CASE RECORD FILE

1420

[redacted]

Sunray Mid-Continent Oil Company
Central Bisti Unit
Bisti Lower Gallup Oil Pool
San Juan County, New Mexico

GAS INJECTION PROJECT OPERATOR'S MONTHLY REPORT

Date January [illegible], 19[illegible]
Normal Unit
Allowable Next Month, BPD [illegible]
Total Gas Injected
Last Month, Cubic Feet [illegible]

water Prod water Inj

				Most Recent Test (Last Month for Producing Wells)					Last Month											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Well No.	Location U S T R	Inj. or Prod	Meth of Prod	Date of Test	24-hr Oil Prod, bbls.	24-hr Gas Prod, cu ft.	24-hr Water Prod, bbls.	Gas-Oil Ratio ft/bbl	Ave Daily Oil Prod, bbls.	Ave Daily Gas Prod, cu ft.	Ave Daily Gas Inj., cu ft.	Ave Inj. Press, psi	Cum. Gas Inj., MCF	Est. Non Penalized Allow	Penalized Allow. For Hi GOR	Gas Inj. Credit Assigned To Well	Adj. Allow Each Well	Allow Trans From Other Wells	Allow Trans To Other Wells	Final Allow: (Col 18 Plus 19 Minus Col 20)
1	M 31 26 12	P	F	11-12	23	61,000	0	2739	24	66,[illegible]				23			23			23
2	C 5 25 12	P	P	11-27	6	4,000	0	674	7	[illegible]				6			6			6
3	A 6 25 12	P	P	11-4	32	61,[illegible]	0	[illegible]	16	[illegible]				32			32			32
4	C 6 25 12	P	F	11-6	[illegible]	370,[illegible]	0	763	[illegible]	[illegible]				[illegible]	[illegible]		[illegible]			[illegible]
5	D 6 25 12	P	P	11-22	[illegible]	22,000	0	[illegible]	[illegible]	13,[illegible]				[illegible]	[illegible]		0	[illegible]		[illegible]
6	K 6 25 12	P	P	12-11	103	[illegible]	0	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]			[illegible]
7	I 6 25 12	P	F	12-4	[illegible]	106,900	0	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]	[illegible]		[illegible]
8	K 5 25 12	P	P	12-7	[illegible]	71,[illegible]	0	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]	[illegible]		[illegible]
9	I 5 25 12	P	P	11-4	98	[illegible]	0	660	27	17,[illegible]				[illegible]			[illegible]			[illegible]
10	K 4 25 12	P	P	12-20	27	[illegible]	0	1270	[illegible]	[illegible]				27			27			27
11	I 4 25 12	P	P	11-8	10	5,600	0.3	[illegible]	8	[illegible]				[illegible]			[illegible]			[illegible]
12	K 3 25 12	P	P	11-14	19	[illegible]	0	1379	17	[illegible]				[illegible]			[illegible]			[illegible]
13	A 9 25 12	P	P	11-9	50	15,400	0	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]		[illegible]			[illegible]
14	B 9 25 12	P	F	12-5	[illegible]	[illegible]	0	[illegible]	[illegible]	87,[illegible]				[illegible]	[illegible]		[illegible]			[illegible]
15	C 9 25 12	P	F	9-3	120	[illegible]	0	1778	0	0				[illegible]	[illegible]		[illegible]			[illegible]
16	D 9 25 12	P	F	12-6	120	67,[illegible]	0	[illegible]	[illegible]	16,[illegible]				[illegible]	[illegible]		[illegible]			[illegible]
17	A 8 25 12	P	F	12-4	[illegible]	[illegible]	0	879	[illegible]	[illegible]				[illegible]			[illegible]	[illegible]		[illegible]
18	C 8 25 12	P	F	12-11	[illegible]	[illegible]	0	977	[illegible]	[illegible]				[illegible]			[illegible]			[illegible]
19	A 7 25 12	P	F	11-11	60	[illegible]	0	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]			[illegible]
20	C 7 25 12	P	F	11-[illegible]	70	[illegible]	0	[illegible]	7	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
21	M 7 25 12	P	P	11-13	[illegible]	53,000	0	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]			[illegible]
22	F 9 25 12	P	P	11-14	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]			[illegible]
23	H 9 25 12	P	F	12-5	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
24	F 10 25 12	P	F	11-10	63	15,[illegible]	0	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]			[illegible]
25	L 10 25 12	P	F	12-6	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]		[illegible]			[illegible]
26	I 9 25 12	P	F	12-[illegible]	276	[illegible]	0	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]			[illegible]
27	K 9 25 12	P	P	11-15	23	[illegible]	0.7	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]		23			23
28	L 9 25 12	P	P	11-[illegible]	[illegible]	170,000	0.4	[illegible]	3	[illegible]				[illegible]	[illegible]		[illegible]			[illegible]
TOTALS																				

CERTIFICATE: I the undersigned, state that I am the __________ of the __________ (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated herein are true, correct, and complete to the best of my knowledge.

Page 2 of 4

SIGNATURE

GAS INJECTION PROJECT OPERATOR'S MONTHLY REPORT

Sunray Mid-Continent Oil Company
Central Blinebry Unit
Blinebry Lower Gallup Oil Pool
San Juan County, New Mexico

Date January 25, 1960
Normal Unit
Allowable Next Month, BPD [redacted]
Total Gas Injected
Last Month, Cubic Feet [redacted]

				Most Recent Test (Last Month for Producing Wells)					Last Month										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Well No.	Location U S T R	Inj. or Prod	Meth of Prod	Date of Test	24-hr Oil Prod, bbls.	24-hr Gas Prod, cu ft.	24-hr Water Prod, bbls.	Gas-Oil Ratio ft/bbl	Ave Daily Oil Prod, bbls.	Ave Daily Gas Prod, cu ft.	Ave Daily Gas Inj., cu ft.	Ave Inj. Press, psi	Cum. Gas Inj., MCF	Est. Non Penalized Allow	Penalized Allow. For Hi GOR	Gas Inj. Credit Assigned To Well	Adj. Allow Each Well	Allow Trans From Other Wells	Allow Trans To Other Wells	Final Allow: (Col 18 Plus 19 Minus Col 20)
[redacted]																				
TOTALS																				

CERTIFICATE: I the undersigned, state that I am the_____of the_____(company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated herein are true, correct, and complete to the best of my knowledge.

[redacted]
SIGNATURE

Sunray Mid-Continent Oil Company
Central Block Unit
Hobbs Lower Gallup Oil Pool
San Juan County, New Mexico

GAS INJECTION PROJECT OPERATOR'S MONTHLY REPORT

Date January 15, 1960
Normal Unit
Allowable Next Month, BPD 105
Total Gas Injected
Last Month, Cubic Feet [redacted]

				Most Recent Test (Last Month for Producing Wells)					Last Month										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Well No.	Location U S T R	Inj. or Prod	Meth of Prod	Date of Test	24-hr Oil Prod, bbls.	24-hr Gas Prod, cu ft.	24-hr Water Prod, bbls.	Gas-Oil Ratio ft/bbl	Ave Daily Oil Prod, bbls.	Ave Daily Gas Prod, cu ft.	Ave Daily Gas Inj., cu ft.	Ave Inj. Press, psi	Cum. Gas Inj., MCF	Est. Non Penalized Allow	Penalized Allow. For Hi GOR	Gas Inj. Credit Assigned To Well	Adj. Allow Each Well	Allow Trans From Other Wells	Allow Trans To Other Wells	Final Allow. (Col 18 Plus 19 Minus Col 20)
[redacted]																				
TOTALS																				

CERTIFICATE: I the undersigned, state that I am the_____of the_____(company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated herein are true, correct, and complete to the best of my knowledge.

Page 3 of 4

_____
SIGNATURE

Sunray Mid-Continent Oil Company
Central Bisti Unit
Bisti Lower Gallup Oil Pool
San Juan County, New Mexico

GAS INJECTION PROJECT OPERATOR'S MONTHLY REPORT

Date [illegible]
Normal Unit
Allowable Next Month, BPD [illegible]
Total Gas Injected
Last Month, Cubic Feet [illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
				Most Recent Test (Last Month for Producing Wells)					Last Month											
Well No.	Location U S T R	Inj. or Prod	Meth of Prod	Date of Test	24-hr Oil Prod, bbls.	24-hr Gas Prod, cu ft.	24-hr Water Prod, bbls.	Gas-Oil Ratio ft/bbl	Ave Daily Oil Prod, bbls.	Ave Daily Gas Prod, cu ft.	Ave Daily Gas Inj;, cu.ft.	Ave Inj. Press, psi	Cum. Gas Inj., MCF	Est. Non Penal-ized Allow	Penal-ized Allow. For Hi GOR	Gas Inj. Credit Assigned To Well	Adj. Allow Each Well	Allow Trans From Other Wells	Allow Trans To Other Wells	Final Allow: (Col [illegible] Plus 19 Minus Col 20)
GI 26	G 7 25 12	I	P	1-21	18	16,000	0	889			•	[illegible]	[illegible]	18			18		18	
GI 27	N 8 25 12	I	P	6-7	16	15,000	0	[illegible]			[illegible]	[illegible]	[illegible]	16			16		16	
GI 28	K 9 25 12	I									[illegible]	[illegible]	[illegible]	•			•		•	
GI 29	P 9 25 12	I	P	7-7	23	70,000	0	[illegible]			[illegible]	[illegible]	[illegible]	23			23		23	
GI 3	E 5 25 12	I	P	6-9	55	43,000	0	773			[illegible]	[illegible]	[illegible]							
GI 6	N 5 25 12	I	P	6-16	120	205,000	0	1,700			[illegible]	[illegible]	[illegible]							
GI 8	N 4 25 12	I	P	7-19	100	135,000	0	[illegible]			[illegible]	[illegible]	[illegible]							
GI [illegible]	P 9 25 12	I									[illegible]	[illegible]	[illegible]							
	• Indicates PI Test																			
	(XXXX)• Shows LPG injection for month.										([illegible])•		([illegible])•							
	(XXXX)•• Shows water injection for month.										([illegible])••		([illegible])••							
TOTALS									[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CERTIFICATE: I the undersigned, state that I am the [illegible] of the [illegible] (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated herein are true, correct, and complete to the best of my knowledge.

Thomas R. [illegible] Page [illegible] of [illegible]
SIGNATURE

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

June 11, 1958

COPY

Mr. Jason Kellahin
Kellahin & Fox
Box 1713
Santa Fe, New Mexico

Dear Mr. Kellahin:

On behalf of your client, Caulkins Oil Company, we enclose two copies of Order R-1191 issued June 10, 1958, by the Oil Conservation Commission in Case 1420, which was heard on April 16th at Roswell.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

bp
Encls.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE NO. 1420
Order No. R-1101

APPLICATION OF CAULKINS OIL COMPANY
TO AMEND THE SPECIAL POOL RULES FOR
THE SOUTH BLANCO-TOCITO OIL POOL,
RIO ARRIBA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 16, 1958, at Roswell, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 10th day of June, 1958, the Commission, a quorum being present, having considered the application and the evidence adduced, 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, Caulkins Oil Company, is the operator of a water injection project in the South Blanco-Tocito Oil Pool in Rio Arriba County, New Mexico.

(3) That the applicant proposes that the Special Rules and Regulations for the South Blanco-Tocito Oil Pool as promulgated by Order No. R-326, dated May 26, 1953, and by Commission Order No. R-1144, dated March 25, 1958, be amended to provide for a system of transferring allowables within said water injection project and to provide credit against gas-oil ratio limitations for net water injected into the reservoir.

(4) That amendment of the Special Rules and Regulations for the South Blanco-Tocito Oil Pool to provide that allowables may be transferred from injection wells to other producing wells within the water injection project will not impair correlative rights.

(5) That production from any one well within the water injection project should be limited to twice the top unit allowable or three hundred (300) barrels a day, whichever is greater.

(6) That in order to prevent the waste of casinghead gas, a no-flare order should be entered for the South Blanco-Tocito Oil Pool, effective October 1, 1958.

(7) That the Rules and Regulations for the South Blanco-Tocito Oil Pool, as set forth in Commission Order No. R-326, dated May 26, 1953, and Commission Order No. R-1144, dated March 25, 1958, should be superseded by this order so as to consolidate all Special Rules and Regulations for the South Blanco-Tocito Oil Pool and for the South Blanco-Tocito Water Injection Project in one order.

(8) That the findings of the Commission, as recited in Commission Order R-326 and Commission Order R-1144, should be incorporated by reference in this order.

IT IS THEREFORE ORDERED:

(1) That the findings of the Commission, as recited in Commission Order R-326 and Commission Order R-1144, be and the same are hereby incorporated by reference in this order.

(2) That the Rules and Regulations for the South Blanco-Tocito Oil Pool as set forth in Commission Order R-326, dated May 26, 1953, and Commission Order R-1144, dated March 25, 1958, be and the same are hereby superseded.

(3) That Special Pool Rules for the South Blanco-Tocito Pool, Rio Arriba County, New Mexico, be and the same are hereby promulgated as follows, effective July 1, 1958:

SPECIAL RULES AND REGULATIONS
FOR THE SOUTH BLANCO-TOCITO OIL POOL

RULE 1. Any well drilled to or completed in the Tocito formation within one mile of the boundaries of the South Blanco-Tocito Oil Pool shall be spaced, drilled, operated, and prorated in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. All wells projected to or completed in the South Blanco-Tocito Oil Pool shall be located on a tract containing 80 acres, more or less, comprising the East half, West half, North half, or South half of the governmental quarter section in which the well is located. Allowables for wells located on such 80-acre tracts shall be assigned in accordance with the 80-acre proportional factor for pools in the 6,000- to 7,000-foot depth range. Wells located on tracts comprising less than 80 acres shall be assigned an allowable which shall bear the same proportion to the standard 80-acre allowable that the acreage assigned to such well bears to 80 acres.

RULE 3. All wells hereafter projected to or completed in the South Blanco-Tocito Oil Pool shall be located in the center of the Northwest quarter or the Southeast quarter of a governmental quarter section, with a tolerance of 100 feet in any direction to avoid surface obstructions.

RULE 4. That all wells hereafter projected to or completed in the South Blanco-Tocito Oil Pool shall be cased in accordance with the following casing rules:

(a) The surface casing shall consist of new or reconditioned pipe with an original mill test of not less than 1000 pounds per square inch, and at least one string of surface casing shall be set at a depth sufficient to protect all potable water-bearing strata encountered, and not less than 450 feet below the surface of the ground. Sufficient cement shall be used to fill the annular space back of the pipe to the bottom of the cellar. Cement shall be allowed to stand a minimum of 24 hours before initiating tests. Before drilling the plug a pump pressure of at least 600 pounds per square inch shall be applied. If at the end of 30 minutes the pressure shows a drop of 100 pounds per square inch, or more, the casing shall be condemned, subject to corrective operations and further testing.

(b) The producing oil string shall consist of new or reconditioned pipe with an original mill test of not less than 2100 pounds per square inch. The producing string shall be set and cemented with sufficient cement to fill the calculated annular space behind the pipe to a minimum of 1000 feet above the guide shoe. Cement shall be allowed to stand a minimum of 72 hours before initiating tests. Before drilling the plug a pump pressure of at least 600 pounds per square inch shall be applied. If at the end of 30 minutes the pressure shows a drop of 100 pounds per square inch, or more, the casing shall be condemned, subject to corrective operations and further testing.

RULE 5. Upon completion of any well in the South Blanco-Tocito Oil Pool and semi-annually, during the months of April and October, a bottom-hole pressure test shall be made and a report thereof filed with the Commission on Commission Form C-124. Bottom hole pressures shall be taken in accordance with the provisions of Rule 302 of the Commission Rules and Regulations except that wells shall remain shut-in for a minimum of 72 hours prior to testing. Tests shall be corrected to a reservoir datum plane of minus 100 (-100) feet.

RULE 6. Upon completion of any well in the South Blanco-Tocito Oil Pool and semi-annually during the months of April and October, a gas-oil ratio test shall be made and a report thereof filed with the Commission on Commission Form C-116.

RULE 7. Prior to making tests required in Rules 5 and 6 above, each operator in the South Blanco-Tocito Oil Pool shall notify all other operators in the pool, as well as the Commission, of the time such tests are to be conducted. Tests may be witnessed by representatives of the other operators and the Commission, if they so desire.

RULE 8. The limiting gas-oil ratio for the South Blanco-Tocito Oil Pool shall be two thousand (2,000) cubic feet of gas for each barrel of oil produced.

RULE 9. No casinghead gas produced from any well completed in the South Blanco-Tocito Oil Pool shall be flared or vented after October 1, 1958.

RULE 10. All wells drilled to and completed in the South Blanco-Tocito Oil Pool prior to May 26, 1958, whose locations do not conform to the well spacing requirements of Rule 3 above are excepted from the requirements of said Rule and their locations are hereby approved as unorthodox well locations. This approval shall apply to the following wells:

	Well No.	Unit	Sec.	Twp.	Rge.
Caulkins Oil Company	T-132	A	9	26N	6W
" " "	T-134	C	10	26N	6W
" " "	T-157	E	10	26N	6W
" " "	T-182	K	10	26N	6W
" " "	T-207	O	10	26N	6W

RULE 11. In addition to the above Rules for the South Blanco-Tocito Oil Pool, the following Rules shall apply to the operation of all wells completed in the Tocito formation and located within the South Blanco Water Injection Project Area, hereinafter referred to as the "Project."

(a) The Project Area shall comprise that area described as follows:

TOWNSHIP 26 NORTH, RANGE 6 WEST, NMPM
Section 3: S/2 SW/4
Section 4: S/2
Section 8: N/2 NE/4
Section 9: N/2 and N/2 S/2
Section 10: NW/4, N/2 SW/4, and SE/4
Section 11: W/2 SW/4

(b) 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 water injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

(c) Allowables for water injection wells may be transferred to producing wells within the project area, as may be the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or are curtailed in their rate of production.

(d) The project allowable may be produced from any well or wells in the project area in any proportion, provided said rate of production is consistent with efficient operation of the Project and provided further, that no well shall produce in excess of two times the top unit allowable for the South Blanco-Tocito Oil Pool, or 300 barrels per day, whichever is greater.

(e) The allowable assigned to any water injection well, which is to be transferred to any other well or wells in the Project area for production, shall in no event exceed the producing capacity of the well prior to conversion to water injection, as determined by the average daily rate of production during the last three months the well was produced prior to such conversion.

Conversion of producing wells to water injection, as abandonment of said producing wells is necessitated by water encroachment, shall be made only after approval of such conversion by the Secretary-Director of the Commission. To obtain such approval, the Project operator shall file proper application for conversion with the Commission, providing copies of said application to all interested parties. The Secretary-Director may approve the conversion to water injection if, within 20 days after receiving the application, no objection to said conversion is received. The Secretary-Director may grant immediate approval provided waivers of objection are received from all interested parties.

(f) The allowable assigned to any well which is to be shut-in or curtailed and which is to be transferred from said well to any other well or wells in the project area shall in no event exceed the ability of the well to produce oil as determined by a 24-hour test at a stabilized rate of production, which shall be the final 24-hour period of a 72-hour test throughout which the well under test shall be produced in the same manner and at a constant rate. The project operator shall notify all other operators in the South Blanco-Tocito Oil Pool, as well as the Commission, of the time such tests are to be conducted. Tests may be witnessed by representatives of the other operators and the Commission, if they so desire.

(g) The allowable assigned to any well in the Project shall be based upon the ability of the well to produce oil and shall be subject to the limiting gas-oil ratio (2000 to 1) for the South Blanco-Tocito Oil Pool, except that credit for daily average net water injected into the Tocito formation through any injection well or wells located within the project area may be applied to any well or wells 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:

$$R_g = (V_{w\ inj} - V_{w\ prod}) \times 5.61 \frac{ft^3}{bbl} \times \frac{P_a}{15.025} \times \frac{520^\circ}{635^\circ} \times \frac{1}{Z}$$

where:

R_g = Average daily gas equivalent of net water injected

$V_{w\ inj}$ = Average daily volume of water injected, barrels

$V_{w\ prod}$ = Average daily volume of water produced, barrels

P_a = Average reservoir pressure at datum of -100 feet, psig +/- 11.5, as determined from most recent semi-annual survey.

15.025 = Pressure base, psi

520° = Temperature base of $60^\circ F$ expressed as absolute temperature

635° = Reservoir temperature of $175^\circ F$ expressed as absolute temperature

Z = Supercompressibility factor for 0.7 gravity gas at average reservoir pressure, P_a, interpolated from supercompressibility tabulation below:

Pressure	Z	Pressure	Z
2000	0.845	1200	0.889
1900	0.849	1100	0.897
1800	0.855	1000	0.905
1700	0.857	900	0.914
1600	0.861	800	0.923
1500	0.865	700	0.932
1400	0.873	600	0.941
1300	0.881	500	0.950

Distribution of the total calculated average daily gas equivalent volume may be made to any well or wells with gas-oil ratios in excess of two thousand to one. The daily adjusted oil allowable for any such well receiving water injection credit shall be determined as follows:

$$\text{Well's Adjusted Allowable} = \frac{\text{(Top unit allowable x 2000) } \div \text{ gas equivalent volume assigned to well}}{\text{Well's gas-oil ratio}}$$

provided however, that in no event shall the gas equivalent volume assigned to a well be such as to cause the well's adjusted allowable to exceed the top unit allowable for the pool.

(h) Each month the project operator shall, within three days after the normal unit allowable for Northwest New Mexico has been established, submit to the Commission a South Blanco-Tocito Water Injection Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required, and requesting allowables for each of the several wells in the Project.

(i) The Commission shall, upon review of the report and after any adjustments deemed necessary, assign allowables to each well in the Project for the next succeeding month in accordance with these rules.

(j) The Special Rules and Regulations for the operation of wells in the project area shall prevail as against the Special Rules and Regulations for the South Blanco-Tocito Oil Pool, if in conflict therewith.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

MURRAY E. MORGAN, Member

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

ir/

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

OIL AND GAS DOCKET NO. 126

8 - 35,314

IN RE: CONSERVATION AND PREVENTION OF WASTE OF CRUDE PETROLEUM AND NATURAL GAS IN THE DIAMOND "M" (CANYON LIME AREA) FIELD, SCURRY AND BORDEN COUNTIES, TEXAS

Austin, Texas
April 29, 1957

SPECIAL ORDER
AMENDING SPECIAL ORDER NO. 8-31,198, APPROVING WATER INJECTION AND PRESSURE MAINTENANCE PROGRAM FOR THE SHARON RIDGE CANYON UNIT IN THE DIAMOND "M" (CANYON LIME AREA) FIELD, SCURRY AND BORDEN COUNTIES, TEXAS

WHEREAS, After due notice, the Railroad Commission of Texas held a hearing on April 10, 1957, on the application of Warren Petroleum Corporation, as Unit Operator for the Sharon Ridge Canyon Unit in the Diamond "M" (Canyon Lime Area) Field, Scurry and Borden Counties, Texas, to consider the amendment of Special Order No. 8-31,198 to provide for a unit allowable, change in the transfer of allowable provisions and increase of the individual well production limitation for the Sharon Ridge Canyon Unit in the Diamond "M" (Canyon Lime Area) Field, Scurry and Borden Counties, Texas; and

WHEREAS, From evidence adduced at said hearing, it appears to the Commission that the water injection and pressure maintenance program for the Sharon Ridge Canyon Unit authorized by Special Order No. 8-31,198, as amended, is proving highly successful; that all working interests in the area included in the unit have been unitized and secondary recovery production operations for all interests are being conducted as a single unified operation; and

WHEREAS, From evidence adduced at said hearing, the Commission is of the opinion and finds that the efficiency of the pressure maintenance program and the ultimate recovery of hydrocarbons from the unit area can be increased and the administrative burden of operating the unit can be substantially decreased by the adoption of the unit allowable and transfer of allowable provisions hereinafter set out; that the efficiency of the program and the uniform benefit to the reservoir can be increased by permitting the production of as much as 400 barrels of oil per day from some wells in the unit.

NOW, THEREFORE, IT IS ORDERED By the Railroad Commission of Texas that effective May 1, 1957, the allowable and transfer of allowable provisions of said Special Order No. 8-31,198 be and they are hereby amended to read as follows:

IT IS FURTHER ORDERED That the allowable and transfer of allowables for the Sharon Ridge Canyon Unit in the Diamond "M" (Canyon Lime Area) Field be established and conducted in accordance with the following provisions:

(1) As the water and supplemental gas injection operation progresses, said operator may expand the injection facilities and may use for injection purposes additional wells, either converted producing wells and/or wells drilled for such use; provided that prior to the use of such additional wells for injection purposes, the operator must file with the Commission's Engineering Department, for its approval, a plat showing thereon the location of such additional injection wells with the date that injection into such wells will be commenced; and if such wells are converted producing wells, the date such wells ceased to produce oil; and provided, further, that no injection well location will be approved at or nearer to the lease boundary line than a regular location for producing wells projected to this reservoir unless and until the operator furnishes waivers from any such offsetting operator or until evidence that such offsetting operator has been notified and that no protest is made to the Commission concerning such location within ten days after such request for approval of the injection well location is received by the Commission's Engineering Department.

(2) The allowable of the Sharon Ridge Canyon Unit shall be the sum of the allowables of the several wells thereon, which allowables may be produced from any wells producing from the Unit, in a manner consistent with efficient operation of the unitized area. The Operator of the Sharon Ridge Canyon Unit may, from time to time, transfer to any other well or wells the individual allowable, or any part thereof, of (a) any well now producing from the Unit and hereafter used for injecting water or gas into the Unit for pressure maintenance, (b) any well heretofore completed as a producer of oil from the Unit and hereafter shut-in or restricted for the benefit of efficient operation of the Unit, (c) any well which on the effective date of this rule may be in use as an injection well for either water or gas with its allowable transferred to other well or wells, and (d) any producing well which on the effective date of this rule is shut-in or restricted with its allowable or any part of its allowable transferred to another well or wells; provided that no well shall be assigned an allowable in excess of 400 barrels of oil per day. Provided, however, that no allowable shall be transferred from any well on which there is an outstanding uncommitted interest without a waiver in writing to such transfer from the owner of such interest.

(3) The Operator of the Sharon Ridge Canyon Unit shall submit to the Commission on or before the first day of each calendar month: a statement, listing each well in the Sharon Ridge Canyon Unit, which, during the calendar month is to be used for injection of water or gas into the Unit, and each well which is to be shut-in during the month for the benefit of efficient operation of the Unit; the well or wells to which the allowable of each of the wells herein before in this paragraph mentioned during the calendar month is to be transferred; a tabulation of all the wells in the Unit with their adjusted allowables for the calendar month, the well allowable for the preceding month, increase or decrease in allowable from the preceding month and the allowable transferred to or from.

(4) Each well that is subject to this order which is shut-in with allowable transferred, as provided above, shall be exempt from any order of the Commission providing for gas-oil ratio surveys or production tests.

(5) The transferred allowable shall in no event exceed the ability of the well to produce oil as determined as follows: At least six (6) days prior to the transfer of allowable from any such well, the operator of the lease or unit shall notify the Commission's Deputy Supervisor and offset operators as to the intention to transfer such allowable and as to the date that a test will be conducted to determine the ability of said well to produce oil. Such test may be witnessed by a representative of the Railroad Commission or of any offset operator.

(6) The test of the ability to produce oil from a well from which the allowable is to be transferred shall be based on a twenty-four (24) hour test at a stabilized rate of production, which shall be the final twenty-four (24) hour period of a seventy-two (72) hour test, and in each twenty-four (24) hour period the well is to be produced in the same manner, and said test shall be reported to the Commission on Commission Form 2 (Potential Test Form) and designated "A Test Determining the Producing Ability of a Well Prior to Transferring the Allowable." Said form shall be signed by a district superintendent, his assistant or an engineer having knowledge of the facts or shall be signed by the offset operator or by an agent of the Commission."

