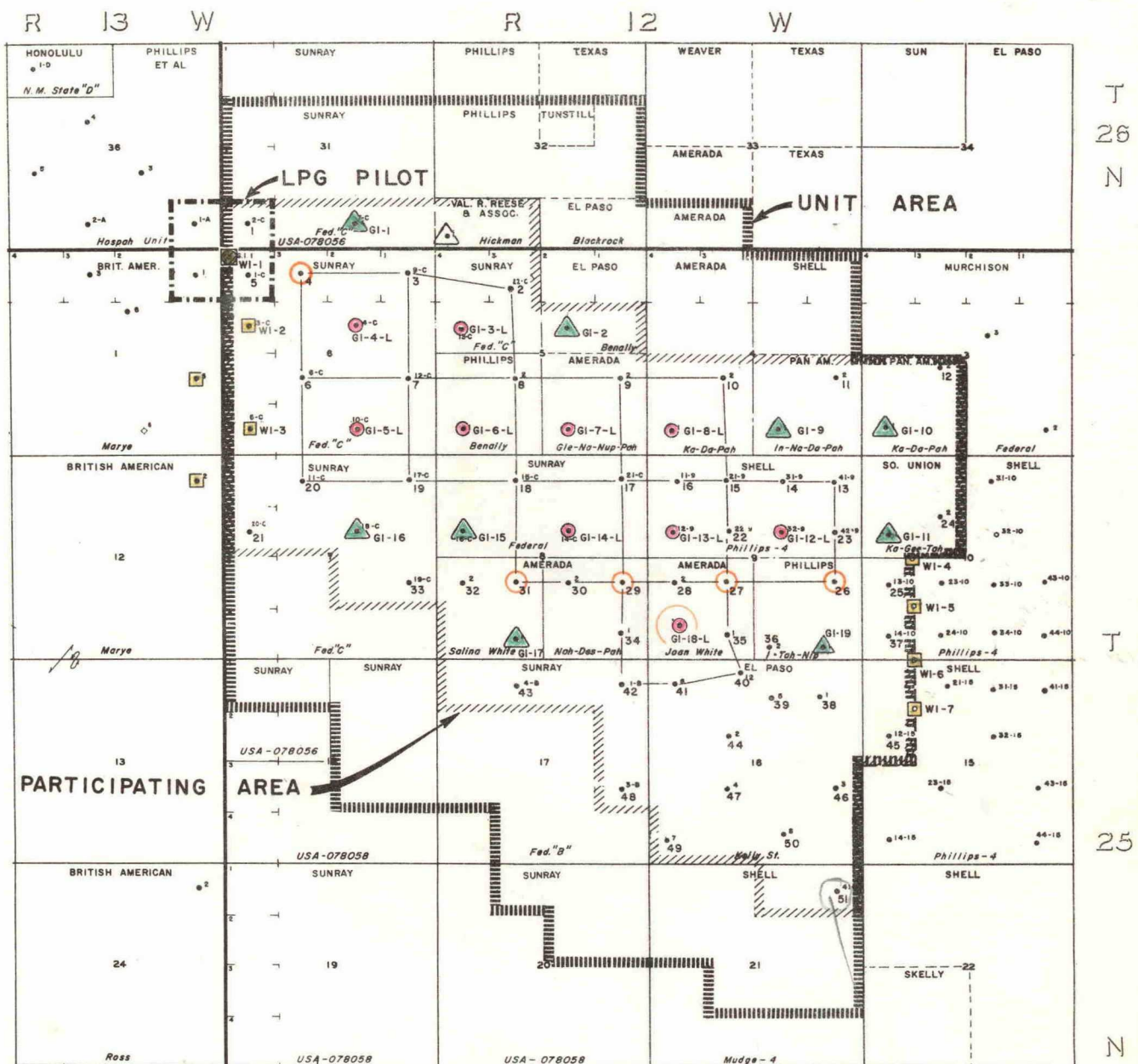


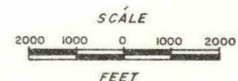
SUNRAY MID-CONTINENT OIL COMPANY  
EXHIBIT NO. 1 CASE NO. 1904



CENTRAL BISTI LOWER GALLUP SAND UNIT  
San Juan County, New Mexico

LEGEND

- LPG INJECTION WELL
- ▲ GAS INJECTION WELL
- DRILLED AFTER UNITIZATION
- WATER INJECTION WELL



EX-1







PRODUCING GAS-OIL RATIO, MCF/BBL.

INJECTION VOLUME / PRODUCED VOLUME

GAS PRODUCTION RATE MMCF/DAY

RESERVOIR BBL. / RESERVOIR BBL.

RESERVOIR PERFORMANCE  
CENTRAL BISTI UNIT  
San Juan Co., New Mexico

INJECTED PRODUCTS /  
RESERVOIR VOIDAGE RATIO

VOLUMETRIC AVERAGE  
BOTTOM HOLE PRESSURE

AVERAGE GAS - OIL RATIO

DAILY OIL PRODUCTION RATE

DAILY GAS PRODUCTION RATE

Unit Activated July 1, 1959

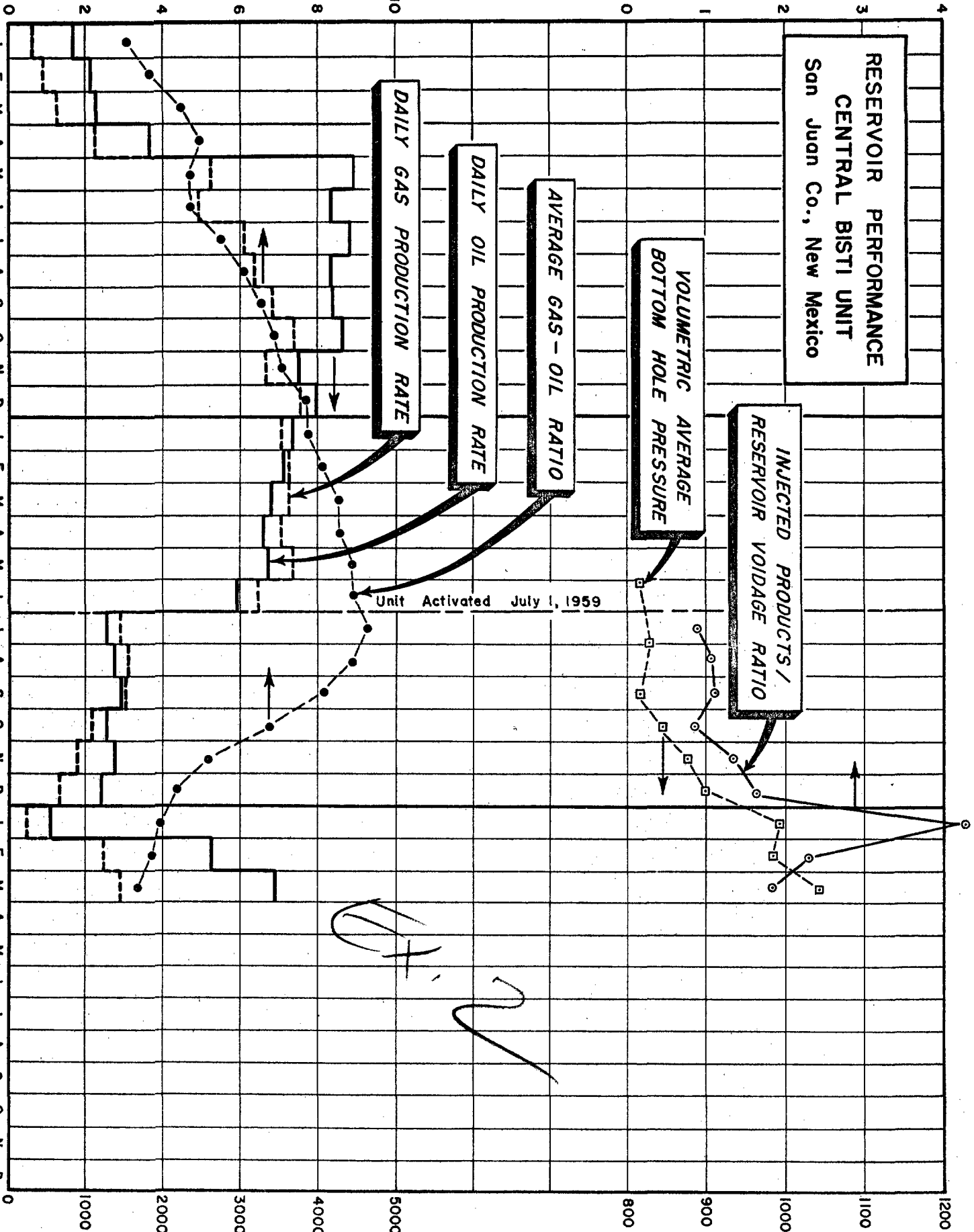
OIL PRODUCTION RATE, BBL./DAY

RESERVOIR PRESSURE, P.S.I.A.