IT IS FURTHER ORDERED That any previous provisions of Special Order No. 8-31,198, as amended, pertaining to allowables and transfer of allowables in conflict herewith, be and they are hereby rescinded.

IT IS FURTHER ORDERED That this cause be held open on the docket for such other and further orders as may be necessary.

RAILROAD COMMISSION OF TEXAS

Chairman

Commissioner

Commissioner

ATTEST:
Secretary

By:

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

OIL AND GAS DOCKET NO. 126

#8 - 35,462

IN RE: CONSERVATION AND PREVENTION OF WASTE OF CRUDE PETROLEUM AND NATURAL GAS IN THE DIAMOND "M" (CANYON LIME AREA) FIELD, SCURRY AND BORDEN COUNTIES, T E X A S

Austin, Texas
May 13, 1957

SPECIAL ORDER
AMENDING SPECIAL ORDER NO. 8-31,198, AS AMENDED BY SPECIAL ORDER NO. 8-35,314, APPROVING A WATER INJECTION PRESSURE MAINTENANCE PROGRAM FOR THE SHARON RIDGE CANYON UNIT IN THE DIAMOND "M" (CANYON LIME AREA) FIELD, SCURRY AND BORDEN COUNTIES, TEXAS

WHEREAS, After due notice and hearing, the Railroad Commission of Texas held a hearing on April 10, 1957, on the application of Warren Petroleum Corporation, as unit operator for the Sharon Ridge Canyon Unit in the Diamond "M" (Canyon Lime Area) Field, Scurry and Borden Counties, Texas, and thereafter adopted Special Order No. 8-35,314, dated April 23, 1957, amending Special Order No. 8-31,198, approving water injection and pressure maintenance program for the Sharon Ridge Canyon Unit in the Diamond "M" (Canyon Lime Area) Field, Scurry and Borden Counties, Texas; and

WHEREAS, It appears to the Commission that Special Order No. 8-35,314 is contradictory in its terms and does not accurately reflect the action of the Commission pursuant to said hearing of April 10, 1957.

NOW, THEREFORE, IT IS ORDERED By the Railroad Commission of Texas that effective May 13, 1957, Special Order No. 8-31,198, as amended by Special Order No. 8-35,314, be and it is hereby amended by deleting Paragraphs (5) and (6) and substituting therefor the following paragraph:

(5) The transferred allowable from any well being converted from a producing well to an injection well shall in no event exceed the ability of the well to produce oil as determined as follows: the test of the ability to produce oil from such a well shall be based on a twenty-four (24) hour test at a stabilized rate of production which shall be the final twenty-four (24) hour period of a seventy-two (72) hour test, and in each twenty-four (24) hour period the well is to be produced in the same manner and said test shall be reported to the Commission on Commission Form 3 (Potential Test Form) and designated "A Test Determining the Producing Ability of a Well Prior to Conversion From a Producing Well to an Injection Well." Said Form shall be signed by a District Superintendent, his assistant, or an engineer having knowledge of the facts, or shall be signed by an agent of the Commission.

IT IS FURTHER ORDERED That this cause be held open on the docket for such other and further orders as may be necessary.

RAILROAD COMMISSION OF TEXAS

Chairman

Commissioner

Commissioner

ATTEST:

Secretary

BP:sn

GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

New Mexico
OIL CONSERVATION COMMISSION

LAND COMMISSIONER, MURRAY E. MORGAN
MEMBER

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

P. O. BOX 871
SANTA FE, NEW MEXICO

January 14, 1958

The Texas Railroad Commission
Tribune Building
Austin, Texas

Attention: Mr. Arthur Barbeck

Gentlemen:

We would appreciate receiving copies of the following orders if you have extra copies available:

Order #8-30,661 dated December 7, 1954
Order #8-35,314 dated April 23, 1957
Order #8-35,462 dated May 13, 1957

All of the above orders were entered in Docket No. 126 for the Diamond "M" (Canyon Lime Area) Field, Scurry and Borden Counties, Texas for the repressuring project in the Sharon Ridge Unit.

Very truly yours,

DANIEL S. NUTTER,
District Engineer

DSN/ir

No. 11-58

DOCKET: REGULAR HEARING APRIL 16, 1958

Oil Conservation Commission 9 a.m., Elks Club, 200 North Richardson Avenue

ROSWELL, NEW MEXICO

ALLOWABLE: (1) Consideration of the oil allowable for May, 1958.

(2) Consideration of the allowable production of gas for May, 1958, for six prorated pools in Lea County, New Mexico; also consideration of the allowable production of gas from six prorated pools in San Juan and Rio Arriba Counties, New Mexico, for May, 1958.

NEW CASES

CASE 1365: Application of Cabot Carbon Company for a hearing de novo before the Oil Conservation Commission of New Mexico on its application for a dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its H. L. Lowe "B" Well No. 1, located 467 feet from the South line and 850 feet from the East line of Section 26, Township 13 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from both the King-Devonian Pool and King-Wolfcamp Pool through parallel strings of 1½" tubing.

CASE 1419: Application of Standard Oil Company of Texas for the creation of the Atoka-Pennsylvanian Gas Pool and for the adoption of temporary special pool rules for said pool. Applicant, in the above-styled cause, seeks an order creating the Atoka-Pennsylvanian Gas Pool, Township 18 South, Range 26 East, Eddy County, New Mexico, and adopting temporary special pool rules for said pool providing for 320-acre spacing with fixed well locations and such other rules as the Commission may deem proper.

CASE 1420: Application of Caulkins Oil Company to amend the Special Pool Rules for the South Blanco-Tocito Oil Pool. Applicant, in the above-styled cause, seeks an order amending the Special Pool rules in the South Blanco-Tocito Oil Pool in Rio Arriba County, New Mexico to provide for the transfer of allowables within its water injection project in said pool and to provide credit against gas-oil ratio limitations for water injected under said program.

CASE 1421: In the matter of the hearing called by the Oil Conservation Commission of New Mexico on its own motion to amend Rule 309 of the Commission Rules and Regulations to permit the production of as many as sixteen units into a common tank battery and to permit the production of oil from separate contiguous oil and gas leases into a common tank battery under certain conditions.

CASE 1422: Southeastern New Mexico nomenclature case calling for an order for the creation of new pools and the extension of existing pools in Lea, Eddy and Roosevelt Counties, New Mexico.

(a) Create a new oil pool for Grayburg production, designated as the South Leo-Grayburg Pool, and described as:

Township 18 South, Range 30 East
Section 31: NW/4

(b) Create a new oil pool for San Andres production, designated as the Seven Rivers Hills-San Andres Pool, and described as:

Township 20 South, Range 26 East
Section 29: NE/4

(c) Extend the Eumont Gas Pool to include:

Township 20 South, Range 36 East
Section 32: NE/4

(d) Extend the Fowler-Devonian Pool to include:

Township 24 South, Range 37 East
Section 16: NE/4

(e) Extend the Gladiola-Wolfcamp Pool to include:

Township 12 South, Range 38 East
Section 8: E/2
Section 17: N/2
Section 18: N/2

(f) Extend the Grayburg Jackson Pool to include:

Township 17 South, Range 31 East
Section 10: SW/4

(g) Extend the West Henshaw-Grayburg Pool to include:

Township 16 South, Range 30 East
Section 3: Lot 13
Section 4: Lots 13 & 14
Section 17: NE/4

(h) Extend the Langlie-Mattix Pool to include:

Township 26 South, Range 37 East
Section 4: NW/4 & N/2 SW/4

Township 24 North, Range 7 West (Continued)
Section 20: N/2
Section 21: N/2 & SE/4
Section 22: S/2
Section 23: S/2
Section 26: N/2 & SW/4
Section 27: All

(c) Extend the South Blanco-Pictured Cliffs Pool to include:

Township 27 North, Range 7 West
Section 5: NW/4
Section 6: NE/4

Township 28 North, Range 7 West
Section 30: SW/4
Section 31: NW/4

Township 28 North, Range 8 West
Section 25: S/2
Section 36: N/2

(d) Extend the Blanco Mesaverde Pool to include:

Township 26 North, Range 2 West
Section 19: All
Section 20: W/2

Township 32 North, Range 13 West
Section 35: S/2

(e) Extend the Bisti-Lower Gallup Oil Pool to include:

Township 24 North, Range 9 West
Section 7: NW/4 & S/2
Section 8: S/2

Township 24 North, Range 10 West
Section 1: W/2
Section 2: N/2
Section 3: NE/4
Section 12: N/2

Township 25 North, Range 10 West
Section 35: SE/4

(f) Extend the Verde-Lower Gallup Oil Pool in San Juan County, New Mexico, to include therein:

Township 31 North, Range 14 West
Section 29: NW/4
Section 30: NE/4

Township 31 North, Range 15 West
Section 11: N/2

ir/

(i) Extend the Maljamar Pool to include:

Township 17 South, Range 33 East	
Section 18:	E/2 NE/4

(j) Extend the Milnesand-Pennsylvanian Pool to include:

Township 8 South, Range 35 East	
Section 18:	SE/4

(k) Extend the Saladar-Yates Pool to include:

Township 20 South, Range 28 East	
Section 33:	SW/4 SE/4

(l) Extend the Tatum-Wolfcamp Pool to include:

Township 13 South, Range 36 East	
Section 6:	NE/4

(m) Extend the Welch-Delaware Pool to include:

Township 26 South, Range 27 East	
Section 16:	SW/4

CASE 1423: Northwestern New Mexico nomenclature case calling for an order for the creation of new pools and the extension of existing pools in San Juan and Rio Arriba Counties, New Mexico.

(a) Create a new gas pool for Gallup production, designated as the Angel's Peak-Gallup Pool and described as

Township 26 North, Range 10 West	
Section 2:	NW/4
Section 3:	N/2
Section 4:	NE/4

Township 27 North, Range 10 West	
Section 26:	SW/4
Section 27:	S/2
Section 28:	SE/4
Section 33:	E/2
Section 34:	All
Section 35:	W/2

(b) Create a new oil pool for Gallup production, designated as the Escrito-Gallup Oil Pool and described as:

Township 24 North, Range 7 West	
Section 16:	SW/4
Section 17:	S/2
Section 18:	SE/4
Section 19:	NE/4

No. 11-58

SUPPLEMENTAL DOCKET: REGULAR HEARING APRIL 16, 1958

Oil Conservation Commission 9 a.m., Elks Club, 200 North Richardson Avenue

ROSWELL, NEW MEXICO

CASE 1424: Application of Humble Oil and Refining Company for an unorthodox well location. Applicant, in the above-styled cause, seeks an order authorizing an unorthodox oil well location for its Federal-North Kirtland Unit Well No. 1 at a point 1230 feet from the North line and 998 feet from the East line of Section 19, Township 30 North, Range 14 West, San Juan County, New Mexico, said well to be drilled as a wildcat to the Dakota formation.

April 3, 1958

ga

production by utilization of the two wells, Federal T-134, and Federal T-109 as injection wells, and that any proration order issued should recognize emergency conditions which might arise in the conduct of a pressure maintenance program by water flooding, and therefore such proration order should be flexible enough to cover such possible emergency conditions.

5. That subsequent to submission of this application, the well designation system in use by the Petitioner has been changed with approval of the Commission, and that the proposed injection wells, Federal 1-134 and Federal 7-35-109 are now designated as Federal T-134 and Federal T-109, respectively.

6. That no objection has been made to the granting of this application.

IT IS THEREFORE ORDERED:

1. That the application of Lowry et al Operating Account for permission to institute a pressure maintenance program in the South Blanco-Tocito Pool by injecting water into either or both Federal T-134, NE/4 NW/4, Section 10, and Federal T-109, SW/4 SW/4, Section 3, both in Township 26 North, Range 6 West, NMPM, should be, and the same hereby is approved.

2. That the permission is hereby granted to inject water in said injection wells, water to enter the Tocito sands, producing horizon of the South Blanco-Tocito Pool, Rio Arriba County, New Mexico.

3. That in the event prorationing of oil production is instituted in the South Blanco-Tocito Pool, Rio Arriba County, New Mexico, the operator shall submit to the Commission a plan for transferring allowables from injection wells to other producing wells in the Pool, together with a plan which will, insofar as possible, take care of emergency conditions which may arise as a result of the proration of production in the pool.

4. That the Operator, Petitioner herein, shall submit monthly reports to the Commission showing the monthly oil production and water production, and the amount of water injected into the reservoir through each injection well bore.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

NEW MEXICO OIL CONSERVATION COMMISSION

Edwin L. Mechem, Chairman

E. S. Walker, Member

S E A L

R. R. Spurrier, Secretary

NEW MEXICO OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

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

CASE NO. 555
ORDER NO. R-349

THE APPLICATION OF LOWRY ET AL OPERATING ACCOUNT FOR THE APPROVAL OF A PILOT PRESSURE MAINTENANCE PROGRAM BY WATER INJECTION IN ONE OR BOTH OF TWO WELLS, SAID INJECTION WELLS LOCATED IN SW/4 SW/4, SECTION 3, AND NE/4 NW/4 SECTION 10, TOWNSHIP 26 N. RANGE 6 WEST, IN THE SOUTH BLANCO-TOCITO POOL, RIO ARRIBA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on July 16, 1953, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission".

NOW, on this 27th day of July, 1953, the Commission, a quorum being present, having considered the testimony adduced at said hearing and the exhibits offered therein, and being fully advised in the premises,

FINDS:

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

2. That the Petitioner's request to institute a pressure maintenance program in the South Blanco-Tocito Pool, Rio Arriba County, New Mexico, by water injection, utilizing either one or both of two proposed injection wells, is in the interests of conservation, will probably result in an increased production of oil that might otherwise be lost, thereby preventing waste, and that correlative rights of others interested in the pool will be protected, and that the application should therefore be granted.

3. That a pressure maintenance program by water injection in the South Blanco-Tocito Pool is of an experimental nature, and periodic reports should be submitted to the Commission by the Petitioner, disclosing its acts and doings in the matter.

4. That in the event prorationing of oil is instituted in the South Blanco-Tocito Pool, the Commission recognizes that consideration should be given to loss of

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION
OF CAULKINS OIL COMPANY FOR AN
AMENDMENT OF ORDER NO. R-326
BEING THE POOL RULES FOR THE
SOUTH BLANCO-TOCITO OIL POOL,
RIO ARRIBA COUNTY, NEW MEXICO.

Case No. _____

APPLICATION

Comes now Caulkins Oil Company, an operator in the South Blanco-Tocito Oil Pool, Rio Arriba County, New Mexico, and applies to the Oil Conservation Commission of New Mexico, hereinafter referred to as "Commission", for an order amending the South Blanco-Tocito Pool Rules as set forth in Commission Order No. R-326, in accordance with the provisions of Orders Numbered R-349 and R-532, to provide for a system of transferring allowables within the water injection project maintained by operator, and to provide credit under gas-oil ratio limitations, for water injected under said program, all as set forth in proposed rules attached hereto, marked "Exhibit A", and made a part hereof, and in support thereof would show the Commission:

1. That this applicant is the operator of a water injection program approved by the Commission, which project is affected by present proration rules in effect in the South Blanco Tocito Oil Pool.

2. That the rules and regulations under which the Commission is presently prorationing the production of oil from the South Blanco-Tocito Oil Pool results in waste, and impairs correlative rights, and special rules should be instituted by the Commission for said pool.

3. That in order to prevent waste and protect correlative rights, provision should be made for the transfer of allowables from certain wells within the pool and for the adoption of a net gas-oil ratio rule with credit being given for net water injected into the reservoir.

4. That efficiency of water injection pressure maintenance program and the ultimate recovery of hydrocarbons from the South Blanco-Tocito Pool can be increased and the administrative burden of operating the pool can be substantially decreased by the adoption of a unit allowable and transfer of allowable provisions as set forth in Exhibit A, attached hereto; and that efficiency of the program and its benefit to the reservoir can be increased by permitting production of as much as 300 barrels of oil per day from some wells, resulting in the prevention of waste.

5. That adoption of the rules proposed in Exhibit A will not impair correlative rights, but will result in the prevention of waste and a greater ultimate recovery of oil and marketable gas from the pool.

WHEREFORE, applicant prays that this matter be set for hearing before the Commission's duly appointed examiner at as early a date as possible, and that after notice and hearing as provided by law, the Commission amend its Order No. R-326, being the South Blanco-Tocito Pool Rules, by adding thereto rules as proposed herein and set forth in Exhibit A.

Respectfully submitted,

KELLAHIN AND FOX

By: Jason W. Kellahin
Attorneys for Applicant
CAULKINS OIL COMPANY

P. O. Box 1713
Santa Fe, New Mexico

"EXHIBIT A"

PROPOSED ADDITIONAL FIELD RULES - SOUTH BLANCO-TOCITO POOL

1. Wells associated with the water injection project are defined as follows:

Caulkins Oil Company

T-85	T-134
T-87	T-157
T-109	T-177
T-127	T-179
T-129	T-182
T-132	T-185
	T-207

2. Additional wells may be associated with the water injection project upon written approval by the Secretary of the Commission, provided that any such additional well is not a direct offset to or located nearer than one location from the lease boundary line of any offsetting operator.

3. The allowable for the water injection unit shall be the sum of the allowables of the several wells within the unit, which allowables may be produced from any well or wells in the unit in a manner consistent with efficient operation of the project. The operator may, as hereinafter provided, transfer to any well or wells, the individual allowable or any part thereof of any well approved and used for the purpose of injecting water for pressure maintenance or any well presently or hereafter shut-in or operated under restricted conditions for the benefit of efficient operation of the project.

4. The operator shall submit to the Commission on or before the fifteenth day of each calendar month a statement listing each well used as an injection well for injecting water into the Tocito formation, and each well which is to be shut-in during the month or have its production restricted for the benefit of efficient operation of the project, showing the amount of production

expected to be produced from such restricted well or wells, together with a list of the well or wells to which the allowable of each of such wells is to be transferred; a tabulation of all of the wells in the project with their adjusted allowables for the calendar month, the well allowable for the preceding month, the increase or decrease in allowable from the preceding month and the allowable transferred to or from each well listed.

5. Each well that is subject to this order which is shut-in or used as an injection well, with its allowable transferred, as provided above, shall be exempt from any order of the Commission providing for gas-oil ratio surveys or production tests.

6. The allowable to be transferred from any well shall in no event exceed the ability of the well to produce oil as determined by a twenty-four hour test at a stabilized rate of production, which shall be the final twenty-four hour period of a seventy-two hour test during which the well under test is to be produced in the same manner during each twenty-four hour period. At least six days prior to the transfer of allowable from any such well, the operator shall notify the Commission's District Engineer of the intention to make the test herein provided and the dates of such test. All tests may be witnessed by a representative of the Commission and any interested operator, and the results of all tests shall be reported to the Commission.

7. Where water is injected into the Tocito producing formation through one or more injection wells associated with the water injection project, the daily average net volume of injected water (water injected less water produced) shall be credited to wells producing with a gas-oil ratio in excess of two thousand (2,000) cubic feet of gas per barrel of oil, increasing the daily gas limit as defined in Rule 506 (b) (1) of the Rules and Regulations of the New Mexico Oil Conservation Commission by a volume

expected to be produced from such restricted well or wells, together with a list of the well or wells to which the allowable of each of such wells is to be transferred; a tabulation of all of the wells in the project with their adjusted allowables for the calendar month, the well allowable for the preceding month, the increase or decrease in allowable from the preceding month and the allowable transferred to or from each well listed.

5. Each well that is subject to this order which is shut-in or used as an injection well, with its allowable transferred, as provided above, shall be exempt from any order of the Commission providing for gas-oil ratio surveys or production tests.

6. The allowable to be transferred from any well shall in no event exceed the ability of the well to produce oil as determined by a twenty-four hour test at a stabilized rate of production, which shall be the final twenty-four hour period of a seventy-two hour test during which the well under test is to be produced in the same manner during each twenty-four hour period. At least six days prior to the transfer of allowable from any such well, the operator shall notify the Commission's District Engineer of the intention to make the test herein provided and the dates of such test. All tests may be witnessed by a representative of the Commission and any interested operator, and the results of all tests shall be reported to the Commission.

7. Where water is injected into the Tocito producing formation through one or more injection wells associated with the water injection project, the daily average net volume of injected water (water injected less water produced) shall be credited to wells producing with a gas-oil ratio in excess of two thousand (2,000) cubic feet of gas per barrel of oil, increasing the daily gas limit as defined in Rule 506 (b) (1) of the Rules and Regulations of the New Mexico Oil Conservation Commission by a volume

equal to the gas equivalent of injected water so credited, such gas equivalent to be computed as follows:

The daily adjusted oil allowable of such well to which credit for injected water is assigned shall be determined and assigned by dividing its daily gas limit, after adjustment for injection credit, by its producing gas-oil ratio in cubic feet per barrel of oil produced in accordance with the formula:

$$\text{Adjusted Allowable} = \frac{(\text{Unpenalized Allowable} \times 2000) - \text{Gas Equivalent of Injected Water}}{\text{Gas-Oil Ratio}}$$

The gas equivalent of injected water shall be determined by converting the daily average net volume of water injected during any one month (water injected less water produced) to an equivalent volume of standard cubic feet of gas in the following manner:

$$\text{Gas Equivalent of Injected Water} = Vw \times 5.61 \times \frac{Pa}{15.025} \times \frac{520}{635} \times \frac{1}{Z}$$

Where:

VW = Net barrels of injected water.
5.61 = Cubic feet per barrel.
PA = Volumetrically weighted average reservoir pressure as determined by most recent semi-annual survey, psig - 11.5.
15.025 = Pressure base.
520 = Temperature base of 60° F expressed by absolute temperature.
635 = Reservoir temperature of 175° F expressed as absolute temperature.
Z = Super-compressibility factor of 0.7 gravity gas interpolated from the tabulation below.

Gas Equivalent One Barrel of Water Expressed as Standard Cubic Feet	Pressure	Super-Compressibility Factor, "Z"
726	2000	0.845
688	1900	0.849
649	1800	0.853
611	1700	0.857
572	1600	0.861
534	1500	0.865
494	1400	0.873
455	1300	0.881
417	1200	0.889
380	1100	0.897

342	1000	0.905
304	900	0.914
269	800	0.923
233	700	0.932
199	600	0.941
165	500	0.950

Provided that in no event shall the daily adjusted oil allowable for any well be permitted to exceed the unpenalized allowable limit assigned and/or transferred to said well. It is expressly understood the terms "Adjusted Allowable", Unpenalized Allowable", and "Daily Adjusted Oil Allowable", as used herein, include all allowables transferred to a well in addition to its own allowable.

b. Wells not associated with the water injection pressure maintenance project shall have their oil and gas prorated in accordance with the New Mexico Conservation Commission's General Rules and Regulations and Order No. R-326 dated May 26, 1953.

JASON W. KELLAHIN
ROBERT E. FOX

KELLAHIN AND FOX
ATTORNEYS AT LAW
54½ EAST SAN FRANCISCO STREET
POST OFFICE BOX 1713
SANTA FE, NEW MEXICO

TELEPHONES
3-9396
2-2266

February 28, 1958

Set for Apr 16th
Reg. hearing

New Mexico Oil Conservation Commission
Post Office Box 871
Santa Fe, New Mexico

Re: Application - Caulkins
Oil Company.

Gentlemen:

I am enclosing a copy of the application for adoption of pool rules for the South Blanco Tocito Oil Pool in connection with the above company.

Very truly yours,

Jason W. Kellahin

Jason W. Kellahin

JWK:j
enc

CAULKINS OIL COMPANY

SOUTH BLANCO TOCITO POOL

COMPARISON OF OIL AND GAS PRODUCTION THREE MONTHS BEFORE AND AFTER PRORATION

	Barrels Oil Produced	Barrels Oil Produced - Daily Average	MCF Gas Produced	Gas/Oil Ratio
BEFORE PRORATION				
September, 1957	18,125	604	50,315	2,776
October, 1957	18,098	584	45,687	2,524
November, 1957	18,392	612	51,400	2,795
AFTER PRORATION				
December, 1957	28,182	908	66,377	2,355 *
January, 1958	12,378	399	54,709	4,420
February, 1958	15,958	571	64,267	4,027

* Oil production taken from most efficient producers as far as conditions would permit

CAULKINS OIL COMPANY

SOUTH BLANCO TOCITO POOL

DISPOSITION OF GAS PRODUCTION THREE MONTHS BEFORE AND AFTER PRORATION

	MCF Gas Produced	MCF Gas Used for Fuel	MCF Gas Sold To El Paso	MCF GAS Wasted	Percent of Produced Gas Wasted
BEFORE PRORATION					
September, 1957	50,315	7,221	34,003	9,091	18
October, 1957	45,687	7,771	31,317	6,599	14
November, 1957	51,400	8,189	34,074	9,137	18
AFTER PRORATION					
December, 1957	66,377	8,482	34,694	23,201	35
January, 1958	54,709	7,256	30,773	16,680	31
February, 1958	64,267	7,040	32,304	24,923	39

CAULKINS OIL COMPANY

SOUTH BLANCO TOCITO POOL

COMPARISON OF RESERVOIR SPACE VOIDAGE PER BARREL OF STOCK TANK OIL PRODUCED THREE MONTHS BEFORE AND AFTER PRORATION

	Daily Average Reservoir Voidage - Barrels	Daily Average Water Injection - Barrels	Net Daily Average Reservoir Voidage - Barrels	Daily Average Oil Production - Barrels	Barrels of Reservoir Space Voided Per Barrel of Stock Tank Oil Produced
BEFORE PRORATION					
September, 1957	3,092	1,306*	1,786	604	2.95
October, 1957	2,894	853*	2,041	584	3.49
November, 1957	3,085	1,560	1,525	612	2.49
AFTER PRORATION					
December, 1957	3,812	1,563	2,249	908	2.48**
January, 1958	3,054	1,573	1,481	399	3.71
February, 1958	4,071	1,565	2,506	571	4.39

* Water supply well shut down for repairs September 28 through November 21. Only water produced with oil was injected during that period.

** Oil production taken from most efficient wells as far as conditions would permit.

CAULKINS OIL COMPANY
SOUTH BLANCO TOCITO POOL

APPLICATION OF PRINCIPLE OF ALLOWABLE TRANSFER AND WATER INJECTION CREDIT TO APRIL, 1958 ALLOWABLES

Well Number	April, 1958 Allowables Unpenalized	Penalized	Water Production Per Cent	Estimated Gas Oil Ratio	Estimated Daily Gas Production-cf	Recommended Adjusted Allowables	Estimated Daily Gas Production-cf
Wells Participating in Pressure Maintenance Unit:							
109	27	27	39	900	24,300	27	24,300
127	97	97	0	1600	155,200	156	249,600
129	97	97	14	700	67,900	250	175,000
132	97	97	0	1100	106,700	97	106,700
177	97	45	0	4300	193,500	15	64,500
179	97	22	49	9000	194,000	15	135,000
182	15	15	95	1200	18,000	15	18,000
185	97	97	0	1800	174,600	200	360,000
207	97	69	Trace	2800	193,200	15	42,000
Injection Wells	69	69		700	48,300		
Totals	790	635			1,194,600	790	1,175,100
Wells Not Participating in Pressure Maintenance Unit:							
123	97	14	0	13,700	191,800	14	191,800
125	97	38	0	5,100	193,800	38	193,800
Totals	984	637			1,580,200	842	1,560,700
Gas/Oil Ratio					2,300		1,854

Water Injection Credit - Estimated Daily Average Net Water Injection 1800 bbls x gas equivalent of 645 cf, the gas equivalant of a barrel of water at present reservoir pressure of 1789 psi

Net Daily Gas Production	1,161,000
Net Daily Gas Oil Ratio of adjusted allowable	399,700
	475

SOUTH BLANCO TOCITO POOL
RIO ARRIBA COUNTY, NEW MEXICO

Date of First Production: July, 1951
Date Water Injection Commenced: October 7, 1953

TOTAL POOL PERFORMANCE

Cumulative Oil Production at Commencement of Water Injection:

Caulkins Oil Company	712,315 bbls.
Texas National	2,901 bbls.
Total	715,216 bbls.