SUNRAY MID-CONTINENT OIL COMPANY  
1958  
EXHIBIT NO. 2  
CASE NO. 4061904

1959  
YEAR

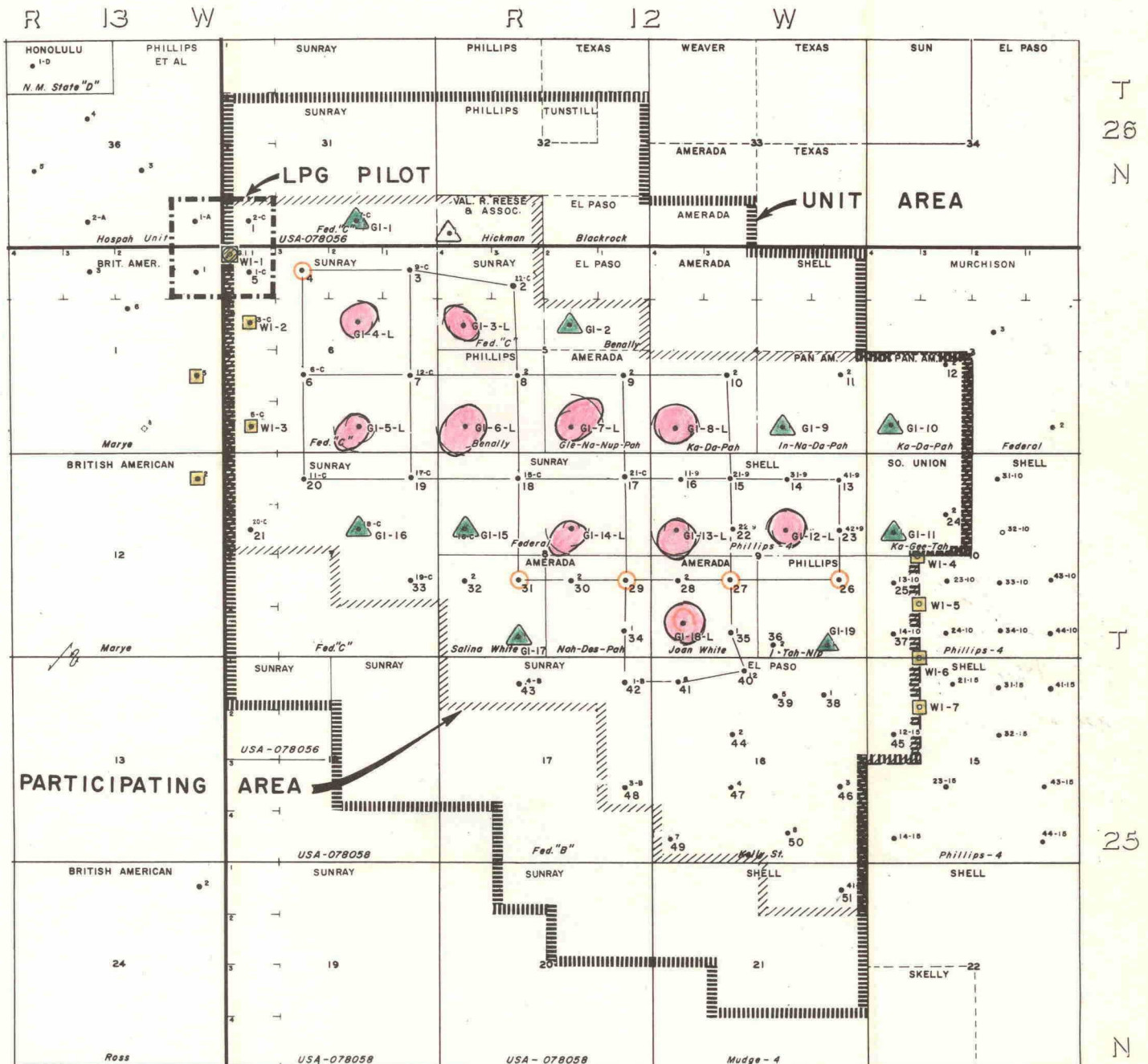
1960





# SUNRAY MID-CONTINENT OIL COMPANY

EXHIBIT NO. 3 CASE NO. 1904



CENTRAL BISTI LOWER GALLUP SAND UNIT  
San Juan County, New Mexico

## LEGEND

- LPG INJECTION WELL
- ▲ GAS INJECTION WELL
- DRILLED AFTER UNITIZATION
- WATER INJECTION WELL

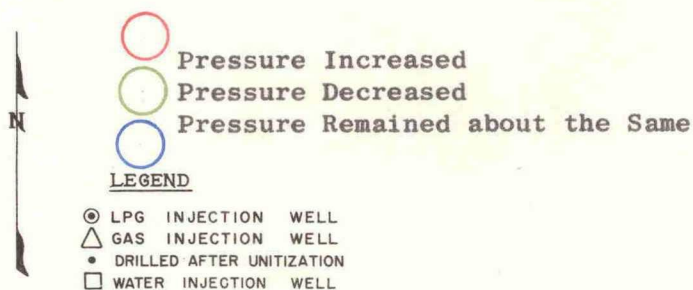
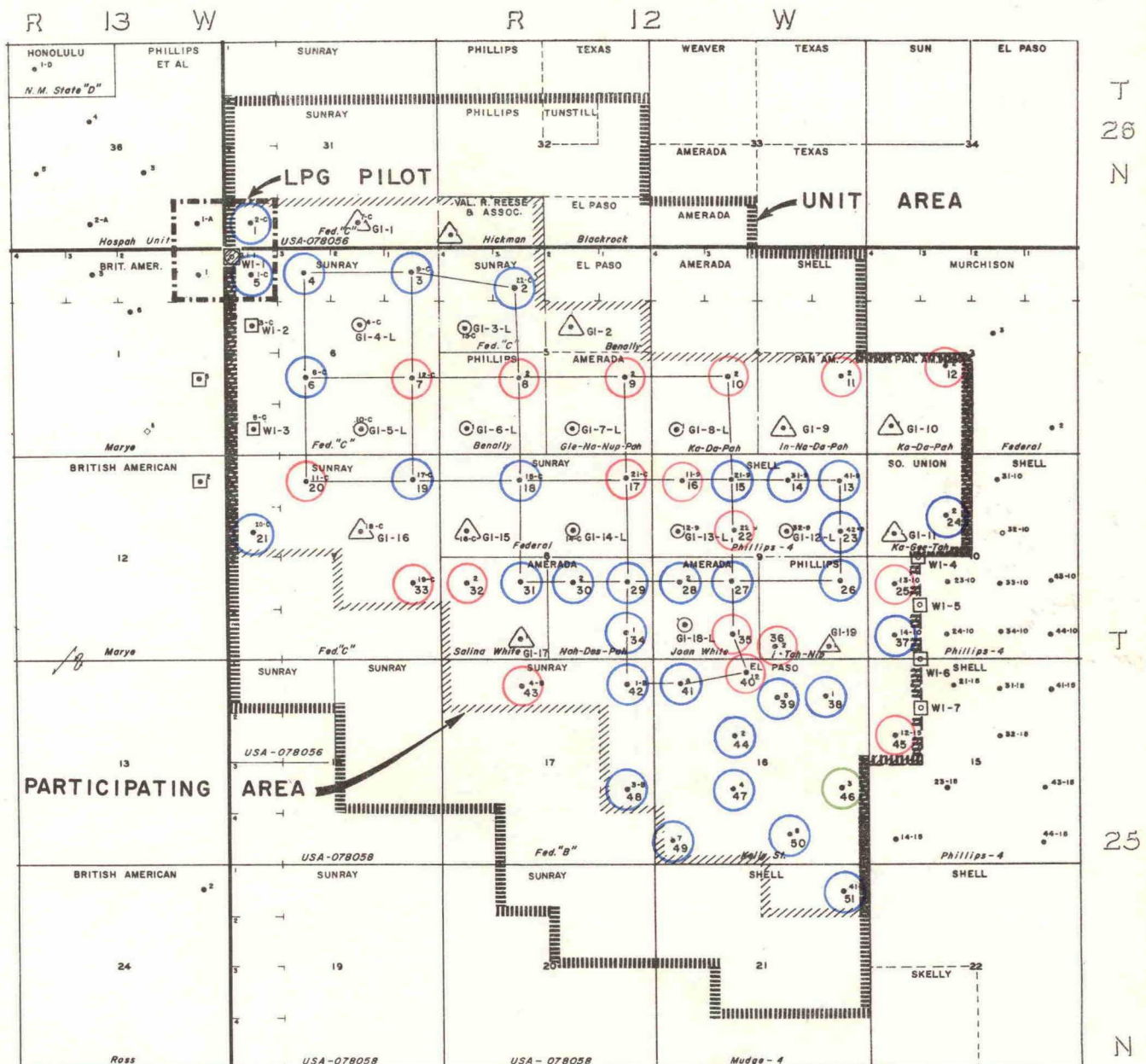
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FEET

EX-3

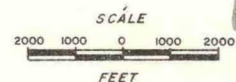


# SUNRAY MID-CONTINENT OIL COMPANY

EXHIBIT NO. 4 CASE NO. 1904



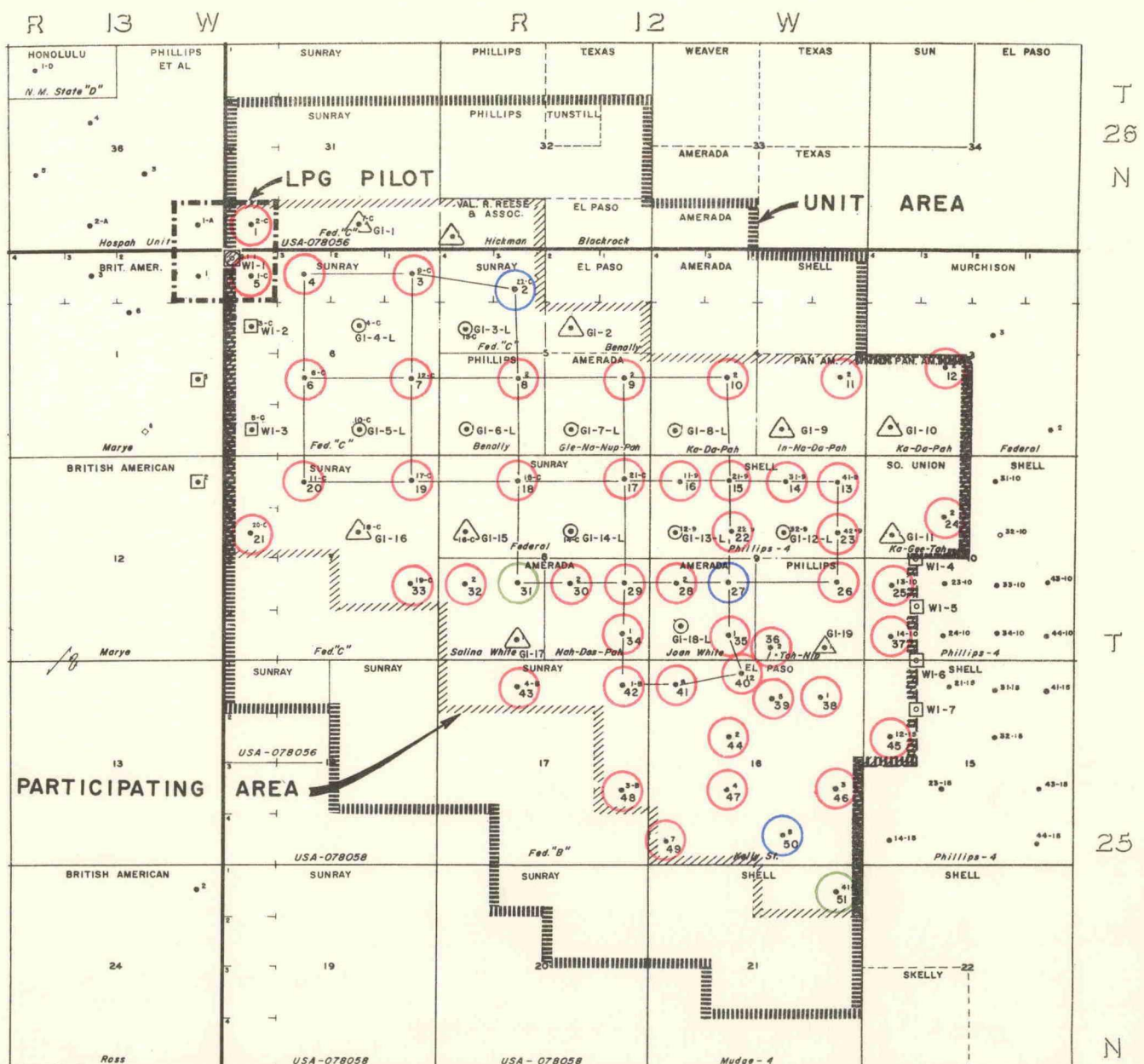
CENTRAL BISTI LOWER GALLUP SAND UNIT  
 San Juan County, New Mexico