Cumulative Oil Production April 1, 1958:

Caulkins Oil Company	2,217,883* bbls.
Texas National	136,000* bbls.
Total	2,353,883 bbls.

*March 1958 Production Estimated.

	Date	Bottomhole Pressure Avg. PSI	Bottomhole Pressure Change-PSI	Incr. Oil Prod.-Bbls.	Bbls. Oil Produced Per PSI Chg.
Initial Condition	7/51	2197	-	-	-
At Commencement of Water Injection	10/53	1971	226	715,216	3165
Current Condition	4/58	1789	182	1,638,667	9004

CAULKINS OIL COMPANY OPERATIONS

	PRODUCTION			
	Oil - Bbls.	Gas - MCF	Water - Bbls.	GOR
Before Water Injection	712,315	1,188,825	0	1669:1
After Water Injection	1,505,568	2,671,226	531,252	1774:1
Cumulative 4/1/58	2,217,883	3,860,051	531,252	1740:1

From commencement of water injection to present date, one (1) barrel of water injected in reservoir occupies equivalent space of approximately 680 cubic feet of gas.

Cumulative Water Injected to 4/1/58	3,500,650 bbls.
Cumulative Water Produced to 4/1/58	531,252 bbls.
Net Water Injected to 4/1/58	2,969,398 bbls.

Equivalent amount of gas necessary to occupy same reservoir space as net water injected:

2,969,398 bbls. x .680 MCF = 2,019,190 MCF

	Gas Production MCF	Gas Equivalent Injected MCF	Net Gas Produced MCF	Oil Produced Bbls.	Net GOR
Before Water Injection	1,188,825	—	1,188,825	712,315	1669:1
After Water Injection	2,671,226	2,019,190	652,036	1,505,568	433:1
	3,860,051			2,217,883	

Since Inception

Cumulative Gross Reservoir Voidage 3/1/58	6,613,913 bbls.
Cumulative Water Injected 3/1/58	3,438,513 bbls.
Cumulative Net Reservoir Voidage	3,175,400 bbls.

Percent Voidage Replacement:

$$\frac{3,438,513 \text{ bbls.}}{6,613,913 \text{ bbls.}} = 51.99\%$$

Since Commencement of Water Injection

Cumulative Gross Voidage 3/1/58	6,613,913 bbls.
Cumulative Gross Voidage 10/7/53	1,839,904 bbls.
Difference	4,774,009 bbls.
Less Water Injected	3,438,513 bbls
Percent Voidage Replacement	1,335,496 bbls.

$$\frac{3,438,513 \text{ bbls.}}{4,774,009 \text{ bbls.}} = 72.03\%$$

BEFORE THE
OIL CONSERVATION COMMISSION
Roswell, New Mexico
April 16, 1958

IN THE MATTER OF:

CASE NO. 1420

TRANSCRIPT OF PROCEEDINGS

DEARNLEY · MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
Phone CHapel 3-6691

NEW MEXICO OIL CONSERVATION COMMISSION

Elks Club

Roswell, NEW MEXICO

REGISTER

HEARING DATE April 16, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
S. W. Ward	Shell Oil Co	Roswell
[illegible]	✓	✓
Frank D. Barlow	Sinclair Crude Oil Co	Tulsa
Robert A. Burns	Malco Refineries, Inc	Roswell, N Mex
Tom McCain	Sinclair Crude Oil	Roswell
E. D. [illegible]	Gulf Oil	✓
G. W. Dashner	Gulf Oil	✓
F. E. Curtis Jr.	Gulf Oil Corp	Roswell
A. D. Salisbury	Featherstone, Corp	"
H. N. Sweeney	✓	"
E. B. [illegible]	Hanover Oil Co	"
Bill Bradley	El Paso Nat. Gas Prod.	El Paso
Joe M. McNutt	✓	✓
R E Carraway	Standard Oil Co of Texas	Houston
Bill M[illegible]	Malco	Roswell
E. F. Whitehurst	Malco	Roswell
W. J. Loyd	Malco	artesia
R. L. Higgins	Malco	"
V. W. Bloom	Phillips Pet. Co	Bartlesville Okla
[illegible] Smith		Midland

NEW MEXICO OIL CONSERVATION COMMISSION

Elks Club

Roswell, NEW MEXICO

REGISTER

HEARING DATE April 16, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
W.B. Kleine	Permian Oil Co	Midland
John Mills	The Texas Co	✓
K.T. Kenny	Gulf Oil	Midland
J.G. Coates	" "	Houston
W. Shellshear	" "	Roswell
J.E. Dameron	Indiana Oil Purch Co	Midland
H.E. Schuurman	Shell Oil Co	Los Angeles
W.E. Owen	Shell	Roswell
Ted Bilberry	State Land Office	Santa Fe
Booth Kellough	Gulf	Denver
[illegible] Bell	Gulf	Denver
[illegible]	Moran	Hobbs
Dick Booker	Cities Service	Midland
[illegible]	✓	Bartlesville
A.C. Blackburn	Blackburn [illegible]	[illegible]
W.E. Harrington	Malco	Roswell
[illegible]	Pan Am [illegible]	[illegible]
C.L. Kelley	"	Roswell
J.H. Brown		" "
H.V. [illegible]		

NEW MEXICO OIL CONSERVATION COMMISSION

Elks Club

Roswell, NEW MEXICO

REGISTER

HEARING DATE April 16, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
John H. Higgins	The Ohio Oil Co.	Roswell, N.M.
J. J. Stanley	Benson-Montin-Greer	Farmington, N.M.
R. L. Houghton	Shell Oil Co.	Midland
J. W. Balch Jr.	El Paso Natural Gas	Jal
L. M. Gill	" " " Products	El Paso
R. M. Mobley	New Mex Oil & Gas Assn	Ros.
[illegible]	Pan American Pet. C.	Ros.
J. J. [illegible]	Pauley Pet	Ros
[illegible]		
C. [illegible]	Shell Oil	Roswell
[illegible] Richey	John [illegible]	[illegible]
[illegible] Graham	Standard of Texas	Houston
D. B. Anderson	Malco	Roswell
O. R. Hell	Elliott [illegible]	Roswell
Jason Kellahin	Kellahin & Fox	Santa Fe
Robert E. Fox	" "	"
[illegible] Kelly	Independent	Roswell

NEW MEXICO OIL CONSERVATION COMMISSION

Elks Club

Roswell, NEW MEXICO

REGISTER

HEARING DATE April 16, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
Harry A. Dippel	Continental Oil Co	Fort Worth
Kenneth D. McKee	John M. Kelly	Hobbs
D. Wilson	[illegible]	Roswell
Foster Morrell	Independent	Roswell
Clarence Babcock	Pan. Am.	Roswell
[illegible]	Union Oil [illegible]	Roswell
[illegible]	Northern Nat Gas	Midland
R. L. McGrath	U.S.G.S.	Farmington
Carl Traywick	U.S.G.S.	Roswell
R. P. [illegible]	U.S.G.S.	Roswell
B. J. Smith	[illegible]	Roswell
K. K. Bryant	Pan [illegible]	Roswell
Geo Buckles	[illegible]	Roswell
[illegible] Malone	[illegible]	Roswell
D. C. A. Johnson	[illegible] Pet.	[illegible]

NEW MEXICO OIL CONSERVATION COMMISSION

Elks Club

Roswell, NEW MEXICO

REGISTER

HEARING DATE April 16, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
J.T. Hampton	Great Western Drlg	Midland
S.H. Snoddy	✓	✓
Robert R. Garlow	Contl Oil	Roswell
Robert Leonard	Leonard Oil Co	" "
William Anderson	Anderson & Anderson Inc.	Fort Worth
W.P. Tomlinson	Atlantic	Roswell
R.F. Baker	Atlantic	Roswell
Cecil V. Chapman	Atlantic	Roswell
O.C. McBryde Jr.	Amerada	Midland
H.C. Hill	Amerada	Hobbs
M.T. Smith	Shell	Midland
M.C. Benn	Shell	Farmington N.M.
Fred W. [illegible]	Mc Wood Corp	Abilene Tex
[illegible] Moore	[illegible]	[illegible], Tex
D. M. [illegible]	Sunray Mid-Continent	Tulsa, Okla.
R. M. [illegible]	Gulf Oil Corp	Denver, Colo.
[illegible]		Durango Colo.

NEW MEXICO OIL CONSERVATION COMMISSION

Elks Club

Roswell, NEW MEXICO

REGISTER

HEARING DATE April 16, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
[illegible]	[illegible]	[illegible]
R. M. Payne	Continental Oil Co	Ponca City, Okla.
Sam F. Weir	Carter Pet. Inc	Midland, Texas
R L Denton	Magnolia Pet Co	"
E. J. FISCHER	OCC	Hobbs,
K L McPherson	McWood Corp	Midland
Roy Johnson	Bruce Burney Inc	Odessa
W. J. Rogers	Sinclair Oil & Gas Co	Midland
Roy don A Webb	" "	"
E W NESTOR	Shell Oil [illegible]	—
E H Ruffin	Rourke	
F. Norman Woodruff	E.P.N.G.	El Paso
John W. Stewart	Gulf	Denver
James Jennings		Roswell
[illegible] Cavin		Roswell
[illegible]	[illegible]	Roswell
[illegible] Woodward	[illegible]	Roswell

NEW MEXICO OIL CONSERVATION COMMISSION

Elks Club

Roswell, NEW MEXICO

REGISTER

HEARING DATE April 16, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
[illegible]	Pan. Am.	Roswell
R. L. Hamilton	" "	"
F. V. Vinklarek	Std Oil Co of Texas	Midland, Tex
G.E. George	" " "	
R L McClennan	" "	Houston
[illegible] Wolfe	U.S.G.S.	Roswell
[illegible]	U.S.G.S.	✓
R F Montgomery	OCC	Hobbs
B R Farris	Std Oil Co of Texas	Midland
[illegible] Leighnor Jr.	" " " " "	Houston
Paul Eaton	Hervey Dow & Hinkle	Roswell
[illegible]	"	
[illegible]	[illegible] Oil Co.	Okla. [illegible]
[illegible]		
[illegible]		
[illegible]		Farmington
[illegible]	[illegible]	Roswell
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	Shell	Roswell

NEW MEXICO OIL CONSERVATION COMMISSION

Elks Club

Roswell, NEW MEXICO

REGISTER

HEARING DATE April 16, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
Foster	Phillips	
John Runyan	OCC	Hobbs
ML Armstrong	OCC	Artesia
Phil D. Helmig	Malco Ref.	Roswell
A. G. Holland	[illegible] Oil Co.	Oklahoma City
V. R. Loar	Sunray Mid-Continent	Tulsa, Okla.
A. R. Kendrick	OCC	Artesia
H. R. Smith	Roswell Daily Record	Roswell.
Nancy Royal	[illegible] Reporting Service	Santa Fe

BEFORE THE
OIL CONSERVATION COMMISSION
Roswell, New Mexico
April 16, 1958

IN THE MATTER OF:

CASE NO. 1420 Application of Caulkins Oil Company to amend the Special Pool Rules for the South Blanco-Tocito Oil Pool. Applicant, in the above-styled cause, seeks an order amending the Special Pool rules in the South Blanco-Tocito Oil Pool in Rio Arriba County, New Mexico to provide for the transfer of allowables within its water injection project in said pool and to provide credit against gas-oil ratio limitations for water injected under said program.

BEFORE:

Mr. A. L. Porter
Mr. Murray Morgan
Honorable Edwin L. Mechem

TRANSCRIPT OF PROCEEDINGS

MR. PORTER: The hearing will come to order, please. The Commission will consider at this time Case 1420.

MR. PAYNE: Application of Caulkins Oil Company to amend the Special Pool Rules for the Sputh Blanco-Tocito Oil Pool.

MR. KELLAHIN: If the Commission please, Jason Kellahin of Kellahin & Fox representing the applicant, Caulkins Oil Company. I would also like to enter the appearance of Mr. Robert Fox and Keith Brown. Mr. Brown is from Oklahoma. We will have two witnesses in this case, Mr. Frank Gray and Art Holland.

MR. PORTER: Will the witnesses stand to be sworn?

(Witnesses sworn)

MR. KELLAHIN: We will call as our first witness Frank Gray.

FRANK GRAY

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Frank O. Gray.

Q By whom are you employed, Mr. Gray?

A Caulkins Oil Company.

Q What is your position?

A I am field superintendent in charge of operations in New Mexico.

Q And in connection with your position as field superintendent, do you have anything to do with the South Blanco-Tocito Oil Pool?

A Yes, I supervise all of the operations that are carried on there.

Q Now, Mr. Gray, what experiences have you had in the oil business?

A I've been in various phases of the oil business for the past thirty-four years, and producing operations, drilling engineer-

ing.

Q During that period, where did you work?

A The first year -- the first six years of my experience in the oil business was with the Continental Oil Company in Oklahoma. The next seventeen years with Anderson-Pritchard Oil Corporation in Oklahoma, Texas, and New Mexico. Twelve years of that time was in southeastern New Mexico. The next four years I was a partner in a contract drilling company. The past seven years, since 1951, I have been employed by Caulkins Oil Company.

Q And during that time it was in the area involved in this application?

A Yes, that's right.

Q Now, what are your duties as field superintendent?

A It is my duty to supervise the complete operation, including drilling, producing, measurements, and disposition of the oil and gas to the pipeline companies.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. PORTER: They are.

Q Now, in connection with your work for the Caulkins Oil Company, have you made a study of prorationing as it is presently operating in the South Blanco-Tocito Oil Pool?

A Yes, sir.

Q Now, referring to what has been marked as Exhibit No. 1, what does that show, Mr. Gray?

A It shows the comparison of the oil and gas production by

months on the Caulkins properties, and it is over a period of three months before and three months after proration was started in that field.

Q Is that information based on tests and records kept by you in the ordinary course of business?

A Yes.

Q Now, I notice from the Exhibit, Mr. Gray, that the production of gas in December of 1957 was extremely high and yet the Exhibit shows no increase in the gas-oil ratios. How do you explain that?

A During the month of December, the proration order permitted the selective production of oil, that is, we were permitted to produce the oil from the well that would produce it most efficiently from the standpoint of gas-oil ratio.

Q Then, in achieving that, are you saying that you produced your oil from the wells with the lower gas-oil ratio insofar as possible?

A Yes, sir.

Q Now, in January, wherein the production of oil was at its -- your daily production was at its lowest, the gas-oil ratio was higher. How do you explain that?

A During the month of January, the proration order required that each well produce its allowable, or that the allowable for each well be taken from that particular well regardless of its gas production. The limiting gas-oil ratio was not in effect during the

months of January and February included in this report.

Q Now, as a matter of fact, there has never been any limiting gas-oil ratio in effect in this pool until the 1st of April, is that correct?

A Unless I am confused on the original order, there has not been any limiting gas-oil ratio until the 1st of April.

Q Now, your explanation of higher gas-oil ratio for the month of January -- would the same explanation be given as to February?

A Yes, sir.

Q Now, with the institution of a limiting gas-oil ratio on April the 1st, will that operate to reduce the gas-oil ratio to the pool as a whole?

A Yes, sir, that will have a very good effect on the gas-oil ratio for the entire pool.

Q But does it in itself solve the problem of controlling the gas-oil ratios in the pool?

A The limiting gas-oil ratio will reduce the production of gas in the field, but in no way will it improve the inefficient producers if they have high gas-oil ratio at one rate of production. That similar ratio to some extent will apply most anywhere.

Q Now, referring to what has been marked as Exhibit No. 2, would you state what that shows?

A Exhibit No. 2 shows the disposition of the gas production during the six month period; three months before proration, and three

months after in the Caulkins properties in this South Blanco Pool.

Q Now, according to the figures which you have set out on Exhibit No. 2 under the heading "MCF Gas Wasted," what does that mean?

A That is the amount of gas that we were not able to either sell or use.

Q Now, during the three months, December, January and February, it shows a decided increase in this amount of gas. What accounts for that situation?

A During the month of December we had an allowable substantially higher than in January or February. The order setting out the allowed rate of production for the field came out, I believe, it was issued on December the 6th, and prior to that time we had been operating at a lower rate of production, and we stepped the rate of production up the remainder of the month in order to sell the amount of oil that we were entitled to sell, but in so doing, the amount of gas produced per day was increased considerably and we were not able to sell the same percentage as we had in the previous months.

Q Well now, you have facilities to take care of the gas that you had been producing prior to that, do you not?

A We have facilities for taking care of about all the gas we produce, except there will be peak loads that may at times cause some gas to be vented, and there are other times when conditions beyond our control make it necessary to shut the compressor down. Our equipment is designed to operate at a maximum pressure of 300

pounds. If the line pressure on the purer exceeds that, it shuts us down, and there have been occasions when that has happened.

Q Now, was this compressor installed by Caulkins Oil Company or its predecessor?

A Yes, sir, that's right.

Q Has Caulkins Oil Company made every effort to sell the gas produced along with the oil on this pool?

A Yes, we have made every effort to sell as much as we can.

Q Now, has the institution of proration created any special problems in connection with this operation?

A The unlimited, or rather the lack of a lending gas-oil ratio during the months of January and February made it necessary for us to produce some high gas-oil ratio wells in order to operate them and keep freezing and flooding of the separators at a minimum. We have found it best to operate them at a high rate of flow, and one well in particular, our No. 123 in Section 7, 26, 6, has a ratio high enough that it by itself, at the most efficient rate we can flow it, it will more than load the system. We have to take care of it. We can handle on up to three and a half, four million feet of gas. The compressor itself will handle about one and a half million, and we use roughly one quarter million for fuel, but the system is so designed that if the suction pressure on the compressor exceeds 20 or 21, 22 pounds, we get into an overloaded condition on the compressor engine, so we are limited by those conditions on the amount of gas we can pass through our plant, and for

that reason we have had to shut wells in while we produced the high gas-oil ratio wells. There are three wells actually that are bad offenders.

Q Now, in the event you were allowed to transfer the allowable from those wells to wells with the lower gas-oil ratio, would that solve that problem?

A I think that would very nearly cure the trouble.

Q With the result that gas produced would be to a much larger extent saved and marketed, is that correct?

A Yes, I think we could get back, at least to -- we could cut the waste of it down, at least to what it was back in September, October and November.

Q Now, referring to what has been marked as Exhibit No. 3, Mr. Gray, what does that design to show?

A The Exhibit No. 3 shows the comparison of reservoir space voided per barrel of stock tank oil produced during this six month period.

Q What is the basis for your filing of the daily average reservoir voidage?

A The daily average reservoir voidage expressed in barrels is the space occupied by the oil produced at reservoir conditions, the gas produced at reservoir conditions, and the water produced, the sum of the three.

Q What are the basis for the other figures shown on this Exhibit?

A The daily water injection in barrels is the amount of water that we inject daily. The daily average water injection of 1306 barrels is the net amount we injected.

Q That would be the amount of water injected less the amount produced?

A No, the amount produced is included in the daily average reservoir voidage. The daily water is the total amount of water we inject per day.

Q What is this figure, the net daily average reservoir voidage?

A That is the difference between the water injected and the reservoir voidage.

Q Now, how do you arrive at the last figure, the last column of figures, the barrels of voidage per --

A That is column 4, the daily average oil production in barrels divided into the net daily average reservoir voidage, and it shows the number of barrels and the space voided per barrel of stock tank oil produced.

Q That column shows a decided increase in the barrels of space voidage per barrels of oil produced for the last two months. How do you account for that?

A That's due to gas production in excess of that produced during the months of September, October and November.

Q Is that as a result of the present system which requires you to produce your oil from each individual well?

A Yes, it is. However, the ratio will be improved a great deal during the month of April when we have a limiting gas-oil ratio, but it is not as low as it could be if we were permitted to operate on taking our oil from the most efficient producer from the group.

Q Based on your experience in this field, do you feel that is an efficient operation, to void 4.39 barrels of space per barrel of oil produced?

A No, I don't think it is an efficient rate because we have demonstrated that it can be done with less space, less space voidage.

Q Now, referring to what has been marked as Exhibit No. 4, Mr. Gray, what is that designed to show?

A Exhibit 4 is an application of the principal of allowable transfers and water injection credit to the April, 1958 allowables authorized for the Caulkins property in the South Blanco-Tocito Oil Pool.

Q Now, is that Exhibit based upon the proposals made in the proposals attached to the application in this case?

A Yes, that shows the estimated results that can be obtained by producing the oil from the most efficient producers.

Q And what effect would those rules then have under the proposed rules -- under the operations, I should say?

A The gas-oil ratio for all of the wells that are operated by Caulkins, which includes wells that would not participate in any allowable transfers and those that would. There are two wells that

will not participate in the transfer of allowables.

Q That is two Caulkins wells you are talking about?

A Two Caulkins wells. The gas-oil ratio estimated to produce 607 barrels, as will be required during the month of April, is 2300. If we were permitted to take the oil from the well that would produce it most efficiently and reduce the take from inefficient wells to an amount that would give us just control and knowledge of any change that might be taking place in them, the gas-oil ratio would be 1854 approximately.

Q In other words, the proposals would allow you to produce the same amount of oil and yet reduce your gas-oil ratios for the pool, is that correct?

A In working this out, this credit for gas-oil ratio as we have recommended, the credit for water injected -- excuse me, as take the allowable for a penalized well, and by having credit for water injected, correct the allowable to top allowable if the well were capable of making it, and in working it out, we would, by receiving credit for the water injected, we would restore the top allowable wells to a top allowable of 842 barrels which would be produced with approximately the same amount of gas as 637. The penalized allowable could be produced. With the gas allowable, we estimate we could produce 637 barrels under the present rules or 1,580,000 cubic feet. To produce 842 barrels from the most efficient wells would require 1,560,700 cubic feet, approximately the

same amount of gas for 150 barrels or so.

Q Would you consider that a more efficient use of the energy available in the reservoir --

A Yes.

Q -- under the present rules?

A Yes, very definitely.

Q Now, based upon your testimony and the Exhibits 1 through 4, can the situation you outlined be avoided by the selective production of wells in the pool?

A I think that the selective production of the wells, that is, favoring the more efficient producers, would conserve reservoir energy and would help him minimize any surface waste of gas.

Q Would it result in greater ultimate recovery of oil from the pool?

A Yes, I think it would.

Q Do you have anything else you wish to add, Mr. Gray?

A No, that's all I have.

MR. KELLAHIN: At this time we would like to offer in evidence Exhibits 1 through 4 inclusive.

MR. PORTER: Without objection, they will be admitted.

MR. KELLAHIN: That is all.

MR. PORTER: Anyone have a question of Mr. Gray? Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Gray, I note that the most gas that was produced in any of the six months as indicated on Exhibit No. 1 was during the month of December, is that correct?

A That's correct.

Q And at that time produced the most oil than any of the six months, is that correct?

A Yes, sir. The December production averaged 908 barrels a day.

Q The highest GOR -- Now, these GOR's that are shown here on Exhibit 1 are produced GOR's, is that correct?

A Yes.

Q The highest GOR is during the month of January, is it not?

A Yes, sir.

Q And that was during the month of your lowest production?

A Yes, sir.

Q Do you think that with increased allowables and the designation of so much oil to each unit without the assignment of allowables from one well to the other will cause you to have high GOR's such as you had during the month of January? Is this -- in other words, are these high GOR's responsible, are they the result of the low rate of production that you had during January?

A No, sir. I think not. During the month of December we were permitted to take the oil from the wells that would produce efficiently. During the months of January and February we were not,

we had to take the allowable from each well regardless of the gas production.

Q Well, how did you do it in September, October, November and December?

A Selectively. We were favoring the most efficient wells.

Q Well, with the imposition of the 2,000 to 1 gas-oil ratio that went into effect April the 1st, do you think you will get the high GOR that you have on this Exhibit?

A No, we would not. The limiting gas-oil ratio will reduce the pool's total gas-oil ratio, but it will not in any way improve the efficiency of the wells that are inclined to produce a lot of gas.

Q Well, Mr. Gray, is this not true at any pool where you have some structures with wells located high in the structure that produce a lot of gas, if you could transfer the allowable to those wells down the structure and shut the wells on the top end, that you could reduce the GOR on the pool?

A Yes, that's correct.

Q Is this a common practice ordinarily?

A Ordinarily, the ownership of the property will not permit a transfer of allowables except on a unit basis, and I am not as familiar as I should be with some of the larger pressure maintenance operations around over the country, but I believe it is where it has been unitized and where it is not a cooperative deal, they favor the producers.

Q Aside from a measure maintenance project, is it a common practice to transfer the allowable from the wells on top of the structure to the well down the structure?

A It is not common practice, because in nonunitized or in -- where the ownership is diversified, it can't very well be done, but that is not the situation we have here.

Q Mr. Gray, do you have an opinion as to whether this pool has an MER, or a most efficient rate of production, has a desirable rate of production which you would like not to see exceeded or not met?

A We have no actual figures on it. We have not attempted to work it out, but I do think that it would be between 850 and 1000 barrels a day.

Q This pool is on 80-acre spacing, right?

A Yes.

Q And it does have the depth factor, does it not?

A Yes.

Q Do you know what the depth factor --

A The combination depth factor is 2.77.

Q With the allowable that the Commission has established for May, 1958, what will the allowable be for the acreage in this pool?

A I believe it figures 138 barrels per day. 139 barrels.

Q How many wells do you have in this project, Mr. Gray, that can produce without being penalized on account of the 2,000 to

1 GOR limit?

A There are three wells in the group that would not be penalized. I believe that's right.

Q On Exhibit 4 there is an estimated gas-oil ratio. What is the estimated gas-oil ratio based on?

A Those figures are based on the latest information available on the wells. Part of it was taken from the report from the month before of gas production, part of it is recent tests.

Q Mr. Gray, I count six wells here which have GOR of less than 2,000.

A The first well, No. 109, is a marginal well. Its capacity is 27 barrels. No. 132, this increase in allowable will make a marginal well out of it. Its capacity is 97 barrels a day. This 185 well will be a top allowable well, also 127 and 129. 207 is a penalty well; 182 is a marginal well; 179 is a penalty well; 177 is a penalty well; 132 is a marginal well with a 97 barrel capacity; 129 is a top well; 127 top well, and 109 a marginal well.

Q Have you made an estimate of how much you can produce with an allowable of 135 barrels and GOR of 2,000 to 1?

A No, sir, I have not.

Q You may be able to achieve the desired rate of production?

A I think we will be permitted to produce approximately the 842 barrels from the total wells in the group that this selective production would entitle us to, if we received credit for water injected and were permitted to do the transferring. But to

increase the production will also increase the production of high gas-oil ratio wells. The penalty applies, I believe, on the gas limit, which is set by multiplying the top permissible gas-oil ratio by the allowable of the top unit in the field, which would be 2,000 times 159 barrels. The penalty for the wells is figured on that basis, by dividing the actual gas-oil ratio into the maximum permissible gas production, which would increase the allowable of the inefficient wells.

Q Mr. Gray, on your Exhibit No. 2, I believe that in the month of December more gas was produced than any other months, is that correct?

A Yes, that is right.

Q And this was during a period when you were taking the oil from the desired wells?

A Yes, that is correct, with one qualification. During the month of December we were producing this No. 179 well continuously, even though it did have a high gas-oil ratio and the reason for that was to obtain information for control of the operation. We had started the injection of water into the No. 85 and No. 87 wells, then discontinued it, and we were testing No. 179 at a rather high rate in order to determine what effect it would have on it to help us trace the movement of water in the reservoir.

Q You weren't observing any GOR limitation during December?

A During the month of December?

Q Yes.

A No, I believe the order permitted us to produce the oil from whatever wells we saw fit.

Q Which order was that?

A The one that was issued December the 6th.

MR. NUTTER: I believe that's all.

MR. PORTER: Anyone else have a question of Mr. Gray?

MR. COOLEY: Yes, sir.

QUESTIONS BY MR. COOLEY:

Q Mr. Gray, you stated one of the objects for transferring allowables ordinarily was a diversity of ownership between wells on high structures and those wells which would make high gas-oil ratios. Can you tell me what the royalty ownership is in the various leases in this project?

A No, sir, I can't tell you who they are or what their respective interests are.

Q Can you tell me whether they are common?

A I believe they are common to this extent. There has been an agreement worked out among the royalty owners that makes this thing work.

Q They are all Government leases, and the overriding royalties are adequately protected?

A Yes, sir. This thing has been in operation now for three or four years, and there has been -- apparently everyone is well satisfied with the operation of the thing as far as their respective interests are concerned, and the management of the accounting for

crude production -- I mean the production of crude and gas.

Q Would you elaborate, please, on your observations -- the prediction that if your proposal is adopted, that greater ultimate recovery will be obtained?

A One of the problems that we've encountered in conducting this operation was channeling, and we think that it was partially due to too high a rate of injection. We would prefer to keep the rate of injection as low as possible to partly or at least minimize that condition, and in order to maintain pressures or control a decline, the rate of injection has got to be either equal to or at least in proportion to the withdrawal, or space voidage. That is one --

Q Will the rate of injection differ whether we adopt the proposed plan or remain on the existing well by well plan?

A The space voidage per barrel produced will be less if we produce less gas to get it, and the amount of water that we need to inject to take the place of the oil and gas that has been withdrawn would be less also.

Q Did you have another reason you were going to --

A No, that's about as far as I want to go on it.

MR. COOLEY: That's all. Thank you very much.

MR. PORTER: Mr. Utz, do you have a question?

MR. UTZ: Yes, I did.

QUESTIONS BY MR. UTZ:

Q Mr. Gray, referring to your Exhibit No. 2 under the

column entitled "MCF Gas Wasted," does that mean that gas was vented to the air?

A Yes, sir.

Q What was your explanation as to the necessity of venting that gas?

A We were unable to either use it or compress it and sell it to El Paso Natural Gas Company.

Q Due to the lack of compressor facilities?

A It was, for the moment, yes. We simply didn't have the capacity to do it, and then there were some shutdowns of the compressor beyond our control that occurs almost every month.

Q What is the maximum pressure that you can transfer gas on your pressure system?

A The rated capacity is 250, and they gave us a safety factor that permitted us to go up to 300 pounds, but we have an automatic device that shuts it down when the compressor reaches 300 pounds; to go beyond that would not be a safe working pressure.

Q Could you two-stage the gas and sell all your gas?

A It is possible that we might, but it would be a little difficult to justify the cost of doing it on the amount of gas we are handling at the present time. The line pressure is supposed to remain at, oh, I believe, approximately 250 pounds. There are conditions that arise that even the gas company has a little control over in the way of freezing and one thing or another that causes those line pressures to go up, and when that occurs, with the equip-

ment we have, all we can do is shut down the compressor. There have been times when we were even able to shut in wells to avoid wasting any gas that we had a market for, but when those things occur at night, there is little you can do about it except to take care of it in the morning when operation are resumed for the day. During the months of September, October and November we were able to use or sell an average of 18 percent, and 18 percent of the total gas we sold that month would hardly be justification for installation of more equipment. Now later, if more wells are drilled and it is necessary to handle more gas, it might be possible to do that.

Q Do you have any idea how much it would cost to increase your compression facilities to be able to produce that gas in the line?

A Well, no, I don't. I wouldn't hazard a guess on it without investigating it more carefully.

Q Now, referring to your Exhibit No. 4, Mr. Gray, I believe that is an example of how you would like to operate this field, is it not?

A Yes, sir.

Q Under your column entitled "Estimated Daily Gas Production," the total is 1,946,000. How much of that gas do you think you could sell?

A I think that the average would be approximately the same as it was during the months of September, October and November. We might even do better than that.

Q Approximately 38 percent of it then?

A Yes.

Q Further down the column, the total for the wells not participating in the pressure maintenance unit, there is a total of over a million and a half cubic feet, what happens to that gas?

A It is put through the same system and through the same compressor. I am not sure that we are together on the volume there. The maximum permissible gas production from each well would be approximately 194,000 feet apiece. The 1,580,000 represents the total produced by all of the wells, those participating and those not participating.

Q Are there any wells producing from the South Blanco-Tocita Oil Pool which do not put their gas into your gathering system?

A We have only the wells that we operate connected to the compressor.

Q Are Texas Natural wells connected to your system?

A No.

Q What happens to the gas from those wells, do you happen to know?

A As far as I know, it is flared.

Q Would Caulkins Oil Company object to a no-flare order in this pool?

A Inasmuch as we are compressing most of the gas that we produce, I think that a no-flare order would have little effect on

for us we are concerned because we are disposing of most of the gas now, selling it or using it.

Q What you are saying is that a no-flare order would affect the Texas Natural wells more than it would you?

A Yes, sir.

MR. UTZ: That's all I have.

MR. PORTER: Anyone else have a question of Mr. Gray?

MR. KELLAHIN: If the cross examination is through, I have a couple of more questions.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Gray, you testified in response to a question, I believe, by Mr. Nutter, that the MER, or the most efficient rate of production for this pool you would guess would be eight hundred to a thousand barrels per day, is that your testimony?

A It would be a guess.

Q Would that be based on the wells presently producing in the pool?

A That is correct.

Q In the event additional wells were drilled, you would revise that figure?

A Of necessity, we would, yes.

Q Now, if you do not receive credit for water injected and the transfer of allowables as requested, would you be able to increase that figure without increasing the GOR to the pool, the thousand

barrels per day under the present system?

A No, I believe the gas-oil ratio of 2300 actually would increase, it would of necessity increase. If we take more oil from the inefficient wells, we must handle more gas to get it, so that the gas-oil ratio would increase and we would not be able to handle substantially more than we have set up here. That is about the capacity of the compressor, if you are asking about the marketing of gas.

Q Now, you, of course, have no assurance that the allowable on this pool will continue at the level set for May?

A I don't.

Q In response to some questions by Mr. Utz, I would like to clarify some points there. Are the compressor facilities adequate to take care of the gas if the proposed rules are adopted, in your opinion?

A With the present number of wells and producing them selectively, we can take care of, I'd say 85, 86 percent of the gas. We would not be able to handle a hundred percent of it for the reasons I have given before. There are a number of things that will cause the compressor to be shut down.

Q Well, in a pool of this type, is it normal to have peak production periods of oil?

A There will be times when your flow of gas will be higher than it is at other times.

Q Well, is that because of the changes in the producing

rates that you have to operate that?

A Usually that is caused by the producing rate and also the efficiency of the well that happens to be producing at the time.

Q And does that also contribute to the situation where you cannot handle the gas one hundred percent?

A Frequently there will be gas flared. When we first open the well up, particularly if it has been shut in for a few days, there will be a gas head on it that will be more than the compressor can handle for a short time.

Q Now, you have a two-stage compressor there, do you not?

A Yes.

Q In other words, if additional compressor facilities were needed, it would be a three-stage compressor to raise the pressures?

A Well, I believe I would prefer to leave that to an equipment expert, the equipment that would suit the job we have to do there.

Q There has never been a no-flare order in this pool, has there?

A No.

Q And Caulkins Oil Company or its predecessor voluntarily installed this compressor equipment to save the gas?

A Yes, sir.

MR. KELLAHIN: That is all.

MR. PORTER: Anyone else have a question?

RECROSS EXAMINATION

BY MR. UTZ:

Q Mr. Gray, could Caulkins Oil Company handle any additional amount of gas?

A No, sir, not with the present proration, not with the present allowables. During the month of February we had a pretty efficient run on that compressor. It was operating, I believe, 96 percent of the time, but due to changes in loading and one thing and another in operating our own wells, that seems to be about the maximum amount of gas we are able to handle, a million two hundred feet a day on the average, which we sold El Paso during the month of February.

Q Then you would not be in a position to handle the gas from the Texas Natural wells?

A No, sir.

MR. UTZ: That is all.

QUESTIONS BY MR. NUTTER:

Q Mr. Gray, the two months on your Exhibit No. 1, in which the GOR was more than a couple of thousand, were January and February, right?

A Will you repeat the question, please?

Q I said the two months on your Exhibit No. 1 in which the GOR was more than a couple of thousand were January and February of '58, is that correct?

A Well, the average for September, October and November would be about 2500.

Q But the average for January and February would be 4200?

A Yes, that's approximately correct.

Q Do you happen to know offhand what the allowable rates of production authorized by the Commission for the San Juan Basin for those two months were?

A Offhand, I don't.

Q Assuming that the allowable is in the average of 10, 13 barrels, that would be an allowable comparable to what we have at the present time, would it not?

A Yes, sir.

Q Is it your opinion that this high gas-oil ratio resulted more from the inability to have Caulkins Oil Company produce the oil from the wells from which they desired to produce it, or from the very low allowables that were in that pool at that time?

A I think it is due almost entirely to the suspending or relaxing of the limiting gas-oil ratio, and the requirement of -- I mean the rule that required that each individual well produce its allowable. As an illustration, during the month of December, we started with Well No. 109, the gas-oil ratio was 924, with the production of 662 barrels; the month of February 914, with 409 barrels.

Q In other words, the gas production has remained virtually constant while the oil production went down?

A The gas-oil ratio did not change appreciably even though there was a difference in production from the well. That is a pumping well, and there are fluctuations from month to month in the

total amount of oil we take from it, which is influenced by trouble and what not that we have with the pump equipment, but I would like to go on with Well No. 123. During the month of December we produced 39 barrels from the well, during the month of February, we produced a thousand and seven barrels. The gas-oil ratio of the well in December was 4231, gas-oil ratio in February was 1927. Now, most of the other wells in the group had lower gas-oil ratios during the months of February than they did during the month of December. Does that answer your question?

MR. NUTTER: I believe so, thank you.

MR. PORTER: Any further questions of Mr. Gray? The witness may be excused.

(Witness excused)

MR. KELLAHIN: Call Mr. Holland as our next witness.

ART HOLLAND

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q State your name, please, sir.

A A. F. Holland.

Q By whom are you employed, Mr. Holland?

A I am employed by Caulkins Oil Company.

Q In what position?

A I am in charge of their production department.

Q You have previously testified before this Commission as an expert engineer and had your qualifications accepted, have you not?

A Yes, sir, I have.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. PORTER: Yes, sir, they are.

Q Mr. Holland, are you familiar with the operations of Caulkins Oil Company in the South Blanco-Tocito Oil Pool?

A Yes, I have followed the operation of that field for approximately six years.

Q Now, the water injection program now under way in that pool was commenced in October of 1954 by order of this Commission, was it not?

A That is correct.

Q Do you have any present opinion as to the effectiveness of this program?

A The program has been in operation approximately four and a half years. Our analysis of the field is that there are approximately 18,000,000 barrels of oil in place in the reservoir under natural production.

MR. NUTTER: Is that at the present time?

A Present developed limits. We include 15,000,000 barrels of oil under natural production, which means we estimate that oil recovery would amount to approximately 4,000,000 barrels. With the

water injection project we believe that oil recovery will be increased and that ultimate recoveries from the field will range in values of 6 to 7 million barrels. We think that we can secure an additional two or three million barrels of this water injection project. Also, the reservoir is believed to have initially contained approximately 25 billion cubic feet of gas. That includes the gas in solution with the oil and the gas in the gas cap. The gas cap limits have not been defined, so our estimates of that gas necessarily are subject to interpretation.

Q Have you had any problems in connection with the operation of this water injection program?

A We've had our share of problems which I think are inherent in an operation of this type. We, at one time, injected rather large quantities of water in some poor type sand condition wells and we have channeling in the reservoir in another area of the reservoir where we used a wetter injection well. We have injected approximately 2 million barrels of water. We think that the oil displacement efficiency is good.

Q Now, referring to what has been marked as Exhibit No. 5, Mr. Holland, will you state what that is?

A Exhibit No. 5 shows the South Blanco-Tocito Pool area. On the map, the area is divided into two segments for proration purposes. One area, delineated in blue, is an area determined to not be associated with the water injection project. It was designated in that manner because the other operator in the pool is not

injecting water or gas. The area also includes the offset wells to that property, which are operated by Caulkins Oil Company. The area delineated in yellow is an area that we determine to be associated with the water injection project and for which we ask that we be allowed to produce oil from wells having the lowest gas-oil ratio, plus not being penalized for wells in that area that do have ratios exceeding the two thousand to one limit.

Q By not being penalized, do you mean receive credit for water injected?

A That is correct. Our reasoning is that by replacing the energy in the reservoir, we should not be penalized with the limiting gas-oil ratio for this area.

Q For what reason have you included the properties of -- or setting the Texas Natural properties in the nonparticipating area, Mr. Holland?

A We propose that they be prorated in accordance with the existing state-wide plan. The other areas I've previously mentioned, we propose that we be allowed to transfer oil from wells of high ratio to wells of low ratios and also not be penalized. We don't think this is a new plan, we copied the plan from other projects, it's not new.

Q Well, would the Caulkins property included in the nonparticipating area proper, affect the buffer zone between your zone and the zone of the Texas Natural?

A We believe it would.

Q Would it, in effect, protect the correlative rights of Texas Natural?

A Yes, that is correct. And it is along the lines the way other operators have handled similar problems in other areas where the offset wells are prorated in the same manner.

Q Now, Mr. Holland, are you familiar with the royalty interest ownership in the property shown on Exhibit 5?

A Yes, sir, I am. I am familiar with the royalty interest underlying the Caulkins Oil Company leases. It is common throughout the area of the Tocito production.

Q And would the adoption of the rules as proposed by Caulkins Oil Company create any problems in connection with royalties or overriding royalties?

A Since the ownership is common, it would not.

Q Now, referring to what has been marked as Exhibit No. 6, would you state what that shows?

A Exhibit No. 6 is a graphical representation of the producing values of the South Blanco-Tocito reservoir since inception. It shows the bottom hole pressure record, the daily oil and gas production record, and the gas-oil ratio record. The significant things that we believe are **in** the record, are that it shows that 18 different reservoir pressure surveys have been conducted to **saturize** the operation of this field. Since water injection was commenced over the approximate four and a half year period reservoir pressure has dropped an estimated 132 pounds. We think that

that definitely shows an arresting of the bottom hole pressure decline for this tyoe of field. Another item that has already been brought out by Exhibits is the increase in gas-oil ratios during the past several months' period. As is shown by the dotted line on the graph, there has been a rather large increase, which was occasioned by not being allowed to selectively produce the wells. We hardly are in favor of proration, but this was an emergency situation and it did increase the gas-oil ratio appreciably.

Q Now, do you consider a pressure drop and bottom hole pressure drop of 182 pounds in four years a significant drop?

A Not for this type of reservoir. We have additional data that will show the change before water injection and after water injection.

Q Now, referring to what has been marked as Exhibit No.7, will you tell us what that is designed to show?

A This Exhibit is a summarization of the oil, gas, water, and bottom hole pressure information for the pool. Since inception, the field has produced approximately 2,300,000 barrels of oil. The bottom hole pressure declined before commencement of water injection and there was one pound drop for each 3,165 barrels of oil produced. Since injecting water, there has been a one pound drop for 9,004 barrels of oil produced, which means that there has been a decrease in the bottom hole pressure decline three times the value before commencement of water injection. That means that energy has been conserved which can be used to produce additional

ultimate oil recovery. The gas-oil ratio of the field has remained practically constant in the past six and a half years that the field has been in operation. The overall gas-oil ratio was 140 cubic feet per barrel. With this type of field, under normal operations, due to depletion, those ratios increased by rather large amounts. By taking into consideration the replacing of energy in the reservoir, since commencement of water injection, one barrel of water has replaced approximately 680 cubic feet of gas. Deducting the amount of gas determined by using an equivalent value, the producing gas-oil ratio, since commencement of water injection, is four hundred and thirty-three cubic feet per barrel. That would be the low solution gas-oil ratios. Since commencement of the water injection operation, for each four barrels of oil, gas, and water removed from the reservoir, three barrels of water have replaced it, which means that there has been a material decrease in the amount of space and energy removed from the reservoir.

Q Well, this tabulation shows the producing gas-oil ratio giving credit for water injection. Approximately what total figure would that represent, water injection as against cubic feet of gas?

A To do the same thing, maintain the same level of pressure, it would have required the injection of an excess of 2 billion cubic feet of gas. I would like to point out one other thing, and that is that since water injection has started, the property, the Caulkins Oil Company leases have produced a million six thousand barrels of oil, with a 132 pound pressure drop. To achieve the

recoveries that we have predicted from the field, using the higher value of 7,000,000 barrels, it would require approximately three times, an additional three times this amount of oil. Projecting the pressure decline on the same basis, it would mean that we would recover the predicted ultimate recovery with an additional 500 pound pressure drop, which means the ultimate oil recovery would be achieved with approximately 1200 pounds of reservoir pressure still remaining, so allowing the pressure analysis, the ultimate recoveries predicted are very reasonable. Another item is the analysis of the gas production. From Caulkins Oil Company's leases, 3,860,000 cubic feet of gas have been produced. The gas production from the Texas Natural Rincon wells is not known, but we estimate it will be at least another billion cubic feet. That would mean to date that 5 billion cubic feet of gas have been used for the production of oil from this reservoir. There was an estimated 25 billion cubic feet of gas initially, leaving an additional 20 billion cubic feet of gas available in the reservoir to recover the predicted ultimate recoveries. Since five billion feet has allowed the recovering of approximately 2,350,000 barrels, which represents about one-third of the predicted recoveries, projecting that same ratio, it would mean that 10 billion additional cubic feet of gas would be necessary to achieve the oil recoveries predicted, and using the gas in the manner that we have, we know that there is an excess of that available.

Q Now, this Exhibit shows that you are not operating a

complete pressure maintenance project. There has been some decline in pressures, has there not?

A Yes, sir, that is correct. One of the principal reasons for such a decline is that on the western edge of the pool there is a gas cap, and we have, to some degree, limited our injection to prevent moving oil up into the gas cap and being forever lost.

Q Now, if the Commission allows the flexibility of operations as proposed in the rules submitted in connection with this application, will your reservoir management be more efficient, in your opinion?

A We think so, and I would like to introduce Exhibit No. 7, which is a plat of the latest gas-oil ratio information available. These ratios that are shown, that is, most of the ratios, were taken from oil and gas measured during the month of March, and include a total month's production for two wells. Tests were available during the month of April, which were essentially the same as the March figures, but since they were later figures, I have used them. Now, what they show -- what this Exhibit shows is that the high gas-oil ratio wells are principally high on structure, or close to the gas cap. The higher portions of the field are to the south and to the west; the lower portions of the field are to the north and to the east. For an example, our well T-123 is one of the higher wells on structure in the field. It has a ratio in excess of 13,000 cubic feet per barrel. A well low on structure would be, for example, our well T-129. It had a ratio of 731 cubic

feet per barrel, another well, T-179, although it is in the center of the field, is a high well structurally. The ratio is 9,000 cubic feet per day. Now, what we propose to do with this transfer of allowable plan is take the oil, for example, that would be assigned to well T-179 and transfer it to a well lower on structure, for example, T-129 and produce oil more efficiently.

MR. PORTER: I believe your discussion had to do with Exhibit No. 8. You referred to it as Exhibit No. 7.

A That is correct. I would like to change that for the record. Thank you.

Q Would that resutl, then, in your opinion, in more efficient use of the reservoir energy available?

A I believe so. The lower the value of the producing gas-oil ratio, the greater and value of the ultimate oil recovery we think we can arrive.

Q And would it, in fact, have a greater ultimate recovery from the pool?

A We think so. The more energy we can conserve in bringing oil to the surface, the greater should be our ultimate oil recovery.

Q Have you completed your discussion of Exhibit No. 8, Mr. Holland?

A Yes, I think that's all.

Q Now, referring to what has been marked as Exhibit No.9, will you state what that is designed to show?

A Exhibit No. 9 is a representation of one of the 18 different bottom hole pressure surveys that have been conducted in the field. This survey was taken during the first part of this month. It shows in detail the well pressures, the average of time, which was 1798 pounds per square inch, and supports our contention that there has been a drop of 182 pounds since inception of the water injection project.

Q Referring to what has been marked Exhibit No. 10, will you state what that is?

A Exhibit No. 10 is a graphical record of the manner in which water was injected into the field. At one time rather high injection rates were used, and at that time, we had the channeling that I mentioned, in which we spent approximately six months to a year in tracing water movement through the reservoir to find out what the trouble was and found that one area. The area where we are now injecting water, the program is operating efficiently. It also shows that there have not been great increases in the amount of water produced from the field. At the present time, the water production averages three to four hundred barrels per day. It shows that of the three and a half million barrels of water that have been injected, approximately [illegible] barrels of that had stayed in the ground, so that means it is displacing oil in the reservoir.

Q And that doesn't indicate that there has been any cycling of water in this operation, does it?

A No, sir, it doesn't. There will be, in water injection projects, there will be water produced, and from our records, we think that the injection is efficient and is recovering additional quantities of oil.

Q Now, referring to what has been marked as Exhibit No. 11, will you state what that is?

A Exhibit No. 11 is a graphical chart showing the reservoir voidage. That is, the barrels of combined oil and water removed; the amount of space replaced by water injection, and the difference between the two. It shows also why reservoir pressure is not being entirely maintained. There is a difference between the gross reservoir voidage and the water injected during the past six months. This difference has averaged about fifteen to eighteen hundred barrels of water per day. During the month of March, which is not shown on this chart because corrected production figures were not available at the time they were prepared, the difference will amount to about 800 barrels per day during the month of April. Under the present pipeline proration plan of 420 barrels from the field, water injection should exceed reservoir voidage. We should have, in excess of water injected, about 700 barrels per day. It shows a restoration of reservoir energy.

Q Then, in your opinion, would you say that increased oil recovery will result as a result of this operation?

A Our analysis of it is that there will be two to three million barrels of additional oil recovered.

Q Now, referring to what has been marked as Exhibit No. 12, will you state what that shows?

A Exhibit No. 12 is a cumulative chart of this same reservoir picture. It shows that since commencement of water injection, that the net voidage, which means the amount of oil-gas and water, that was not replaced by water, has greatly declined over the life of the property. Gross voidage has exceeded six million barrels. During the period of water injection, the voidage amounted to 4,774,009 barrels. The water injected amounted to 3,438,513 barrels. The difference is 1,335,496 barrels. It shows that for each four barrels of combined oil-gas and water removed, that three barrels of water were replaced in the reservoir. Another item is that in replacing the space voided by oil-gas and water, the gas equivalent of the water injected amounted to 2,019,190 cubic feet, or represented approximately 75 percent of the gas produced. It means that a major portion of the reservoir energy and the pressure maintains is being maintained.

Q Mr. Holland, I am somewhat confused at this point. Do you have another exhibit?

A No, that's all.

Q Now, are you familiar with the proposed rules which were attached to the application in this case?

A Yes, sir, I am. They provide, No. 1, for the transfer of allowables that I've mentioned from wells of high gas-oil ratio to wells of low oil ratio. The proposed rulings provide that a

schedule will be prepared each month showing the Commission how this transfer is to be accomplished so that they can follow the programs. The rules also provide a means of translating the amount of water injected into a gas equivalent and applying that as a credit against wells of high gas-oil ratio. The transfer of the allowable, then, from these wells will also be shown on the schedule submitted to the Commission. The proposed rules also divide the area into two proposed areas for proration purposed. That is, one area will be prorated as presently employing state-wide proration rules, and the other would incorporate the features that we have mentioned.

Q In the event any other operator in the pool wishes to participate in the water injection program, would you have any objection to the same rules applying to the pool as a whole?

A We would not. We would feel it would be a credit for water injected. On a state-wide basis, it would be an attractive, economical promotional feature toward securing additional oil for the state.

Q Are the rules which Caulkins Oil Company proposed in this case in effect in other pools or pools similar thereto?

A For the State of New Mexico, one project in particular has a gas injection project, the Langley gas injection project, and it is my understanding that there was no penalty there, and the allowables were assigned on a unit basis and the oil and gas could be produced from any well in the pool at the discretion of the operator for the most efficient operations, and in other states,

there are quite a number of projects and most of them have the features we have outlined wherein they allow transfer of allowables for the most efficient operation of the unit, and No. 2, they allow credit either for injected water or gas against producing gas-oil ratios. As I say, it is not new, it is something we have copied.

Q Now, in your opinion, would the adoption of these rules result in a more efficient operation of this pool?

A I believe it will. First and foremost,it would allow us to produce at a lower gas-oil ratio. Another feature, it would allow us to, in some degree, control the movement of water through the reservoir by producing oil in different areas. We can somewhat control the pressure in the reservoir and control the movement of water. By doing all of those things, we should be able to recover additional amounts of oil from the pool.

Q It would then result in the prevention of waste as designed by the statutes?

A By the recovering of additional amounts of oil, waste would be prevented, yes.

Q And would correlative rights and operators and royalty owners be protected?

A We think so.

Q Do you have anything further you wish to comment on, Mr. Holland?

A I believe that's all.

MR. KELLAHIN: At this time we would like to offer in

evidence Exhibits No. 5 through 12 inclusive, and we would also like to offer as an exhibit in this case the proposed rules which were attached to the application filed by the applicant.

MR. PORTER: Without objection, they will be admitted. We will have a ten-minute recess.

(Recess)

MR. PORTER: The hearing will come to order, please. Mr. Holland, will you take the stand, please.

Does anyone have any questions of Mr. Holland?

MR. NUTTER: Yes, sir.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Holland, do I understand correctly that your proposition in this case is that you would -- you propose that Caulkins receive credit on the gas-oil ratio on the high GOR wells or on all of the wells? Receive credit for all of the wells or just on the high GOR?

A Just on the high GOR within the area we delineated at this particular time. There would be three wells with ratios in excess of 2000 to 1 to receive credit.

Q And the equivalent factor of some 680 cubic feet per barrel is the factor you have used?

A At the present time it would be about 615.

Q Now, after you received credit on the GOR's for the injected water and you chose to shut a well in, would you transfer

the unpenalized allowable for that well, after it had received its credit for the water injected, to the other wells?

A We would probably -- it would work like this. Take for instance, Well T-177. The well has a gas-oil ratio of 4300 cubic feet per barrel. Under the present gas-oil ratio limit, and under a 35 barrel per day basic unit allowable, the penalized allowable would be 45 barrels per day, because we are injecting water replacing reservoir energy. The allowable of that well would be assigned at 97 barrels of oil per day. We would obtain that by a formula which was presented in these proposed rules which applies the water given, a gas equivalent, allowing increase gas production. It would bring the allowable up to the 97 barrels per day, then we would like to take the major portion of that 97 barrels and produce it from a well having a lower gas-oil ratio. And, as I say, we have copied this plan. That is the way they have handled the problem in other water injections or gas injection areas.

Q How many barrels per day do you inject on the average at the present time?

A At the present time we are injecting 2300 barrels per day.