Ex. 4



SUNRAY MID-CONTINENT OIL COMPANY  
EXHIBIT NO. 5 CASE NO. 1904



○ GOR Decreased  
○ GOR Increased  
○ GOR Remained about the Same

LEGEND

- ⊙ LPG INJECTION WELL
- △ GAS INJECTION WELL
- DRILLED AFTER UNITIZATION
- WATER INJECTION WELL

CENTRAL BISTI LOWER GALLUP SAND UNIT  
San Juan County, New Mexico

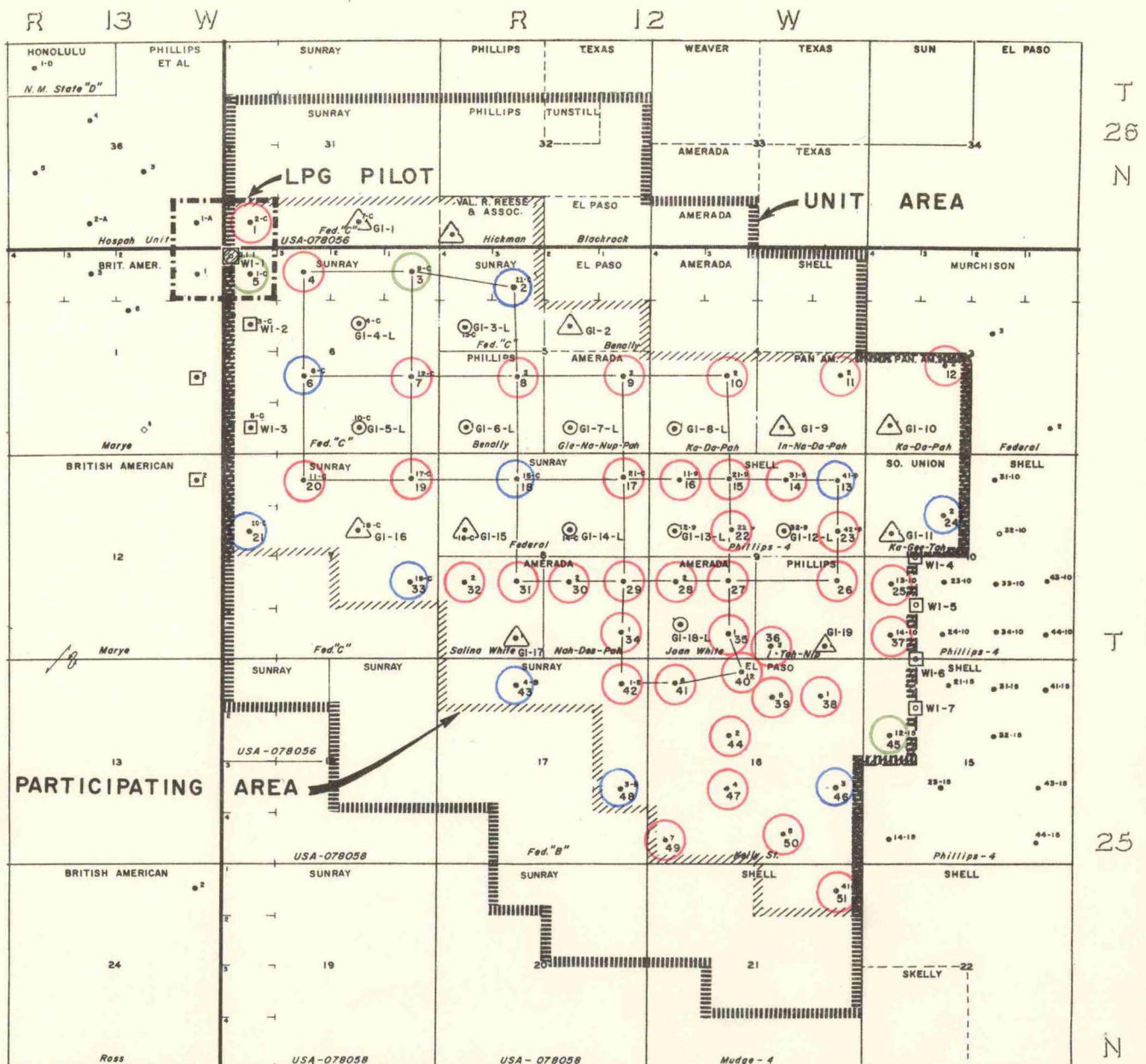
SCALE  
2000 1000 0 1000 2000  
FEET

EX. 5



# SUNRAY MID-CONTINENT OIL COMPANY

EXHIBIT NO. 6 CASE NO. 1904

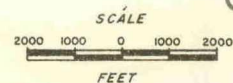


- Production Capacity Increased
- Production Capacity Decreased
- Production Capacity About the Same

## LEGEND

- LPG INJECTION WELL
- △ GAS INJECTION WELL
- DRILLED AFTER UNITIZATION
- WATER INJECTION WELL

CENTRAL BISTI LOWER GALLUP SAND UNIT  
San Juan County, New Mexico



Ex. 6



## SUNRAY MID-CONTINENT OIL COMPANY

EXHIBIT NO. 7 CASE NO. 1964

*Producers*

## WELL TESTS IN EFFECT AT TIME OF UNITIZATION

## CENTRAL BISTI UNIT

BISTI POOL, SAN JUAN COUNTY, NEW MEXICO

<u>CENTRAL BISTI UNIT</u> <u>WELL NUMBER</u>	<u>OIL PRODUCTION</u> <u>BARRELS PER DAY</u>	<u>CENTRAL BISTI UNIT</u> <u>WELL NUMBER</u>	<u>OIL PRODUCTION</u> <u>BARRELS PER DAY</u>
1	25	26	--
2	9	27	--
3	93	28	46
4	--	29	--
5	118	30	122
6	112	31	--
7	132	32	20
8	131	33	22
9	125	34	23
10	25	35	46
11	10	36	23
12	7	37	*
13	} 110	38	28
14		39	12
15	} 127	40	10 <sup>(4)</sup>
16		41	15
17	132	42	9
18	46	43	8
19	95	44	**
20	65	45	125
21	30	46	25
22	125 <sup>(1)</sup>	47	7
23	125 <sup>(2)</sup>	48	7
24	40	49	11
25	126 <sup>(3)</sup>	50	7
		51	15
		TOTAL	2,389

- (1) Includes Test for GI-13  
 (2) Includes Test for GI-12  
 (3) Includes Test for CBU-37  
 \* Included with Test for CBU-25  
 (4) Includes Test for CBU-44  
 \*\* Included with Test for CBU-40

*Ex. 1*



SUNRAY MID-CONTINENT OIL COMPANY  
EXHIBIT NO. 8 CASE NO. 1904

DECEMBER, 1959, CAPACITY WELL TESTS  
CENTRAL BISTI UNIT  
BISTI POOL, SAN JUAN COUNTY, NEW MEXICO

<u>CENTRAL BISTI UNIT</u> <u>WELL NUMBER</u>	<u>OIL PRODUCTION</u> <u>BARRELS PER DAY</u>	<u>CENTRAL BISTI UNIT</u> <u>WELL NUMBER</u>	<u>OIL PRODUCTION</u> <u>BARRELS PER DAY</u>
1	23	27	23
2	6	28	41
3	32	29	21
4	486	30	142
5	101	31	31
6	103	32	20
7	442	33	20
8	256	34	19
9	98	35	65
10	27	36	26
11	10	37	56
12	19	38	30
13	50	39	42
14	443	40	30
15	120	41	23
16	120	42	26
17	407	43	7
18	39	44	31
19	60	45	15
20	70	46	21
21	24	47	14
22	118	48	15
23	409	49	18
24	63	50	30
25	345	51	30
26	276		
		TOTAL	4,943

Ex. 8



## SUNRAY MID-CONTINENT OIL COMPANY

EXHIBIT NO. 9 CASE NO. 1904*Producing*CURRENT CAPACITY WELL TESTS  
CENTRAL BISTI UNIT  
BISTI POOL, SAN JUAN COUNTY, NEW MEXICO

<u>CENTRAL BISTI UNIT</u> <u>WELL NUMBER</u>	<u>OIL PRODUCTION</u> <u>BARRELS PER DAY</u>	<u>CENTRAL BISTI UNIT</u> <u>WELL NUMBER</u>	<u>OIL PRODUCTION</u> <u>BARRELS PER DAY</u>
1	50	26	805
2	10	27	29
3	49	28	95
4	399	29	169
5	95	30	143
6	115	31	30
7	1,067	32	33
8	339	33	19
9	170	34	39
10	35	35	79
11	30	36	59
12	19	37	68
13	57	38	67
14	507	39	29
15	265	40	26
16	248	41	78
17	649	42	28
18	51	43	8
19	163	44	10
20	170	45	8
21	32	46	27
22	523	47	19
23	732	48	8
24	49	49	16
25	220	50	12
		51	33
		TOTAL	7,981

*Ex. 9*



GROSS EXPENDITURE ANALYSIS  
(NOT INCLUDING OPERATING EXPENSE AND GAS PURCHASE)

CENTRAL BISTI UNIT

BISTI POOL - SAN JUAN COUNTY, NEW MEXICO

SUNRAY MID-CONTINENTAL OIL COMPANY  
EXHIBIT NO. 10 CASE NO. 1904

LPG AND GAS INJECTION

CONVERT 9 WELLS FOR LPG INJECTION	\$ 23,000
DRILL AND COMPLETE 1 WELL FOR LPG INJECTION	51,890
CONVERT 8 WELLS FOR GAS INJECTION	20,200
LPG SUPPLY AND INJECTION LINES	99,560
GAS SUPPLY, INJECTION LINES AND COMPRESSOR FACILITIES	332,700
PRODUCED GAS GATHERING SYSTEM	165,060
LPG PURCHASE @ \$2.10/BBL.	1,972,000
LPG INJECTION	<u>72,200</u>
SUB TOTAL	\$2,736,610

WATER BARRIERS

WEST BARRIER

CONVERT 2 WELLS, ACQUIRE AND RECOMPLETE	
GI #1 FOR W.I. LESS BRITISH AMERICAN 50%	\$ 8,700
INJECTION LINE	<u>4,310</u>
SUB TOTAL	\$ 13,010

EAST BARRIER

DRILL AND COMPLETE 4 WATER INJECTION WELLS	\$ 71,050
DRILL AND COMPLETE 1 WATER SUPPLY WELL	28,700
INJECTION PLANT AND FACILITIES	<u>42,950</u>
SUB TOTAL	\$ 142,700

OIL GATHERING AND LEASE FACILITIES

DRILL AND COMPLETE 5 OIL WELLS	\$ 227,470
INSTALL CONTROL LACT SYSTEM AND CRUDE OIL GATHERING SYSTEM	175,000
RELOCATION OF OIL LINES	17,380
TRANSFERRING SEPARATORS AND TREATERS ON LEASE	13,160
CHROMATOGRAPH AND TEST EQUIPMENT	3,490
FIELD OFFICE, WAREHOUSE AND LAB	<u>5,420</u>
SUB TOTAL	\$ 441,920

TOTAL

\$3,334,240

EX. 10



OPERATING EXPENSE ANALYSIS  
FIRST SIX MONTHS 1959, SUNRAY WELLS BEFORE UNITIZATION  
vs.  
CENTRAL BISTI UNIT AREA AFTER JULY 1, 1959  
BISTI POOL - SAN JUAN COUNTY, NEW MEXICO

		No. of Producing Oil Wells	<u>Operating Costs Less Injection Expense</u>	
			<u>\$/Well Month</u>	<u>\$/Bbl. Oil</u>
1959	January	24	\$ 195	\$0.08
	February	24	312	0.16
	March	24	322	0.16
	April	24	262	0.12
	May	24	222	0.11
	June	24	397	0.11
	July	65	1,875	2.82
	August	71	1,107	2.04
	September	73	550	1.02
	October	78	791	1.59
	November	78	353	0.43
	December	78	561	1.19
1960	January	78	566	2.68
	February	78	1,350	1.39
	March	78	1,269	0.92

Note: January through June 1959, no gas injection expense, July 1959 through March 1960, gas injection expense included but excluding LPG expense.

EX. 11



CALCULATED UNIT ALLOWABLE  
CENTRAL BISTI UNIT  
BISTI POOL, SAN JUAN COUNTY, NEW MEXICO

CENTRAL BISTI UNIT WELL NO.	ACRES IN PRORATION UNIT	NORMAL UNIT WELL ALLOWABLE BASED ON MARCH, APRIL & MAY WELL TESTS <u>BARRELS OIL/DAY</u>	CENTRAL BISTI UNIT WELL NO.	ACRES IN PRORATION UNIT	NORMAL UNIT WELL ALLOWABLE BASED ON MARCH, APRIL & MAY WELL TESTS <u>BARRELS OIL/DAY</u>
1	80	50	25 & 37	80	120
2	80	10	26	80	120
3	80	49	27 & 28	80	120
4 & 5	80	120	29 & 30	80	120
6	80	115	31 & 32	80	63
7	80	120	33	80	19
8	80	120	34	80	39
9	80	120	35	80	79
10	80	35	36	80	59
11	80	30	38	80	67
12	80	19	39	80	29
13 & 14	80	120	40 & 44	80	35
15 & 16	80	120	41	80	78
17	80	120	42	80	28
18	80	50	43	80	7
19	80	120	45	80	8
20	80	120	46	80	27
21	80	32	47	80	19
22 & GI-13	80	120	48	80	8
23 & GI-12	80	120	49	80	16
24	80	49	50	80	12
			51	80	33

TOTAL (2,865)

Producing Well Allowable - B/D 2,865

Transferred Allowable from

Injection Wells - B/D 1,484

Total Unit Allowable - B/D (4,349)

will  
go up  
will  
it  
not

EX. #12

operations tied  
to  
5,000 bbls.  
per day  
figure



INJECTION WELL ALLOWABLE  
AVAILABLE TO TRANSFER

<u>WELL NO</u>	<u>AC</u>	<u>ALLOW AVAIL TO TRANS</u>
GI 1	80	33
GI 2	80	24
GI 3	80	55
GI 4	80	120
GI 5	80	120
GI 6	80	120
GI 7	80	120
GI 8	80	100
GI 9	80	47
GI 10	80	120
GI 11	80	77
GI 12	40	60
GI 13	40	60
GI 14	80	113
GI 15	80	110
GI 16	80	18
GI 17	80	16
GI 18	40	28
GI 19	40	23
GI 20	80	0
WI 2	80	120
WI 3	80	<u>120</u>
		1,604



3. A letter stating that all offset operators to the project area have been furnished a complete copy of the application and the date of the notification.

The Secretary-Director may approve the proposed injection well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval provided waivers of objection are received from all offset operators.

Rule 6. Each well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the Bisti-Lower Gallup Oil Pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected into the Bisti-Lower Gallup Oil Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any such well receiving gas injection credit shall be determined in accordance with the following formula:

$$A_{adj} = \frac{TUA \times F_a \times 2,000}{\frac{P_g - l_g}{P_o}}$$

Where:

- $A_{adj}$  = the well's daily adjusted allowable
- TUA = top unit allowable for pool
- $F_a$  = the well's acreage factor
- $P_g$  = average daily volume of gas produced by the well during the preceding month, cubic feet.
- $l_g$  = the well's allocated share of the daily average gas injected during the preceding month, cubic feet.
- $P_o$  = average daily volume of oil produced by the well during the preceding month, barrels.

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio,  $\frac{P_g - l_g}{P_o}$  to be less than 2,000 cubic feet of gas per barrel of oil produced.