Q So in effect you would have 6/5 times 2300 as the credit that you would receive with the compressibility factor that you have in your application?

A We would deduct the injected water we are producing.

Q So you would have something in the range of 2000 barrels

of net injected water per day?

A Yes.

Q And --

A And at present we are injecting enough water so that it will raise the allowable of those three wells to top unit allowable.

Q Would you propose any sort of a maximum rate of production that any well could have?

A We have made no such recommendation. It has been done in other places. Those that we have seen range from double unit allowable up to 350 barrels per day. If a limit is placed here, we would like to have it placed around 300 barrels per day.

Q That would be slightly in excess of double the unit allowable at this time, would it not?

A Yes, it would be.

Q Rather than a flat limitation being placed on a well, would Caulkins be agreeable to a factor of say two times the normal unit allowable being assigned as the maximum any well could receive?

A As I understand it, we would be permitted to transfer up to two times the allowable. I think we could produce a little more efficiently if we had a higher limit, but if the Commission establishes that, that limit, why naturally we will produce our wells that way.

Q How many producing wells are in the area outlined in yellow on Exhibit 5?

A I believe there are nine. Nine.

Q How many of these wells do you feel are capable of producing much in excess of the present allowable?

A In excess of double the present unit allowable?

Q In excess of the present unit allowable.

A I believe six of the nine.

Q Mr. Holland, has Caulkins Oil Company ever given any consideration to reinjection of gas in this pool?

A Yes, sir, we have.

Q Do you think that would improve the ultimate recovery of the pool?

A Well, it could possibly to a small degree. Our observations of the field performance are that gas and gas alone is not a very efficient mechanism. Before the injection of water, some of the wells in the early part of their producing life had extreme increases in gas-oil ratios. In addition to that, we had some relative permeability measures made, and all of that data indicated that gas injection was very inefficient, so --

Q That was as a means of maintaining the pressure in the pool and not considering water pressure maintenance with the gas, is that true?

A It was considered separately and in conjunction with the water, yes, sir.

Q And injection of gas in either case didn't add materially to the ultimate recovery?

A We felt if we could do the job with water we were dupli-

cating effort. If we inject gas we would have to come back with water. We haven't been able to work out a cooperative plan all over the field and we think that we can do a better job with water than we can with gas.

Q I note, Mr. Holland, that under the best of conditions, as depicted on Mr. Gray's Exhibit 2, that a certain percentage of gas is wasted. I just wondered if there might not be a useful benefit obtained from that gas by injecting it into the gas cap rather than flaring it?

A We don't like to flare gas either, and I think that most of the gas flaring is during peak periods, during peak loads, and it's occasioned by the inherent producing characteristics of wells where you flow them at intervals and produce them that way to most efficiently get your oil. This type of gas production has those lows and those peaks. Essentially, we think that the gas that is vented represents those peaks.

Q I see. This is not a continual venting of gas every day of the month?

A No, sir.

MR. NUTTER: I believe that's all. Thank you.

QUESTIONS BY MR. UTZ:

Q Mr. Holland, when did you first discover channeling in this project?

A If my memory is right, about a year and a half ago.

Q It was about a year and a half ago that you ran into

this condition?

A The first step was taken in May of 1956; that would be nearly two years ago.

Q What was your percent of water production before this occurrence before channeling?

A Field total?

Q Yes.

Q I'd estimate around 50 percent. I don't believe we ever produced over five or six hundred barrels of water per day, maybe 50 or 60 percent.

Q 50?

A That figure is substantially lower now.

Q That was my next question. Do you know what it is now?

A During the month of February it was 43 percent.

Q Would you consider that a substantial decrease?

A Well, there has been no increase. I think one of our Exhibits shows this, the amount of our water production, and it's been a declining situation.

Q Your percent of water production is declining now?

A Yes.

MR. UTZ: That's all the questions I have.

MR. PORTER: Any further questions of Mr. Holland? If not, the witness may be excused.

(Witness excused)

MR. KELLAHIN: If the Commission please, that concludes

our case. I would, however, like to make a closing statement after other statements have been made, if any.

MR. PORTER: Anyone have any further testimony?

MR. **Boedler** , Mr. Porter, I am Bill **Boedler** , representing El Paso Natural Gas Product. El Paso Natural Gas Product Company is sole purchaser in the South Blanco-Tocito Oil Pool, in Rio Arriba County, New Mexico, and urges the Commission to adopt Caulkins Oil Company's application as submitted to the Commission. El Paso Natural Gas Company Products Company feels that special rules should be permitted to allow a unit allowable to this water injection project in order to prevent waste and protect correlative rights. Thank you.

MR. STANLEY: My name is S. J. Stanley. I represent Benson-Montin-Greer Drilling Corporation. We believe in the principal of secondary recovery or a pressure maintenance project such as this one in order to better utilize reservoir energy and prevent waste. Also, we believe that inasmuch as secondary recovery or pressure maintenance projects result in greater ultimate recovery of oil, the Commission should encourage the formation of these projects and credit for net water injected, as applied against high gas-oil ratio wells, is a minimum incentive that the Commission can grant to encourage secondary recovery or pressure maintenance projects. Caulkins' request for credit for net water injected as applied against high gas-oil ratio wells involves a very small additional allowable for such a project. We believe it would be

appropriate for the Commission to assign even greater allowables than this in order to provide more incentive to create pressure maintenance projects. From the evidence presented here today in this case, it has been shown that correlative rights will be protected and waste will be prevented and it is urged that the Commission grant the Caulkins Oil Company's request.

MR. PORTER: Anyone else have a statement?

MR. McGRATH: B. T. McGrath, U. S. Geological survey. All the wells in the South Blanco-Tocito Pool are on Federal land, and I agree with the testimony that was presented here that it will, if it is approved, will conserve gas and I am sure ultimately will recover more oil from the reservoir. I would like to urge the Commission that they approve the application of Caulkins Oil Company.

MR. KELLAHIN: If the Commission please, the presentation of this case has taken somewhat longer than we anticipated. However, I am not making an apoligy because, personally, I feel that this is rather an important case in the history of the Commission. We have here a company which has expended a great deal of money both in engineering and in facilities in order to achieve the greatest ultimate recovery of oil from a small pool here in New Mexico. The Commission, of course, is quite familiar with the hisotry of this project, having had various phases of the project before it in other cases.

The present situation is that we are faced with a new con-

dition which was brought about primarily by the institution of prorating in the South Blanco-Tocito Pool. Prior to that, our limit in the Pool was the market which was available. Now, we have submitted, and they are a part of the record now, proposed rules, and I believe they have been sufficiently covered that I will not make any comment on them.

As was pointed out, the evidence presented here does show that some gas is being flared. However, as Mr. Holland explained, that can be accounted for by the fact that there is excess gas production during peak periods of production, which is a normal situation in an oil pool of this type, and it is not a continuous flaring of gas. In addition to this, I would like to point out to the Commission that insofar as I know, there is not another oil pool in northwestern New Mexico where the operator has voluntarily installed facilities to gather, compress, and market the gas that is produced, and I certainly think this company has shown a proper attitude in the spirit of conservation in doing that in the South Blanco-Tocito Pool.

Now, the proposals which we are making here are not a new thing by any means. The Commission here in New Mexico has heretofore granted transfer of allowables in pressure maintenance projects or water injection projects. I would like to call attention to the Commission, to its Order R-1127 in Case 1381; Order No. R-1058 in Case 1300, involving the Pilot water flood project in the Grayburg-Jackson Pool, and one of the original orders of this type

was entered by the Commission in 1941 by Order No. 340 in which the transfer of allowables was allowed.

Now, as to the proposition of receiving credit for injected water, that is an established custom in other states, and certainly, we urge it as an incentive to an operator to properly manage his reservoir where he has a control such as available in this reservoir. That should be allowed. The state of Texas had the following Pools in which the transfer -- I mean the credit for water injected against net gas-oil ratio is allowed: the Salt Creek Field, Diamond Field, Fullerton Field, Merchant Field, and Fort Chadbourne Field. And we have available copies of the orders which were entered by the Texas Railroad Commission in those cases, if any of the Commission members or the staff would like to look at them. In the State of Oklahoma they have taken somewhat broader views, and in a project of this type, they have entered a blanket order which just automatically eliminates the requirement for the making of gas-oil ratic tests. I would conclude that that was done on the theory that any operator who is making an effort to maintain pressure and produce the greatest ultimate amount of oil from the reservoir was certainly not going to engage in any wasteful practices, and in their case no. 1763 Order no. 21301 entered by the Corporation Commission of the State of Oklahoma, projects of this type throughout the states are not required to take their gas-oil ratio tests.

Now, on the basis of the evidence which has been offered

here, I believe we have fairly shown that the greater ultimate recovery of oil from this reservoir will be achieved as a result of a pressure maintenance project which was instituted there with the approval of this Commission some six years ago. We are now faced with a situation where the effectiveness of this program, we feel, is being considerably lessened by the effect of prorating in that we are required under the present rule to produce our oil if we are to get our allowable from wells with high gas-oil ratios and we get no credit whatever for water injected, which is in effect replacing the reservoir energy, which by the statute of the State of New Mexico, we are entitled to use. In other words, we are conserving that which is already ours in this well. We should get credit for that, and we feel, as a proposition of good reservoir management, we should be allowed to produce it from the wells which are best able to produce it with least damage to the reservoir and achieve thereby the greatest ultimate recovery of oil on that basis, which will prevent waste as it is defined by the Statute of New Mexico. As has been shown, the correlative rights of other operators will not be prejudiced in any way. Texas Natural was fully aware of the application in the case. They appeared at the last hearing, and as far as I know, they have not appeared in this one. The chief royalty owner, being the U. S. Government, has made its statement in support of the application, so in the interest of conservation, we urge the Commission to adopt the rules as urged by Caulkins Oil Company. Thank you very much.

MR. PORTER: Anyone else anything?

MR. JOHNSON: David Johnson, Texas Natural Petroleum. Texas Natural Petroleum feels that Caulkins Oil Company can produce its lease more efficiently if allowed some flexibility in its operations. We realize that ultimate recovery would be higher if the pool could be produced at the lowest possible GOR. Therefore, we believe that the South Blanco-Tocito Pool will benefit by the Commission's approval of Caulkins' application.

MR. PORTER: Anyone else have a statement?

MR. KELLAHIN: I would like to point out to the Commission that the position taken by Texas Natural constitutes an agreement among all of the operators within this pool, there being only two.

MR. PORTER: And you don't object to support, even though it may be unexpected?

MR. KELLAHIN: No, sir.

MR. PORTER: The Commission will take the case under advisement.

C E R T I F I C A T E

STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

I, J. A. TRUJILLO, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in stenotype and reduced to typewritten transcript under my personal supervision, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 9th day of May, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph A. Trujillo
Notary Public

My commission expires:

October 5, 1960.

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
3-6691 5-9546

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

Case No. 1420

TRANSCRIPT OF HEARING

June 4, 1959

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE NEW MEXICO
Phone CHapel 3-6691

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

Case No. 1420 Application of Caulkins Oil Company and El Paso Natural Gas Products Company for an amendment of Order No. R-1191, for approval to convert two wells to water injection, for establishment of an administrative procedure for extending the South Blanco water injection project and for including new wells in said project, for an unorthodox gas well location and for a dual completion. Applicants, in the above-styled cause, seek an order amending Order No. R-1191 to extend the project area of the South Blanco water injection project to include acreage in Sections 6,7, and 8, Township 26 North, Range 6 West, Rio Arriba County, New Mexico, and for the establishment of an administrative procedure whereby the project area may be extended and new wells included without notice and hearing. Applicants further seek permission to convert two wells located in said Sections 6 and 7 to water injection, and to dually complete the Caulkins Well No. T-123 located in the NW/4 NE/4 of said Section 7 in such a manner as to permit production from the Dakota formation and production from, or water injection into, the Tocito formation, and for approval of an unorthodox gas well location for said well.

Room 109
Santa Fe, New Mexico
April 8, 1959

BEFORE:
E. J. Fischer, Examiner.

TRANSCRIPT OF HEARING

MR. FISCHER: The next case will be 1420.

Mr. PAYNE: Case 1420, "Application of Caulkins Oil Company and El Paso Natural Gas Products Company for an amendment of Order No. R-1191, for approval to convert two wells to water injection,

for establishment of an administrative procedure for extending the South Blanco water injection project and for including new wells in said project, for an unorthodox gas well location and for a dual completion."

MR. KELLAHIN: Jason Kellahin, Kellahin and Fox, Santa Fe New Mexico, representing the applicant in this case. Before we get into it, Mr. Examiner, I would like to make just a brief statement. According to the Rincon Unit Agreement of the El Paso Natural Gas Products Company, most of the approval of the additional five per cent of the net working interest above the net working interest is held by the El Paso Natural Gas Products Company. Before entering into a project such as the South Blanco Water Flood Project, in order to obtain the additional five per cent, it is necessary to have the approval of the Delhi-Taylor Corporation. Delhi-Taylor has not yet given their approval, we expect the decision within a short period of time. When this decision is received, the Oil Conservation Commission will be notified. The problem presented then is this: A portion of the acreage involved in this extension is held by El Paso Natural Gas Products Company and the approval of Delhi-Taylor will be required before the extension can be actually made. Now, is it the desire of the examiner that we proceed with our testimony or would you prefer to continue the case?

MR. FISCHER: I would just as soon proceed.

MR. KELLAHIN: We would just as soon proceed, too.

MR. FISCHER: If there is no objection to it.

MR. KELLAHIN: With that understanding.

MR. FISCHER: All right.

MR. KELLAHIN: We will have one witness, Mr. Frank Gray.

MR. FISCHER: Are there any other appearances to be made in this besides Mr. Gray?

(Witness sworn in.)

FRANK GRAY

a witness, having first been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Will you state your name, please.

A Frank Gray.

Q By whom are you employed, Mr. Gray?

A Caulkins Oil Company.

Q In what position?

A Field Superintendant.

Q Have you previously testified before this Commission and had your qualifications accepted?

A Yes sir, I have.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. FISCHER: They are.

Q (By Mr. Kellahin) Mr. Gray, are you familiar with the application before the Commission in Case 1420?

A Yes, sir.

Q Would you state briefly what is proposed in this application?

A The extension, or rather it is proposed to extend the South Blanco Tocito water injection project, convert two producers, the Caulkins T-125 and the El Paso Natural Gas Products Company Rincon No. 11 to water injection, deepen the 125 well to the Dakota and to complete it as a combination water injection well and Tocito producer.

MR. FISCHER: Do you have any exhibits that you could give us to follow, please, while you are reading that off?

(Thereupon, the documents were marked as applicant's Exhibit, 1, 2, and 3 for Identification)

MR. KELLAHIN: Just hand them all out if you want to.

MR. FISCHER: Thank you.

A This is Exhibit 1, a black--

MR. KELLAHIN: Mr. Gray, you can just hand them all the exhibits.

A I would like to keep one for myself.

MR. KELLAHIN: I mean the other exhibits.

A All right, Exhibit No. 2 and 3--

Q (By Mr. Kellahin) Mr. Gray, referring to what has been marked as Exhibit No. 1, would you state what that shows?

A The acreage outlined in red is that part of the South Blanco-Tocito Pool that is considered as the water injection project at this time. The acreage outlined in blue is the acreage that we propose to include in the water injection project.

Q Now, does the exhibit reflect the wells within this area and the ownership of the leases?

A Yes sir, it does.

Q Now, how are the subject wells shown, that is, the T-125 and the Rincon No. 11?

A The T-125 and the Rincon 11 are circled with an orange pencil.

Q Have you indicated on the exhibit the present injection wells?

A The present injection wells are indicated by circling the dots that would normally indicate a producing well with a small circle.

Q Why do you consider it necessary to expand the present project area?

A One of the reasons that we desire to expand is one of correlative rights. We don't feel that we can continue to pump water into the eastern end of the field indefinitely without moving oil from that area up into the proposed expansion of the area. We

also propose to use the T-123 and the No. 11 Well, both of which has extremely high gas-oil ratios, by including this area in the project and operating these wells under the same rules and conditions as the remainder of the field. The oil now produced by these two wells could be produced by wells having a lower gas-oil ratio, more efficient wells. There is still a--we still have a declining bottomhole pressure and we believe that by reducing the gas production and replacing the phase voided by the production of oil and gas by injecting water in those two wells, that will assist in stabilizing or reducing the decline in this bottomhole pressure, which is our desire.

Q Does that have the effect of conserving gas in the reservoir?

A Yes sir, I think it would.

Q In your opinion, would it increase the ultimate recovery of oil from the reservoir?

A Yes, sir, I believe it would.

Q Is there anything in your experience in this reservoir performance that would support these conclusions? Referring to Exhibit Number Two, Mr. [illegible], would you state what that indicates?

A Exhibit Number Two [illegible] production of oil, gas, and water production and water injection, gas produced and gas-oil ratio for the [illegible], [illegible] [illegible], [illegible], and [illegible] [illegible].

Q Would you give a copy of that to Mr. Nutter, please?

A Yes, sir.

MR. NUTTER: Do you have any extra copies?

A Yes, sir. The high point of gas production and probably the most efficient, the most inefficient operation was experienced during the month of August. We had an increase in allowable and the wells were capable of making it all right and it was produced with the results that the gas-oil ratio increased from 2700 to 4400 in one months time. Now, that continued rather high until October, the date that the no flare order from the Oil Conservation Commission took effect and at that time, there was an immediate reduction in the oil-oil ratio and there was also a cut back on our production in order to comply with this order. At the same time when the increased allowable was vented, we did increase the amount of water injected per day, but any change in the amount of water injected does not become immediately apparent, it takes quite a long time for any change in the rate of injection to become noticeable. However, the gas-oil ratio during the month of February had dropped from a high of 4400 down to 3600 in February of this year. The latest reports we have of that is that we have had a further decrease that we won't have the monthly figures on this for another--well, over two--

Q Then you anticipate a further decrease for the month of March?

A We have already measured a further decrease in it.

Q Now, in your opinion, will approval of the proposed injection wells be of benefit to these operations?

A Yes sir, I think so.

Q Will it lower the gas-oil ratios?

A It would immediately lower the gas-oil ratios of the field as a whole because it would be producing the allowable at a high ratio from more efficient wells.

Q What effect would it have on the possible movement of oil in the reservoir?

A Both of the proposed injection wells are located near what we believe was the limit of the original gas cap area and the injection of water would tend to stop, in part at least, any movement of oil into the dry gas sand due to water injection in the lower part of the field.

Q How much water do you intend to inject in each well?

A The amount of water we would inject in the well would have to be based more on just a trial and error procedure. We would recommend or suggest starting with an injection of three hundred and five hundred barrels per day. The factors that would determine whether we would continue to inject water or stop it or increase the rate of injection would be the amount of pressure that we find necessary to inject the water and the performance of the wells around it. We have had our troubles before now and we know that a high rate of injection immediately after putting a well into injection service may cause a break through. However, there has been

no permanent ill effect from those break throughs. We have had wells that were affected adversely by certain injection wells that came back to normal production when the water injection was discontinued. And from that experience, we feel that it would have to be a trial and error procedure, but from our experience in the past, we would approach it with a small rate of injection to begin with and then step it up if conditions appeared to justify it.

Q Now, the application before the Commission also includes the application of dual completion of the T-125 well. Referring to what has been marked as Exhibit No. 5, would you state what that shows?

A Exhibit No. 5 is a schematic drawing of the proposed mechanical arrangement of the equipment in this T-125 well if and when it is deepened to the Dakota. It shows the present Tocito perforations from 6797 to 6812 with a liner, a five and a half inch liner to be hung at 6814 to extend to the Dakota section and that would be cemented from top to bottom, that liner will be cemented from top to bottom. The Dakota zone would then be fractured, perforated and fractured, that is, water fractured, in a manner that we feel would get the best results and after which a baker packer would be set between the Dakota perforations and the Tocito perforations with a single string of tubing set in the baker packer to permit the production of Dakota gas and distillate through the tubing and at the same time, we would propose, or we do propose to inject water

into the tubing casing and this is to be injected to the Tocito.

Q What pressures do you anticipate in the Dakota formation?

A Well, the shut in pressures would be somewhere between 2700 and 3000 lbs, the operating pressure would be approximately 500 pounds plus or minus a hundred pounds.

Q What pressures would you have in the Tocito injection portion of the well?

A That is difficult to state or to predict; however, the sand in this particular well has good permeability and the well should take water readily. I don't believe the injection pressures at the rate we would use would probably ever exceed fifteen hundred pounds at the surface.

Q What would your hydrostatic head amount to?

A The hydrostatic pressure at the Tocito sand would be approximately 2900 pounds, a little over 2900 pounds.

Q That would make a pressure differential between the Tocito and the Dakota, would it not?

A Yes, it would at all times.

Q In your opinion, is the type of completion you are proposing adequate to protect against communication between the two zones with that pressure differential?

A Yes, the matter has been discussed a number of times with the manufacturer of the baker packer and they don't hesitate at all to recommend it for differential pressure of that magnitude.

[illegible] injection [illegible] pressure at the Tocito sand [illegible] and as far as the tubing is concerned [illegible], it would be four hundred pounds, seven and three eighths OD [illegible] four hundred seven J 55 stainless tubing. The manufacturers recommended setting depth, as far as collapse [illegible], seven hundred [illegible] pounds. That setting depth would [illegible] equivalent to an external pressure of 5525, five hundred twenty five pounds, which would be more than the differential pressure that we expect from the hydrostatic pressure plus the required injection pressure to get water into the Tocito sand.

Q How, have you any problem of corrosion in the water which is injected, Mr. [illegible]?

A The corrosion has been almost nil. We have a system or a plan for checking the effects of corrosion, we use coupons at the strategic points in the injection system which are measured regularly or pulled and measured at regular intervals to check the amount of corrosion present. We have not had to do any repair work of any kind on the [illegible] lines or [illegible] injection lines, well casing or anything else in any of the equipment [illegible] injection operation. The first well, [illegible] for the [illegible] water [illegible] and [illegible]

there is no indication that we have any trouble down hole.

Q Will you use the same water in the two proposed wells that you are using in the present injection well, is that correct, same source?

A The water would be from the same source.

Q Now, do you use inhibitors in that water?

A We use an inhibitor manufactured by the Tretolite Corporation. I believe that they have made a number of them for the WF-1.

Q What pressure do you use in regards to electrostatic--

A All of the flow lines and water lines, water injection lines, gas lines and all of the equipment is protected with insulated cupings at the well head and also at the main flow line. We have insulated the flow lines as much as possible from the other equipment.

Q In the event that there was packer leaking or failure of the tubing, how would that be protected?

A Well, if there was a tubing leak, it would be immediately apparent in the Dakota production.

Q Would any water getting into the Dakota, even temporarily, cause any damage?

A No, we have been since we waterfraced the Dakota well recently, using the same water that we are injecting into this injection well. The results from sand fracing the two wells were

very good.

Q Do you propose to use the same method of completion in this well in the event this dual completion is approved?

A Yes sir, it would be water fraced with the same water that is injected into the Tocito.

Q Mr. Gray, have you considered using packer and two strings of tubing in this completion?

A Yes sir, we have considered that plan, but since we have experienced no trouble in our T-134 well which has been in continuous injection service for more than six years, we don't really think that we would be justified in going to the extra expense of running an extra packer and an extra string of tubing. It can be done and it would work, as far as the end results are concerned, it would be just the same as we propose to do. It would cost more money and if we have trouble down hole, the cost of the remedial work would be more if we had two strings than it would if we had one.

Q Now, the application also asks for an exception to the spacing rules for the Dakota formation. Would you explain that, please?

A The Dakota spacing requires that the Dakota wells be spaced a minimum of seven hundred and sixty feet from the lease line and--

Q Seven hundred and ninety feet, is it not, sir?

A Exceus [illegible] ninety feet from the lease line and one hundred [illegible] feet from the quarter quarter line of the section. This well is located eighteen hundred feet from the east line and seven hundred feet from the north line of Section 7, 26 North, [illegible] West.

Q In that location, would it be possible to drill at seven hundred and ninety feet from the north line?

A The topography of the land would not allow us to drill at seven hundred and ninety feet from the north line. It would be extremely difficult to drill a well in that location, it is rocky and actually there are some large rocks that would have to be moved away before we could even get into it.

Q Now, has El Paso Natural Gas Company indicated any reaction to the proposed dual completion?

A Yes sir, Exhibit Number Four is a letter from Caulkins Oil Company to El Paso Natural Gas Products Company, also the reply from El Paso Natural Gas Company to Caulkins Oil Company in which they voice no objection to the deepening and producing of this well from the Dakota zone.

Q Is the original of El Paso Natural Gas Products Company's letter in Caulkins Oil Company's files?

A Yes, sir.

Q Would it be made available to the Commission if they request it?

A Yes, sir.

Q Now, federal acreage is involved in this application, is it not?

A Yes, all of the acreage involved is federal acreage.

Q Has the proposed extension of the project area and the dual completion been discussed with the United States Geological Survey?

A Yes sir, verbal permission was obtained from the Farmington office of the USGS to make the dual completion of the T-123, also to inject water into the T-123 and Rincon 11 and to extend or expand the project as outlined. This verbal permission is subject to the approval of the Oil Conservation Commission.

Q Now, the application also asks for an administrative procedure for extension of the project area and the inclusion of new wells in the area either as injection wells or producing wells under the provision of the project rules. Why is that necessary, Mr. Gray?

A The area is not entirely drilled up. We may find it necessary to drill additional wells and it is also quite possible that El Paso Natural Gas Products will also find it necessary to drill additional wells and it would just appear to be desirable to have the mechanics set up for administrative approval of the inclusion of more acreage as long as the acreage involved was -- long as there was no question but what it was part of the [illegible]

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NEW MEXICO OIL CONSERVATION COMMISSION

Mabry Hall

Santa Fe, **NEW MEXICO**

REGISTER

HEARING DATE Examiner April 8, 1959 **TIME:** 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
Emmett W. Walsh	El Paso Natural Gas Products Co	Farmington, N.M.
Frank Gray	Caulkins Oil Co.	"
Elmo Hubble	" " "	"
Jason Kellahin	Kellahin & Fox	Santa Fe, N.M.
L.N. Millers	Tidewater Oil Co.	Hobbs N.M.
SAM F. HARRILL	HUMBLE OIL & REF. Co.	HOBBS, N.M.
Alvin Smith	Tidewater	Santa Fe, N.M.
Charles R. Marshall	Pan American	Farmington
C [illegible]	/	[illegible]
John Mason		
[illegible]	EPNG	El Paso
[illegible]	[illegible]	El Paso
	Pan Am[illegible]	Farmington

Blanco Tocito Pool, as long as the tracts to be added were direct offsets and proof could be furnished that the wells were producing from the same reservoir. It would seem desirable to have the mechanics set up so that the company could include this with the least possible time of the Commission and the operator.

MR. KELLAHIN: At this time, we would like to offer in evidence Exhibits 1 through 4 inclusive.

MR. FISCHER: Without objection, they will be so admitted.

MR. KELLAHIN: That completesour testimony, if the Commission pleases. There is one other point that appears in the application under four asking for exception to the provision of Commission's Rule 502. We have presented nothing on that and do not intend to do so for the reason that the present project rules as set out in the order for the South Blanco Tocito Pool, Order R-1191, adequately covers that point and we don't feel that anything further is necessary on it. That's all the questions I have.

MR. FISCHER: Any questions of Mr. Gray?

MR. PAYNE: Yes sir,

MR FISCHER: Mr. Payne?

CROSS EXAMINATION

BY MR. PAYNE:

Q The T-123 well that produces from the Tocito is now producing, Mr. Gray?

A Yes, sir.

Q Well, do I understand your application right, do you propose to inject water into the Tocito only after production has ceased from the formation?