Rule 7. Credit for daily average net water injected into the Bisti-Lower Gallup Oil Pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

$$E_g = (V_{w \text{ inj}} - V_{w \text{ prod}}) \times 5.61 \times \frac{P_a}{15.025} \times \frac{520^\circ}{T} \times \frac{1}{Z}$$



SPECIAL RULES AND REGULATIONS  
FOR SUNRAY MID-CONTINENT OIL COMPANY'S  
CENTRAL BISTI LPG-GAS-WATER INJECTION PROJECT

IT IS THEREFORE ORDERED THAT the special rules and regulations governing the operation of Sunray Mid-Continent Oil Company's Central Bisti LPG-Gas-Water Injection Project as set forth in R-1414 dated June 5, 1959, are amended as follows:

Rule 1. The project area of the Sunray Mid-Continent Oil Company Central Bisti LPG-Gas-Water Injection Project shall comprise that area described as follows:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 3	SW/4
Sections 4, 5, and 6	All
Sections 7, 8, and 9	All
Section 10	NW/4, W/2 SW/4
Section 15	W/2 NW/4
Section 16	All
Section 17	N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 18	NE/4, N/2 NW/4, and N/2 SE/4
Section 20	NE/4 and NE/4 NW/4
Section 21	N/2, N/2 SE/4, and NE/4 SW/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31	S/2 N/2, and S/2
Section 32	S/2, S/2 N/2
Section 33	S/2 SW/4

Rule 2. The allowable for the project shall be the sum of the allowables of the several wells within the project area including those wells which are shut-in or are used as injection wells. The allowable assigned to the wells in the project area shall be the current normal unit allowable for NW New Mexico with 80-acre pro-rata units being assigned an 80-acre proportional factor of two.

Rule 3. Allowables for injection wells may be transferred to producing wells within the project area, as may the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or curtailed because of high gas-oil ratio or shut-in for pressure regulation, control of pattern or sweep efficiencies, to observe changes in pressures or changes in characteristics of reservoir liquids, or progress of sweep.

Rule 4. The project allowable may be produced from any well or wells in the project area in any proportion.

Rule 5. Conversion of producing wells to injection or the drilling of additional wells for injection shall be done only after approval of same by the Secretary-Director of the Commission. To obtain such approval, the Project Operator shall file proper application with the Commission which application shall include the following:

1. A plat showing location of proposed injection well, all wells within the project area and offset operators, locating their off-setting wells to the project area.
2. A schematic drawing of the proposed injection well which fully describes the casing, tubing, perforated interval, and depths and showing that injection of LPG-gas-water will be confined into the Bisti-Lower Gallup formation.



where:

- $E_g$  = Average daily gas equivalent of net water injected, cubic feet
- $V_w$  inj = Average daily volume of water injected, barrels
- $V_w$  prod = Average daily volume of water produced, barrels
- 5.61 = Cubic foot equivalent of one barrel of water
- $P_a$  = Average reservoir pressure at mid-point of upper pay-zone of Bisti-Lower Gallup Oil Pool in project area, psig  $\neq$  11.5, as determined from most recent survey
- 15.025 = Pressure base, psi
- 520° = Temperature base of 60°F expressed as absolute temperature
- $T_s$  = Reservoir temperature of 145°F expressed as absolute temperature
- $Z$  = Compressibility factor from analysis of Bisti-Lower Gallup gas at average reservoir pressure,  $P_a$ , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9950	800	.9000
100	.9900	850	.8938
150	.9825	900	.8875
200	.9775	950	.8825
250	.9725	1000	.8775
300	.9625	1050	.8713
350	.9563	1100	.8663
400	.9500	1150	.8600
450	.9425	1200	.8550
500	.9363	1250	.8500
550	.9300	1300	.8450
600	.9238	1350	.8400
650	.9175	1400	.8360
700	.9115	1450	.8325
750	.9050		

Rule 8. Each month the Project Operator shall within three days after the normal unit allowable for NW New Mexico has been established, submit to the Commission a Project Operator's report on a form prescribed by the Commission outlining thereon the data required and requesting the allowable for the project.

Rule 9. The Commission shall upon the review of the report and after any adjustments deemed necessary assign an allowable to the project for the next succeeding month in accordance with these rules.

Rule 10. The Special Rules and Regulations for the operation of the subject Project shall prevail against the Statewide Rules and also against the Special Rules and Regulations for the Bisti-Lower Gallup Oil Pool, if in conflict therewith.



CLOSE-UP OF VARIOUS GRASSES AND CLOVER,  
TYPICAL OF THE VALLEYS OF THE AREA.  
PHOTO AUGUST 9, 1963.

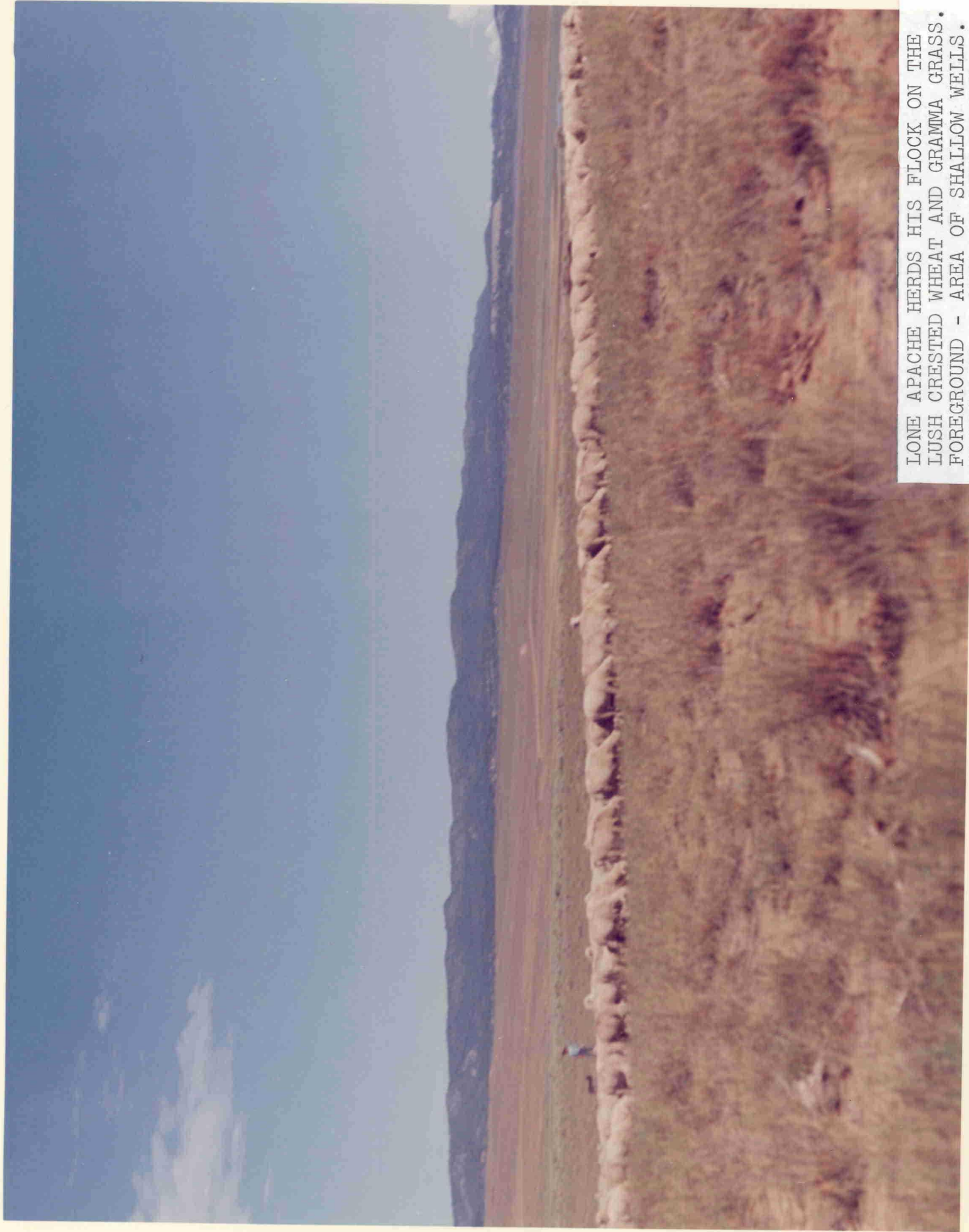






CLOSE-UP OF MATURED CRESTED WHEAT.  
PHOTO AUGUST 9, 1963.