A Yes, we plan to inject as soon as we can obtain permission from the Oil Conservation Commission.

Q I see. Now, what kind of water are you using in this water injection project, is that fresh water or salt water?

A A mixture of fresh water and produced water. We have been producing roughly four hundred barrels of water a day with the oil production. That water is returned along with the make up water from a water well.

Q Now, if I understand your testimony correctly, it is your feeling that there is no danger to the Dakota formation in the event of a tubing leak because you have used the same type water in water fracturing other wells in the area, is that right?

A Yes sir, our D-204 would be a good case where we water fraced with the same water to the extent of a hundred thousand gallons.

Q A hundred thousand gallons?

A Yes, sir.

Q Is there any possibility that more water would get into the Dakota formation in the event of a tubing leak than say a hundred thousand gallons?

A It is possible that more than that would get into the Dakota sand.

Q Would you care to say what amount, what particular amount of water that got into the Dakota sand would damage the reservoir, do you have any points at which you would say it was safe or where it wasn't safe?

A I think there would be little chance of enough water getting into the Dakota sand during any reasonable remedial, period of remedial work to do any permanent harm. As a matter of fact, I doubt if you could inject enough to do any permanent harm. In fact, the result of a water frac, the water fracs that we have done, we seldom get all the water back that we put in, anyway.

MR. PAYNE: Thank you, I believe that's all I have right now.

MR. FISCHER: Mr. Nutter?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Gray, as I understand it, you are making application here today for conversion of two wells?

A Yes, sir.

Q One on El Paso's property and the other on Caulkins' property?

A Yes, sir.

Q What is the producing characteristic of each of those

two wells at the present time, what's the capacity?

A Both of the wells are capable of making, I believe both of them will be capable now of making top allowable of 447 barrels per day but to produce that, we also would produce a large amount of gas.

Q What is the GOR of the El Paso Rincon No. 11?

A I can't tell you exactly, but it's around eighteen, nineteen thousand.

Q How about your T-129?

A It's approximately ten thousand.

Q Now, will these wells, when converted to water injections, be so computed that the injection will be in the gas cap or will it be in the oil saturated sand or twilight zone between the two or just where?

A We believe that the wells are located in the twilight zone and it would be hard to predict which way it would go, but as long as we get it in and replaced, or rather fill out the space in the reservoir, that would accomplish what we set out to do.

Q Isn't the injection of water into the twilight ground going to drive the water higher into the formation, drive the oil higher into the formation?

A It is possible that it will, but we believe that there would be less oil driven into the gas cap if we use these wells now than would be the case if we did not use them and continue to inject

water in the well that is presently being used for water injection purposes. There would be no problem at all if we continue it on the same program that we are proposing here.

Q Have you ever considered the injection of gas into the gas cap?

A Yes, we have considered the injection of gas.

Q That would prevent the migration of oil up to the dryer sand, wouldn't it?

A It would.

Q And if the injection of water in this area would drive oil up into the gas cap and these sands are dry or not oil saturated, a certain amount of that oil would be lost in wetting those sands, would it not?

A Yes sir, it is possible that it will. However, the amount , or rather the fact that the wells are producing with an extremely high gas-oil ratio would be so evident that the gas cap was very close to the well and the amount of oil that we would lose would be negligible. The cost of gas injection would probably be prohibitive at this time.

Q Why would that be, Mr. Gray?

A Well, it would just cost an awful lot of money to buy compressors and to lay field distribution lines and put the gas back in.

Q You are probably also considering the loss of the

immediate market for the gas?

A No, we are not, we wouldn't be concerned with the loss of the immediate market for the gas at this time. We feel that the gas will still be there at some later date. The production of gas will not be lost, we do not--at least we don't think so.

Q That's what I meant, the immediate market for the gas?

A The immediate market for the gas, actually, we would prefer to leave the gas in the ground at this time if we can.

Q But not to inject it into the ground?

A Well, it is cheaper to leave it than it is to inject it.

Q How many Dakota wells are presently producing in this area, Mr. Gray?

A We have three, our D-83 and the D-204, D-268, to the north of us, the El Paso Natural Gas Company has their Rincon No. 1, Rincon No. 57, we have near completion our P and D-224.

Q What's the location of that, please?

A The P and D-224 is in Section 15, 16, 7. We also have casing set on another one in section 54, 27, 6. Those locations are not shown on this plaque.

Q Now, those two El Paso wells that you mentioned, Dakota wells, are they shown on this exhibit?

A No sir, they are to the north of the area outlined here.

Q When you mentioned that the shut in pressure in the

Dakota would be 2700 to 3000, you also stated that there would be about a five hundred operating pressure, that the bottom hole operating pressure--

A Well, that would be--I said plus or minus a hundred pounds. That would be the bottom hole, the approximate bottom hole operating pressure.

Q So you would have a differential then on that packer from 4400 or 4500 pounds at the top of it to maybe five hundred pounds at the bottom of it?

A Yes, sir.

Q What size hole would you be able to drill down to this seven inch casing which is presently set in the hole?

A Six and a quarter.

Q And then the outside diameter in the liner would be five and a half then?

A Five and a half OD. We would use special clearance couplings on the liner and they would be five and seven eighths.

Q What would be the thickness of the cement sheath around that liner then, Mr. Gray?

A About three sixteenths of an inch. That's assuming that the liner is centered perfectly in the six and one quarter hole. It would be less than that in the coupling.

Q Is that the maximum thickness of it?

A Yes, sir.

MR. NUTTER: I believe that's all, thank you.

MR. FISCHER: Any more questions of Mr. Gray?

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Gray, are there any producing oil wells in the Tocito that are up structure from the proposed injection wells?

A The only other well we have that is higher structurally is the D-204.

Q Where is that located?

A In the southeast of Section 9. Permission of the Oil Conservation Commission was obtained to make a dual completion of this well so that it would produce from the Tocito and Dakota simultaneously some time ago. The well has been completed, just completed, in fact, to operate in that fashion.

Q That well is located at some distance from the proposed injection wells, is it not?

A It would be in excess of two miles.

Q Then any migration of oil resulting from injection from the proposed injection wells would be down structure, or would it?

A Would you repeat the question?

Q I say, would the migration of oil resulting from injection in the proposed injection wells be down structure or up structure?

A Well, the normal tendency of the water movement would

be in that direction because in the gas cap area, there are higher pressures now than exist in the part of the field that is included in the water flood project at this time. That is borne out by the fact that the higher pressures in the wells are in the T-125, No. 11 and also the Rincon No. 6.

MR. KELLAHIN: That's all the questions I have.

MR. FISCHER: Any other questions of Mr. Gray?

Mr. Gray, I have some questions here.

RECROSS EXAMINATION

BY MR. FISCHER:

Q You mentioned that some of your wells were hurt in there, I don't recall which ones they were. Talking about how they were hurt, was there an increase in the GOR or what was it?

A No, when we started producing water, there was an immediate increase in--or rather decrease in the oil productivity of the well. One classic example is the T-129 in Section 9 in the northwest of 9. When we injected the T-86 and the T-87 at the same time at a fairly high rate, some four thousand barrels a day, as I recall, there was an immediate oil bank that moved into the 129, but it was followed very shortly with a water bank and then the production of the well declined to forty or fifty barrels a day and water injection in those two wells was discontinued and the well has now come back to make one hundred and forty or one hundred and fifty barrels.

Q It still makes water?

A It still makes water but I think the water per cent now is something like ten per cent.

Q What was the--

A It got up to seventy or eighty per cent.

Q Did it cone in there or--

A I think it channeled.

Q You just pumped it up and channelled it off?

A We were pumping water at too high a rate into--in particular into the T-85.

Q Well, Exhibit No. 3, the diagramatic sketch, you have a pretty close tolerance in there to bring your bottom at 6812 and the proposed hanging of five and a half inch liner. Is there a collar in there somewhere from the base of the seven inch?

A That collar is normally, or rather I think that it would hang to the pipe without actually checking the joints and that would be about thirty feet long.

Q You have got about thirty five feet in there, I believe, is that right, 6, 18, 12, and you propose to hang your liner at 6814, which would be above the liner, I think.

A It would have the shoe of the seven inch casing below it.

Q Below that collar?

A Below the perforations. I don't think it's critical at

this point. If there was any chance for error, I think we would still have sufficient room to move down a little ways to stay within the perforations and still be able to tie the two strings together all right with the cement job.

Q Could you put a four and a half inch liner in there as well as you could put your five and a half inch liner?

A Yes, it could be done.

Q Would you have to use a lot of homemade equipment, however?

A No, we could get four and a half inch that's standard, would be standard for--I mean it's standard equipment, you can get a liner like that, they have that in stock in that size. The only objection that we have to using the four and a half inch is that the smaller the pipe the more difficult it is to work inside it.

Q This baker Model D Packer will be set on an electric line or tubing?

A It will be set on an electric line.

Q And will you also have a safety joint in there where you could go in and get right to--

A We had not planned to run a safety joint; we can do so if the Commission desires.

Q You don't feel then that there is any need to ever put any side door choke, say, or Garrett sleeves or something like that on your tubing, that you could work to your tubing from your Tocito

zone if need be?

A We don't think so, we think that retrieving the tubing from a model D packer is a farily simple job. If we did have work to do on it, we don't feel that the water or oil either one would do any harm to the Dakota sands. If the tubing should stick and necessitate a work over it would be easy enough to run an acid gun and cut it off at most any point in the hole that we would like to cut it off, and if we run side door chokes and sleeves and one thing and another, they just represent more avenues for leaks.

Q So you are going to have one continuous string of tubing?

A Yes, sir.

Q Will this water that you will inject, will you try to take up for any sand or do you think there is any chance of sand getting into the water that you would inject into the Tocito?

A There has been no evidence of any build up of sand in any of the injection wells.

Q And if you had to kill your tubing, casing in the Tocito zone, what would you kill it with, water?

A Water.

Q Now, you have to have a packer leakage test at least once a year--

A Yes, sir.

Q --according to our rules?

A Yes, sir.

Q And how would you propose to that, could you tell us how you propose to take a packer leakage test on this well.

A In this particular case, I think we would be making a continuous packer leakage test. As far as bottom hole pressure is concerned, we would be in position mechanically to take any kind of down hole pressure test that anyone would want and as far as the leakage test is concerned, the minute the packer begins to leak, it would have to leak to the outside and it would be apparent in the production from the Dakota zone.

MR. FISCHER: That's all I have. Are there any other questions?

The witness may be excused.

(Witness excused)

MR. FISCHER: Any statements to be made?

We will take the case under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, JERRY MARTINEZ, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing were reported by me in Stenotype, and that the same was reduced to typewritten transcript by me and contains a true and correct record of said proceedings, to the best of my knowledge, skill and ability.

DATED this 15th day of April, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Notary Public

My Commission Expires:

January 24, 1962

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1420, heard by me on Apr. 8, 1959.

E. J. Fischer, Examiner
New Mexico Oil Conservation Commission

DEARNLEY MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
Phone CHapel 3-6691

Case No.

1420

Application, Transcript,
Small Exhibits, Etc.

[redacted]

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. 1420
Order No. R-1191-B

APPLICATION OF CAULKINS OIL
COMPANY AND EL PASO NATURAL GAS
PRODUCTS COMPANY FOR AN ORDER
AMENDING IN CERTAIN PARTICULARS
THE SPECIAL RULES GOVERNING THE
SOUTH BLANCO-TOCITO WATER
INJECTION PROJECT IN RIO ARRIBA
COUNTY, NEW MEXICO, AS SET FORTH
IN ORDER R-1191, FOR PERMISSION
TO CONVERT TWO WELLS IN SAID
PROJECT TO WATER INJECTION, FOR
PERMISSION TO DUALLY COMPLETE A
WELL IN SAID PROJECT AS A
PRODUCING-INJECTION WELL AND
FOR APPROVAL OF AN UNORTHODOX LOCA-
TION FOR SAID WELL

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 8, 1959, at Santa Fe, New Mexico, before E. J. Fischer, Examiner duly appointed by the New Mexico Oil Conservation Commission in accordance with Rule 1214 of the Commission Rules and Regulations, and Order No. R-1191-A was entered denying the application in one respect, whereupon this case came on for hearing de novo at 9 o'clock a.m. on July 15, 1959.

NOW, on this 3rd day of August, 1959, the Commission, a quorum being present, having considered the application and the evidence adduced, 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 in the subject hearing de novo, Caulkins Oil Company, is the operator of Well No. T-123 located in the NW/4 NE/4 of Section 7, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico.

(3) That the applicant in the subject hearing de novo, Caulkins Oil Company, has requested that only that portion of Order No. R-1191-A dealing with the proposed dual completion of its said Caulkins Well No. T-123 be considered at this hearing.

(4) That the applicant seeks permission to deepen the said Caulkins Well No. T-123 and to dually complete it in such a manner as to permit water injection into the Tocito formation and the production of gas from the Dakota Producing Interval through parallel strings of 2-3/8 inch EUE tubing.

(5) That the maximum expected surface pressure which will be required for water injection into the Tocito formation, plus the hydrostatic head of the water column, is such as to constitute a hazard to the known gas reserves in the Dakota Producing Interval.

(6) That in order to ensure that the Dakota Producing Interval is not damaged, permission to dually complete the aforesaid Caulkins Well No. T-123 in such a manner as to permit the injection of water into the Tocito formation and the production of gas from the Dakota Producing Interval should, under the Commission's obligation to prevent the waste of oil or gas, be denied.

(7) That permission should be granted, at the operator's option, to dually complete the said Caulkins Well No. T-123 in such a manner as to permit the production of oil from the Tocito formation and the production of gas from the Dakota Producing Interval through parallel strings of tubing, or to utilize said well as a water injection well in the Tocito formation without deepening it to produce from the Dakota Producing Interval, or to singly complete the well to produce gas from the Dakota Producing Interval and neither produce from nor inject into the Tocito formation.

(8) That the unorthodox gas well location of the said Caulkins Well No. T-123 should be approved inasmuch as the operator may choose one of the above options to produce the well from the Dakota Producing Interval.

IT IS THEREFORE ORDERED:

(1) That the application of Caulkins Oil Company for permission to deepen its Well No. T-123, located in the NW/4 NE/4 of Section 7, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico, and to complete said well in such a manner as to permit the injection of water into the Tocito formation and the production of gas from the Dakota Producing Interval through parallel strings of tubing be and the same is hereby denied.

(2) That the applicant be and the same is hereby authorized to complete the said Caulkins Well No. T-123 in accordance with any one of the following procedures:

(a) Complete the well as a single completion in the Tocito formation, utilizing it as a water injection well in said Tocito formation or as a producing well in said formation.

(b) Complete the well as a single completion in the Dakota Producing Interval, utilizing said well for the production of gas from the Dakota Producing Interval.

(c) Complete the well as a dual completion, utilizing said well to produce oil from the Tocito formation and to produce gas from the Dakota Producing Interval.

(3) That an unorthodox gas well location for said Caulkins Well No. T-123 in the Dakota Producing Interval be and the same is hereby approved.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JOHN BURROUGHS, Chairman

MURRAY E. MORGAN, Member

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

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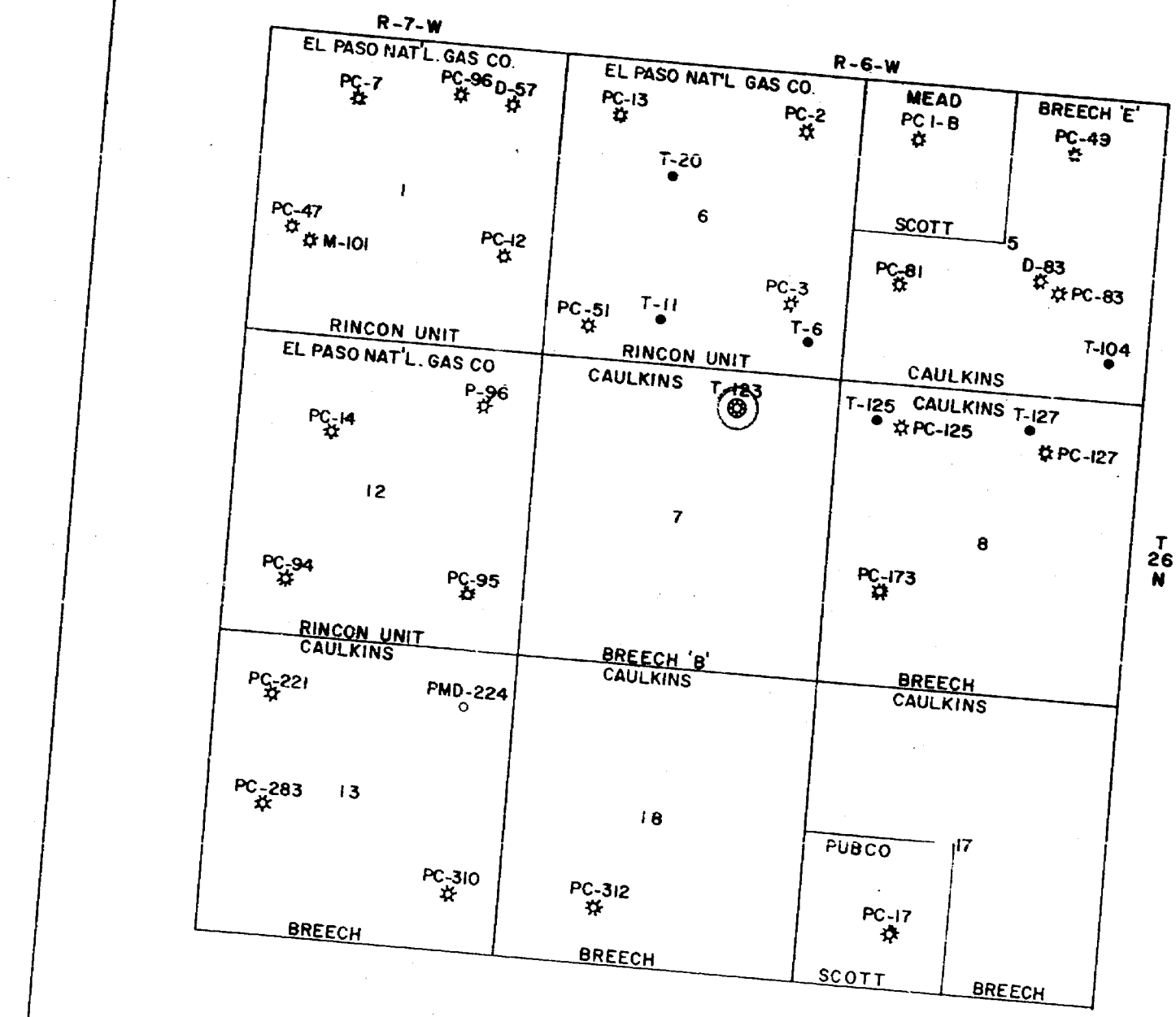


BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Caulkins EXHIBIT No. 1
CASE 1420 De Novo

Case No. 1420
Exhibit No 1

AREA SURROUNDING CAULKINS OIL CO. PROPOSED TOCITO-DAKOTA DUAL COMPLETION T-123 LOCATED NW1/4NE1/4 S.7 T26N R6W NMPM., RIO ARRIBA CO., NEW MEXICO.

SCALE: 2"=1 MILE

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

BOX 1878
FARMINGTON, NEW MEXICO

July 10, 1959

Mr. Frank Grey
1201 East 1[illegible]th Street
Farmington, New Mexico

Subject: Temporary Plugging Material- [illegible] Working Time

Summary:

This material known under Dowell code as Gel X 820, is a Kerosene gel offering working times from several days to several weeks. (The working time is defined as the time in the well during which the gel maintains 3/4 of its maximum viscosity). The well temperature and amount of catalyst used in the gel are the controlling factors in determining how rapidly the gel forms, and how long it retains a high viscosity. Thus by knowing the bottom hole temperature and the length of the zone to be plugged we can determine how much material is needed and govern working time to fit most work over jobs.

Application:

This type gel has been used very successfully in many applications such as plugging off a zone while working on another zone for an extended period, (three weeks for instance). Other possible applications include:

1. As a plug to seal off a zone while well is being deepened.
2. As a protective plug in conjunction with packer while zone below is being re-worked.
3. As a bottom hole plug while working on zone above.

The following table summarizes the scope of gels in regard to their working time and well temperature range:

Temperature	Viscosity Range	Working Time
[illegible]-100 °F	1 Million Gel Units	2[illegible] days-[illegible] days
100-1[illegible] °F	1 Million Gel Units	[illegible] days-[illegible] days
1[illegible]-[illegible] °F	1 Million Gel Units	1.[illegible] days-29 days

The viscosity is given in gel viscosity units which is related to centipoise but [illegible] difficulties in measuring very high viscosity. [illegible] It remains in this form until the catalyst breaks down, and the gel gradually thins and is removed by well fluids. This can be controlled by either increasing or decreasing amount of catalyst used. [illegible] an excess [illegible] without moving the gel from desired placement.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 3
CASE 1420

Case No. 142[illegible]
Exhibit No 3

In preparing a gel for temporarily plugging a formation, the following factors should be considered:

1. Desired thickness of gel (range from 100,000 cps to i million gvu.
2. How long the gel will act as a plug in the well.
3. How long it takes for the gel to thicken above ground before it becomes too viscous to pump.
4. Length of time required for the gel to break down and allow productions of well fluids.

If the problem of fluid migration should come about as we discussed, the use of this material should satisfactorly control the fluids until the necessary corrective steps can be taken to permanently seal off damage.

I hope this information concerning Jel X 820, will give you some insight regarding this particular chemical and how it works, and additional information will be supplied if possible.

Sincerely

H.W. Buckles

H.W. Buckles
District Engineer

HWB:sc

Case No 1420
Exhibit No. 5

Halliburton OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

Farmington, New Mexico
July 10, 1959

Mr. Frank Gray
Caulkins Oil Company
Box 967
Farmington, New Mexico

Dear Sir:

I am sending you two copies of the data on Gel Plug. This is our material for formation protection during initial completion or remedial work on a well. I think this is exactly the material you would want to use to insure of a definite separation of the zones in the Breech B T-123 well should any remedial work ever be necessary.

This is an improved material over that which I spoke to you about. Previously we used the powdered ATB as an emulsifier where a fluid ATO is now used.

All material necessary to make Gel Plug are available in Farmington as well as in Cortez, Colorado. They are hauled separately to the location and any amount of the material can be mixed at the well site. I do not remember any occasion where more than 500 gallons was necessary to get the desired results.

Gel Plug currently is priced at thirty cents (30¢) per gallon.

If you desire any further information let us know.

Yours very truly,

Dick Northcutt
Fieldman

DN:fab
cc: O. L. Elliott
H. C. Gray
Bill Taylor

BEFORE THE
OIL CONSERVATION C
SANTA FE, NEW M
EXHIBIT No. 4
CASE 20

Case No. 1420
Exhibit No. 4

GEL PLUG

Gel Plug is a thick fluid designed to blanket an exposed formation so that undesired fluids in the well will not contact that formation.

Properties

It is prepared by emulsifying calcium chloride solution and Diesel oil or kerosene resulting in what is known as a water-in-oil emulsion. This means that the water is present as very fine thoroughly dispersed drops within a continuous oil matrix. This can be demonstrated by placing a small quantity of Gel Plug in water and in kerosene. Easy mixing with kerosene and difficult mixing with water will be observed.

This miscibility with oil allows dilution with formation crude oil and the complete removal from the formation will result.

Very little Gel Plug will normally enter the formation due to its high consistency and the low pressures involved. It is normally used as a blanket across the face of a formation to prevent the entrance of fluids present in the well into the formation which has been exposed while manipulating the packer during a remedial treatment of a well.

Much of the trouble normally experienced in cleaning up a well after the usual well-killing fluids have been employed will be avoided by use of this material. The possible harm to the formation such as a water block or the swelling of bentonitic materials present in the formation will also be avoided.

The viscosity of Gel Plug is not easily measured by conventional methods and will vary depending upon the amount of mixing employed during its preparation. A consistency that is almost too thick to pump can be obtained.

Calcium chloride serves to increase the weight of this material so that it will not be displaced by the fluid above it in the well bore. A density of about 10 pounds per gallon is obtained. In the event that bentonitic materials are contacted in the formation, no appreciable swelling should result due to the inhibiting action of calcium chloride.

Gel Plug does not contain any type of chemical breaker which will destroy it. The finished emulsion is extremely stable and will remain in this condition for an indefinite period of time. Therefore, it may be necessary, in order to remove this fluid from the well, to swab it from the hole rather than expect it to flow out with ease. A small amount of dilution by well fluids will lower the viscosity considerably, making it much more easily removed.

Materials

Code Name	Part Number	Description
ATC	29.15533	Emulsifier
Calcium chloride	--	Weighting material

Uses

This material is normally used to prevent the entrance of an undesirable fluid into the formation which has been exposed due to manipulating a packer during remedial treatment of the well.

It has also been employed where a diverting action of a thin fluid being injected at a slow rate is desired. For example, in acidizing, this material has been used as a blanketing fluid.

A reverse application also has been found. Gel Plug pumped into formations has prevented formation fluids from entering a well. This is sometimes desirable while moving a packer between fracturing treatments.

Advantages

1. Less trouble experienced in cleaning up a well. A little swabbing is usually all that is necessary to initiate production.

2. Prevention of possible water blocking of the formation.

3. Prevention of possible swelling of bentonitic materials if present in the formation.

BEFORE THE OIL CONSERVATION COMMISSION

OF

NEW MEXICO

IN THE MATTER OF THE APPLICATION OF CAULKINS OIL COMPANY AND EL PASO NATURAL GAS PRODUCTS COMPANY FOR APPROVAL OF THE CONVERSION OF TWO WELLS TO WATER INJECTION IN THE BLANCO-TOCITO OIL POOL, RIO ARRIBA COUNTY, AND FOR AMENDMENT OF THE POOL RULES OF THE SOUTH BLANCO-TOCITO OIL POOL AND AN EXCEPTION TO THE PROVISIONS OF COMMISSION RULE 502.

Case No. 1420
Order No. R-1191-A

De Novo Hearing

APPLICATION FOR REHEARING

Comes now CAULKINS OIL COMPANY, one of the applicants in the above captioned case, and applies to the Oil Conservation Commission of New Mexico for rehearing on the provisions of Order No. R-1191-A entered therein, in so far, but only in so far as said order denies permission to deepen the Caulkins Oil Company Well No. T-123, located 700 feet from the North line and 1800 feet from the East line of Section 7, Township 26 North, Range 6 West, NMPM, and complete said well as a dual completion for production from the Dakota formation, and water injection into the Tocito formation as a part of the water-injection program in the South Blanco-Tocito Oil Pool, Rio Arriba County, New Mexico, and in support thereof would show:

1. By application, Caulkins Oil Company and El Paso Natural Gas Products Company, in Case 1420, sought approval of changes in the pool rules for the South Blanco-Tocito Oil Pool, together with other relief, including approval of the dual completion of the Caulkins Oil Company Well No. T-123 in such manner as to permit the production of gas from the Dakota formation and water injection in the Tocito formation.

2. The application was set for hearing before Commission Examiner E. J. Fischer on April 8, 1959, and after notice and hearing, the Commission entered its order No. R-1191-A approving and granting all matters set forth in the application, except that said order denied permission to dually complete said Well No. T-123 in such manner as to permit production from the Dakota formation and water injection in the Tocito formation, and in lieu thereof, approved the location of Well No. T-123 for Dakota production, with either dual completion for the production of gas from the Dakota and oil from the Tocito through parallel strings of tubing; or in the alternative, conversion of said well for water injection in the Tocito formation.

3. Dual completion of the Caulkins Oil Company Well No. T-123 can be effected as proposed in the application in such manner as to allow production of gas from the Dakota formation and water injection in the Tocito formation without endangering any producing or other formation. Such dual completion can be effeciently and economically made either in the manner proposed upon the original hearing of this application, or in some other manner as may meet with approval of theCommission, is mechanically feasible, and will not result in waste, but will be in the interests of conservation and the prevention of waste, on which matters applicant proposes to offer testimony in the event the application is granted.

WHEREFORE, applicant prays that this application be set for rehearing before the Oil Conservation Commission of New Mexico in so far as Order No. R-1191-A denies authority to make a dual completion of the Caulkins Oil Company Well No. T-123 for production of gas from the Dakota formation and injection of

water in the Tocito formation, and that after notice and hearing, de novo, as provided by law, said authority be granted, and that Order No. R-1191-A be in all other respects affirmed.

Respectfully submitted,

CAULKINS OIL COMPANY

By Kellahin and Fox
Attorneys for Applicant

P. O. Box 1713
Santa Fe, New Mexico

Case No.

1420

Application, Transcript,
Small Exhibits, Etc.

CASE [illegible]. Hearing April [illegible], 1959 - Appli-
cation of [illegible] Oil Co. [illegible]
Gas Products Co. to amend R-[illegible].

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

294

COPY

September 2, 1959

El Paso Natural Gas Company
Box 1492
El Paso, Texas

Attention: Mr. C. L. Perkins

Re: Rincon Unit-Water Pressure Maintenance Program; Rio Arriba County, New Mexico

Gentlemen:

This is to advise that the New Mexico Oil Conservation Commission has this date approved your proposal, dated April 1, 1959, as operator of the Rincon Unit Area, Rio Arriba County, New Mexico, to join with Caulkins Oil Company in a joint water pressure maintenance project for the South Blanco-Tocito Oil Pool.

Approval is made contingent upon like approval being obtained from the United States Geological Survey and the Commissioner of Public Lands of the State of New Mexico.

We are forwarding two copies of your proposal to the Commissioner of Public Lands for his consideration.

Very truly yours,

A. L. PORTER, Jr.,
Secretary-Director

ALP/DSN/og

cc: U. S. Geological Survey - Roswell
Commissioner of Public Lands - Santa Fe

El Paso Natural Gas Company

El Paso, Texas

April 1, 1959

Mr. John A. Anderson, Supervisor
United States Geological Survey
P. O. Box 6721
Roswell, New Mexico

Commissioner of Public Lands
State of New Mexico
Capitol Annex Building
Santa Fe, New Mexico

Oil Conservation Commission
State of New Mexico
Capitol Annex Building
Santa Fe, New Mexico

Re: RINCON UNIT I-SEC No. 916
WATER PRESSURE MAINTENANCE PROGRAM
Rio Arriba County, New Mexico
Tocito Formation & Participating Area

Gentlemen:

In accordance with Sections 13 and 16 of the above Unit Agreement, El Paso Natural Gas Company, as Unit Operator, hereby requests permission and approval to join with Caulkins Oil Company in a joint water pressure maintenance program for the South Blanco Tocito Pool.

A major portion of the South Blanco Tocito Pool is outside the boundaries of the Rincon Unit. Caulkins Oil Company as the operator of the majority of the producing acreage in the South Blanco Tocito Pool has already instituted and has been operating for some time a Pressure Maintenance Program on their acreage outside of the Rincon Unit. Exhibits A, B, C, D, E, F, and G are attached hereto and made a part of this application. Exhibit A shows the boundaries of the Rincon Unit with the Tocito participating area colored in red. Exhibit A also shows an isopachous map of the South Blanco Tocito Pool showing all wells drilled to the Tocito formation, wells which have already been converted to Water Injection wells and the proposed additional water injection wells, together with their lines and water storage facilities. Exhibit B shows the oil production history of the entire field while Exhibit C shows the Unit oil production history. Exhibit D shows the reservoir pressure history of the entire field. Exhibit E shows a summary of Rock and Fluid Characteristics. Exhibit F shows the water injection statistics in the field so far, while Exhibit G shows the oil well capacity and cumulative oil production.

The South Blanco Tocito Pool is a small oil reservoir in which the oil is saturated with gas and which has a free gas cap. In order to conserve the reservoir energy, a water pressure maintenance program was started early in the life of the field. The New Mexico Oil Conservation Commission has by Order No. R-1191 already approved this water injection program insofar as it covers certain producing acreage outside of the Rincon Unit. Another application is being filed with the Oil Conservation Commission to enlarge the water pressure maintenance program to include Unit lands.

We propose to install a water injection line from Caulkins Oil Company Central Plant to connect with Caulkins Oil Company's T-123 well located in the NW/4 NE/4 of Section 7, Township 26 North, Range 6 West, and to also connect with El Paso Natural Gas Products Company's Rincon #11 well located in the SE/4 SW/4 of Section 6, Township 26 North, Range 6 West. These two wells will then be converted to water injection wells, and the allowable for the Rincon #11 well will be transferred to the Rincon #6 and #20 wells. The Rincon #6 and #20 wells would be retained as producing unit wells. Production from these two wells would be allocated to the Tocito Participating Area. No unit production would be given or allocated to any lands outside the Unit Area, nor would any production from wells outside the Unit be allocated to Unit lands.

We could, of course, refuse to join with Caulkins Oil Company's presently operating water pressure maintenance program. We might even reap some benefit from their pressure maintenance program without joining. We do not, however, recommend such a procedure and believe that such action would be contrary to good conservation practice. Without additional injection wells it appears to us that Caulkins Oil Company will be unable to retain the present reservoir pressure, at least not in our end of the field. The gas/oil ratio of the Rincon Unit #11 well is increasing, indicating the advance of and close proximity of the gas/oil contact to this well. The increased gas/oil ratio has already resulted in a lower allowable for the Rincon Unit #11 well. On behalf of Unit Operator we recommend that we join with Caulkins Oil Company in a joint water pressure maintenance program and convert our Rincon Unit #11 well into a water injection well. We believe that this program would increase our ultimate oil recovery in the Rincon by approximately fifty per cent (50%). We also believe that our joinder will prevent waste and be in the best interest of all Unit interest owners, both working and royalty.

We therefore respectfully request your approval to join in this Water Pressure Maintenance Program in the South Blanco Tocito Pool. Upon approval of this program and before converting the Rincon Unit #11 well to a water injection well, an application to do so will be filed with the District Engineer of the U.S.G.S. in Farmington and with the Oil Conservation Commission office in Aztec.

Yours very truly,

EL PASO NATURAL GAS COMPANY

By C. L. Perkins

Vice President

RLH:ms

APPROVED:

_____

Regional Supervisor

APPROVED:

_____

Commissioner of Public Lands

APPROVED:

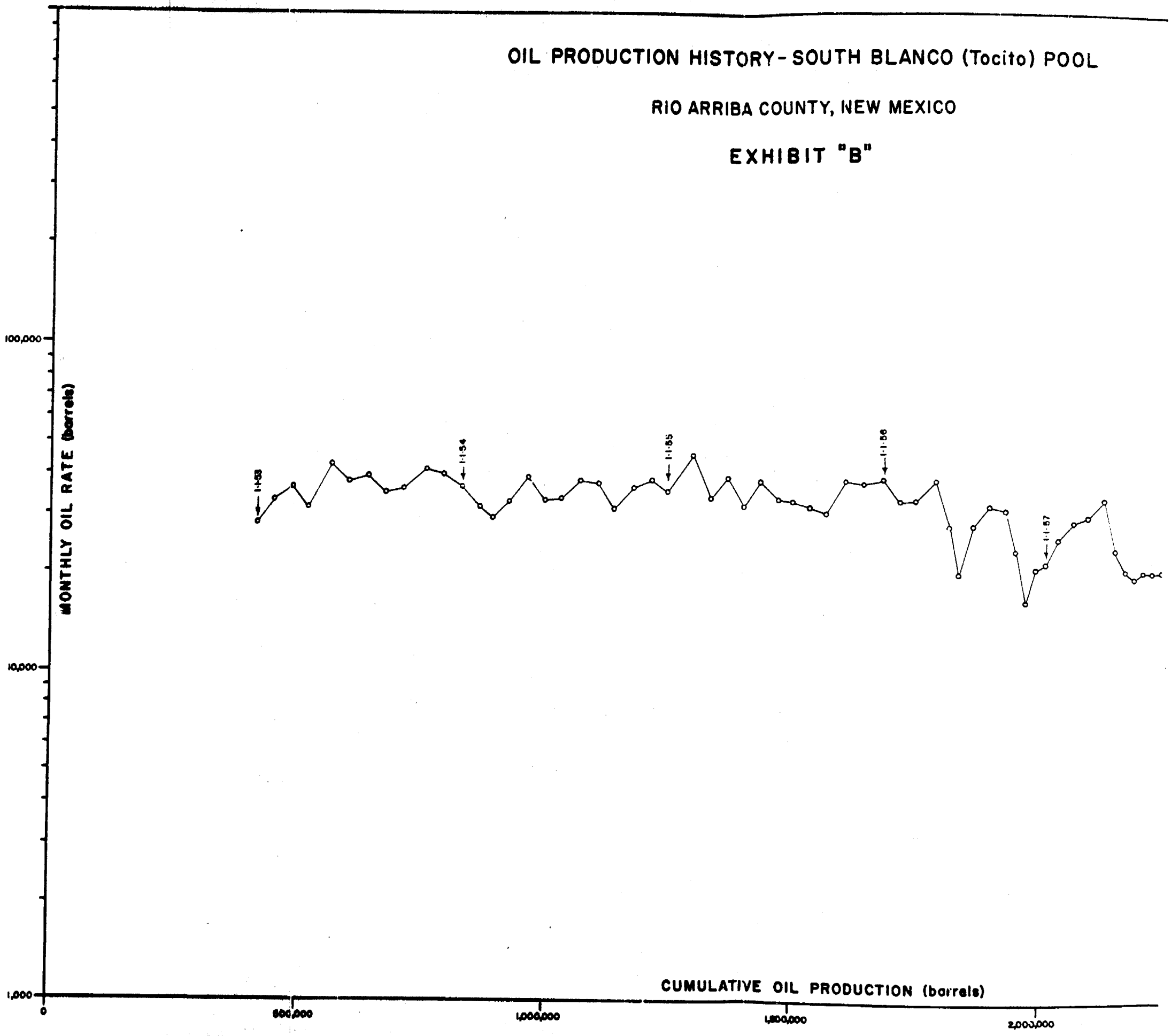
_____

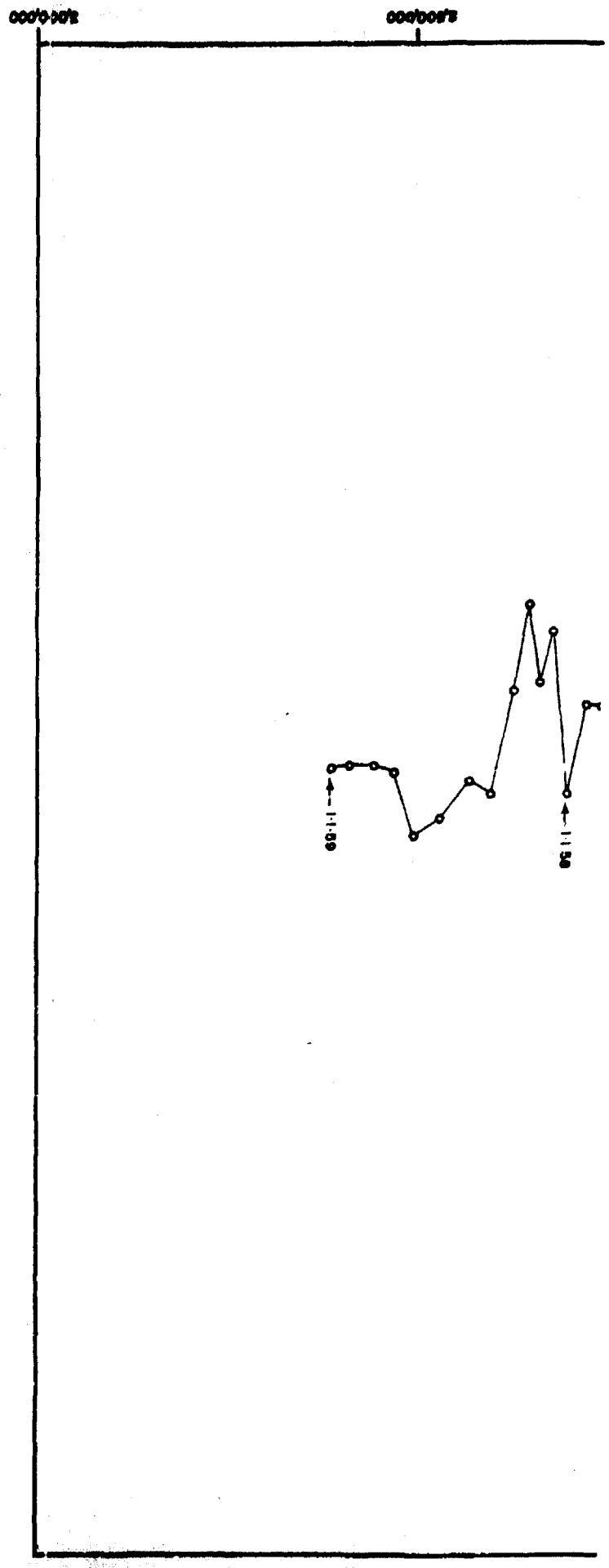
Oil Conservation Commission

OIL PRODUCTION HISTORY - SOUTH BLANCO (Tocito) POOL

RIO ARRIBA COUNTY, NEW MEXICO

EXHIBIT "B"

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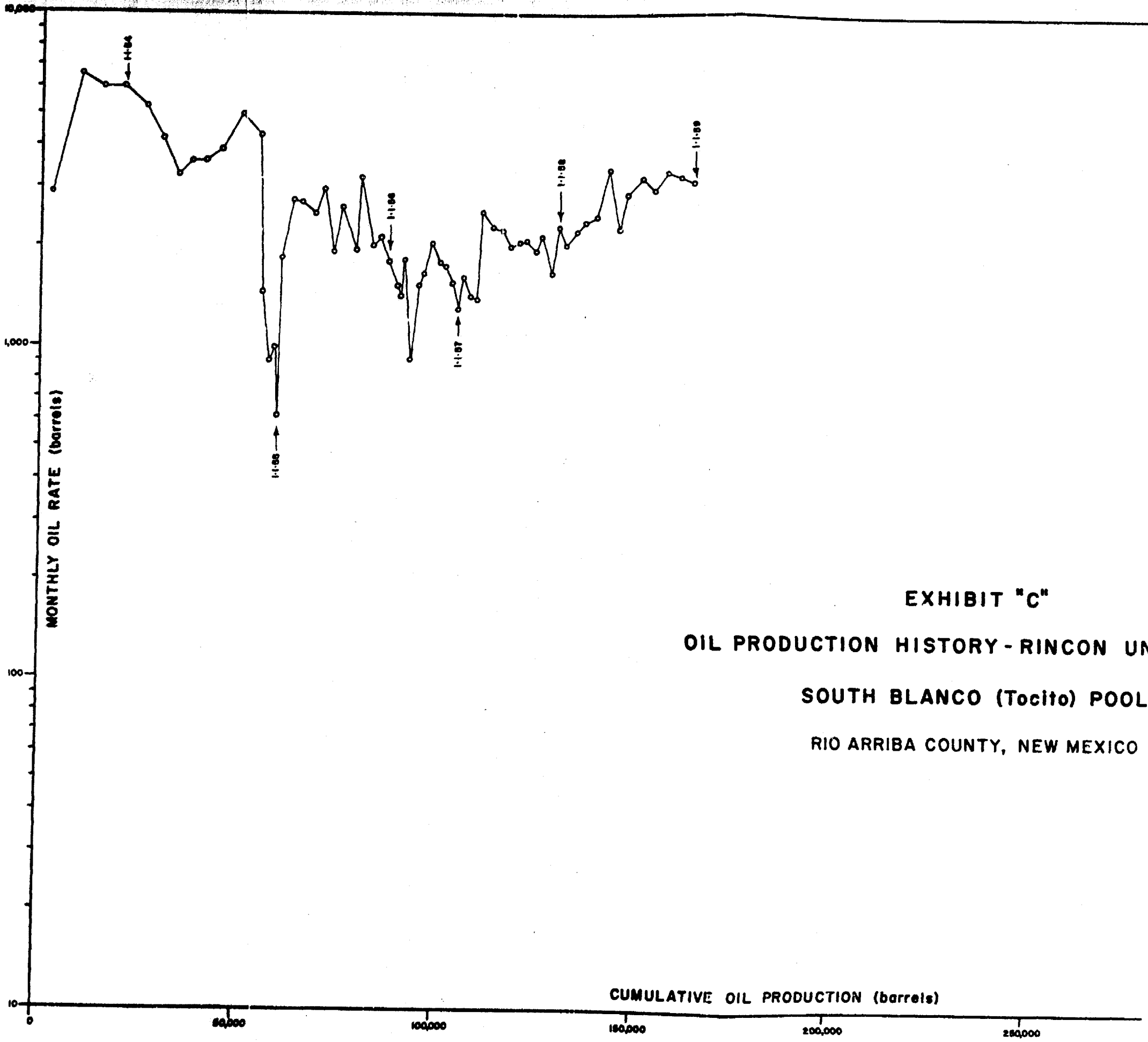


EXHIBIT "C"

OIL PRODUCTION HISTORY - RINCON UN

SOUTH BLANCO (Tocito) POOL

RIO ARRIBA COUNTY, NEW MEXICO

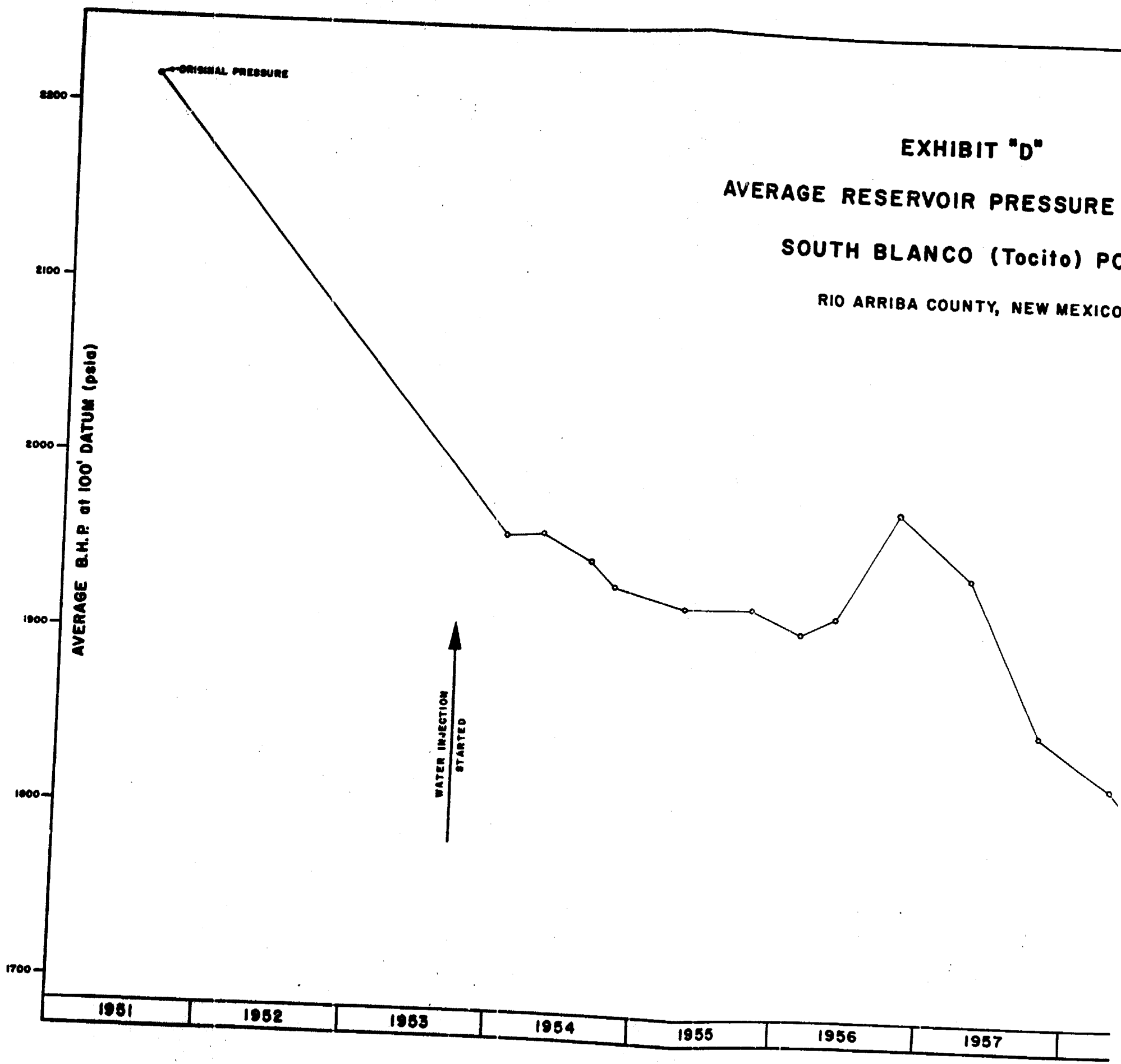
IIT LEASE

EXHIBIT "D"

AVERAGE RESERVOIR PRESSURE I

SOUTH BLANCO (Tocito) POC

RIO ARRIBA COUNTY, NEW MEXICO



HISTORY

IL

1958	1959	1960

EXHIBIT "E"

SUMMARY OF AVERAGE ROCK AND FLUID CHARACTERISTICS

SOUTH BLANCO (TOCITO) POOL
RIO ARRIBA COUNTY, NEW MEXICO

AVERAGE RESERVOIR ROCK CHARACTERISTICS - TOCITO SAND

Porosity	=	13%
Water Saturation	=	21%
Permeability	=	220 md
Net Pay Thickness	=	Approximately 10 feet

AVERAGE RESERVOIR FLUID CHARACTERISTICS

Oil Gravity	=	43.8° API
Original Pressure	=	2200 psig at - 100' datum
Oil Shrinkage Factor	=	1.545
Solution Gas:Oil Ratio	=	860 cubic feet per barrel

EXHIBIT "F"

WATER INJECTION STATISTICS

SOUTH BLANCO (TOCITO) POOL
RIO ARRIBA COUNTY, NEW MEXICO

WELL	No. 85	No. 87	No. 109	No. 134	No. 157
Date Wtr. Injection Started	Jan. '55	Jan. '56	Dec. '58	Sept. '53	Jan. '56
Cumulative Wtr. Injected to 3-1-59, Bbl	784, 827	650, 474	37, 457	2, 538, 592	339, 054
Avg. Daily Injection Rate, BWPD-Mar. '59	--	--	477	1, 342	832
Avg. Well Head Pressure, PSIG Mar. '59	--	--	760	1, 671	507
Remarks	Inactive since May 30, 1956.	Inactive since Mar. 28, 1957.			

EXHIBIT "G"

CAPACITY AND CUMULATIVE OIL PRODUCTION STATISTICS FOR PRODUCING WELLS

SOUTH BLANCO (TOCITO) POOL
RIO ARRIBA COUNTY, NEW MEXICO

Company	Lease	Well	Oct. '58 Well Tests			Mar. '59 Allowable BOPD	Cum. Oil Prod. to 3-1-59, Bbl.
			Oil BPD	Wtr. BPD	GOR		
Caulkins	Breech "A"	T-125	152	0	6,052	48	98,946
"	"	T-127	148	0	4,074	130	283,509
"	"	T-129	142	36	1,718	110	277,432
"	"	T-132	104	0	788	50	290,366
"	"	T-177	165	0	7,084	80	138,590
"	"	T-179	207	40	628	145	366,217
"	"	T-182	31	337	193	14	162,467
"	"	T-207	75	80	4,440	30	322,689
"	Breech "B"	T-123	139	0	10,697	28	9,072
"	Breech "D"	T-185	266	0	2,924	140	182,371
"	Breech "E"	T-104	150	0	1,700	145	10,338
El Paso	Rincon Unit	6	160	0	4,947	59	91,990
"	"	11	62	0	19,612	15	35,936
"	"	20	35	0	2,023	35	41,438

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

May 22, 1959

Mr. Jason Kellahin
Box 1713
Santa Fe, New Mexico

Dear Mr. Kellahin:

On behalf of your clients, Caulkins Oil Company and El Paso Natural Gas Products Company, we enclose two copies of Order No. R-1191-A issued May 21, 1959, by the Oil Conservation Commission.

Very truly yours,

A. L. PORTER, Jr.,
Secretary-Director

ir/

Enclosures

Case 1420 File

JASON W. KELLAHIN
ROBERT E. FOX

KELLAHIN AND FOX
ATTORNEYS AT LAW
54½ EAST SAN FRANCISCO STREET
POST OFFICE BOX 1713
SANTA FE, NEW MEXICO

TELEPHONES
YUcca 3-9396
YUcca 2-2266

OK
EF

April 17, 1959

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

Attention: Mr. E. J. Fischer

Re: Case 1420 - Application of Caulkins Oil Company and El Paso Natural Gas Products Company.

Gentlemen:

At the time of the hearing on the above captioned case the consent and agreement of Delhi-Taylor Oil Company had not been obtained for the proposed expansion of the water injection project. We advised the Commission examiner that upon securing such approval the Commission would be notified.

I was advised today by Mr. Ed Norton of El Paso Natural Gas Products Company that the approval of Delhi-Taylor had been obtained. If anything further is needed in connection with this, please let me know.

Yours very truly,

Jason W. Kellahin

Jason W. Kellahin

JWK:j
cc: Mr. Art Holland
Mr. W. T. Hollis

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. 1420
Order No. R-1191-A

APPLICATION OF CAULKINS OIL
COMPANY AND EL PASO NATURAL GAS
PRODUCTS COMPANY FOR AN ORDER
AMENDING IN CERTAIN PARTICULARS
THE SPECIAL RULES GOVERNING THE
SOUTH BLANCO-TOCITO WATER
INJECTION PROJECT IN RIO ARRIBA
COUNTY, NEW MEXICO, AS SET FORTH
IN ORDER R-1191; FOR PERMISSION TO
CONVERT TWO WELLS IN SAID PROJECT
TO WATER INJECTION; FOR PERMISSION
TO DUALLY COMPLETE A WELL IN SAID
PROJECT AS A PRODUCING-INJECTION
WELL AND FOR APPROVAL OF AN
UNORTHODOX LOCATION FOR SAID WELL

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 8, 1959, at Santa Fe, New Mexico, before E. J. Fischer, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 21st day of May, 1959, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, E. J. Fischer, 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 Rule II of Order No. R-1191 established Special Rules and Regulations governing the operation of the South Blanco-Tocito Water Injection Project in the South Blanco-Tocito Oil Pool in Rio Arriba County, New Mexico, and described the acreage encompassed in said South Blanco-Tocito Water Injection Project, hereinafter referred to as the "Project."

(3) That the applicants, operators in said Project, seek an amendment of Order No. R-1191 to provide for the inclusion of the following-described acreage in the Project:

TOWNSHIP 26 NORTH, RANGE 6 WEST, NMPM
Section 6: All
Section 7: NE/4
Section 8: S/2 NE/4; NW/4

Rio Arriba County, New Mexico.

(4) That the applicants propose that Order No. R-1191 be amended to establish an administrative procedure whereby the Project area may be extended and new wells included in the Project without notice and hearing.