LONE APACHE HERDS HIS FLOCK ON THE  
LUSH CRESTED WHEAT AND GRAMMA GRASS.  
FOREGROUND - AREA OF SHALLOW WELLS.  
BACKGROUND - AREA OF DEEP WELLS.





CLOSE-UP OF MATURED CRESTED WHEAT.  
PHOTO AUGUST 9, 1963.













ANOTHER VIEW OF THE ALTERNATE LOCATION,  
NE  $\frac{1}{4}$  SEC. 18, T-25N, R-1E.





APACHE LAND. FLOCK GRAZING ON CRESTED  
WHEAT. T-27N, R-1E, AREA OF SHALLOW  
WELLS. PHOTO AUGUST 9, 1963.



An aerial photograph showing a wide valley. The left and right sides of the valley are covered in dense, dark green forest. The central part of the valley is a lighter, brownish-tan color, indicating a different type of vegetation or bare ground. A small, dark, rectangular feature is visible in the center of the valley, likely the well mentioned in the caption. The overall perspective is from a high altitude, looking down on the landscape.

OPEN VALLEY - FOREST ON EACH SIDE - WELL  
AND TANKS. VALLEY COVERED WITH CRESTED  
WHEAT AND GRAMMA GRASS. INTEX WELL NEAR  
CENTER T-26N, R-1E. (AERIAL PHOTO)



OPEN VALLEY - FOREST ON EACH SIDE - WELL  
AND TANKS. VALLEY COVERED WITH CRESTED  
WHEAT AND GRAMA GRASS. INTEX WELL NEAR  
CENTER T-26N, R-1E. (AERIAL PHOTO)















AERIAL VIEW, PINE FOREST. COVERS MAJOR  
PORTION OF AREA.



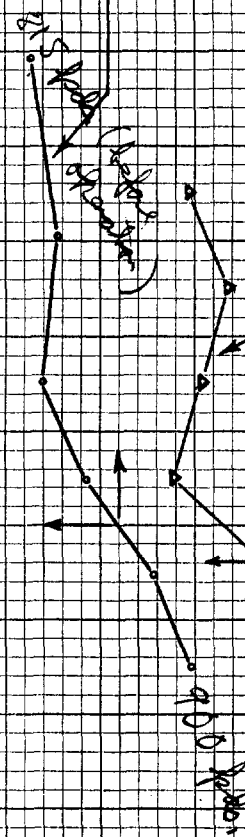
# BEFORE EXAMINER UTZ

OIL CONSERVATION COMMISSION

EXHIBIT NO. 1  
CASE NO. 1904

Injected Products - Reservoir Voidage Ratio

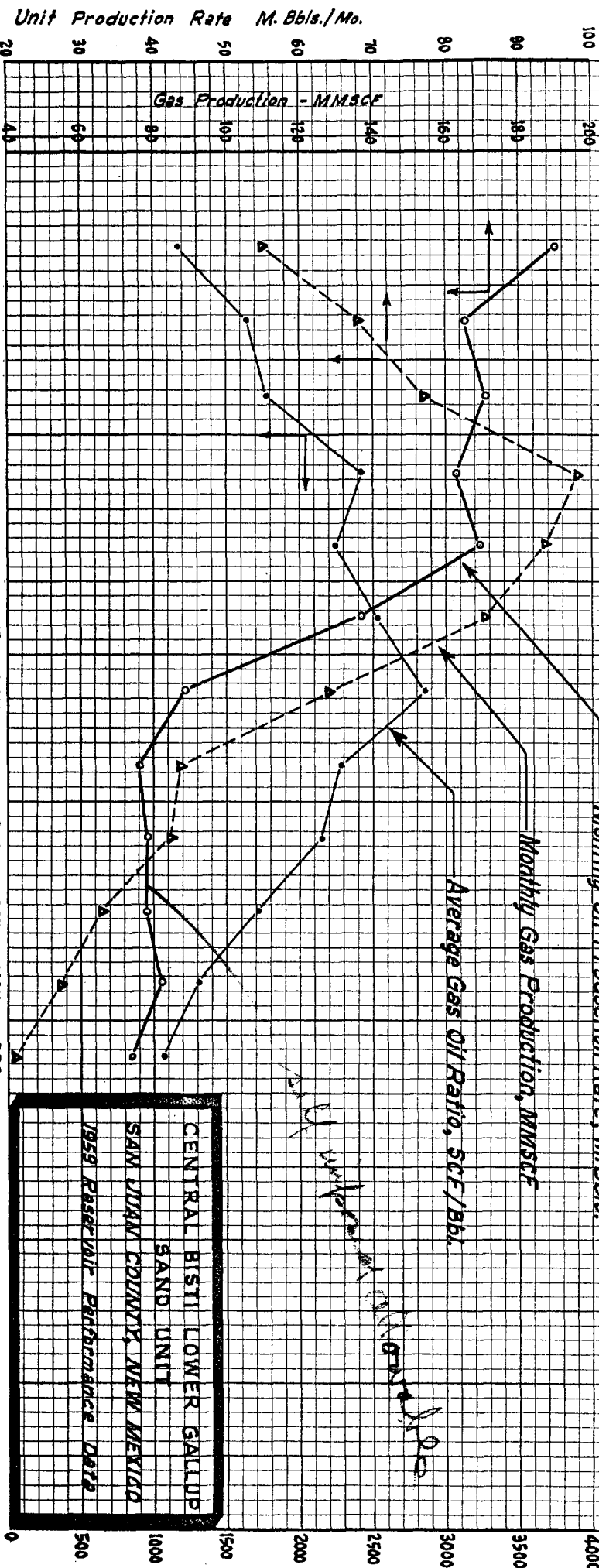
Volumetric Average B.H.P., psig.



Monthly Oil Production Rate, M. Bbls.

Monthly Gas Production, MMSCF

Average Gas Oil Ratio, SCF/Bbl.



CENTRAL BISTO LOWER GALLUP  
SAND UNIT  
SAN JUAN COUNTY, NEW MEXICO

1959 Reservoir Performance Data

JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.  
1959



SPECIAL RULES AND REGULATIONS  
FOR SUNRAY MID-CONTINENT OIL COMPANY'S  
CENTRAL BISTI LPG-GAS-WATER INJECTION PROJECT

BEFORE EXAMINER UTZ  
OIL CONSERVATION COMMISSION  
EXHIBIT NO. 2  
CASE NO. 1904

IT IS THEREFORE ORDERED THAT the special rules and regulations governing the operation of Sunray Mid-Continent Oil Company's Central Bisti LPG-Gas-Water Injection Project as set forth in R-1414 dated June 5, 1959 are amended as follows:

Rule 1. The project area of the Sunray Mid-Continent Oil Company Central Bisti LPG-Gas-Water Injection Project shall comprise that area described as follows:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 3	SW/4
Sections 4, 5, and 6	All
Sections 7, 8, and 9	All
Section 10	NW/4, W/2 SW/4
Section 15	W/2 NW/4
Section 16	All
Section 17	N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 18	NE/4, N/2 NW/4, and N/2 SE/4
Section 20	NE/4 and NE/4 NW/4
Section 21	N/2, N/2 SE/4, and NE/4 SW/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31	S/2 N/2, and S/2
Section 32	S/2, S/2 N/2
Section 33	S/2 SW/4

Rule 2. The allowable for the project shall be the sum of the allowables of the several wells within the project area including those wells which are shut-in or are used as injection wells. The allowable assigned to the wells in the project area shall be the current normal unit allowable for NW New Mexico with 80-acre pro-rata units being assigned an 80-acre proportional factor of two.

Rule 3. Allowables for injection wells may be transferred to producing wells within the project area, as may the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or curtailed because of high gas-oil ratio or shut-in for pressure regulation, control of pattern or sweep efficiencies, to observe changes in pressures or changes in characteristics of reservoir liquids, or progress of sweep.

Rule 4. The project allowable may be produced from any well or wells in the project area in any proportion.

Rule 5. Conversion of producing wells to injection or the drilling of additional wells for injection shall be done only after approval of same by the Secretary-Director of the Commission. To obtain such approval, the Project Operator shall file proper application with the Commission which application shall include the following:

1. A plat showing location of proposed injection well, all wells within the project area and offset operators, locating their off-setting wells to the project area.
2. A schematic drawing of the proposed injection well which fully describes the casing, tubing, perforated interval, and depths and showing that injection of LPG-gas-water will be confined into the Bisti-Lower Gallup formation.



3. A letter stating that all offset operators to the project area have been furnished a complete copy of the application and the date of the notification.

The Secretary-Director may approve the proposed injection well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval provided waivers of objection are received from all offset operators.

Rule 6. Each well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the Bisti-Lower Gallup Oil Pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected into the Bisti-Lower Gallup Oil Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any such well receiving gas injection credit shall be determined in accordance with the following formula:

$$A_{adj} = \frac{TUA \times F_a \times 2,000}{\frac{P_g - l_g}{P_o}}$$

Where:

- $A_{adj}$  = the well's daily adjusted allowable  
 $TUA$  = top unit allowable for pool  
 $F_a$  = the well's acreage factor  
 $P_g$  = average daily volume of gas produced by the well during the preceding month, cubic feet.  
 $l_g$  = the well's allocated share of the daily average gas injected during the preceding month, cubic feet.  
 $P_o$  = average daily volume of oil produced by the well during the preceding month, barrels.

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio,  $\frac{P_g - l_g}{P_o}$  to be less than 2,000 cubic feet of gas per barrel of oil produced.

Rule 7. Each month the Project Operator shall within three days after the normal unit allowable for NW New Mexico has been established, submit to the Commission a Project Operator's report on a form prescribed by the Commission outlining thereon the data required and requesting the allowable for the project.

Rule 8. The Commission shall upon the review of the report and after any adjustments deemed necessary assign an allowable to the project for the next succeeding month in accordance with these rules.

Rule 9. The Special Rules and Regulations for the operation of the subject Project shall prevail against the Statewide Rules and also against the Special Rules and Regulations for the Bisti-Lower Gallup Oil Pool, if in conflict therewith.



# SUNRAY MID-CONTINENT OIL COMPANY

March 7, 1960

Mr. Elvis Utz  
New Mexico Oil Conservation Commission  
Box 871  
Santa Fe, New Mexico

Dear Mr. Utz:

Enclosed are the Central Bisti Unit bottom hole pressure datum depths that you requested from Mr. T. W. Brinkley.

Yours truly,

SUNRAY MID-CONTINENT OIL COMPANY

*T. R. Lavery*  
T. R. Lavery

TRL:jl

Enc.





<u>Well No.</u>	<u>Datum Elev. Depth</u>	<u>Datum Sea Level</u>
1	4848	+1323
2	4800	+1354
3	4826	+1344
4	4833	+1353
5	4846	+1350
6	4832	+1379
7	4822	+1372
8	4805	+1377
9	4789	+1378
10	4763	+1382
11	4802	+1373
12	4837	+1367
13	4786	+1415
14	4782	+1417
15	4766	+1418
16	4776	+1410
17	4769	+1419
18	4803	+1404
19	4810	+1458
20	4853	+1405
21	4881	+1422
22	4774	+1432
23	4792	+1430
24	4808	+1425
25	4744	+1444
26	4733	+1434
27	4758	+1458
28	4757	+1452
29	4775	+1448
30	4776	+1453
31	4805	+1430
32	4838	+1449
33	4847	+1442
34	4766	+1473
35	4754	+1472
36	4765	+1471
37	4787	+1459
38	4740	+1500
39	4747	+1492
40	4729	+1585
41	4768	+1484
42	4766	+1474
43	4818	+1484
44	4758	+1498
45	4708	+1518
46	4709	+1524
47	4756	+1514
48	4770	+1501
49	4741	+1529
50	4724	+1536
51	4722	+1546
WI 1	4838	+1352
WI 2	4832	+1367
WI 3	4846	+1395
WI 4	4756	+1444

+ 15 85  
 + 1323  
 + 262



<u>Well</u> <u>No.</u>	Datum Elev. <u>Depth</u>	Datum Sea <u>Level</u>
WI 5	4754	+1458
WI 6	4770	+1468
WI 7	4763	+1499
GI 1	4835	+1328
GI 2	4800	+1366
GI 3	4813	+1355
GI 4	4831	+1359
GI 5	4724	+1396
GI 6	4816	+1397
GI 7	4792	+1398
GI 8	4773	+1397
GI 9	4788	+1395
GI 10	4813	+1386
GI 11	4791	+1427
GI 12	4761	+1430
GI 13	4766	+1432
GI 14	4779	+1422
GI 15	4811	+1430
GI 16	4849	+1432
GI 17	4784	+1470
GI 18	4795	+1427
GI 19	4739	+1470



# SUNRAY MID-CONTINENT OIL COMPANY

P. O. BOX 2039

TULSA 2, OKLAHOMA

March 4, 1960

Mr. Elvis Utz  
New Mexico Oil Conservation Commission  
P. O. Box 871  
Santa Fe, New Mexico

Re: Central Bisti Unit,  
New Mexico

Dear Elvis:

Consistent with your telephone request today, I am attaching appropriate factors (Z), representing deviation from ideal gas for solution and injected gases in the captioned unit. The injected gas deviation factors are representative for El Paso Transmission Gas which supplies the injected gas for unit operations.

The datum elevations for the wells in the Central Bisti Unit have been requested forwarded to you from our Farmington, New Mexico office.

Yours very truly,

*Thos. W. Brinkley*  
Thos. W. Brinkley  
Chief Reservoir Engineer

TWB/gs  
Attach.



D-X SUNRAY OIL COMPANY IS A WHOLLY-OWNED REFINING & MARKETING SUBSIDIARY



DEVIATION FROM IDEAL GAS

CENTRAL BISTI UNIT, NEW MEXICO  
LOWER GALLUP OIL RESERVOIR

.95 *4.1*

1.00 *2.1* *0.00*

.75

Z

Pressure  
Psia

Injected  
Gas

Solution  
Gas

50  
100  
150  
200  
250

0.9950  
0.9900  
0.9850  
0.9787  
0.9725

0.9950  
0.9900  
0.9825  
0.9775 ✓  
0.9700 ✓

300  
350  
400  
450  
500

0.9675  
0.9619  
0.9556  
0.9500  
0.9450

0.9625 ✓  
0.9563 ✓  
0.9500 ✓  
0.9425 ✓  
0.9363 ✓

550  
600  
650  
700  
750

0.9388  
0.9331  
0.9275  
0.9225  
0.9163

0.9300  
0.9238  
0.9175  
0.9115  
0.9050

800  
850  
900  
950  
1000

0.9113  
0.9050  
0.9000  
0.8950  
0.8900

0.9000  
0.8938  
0.8875  
0.8825  
0.8775

1050  
1100  
1150  
1200  
1250

0.8850  
0.8800  
0.8775  
0.8725  
0.8688

0.8713  
0.8663  
0.8600  
0.8550 ✓  
0.8500 ✓

1300  
1350  
1400  
1450  
1500

0.8650  
0.8610  
0.8570  
0.8535  
0.8495

0.8450 ✓  
0.8400 ✓  
0.8360 ✓  
0.8325 ✓



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



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