(5) That the applicants also seek authorization to convert the following-described wells to water injection:

El Paso Rincon Unit Well No. 11, located in the SE/4 SW/4 of Section 6,

Caulkins Well No. T-123, located in the NW/4 NE/4 of Section 7,

both in Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico.

(6) That applicants further seek permission to deepen the said Caulkins Well No. T-123, and to dually complete it in such a manner as to permit water injection into the Tocito formation through the casing-tubing annulus and gas production from the Dakota formation through tubing.

(7) That the location of the said Caulkins Well No. T-123 at a point 700 feet from the North line and 1800 feet from the East line of said Section 7 is unorthodox for a gas well in the Dakota Producing Interval and applicants seek approval for said unorthodox location.

(8) That permission should be granted for the conversion of the aforesaid El Paso Rincon Unit Well No. 11 to water injection.

(9) That in order to ensure the Dakota reservoir is not damaged, permission to dually complete the aforesaid Caulkins Well No. T-123 in such a manner as to permit the injection of water into the Tocito formation through the casing-tubing annulus and the production of gas from the Dakota formation through the tubing should be denied,

(10) That permission should be granted, at the operator's option, to either dually complete the said Caulkins Well No. T-123 in such a manner as to permit the production of oil from the Tocito formation and the production of gas from the Dakota formation through parallel strings of tubing, or to utilize said well as a water injection well in the Tocito formation without deepening it to produce from the Dakota formation.

(11) That the unorthodox gas well location of the said Caulkins Well No. T-123 should be approved inasmuch as the operator may choose to dually complete said well in such a manner as to permit the production of oil from the Tocito formation and the production of gas from the Dakota formation.

(12) That the inclusion of the additional acreage in the water injection project, as described in Finding No. 3, and the establishment of an administrative system for future expansion, as described in Finding No. 4, should be provided by an amendment to Rule 11(a) of the South Blanco-Tocito Water Injection Project Area Rules, as set forth in Order No. R-1191.

IT IS THEREFORE ORDERED:

(1) That the applicants be and the same are hereby authorized to convert the El Paso Rincon Unit Well No. 11, located in the SE/4 SW/4 of Section 6, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico, to water injection.

(2) That permission to deepen the Caulkins Well No. T-123, located 700 feet from the North line and 1800 feet from the East line of Section 7, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico, in such a manner as to permit the injection of water into the Tocito formation through the casing-tubing annulus and the production of gas from the Dakota formation through tubing be and the same is hereby denied.

(3) That the operator be and the same is hereby authorized to either utilize said Caulkins Well No. T-123 as a water injection well in the Tocito formation without deepening it so as to produce from the Dakota formation or to dually complete said well in such a manner as to permit the production of oil from the Tocito formation and the production of gas from the Dakota formation through parallel strings of tubing.

(4) That an unorthodox gas well location for said Caulkins Well No. T-123 in the Dakota formation be and the same is hereby approved.

IT IS FURTHER ORDERED:

That Rule 11(a) of the South Blanco-Tocito Water Injection Project Rules as set forth in Order No. R-1191, be and the same is hereby amended to read in its entirety as follows:

(a)-1. The project Area shall comprise that area described as follows:

TOWNSHIP 26 NORTH, RANGE 6 WEST, NMPM

Section 3:	S/2 SW/4
Section 4:	S/2
Section 6:	All
Section 7:	NE/4
Section 8:	N/2
Section 9:	N/2 and N/2 S/2
Section 10:	NW/4, N/2 SW/4, and SE/4
Section 11:	W/2 SW/4

(a)-2. Expansion of the project area to include additional acreage may be approved administratively by the Secretary-Director of the Commission for good cause shown. To obtain such approval, the project operator shall file proper application with the Commission, furnishing copies of said application to all interested parties. "Interested parties" are defined as being working interest owners and royalty owners within the project area and immediately offsetting it. The Secretary-Director may approve the expansion of the project area if, within 20 days after receiving the application, no objection is received from any interested party. The Secretary-Director may grant immediate approval provided waivers of objection are received from all interested parties.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JOHN BURROUGHS, Chairman

MURRAY E. MORGAN, Member

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

vem/

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1420

TRANSCRIPT OF HEARING

JULY 15, 1959

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE NEW MEXICO
Phone CHapel 3-6691

Page______

NEW MEXICO OIL CONSERVATION COMMISSION

Mabry Hall

Santa Fe, NEW MEXICO

REGISTER

HEARING DATE Examiner April 8, 1959 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
[illegible]	El Paso Natural Gas Products Co	Farmington, N.M.
Frank Bray	Caulkins Oil Co	"
[illegible] Hubble	" "	"
[illegible] Kellahin	Kellahin & Fox	" "
[illegible] Miller	Tidewater Oil Co.	Santa Fe, N.M.
[illegible] H F. HARRELL	HUMBLE OIL & REF. CO.	Hobbs, N.M.
Alvin Smith	Tidewater	HOBBS, N.M.
Charles R Marshall	Pan American	Santa Fe, N.M.
[illegible]	[illegible]	Farmington
John Mason	EPNG	[illegible]
[illegible]	El Paso Natural	El Paso
Kirk Newman	Pan American	El Paso
		Roswell

ILLEGIBLE

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
JULY 15, 1959

IN THE MATTER OF:

CASE 1420 (Hearing De Novo) Application of Caulkins Oil Company for a hearing de novo before the Oil Conservation Commission of New Mexico in Case No.1420. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its Well No. T-123, located 700 feet from the North line and 1800 feet from the East line of Section 7, Township 26 North, Range 6 West, Rio Arriba County, New Mexico, in such a manner as to permit the production of gas from the Dakota formation and water injection into the Tocito formation.

BEFORE:

Gov. John Burroughs
Murray Morgan
A. L. Porter

TRANSCRIPT OF PROCEEDINGS

MR. PORTER: Take up next Case 1420.

MR. PAYNE: (Hearing De Novo) Application of Caulkins Oil Company for a hearing de novo before the Oil Conservation Commission of New Mexico in Case No. 1420.

MR. KELLAHIN: If the Commission please, Jason Kellahin, Kellahin & Fox, Santa Fe, New Mexico, representing the ap-

plicant, Caulkins Oil Company. We will have one witness, Mr. Fran Gray.

(Witness sworn)

MR. KELLAHIN: If the Commission please, I would like to very briefly review the situation that brought about this application on the part of Caulkins for a de novo hearing before the Commission. The application regards only that portion of Case 1420 and Order No. R-1191-A which denied the permission to make a dual completion for production from the Dakota sand with water injection in the Tolcito formation. At the time of this hearing, on April the 8th, 1959, a plan was proposed by Caulkins Oil Company which would have allowed them to drill to the Dakota sand to cement 5½ inch casing from a total depth to approximately 6328 feet; set a Baker Model D production packer in the 5½ inch casing just above the top of the Dakota production or perforations, and run 2 inch tubing and seal it into the production packer. Under that completion we would have produced gas from the Dakota through the 2 inch tubing with water injection into the Tolcito through the casing tubing annulus.. Now, insofar as the provisions of Order R-1191-A are concerned, that is the only point on which we have requested a rehearing. We are perfectly satisfied with the rest of the Order which was entered pursuant to the recommendation of the Commission's Examiner.

Again, we take no quarrel with the Commission's Examiner in his recommendations as to this dual completion. Rather, we have

come up with an alternate proposal to submit to this committee which we think will satisfy the objections which were made in the findings of the Commission in the original case.

Now, in order to facilitate this hearing and save time, I would like to offer in evidence the complete record and transcript in Case 1420 heard on April the 8th, 1959.

MR. PORTER: Without objection, it will be made a part of the record of this hearing.

FRANK GRAY,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Will you state your name, please?

A Frank Gray.

Q By whom are you employed and in what position, Mr.Gray?

A I am employed as field superintendent for Caulkins Oil Company.

Q Now, have you previously testified before this Commission and had your qualifications accepted by this Commission?

A Yes, sir.

MR. PORTER: His qualifications are acceptable.

Q Now, Mr. Gray, are you familiar with the facts and circumstances involved in this application?

A Yes, sir.

Q Would you state briefly what is the present casing of the subject well?

A This well is presently cased with 7 inch casing to a depth of 6843 and is being operated as a Tolcito Oil Well, and produces from perforations from 6797 to 6812.

Q Now, what is proposed -- first, referring to what has been marked as Exhibit No. 1, will you state what that shows?

(Thereupon, Caulkins' Exhibit No. 1 was marked for identification.)

A Exhibit No. 1 is a plat showing the ownership of the acreage surrounding the section in which this well is located.

Q Does it likewise show the location of the subject well?

A It shows the location of the subject well also.

(Thereupon, Caulkins' Exhibit No. 2 was marked for identification.)

Q Now, referring to Exhibit No. 2, would you explain that Exhibit?

A Exhibit No. 2 is a diagramatic sketch showing the arrangement we propose to make, or that we would like to make in making a dual Dakota producer Tolcito water injection well.

Q Now, referring to the Exhibit, would you explain exactly what you propose to do?

A We propose to drill a 6 inch hole from 6843 to approximately 7700 feet, and cement 5 inch OD 1300 pounds N-80 seam-

less casing from approximately 7700 feet to 6833 feet, using twice the calculated amount of cement necessary to cement the liner from bottom to top. The casing proposed is designed to withstand external pressure in excess of 6582 pounds per square inch. The clearance between the 5 inch OD casing and 6¼ inch hole is 1.25 inches, making a sheath of cement .625 inches thick possible. The annular flow space would be approximately 11 square inches. The clearance between 6¼ inch hole and a 5 inch OD casing coupling is .687 inches. The annular flow space between the coupling and hole would be 6.30 square inches and would permit a sheath of cement .343 inches thick. This liner would be run on drill pipe or tubing using a Baker Oil Tools, Inc. duplex float shoe. The top of the liner would be set below the Tocito perforations to avoid possible damage to the Tocito from cement used around the liner. A loss of any appreciable amount of cement in the Tocito sand might impair its value as a water injection well. Also, by leaving the top of the liner below the Tocito perforations it would be possible to use 7 inches production packers in the completion of the well. This would be an advantage if any remedial work was ever attempted in the future with packers in place, because the bore diameter of the 7 inch packers in much larger than in 5 inch OD packers. Then forty-eight hours after cementing the liner it would be perforated at 6685 feet. This would be approximately two feet below the shoe of the 7 inch casing. A cement retainer would then be set in 7 inch casing at 6820 feet. This retainer would be run on a wire

line for safety and accuracy of measurements.

2 3/8 inch OD EUE J-55 seamless tubing would then be run and connected to the cement retainer. Sufficient cement would be squeezed through the perforations at 6845 feet in 50 sack stages to obtain a minimum final squeeze pressure of 6,000 pounds. This would exceed the maximum injection pressure anticipated by 3000 pounds and would equal the greatest differential pressure possible under the conditions that we expect to operate.

After obtaining the desired final squeeze pressure, the retainer and cement would be drilled out to the shoe of the 5 inch OD liner. A test packer would then be run on tubing and set at 6830 feet. The casing and liner below that depth would be tested with 4000 pounds pressure. If a leak to formation is indicated, the squeezing and drilling out operation would be repeated until a satisfactory test with 4000 pounds pressure is obtained.

The Dakota zone would then be perforated and sand-water fractured.

After the fracturing operations are finished, Baker Oil Tools, Inc. permanent type production packers would be run and set on a wire line as shown on Exhibit 2. That's a Model FA Packer. On the upper part, it would be a Model FA, the lower would be a Model D. A Baker parallel flow tube would be run in the 2 inch Dakota string of 2 inch 4.70 pounds N-80 seamless tubing and would be latched into the 7 inch Model FA Packer set at 6795 to 98. The tubing string would also include six Baker tubing seal nipples spaced to

seal off in the 7 inch Model D Packer set at 6827 to 6830 feet. The portion of the barrel of this packer in which the nipples can seal is 32 inches long. The length of each nipple is 17 inches. The excessive number of seal nipples proposed is to provide assurance that a seal nipple will always be positioned in the barrel or bore of the packer at 6827 to 30 feet regardless of slight measurements, expansions or contractions. The Dakota string of tubing would be set just above the top of the Dakota perforations and would be run with a seating nipple on bottom, and otherwise it would be opened.

A parallel string of 2 inch tubing would be run and latched into the parallel flow tube at 6785 feet using a parallel anchor seal nipple. With the equipment in the well arranged in this manner, Dakota production would be confined to one string of 2 inch tubing and Tocito injection water would be confined to a companion string of 2 inch tubing. The Baker packers proposed for this installation are recommended by the manufacturer for use in wells having up to 10,000 pound pressure. The H-30 tubing or 2 inch H-80 tubing proposed for the Dakota string is recommended for use in external pressure of less than 7200 pounds.

Q Now, with that type of compression, Mr. Gray, how would you conduct a packer leakage test?

A With Dakota gas and distillate production and Tocito injection water each confined to separate strings of 2 inch tubing, the operation of the well for production and injection could be

carried on with the tubing head valves wide open. If the upper packer or the water injection string of tubing should ever begin to leak, the leak would be immediately indicated by the return of water through the tubing head. If there should be a leak of injection water by the lower packer, or around the 7 inch casing and liner, the leak would be immediately apparent because water reaching the Dakota zone would either kill the flow of gas or would be brought to the surface by the gas.

If a leak should start in the Dakota string of tubing above the depth of balance between the fluid in the 7 inch casing and gas pressure inside the tubing, the production of gas through the open tubing head valves would be immediately apparent.

To summarize the packer leakage test possibilities, we could say first, that both strings of tubing and both packers would actually be on a leakage test continuously because a leak at any point would be immediately apparent. Further, by injecting water through a string of tubing instead of through the casing-tubing annulus as was proposed during the April 3 hearing, the possibility of losing injection water in sands above the Tocito through casing leaks would also be eliminated. Facilities would also be in place to permit the immediate protection of the Dakota zone from any injection water that might reach it from any source.

Q Now, in the event a leak did occur, what remedial steps would you take to prevent any damage?

A The first operation in the event of a leak of water

from any source would be to discontinue immediately the injection of water. Now, we would also install a high-low shutoff valve on a water injection line to accomplish this shutting down of the water injection automatically, and by this, I mean it wouldn't be necessary for anyone to go to it.If we had a leak, a break in the water line down hill or a packer gave way or anything like that, it would automatically shut off and water injection would be stopped then.

Q Now, what other steps could you take to prevent damage to the formation?

A Well, a leak in either string of tubing could be stopped by setting a retrievable bridge plug below the leak. Equipment for this purpose is available twenty-four hours a day in the San Juan Basin. If there should be a leak of injection water by the lower packer or around the 7 inch casing and liner, the Dakota sand could be adequately protected by pumping temporary plugging materials into the Dakota zone through the 2 inch tubing strings. Now, there are several types of plugging material available in the area on short notice, two of which are described in our Exhibits 3 and 4.

Q Are Exhibits 3 and 4 industry information on plugging materials and its uses?

A Yes, it is, and it was furnished upon request. One -- Exhibit 3 is a letter from Dowell about their temporary plugging material, and Exhibit 4 is a letter with some attachment from Halli-

burton Oil Well Cementing Company.

Q Now, what type of water are you using in this injection program, Mr. Gray?

A We are using the same, or rather we are using fresh water, approximately 3000 barrels or 3300 barrels of fresh water with about 200 barrels of produced water, which is fresh water that has been pumped in to -- or rather, recovered, producing the wells in the water flood operation.

Q Have you had any experience with that water and its effect on the Dakota formation?

A We have used this water in the fracing of Dakota wells in this immediate area, and we have obtained excellent stimulations where this water was used. We have used other fresh waters with the same results, but there appears to be no difference in the results. It is our completion practice to water-frac these Dakota wells, and we have done so, using this water as well as other waters without any harm at all.

Q Have you ever had occasion to use this water to kill a well?

A Yes, it was necessary to use water to do some repair work on our dual Tocito producer No. "D" 204. We had a leak in a permanent type packer; it was necessary to pull the tubing, and we ran a second packer and set it immediately above the one that was already in the hole, but it was necessary to keep water going into the well continuously to keep it dead so that we could work

on it. This particular operation required the use of parallel string of tubing planted together, and we couldn't run it with strip rubbers.

Q What volumes of water did you inject and for how long?

A We had approximately 500 barrels a day going into the well for about a week.

Q And did that have any adverse effect on the producing characteristics of the Dakota formation?

A Not at all. Just as soon as the tubing was landed in the packer, the tubing head valves were installed. About thirty minutes after, the well kicked off and started flowing. The production is both gas and distillate, and since the well has cleaned up, it is approximately the same as it was since we worked on it.

Q In your opinion, would the leakage of water into the Dakota formation cause any damage to that formation?

A The amount of water that would get into the Dakota from a leak, before we could get temporary plugging material pumped into the well would not harm it.

Q Now, with this type of completion or any work, are any workovers possible or other remedial work?

A The -- you mean --

Q What work can you do on the well with this type of completion?

A The tubing can be pulled out of the well at any time. The Dakota would have to be pulled first. Either or both can be

pulled -- I mean both can be pulled. By pulling the Tolcito string first, these packers can be removed and replaced, if that should become necessary, and it is also possible to do a limited number of remedial operations through the tubing without removing the packers. For instance, if we used this temporary plugging material Dowell or Halliburton advertize. It might be too viscose and thick to flow out under its own steam. We could go in with tubing through those packers and wash that out.

Q Now, what is the reason for Caulkins Oil Company seeking this type of completion?

A Well, it's -- of course, we want to have the advantage of increased production by reason of water injection. As far as the Tolcito is concerned, and the deepening to the Dakota zone is a matter of economics. The cost of doing the work that we propose to do would be returned in less than two years if we were successful in obtaining an average Dakota well for this area, while if a new Dakota well were drilled, the cost of drilling a well would be returned in approximately four years.

Q Now, do you consider an additional Dakota well necessary to get the production from that formation?

A No. I think that we can produce it as a dual Dakota, gas distillate producer and water injection well, and give the Dakota sand full protection from any leaks of water that might develop at any time.

Q Now, you said that you can give the Dakota formation

complete protection. Will, in your opinion, all of the other formations which may underly the lands involved in this application be adequately protected by this completion?

A I think that with the separate string of tubing for the Tolcito that we would be giving complete protection to any sands above the Tolcito, because if the tubing should spring a leak at any time, the water will start running out the tubing head, and it is going to be apparent to anybody that goes by the well, and those wells are visited at least once a day, so the leak cannot continue for more than twenty-four hours without being detected.

Q In your opinion, is this type of completion in the interest of conservation and the prevention of waste?

A Yes, sir, I think so.

Q Were Exhibits 1 and 2 prepared by you or under your direction and supervision?

A They were prepared under my direction.

Q And Exhibits 3 and 4 are reports submitted to you?

A Yes, sir.

MR. KELLAHIN: At this time we would like to offer Exhibits 1 through 4, inclusive.

MR. PORTER: Without objection, the Exhibits will be admitted.

(Whereupon, Caulkins Exhibits 1 through 4 were received in evidence.)

MR. PORTER: Anyone have a question of Mr. Gray?

MR. NUTTER: Yes.

MR. PORTER: Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Gray, when you drilled this well, what size of hole did you drill down to the shoe of this 7 inch casing?

A We didn't drill the shoe out.

Q What size of a hole is that pipe setting?

A I believe it is 6 3/4 inch hole.

Q What is the top of the cement on that string?

A It is approximately 5,000 feet. I believe it is shown on the sketch here, I'm not certain of that. No, it isn't. It is approximately 5,000 feet.

Q Were centralizers used in that casing?

A I'm not certain whether they were or not, but I'm almost sure they were, because that has been more or less a standard completion practice.

Q You feel sure, then, that you have a cement sheath around that 7 inch pipe with uniform thickness?

A The purpose of making the perforations at 6845 is to make certain that there is no communication between the Tocito sand and the lower formations. In carrying on the operation, water would be pumped through those perforations at 6845 to break down the formation at that depth before pumping. In any event, if a return of water is obtained, a channel from the shoe of the 7 inch

to the perforations from 6797 to 6812 would be indicated. Now, if such a condition is encountered, the channel would be cemented and the cement retainer drilled out, and any cement remaining in the 5½ inch OD liner about 6805 would be also drilled out, and we would -- the 5 inch liner would be perforated again and another cement retainer set at 6820, and then those perforations would be squeezed with enough cement in 50 sack stages to get this 6,000 pounds minimum pound squeeze pressure that we propose.

Q What size of hole do you propose to drill for your 5 inch line?

A Six and a quarter. That is 26 pound casing, and there may be some question about the use of a six and a quarter bit in 7 inch 26 pound pressure, but from experience it will be --

Q Experience of this particular well?

A I couldn't say. We didn't -- I don't believe we had a bit in that. I think we just braced that plug in with water and didn't drill it down, but in other casing strings where we have had 26 pound casing, we have used six and a quarter bits.

Q Now, what is the next smaller size?

A Six and an eighth.

Q What would be your cement sheaths under the two bits?

A It would be a sixteenth of an inch less.

Q Now, this 3,000 pounds anticipated injection pressure, what is that surface pressure?

A That is surface pressure.

Q What would be the pressure down here on the top of this lower packer then?

A Roughly 6,000 pounds.

Q What is the pressure of the Dakota?

A Bottom hole pressure at this time on it would range between 2800 and 2900 pounds.

Q Now, is this 3,000 pound surface pressure or 6,000 injection pressure, is that a pressure that you are having to acquire in the other injection wells in that pool?

A No, we were not. The highest injection pressure we have at this time is a little over 2,000 pounds, and that is in a well that was a tight well to begin with, and one in which some three million barrels of water has been injected.

Q What do you expect will be the initial injection pressure here?

A I think that probably for a day or two it might even go in on vacuum, but we have another well that was not quite -- that did not have quite as great an initial flow as this well that we are using for injection purposes, and at the present time we are injecting a thousand barrels a day in it, and the pressure is about 600 pounds.

Q Well, now, if you had pressures in the range of vacuum to 600 or 700 pounds in your Tocito and you had a failure of that lower packer or of tubing leak between the two packers, the Dakota

gas would go into the Tocito formation, then, wouldn't it?

A No, sir, the weight of your fluid column at 6800 feet would be about 3,000 pounds, and that alone would be greater than the pressure in the Dakota zone.

Q You will always have more pressure in that interval between the packer than you would from the Dakota?

A Unless it went in on a vacuum. The present pressure in the Tocito is approximately 1800, 1900 pounds in that well, so it is not likely to drop below that. So that I think that we could say that we would always have more pressure on the outside of the Dakota string than inside.

MR. NUTTER: I believe that's all. Thank you. Oh, yes, one more question, Mr. Gray.

Q (By Mr. Nutter) What is this proposed Dakota perforation interval?

A It would be -- oh, it would be over a vertical area of about 300 feet.

Q What is the interval that you are proposing for the Dakota?

A For the Dakota?

Q Yes, sir.

A Well, it would be approximately 7600 to 7700.

MR. NUTTER: Thank you.

MR. PORTER: Does anyone else have a question of Mr. Gray? The witness may be excused.

(Witness excused)

MR. PORTER: Anyone have anything further to offer in this case?

MR. KELLAHIN: I would like to make a very brief statement. If the Commission please, I believe that our presentation has shown that adequate protection has been afforded by this proposed completion to all of the zones which could be affected by the proposal to inject water through a dual completion of this type. In addition to that, I think the safety features which are proposed here, which would include automatic cutoff in the event of a packer leak and the remedial work which could be done in the event of such a leak, plus the fact that experience has shown that this type of water is suitable for fracturing and for killing a well with no adverse effect on the Dakota formation, clearly shows that the proposal is feasible, and we urge the Commission's approval of it.

MR. PORTER: Anyone else have anything further in the case? Take the case under advisement.

We are going to recess the hearing at this time until 8:30 in the morning, at which time we will reopen the oil allowable case briefly. Mr. Nutter indicated this morning that he would have additional information concerning the allowables for Northwest New Mexico, that should take a few minutes.

The next case to be considered in the morning will be Case 1722, following the allowable case. The hearing is recessed until 8:30 tomorrow morning.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, J. A. Trujillo, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in Stenotype and reduced to typewritten transcript by me, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the 29th day of July, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

J. A. Trujillo
NOTARY PUBLIC

My Commission Expires:

October 5, 1960

BEFORE THE

OIL CONSERVATION COMMISSION OF

NEW MEXICO

IN THE MATTER OF THE APPLICATION OF CAULKINS OIL COMPANY AND EL PASO NATURAL GAS PRODUCTS COMPANY FOR APPROVAL OF THE CONVERSION OF TWO WELLS TO WATER INJECTION IN THE BLANCO-TOCITO OIL POOL, RIO ARRIBA COUNTY, AND FOR AMENDMENT OF THE POOL RULES OF THE SOUTH BLANCO-TOCITO OIL POOL AND AN EXCEPTION TO THE PROVISIONS OF COMMISSION RULE 502.

No. 1416

APPLICATION

Come now CAULKINS OIL COMPANY and EL PASO NATURAL GAS PRODUCTS COMPANY and apply to the Oil Conservation Commission of New Mexico for an order amending the pool rules of the South Blanco-Tocito Oil Pool, set forth in Order No. R-1191, as follows:

1. Extension of the project area of the South Blanco-Tocito water injection project area to include the following lands:

Township 26 North, Range 6 West, N.M.P.M.

Sec. 8 - $S\frac{1}{2}NE\frac{1}{4}$, $NW\frac{1}{4}$
Sec. 7 - $NE\frac{1}{4}$
Sec. 6 - [illegible]

2. Approval of conversion of El Paso Natural Gas Products Company's Rincon Unit Well No. 11, located in the Southeast Quarter of the Southwest Quarter ($SE\frac{1}{4}SW\frac{1}{4}$) Section 6, Township 26 North, Range 6 West, and conversion of Caulkins Oil Company's Well No. T-123, located in the Northwest Quarter of the Northeast Quarter ($NW\frac{1}{4}NE\frac{1}{4}$) of Section 7, Township 26 North, Range 6 West, to water injection wells with the right to transfer allowables to other wells in the project area as provided by Order No. R-1191,

together with credit allowed for water injected against the gas-oil ratio penalties, as provided by said Order No. R-1191.

3. Establishment of an administrative procedure for extension of the project area, and for the inclusion of new wells in the project area, either as injection wells or as producing wells, with credit for water injection against the gas-oil ratio penalties and procedure for transfer of allowables in accordance with pool rules.

4. An exception to the provisions of Commission Rule No. 502, in so far as said rule affects the daily tolerance of allowable production from wells within the project area.

5. Permission to deepen the Caulkins Oil Company Well No. T-123, located 700 feet from the north line and 1800 feet from the east line of Section 7, Township 26 North, Range 6 West, and complete said well as a dual completion for production from the Dakota formation, and production from or water injection into the Tocito formation, with approval of the location of said well for Dakota production.

In support whereof, applicants would show the Commission that said order will result in more efficient operation of the water injection project in the South Blanco-Tocito Oil Pool, Rio Arriba County, New Mexico, and is in the interest of conservation and the prevention of waste.

WHEREFORE, applicants pray that this application be set for hearing before the Commission's duly appointed examiner, or before the Commission, and that upon hearing the order prayed for be granted by the Commission.

Respectfully submitted,

CAULKINS OIL COMPANY
EL PASO NATURAL GAS PRODUCTS CO.

By Jason W. Kellahin
Attorney

KELLAHIN and FOX
Attorneys at Law
54½ East San Francisco
P. O. Box 1713
Santa Fe, New Mexico

Attorneys for Applicants

BEFORE THE

OIL CONSERVATION COMMISSION OF

NEW MEXICO

IN THE MATTER OF THE APPLICATION OF CAULKINS OIL COMPANY AND EL PASO NATURAL GAS PRODUCTS COMPANY FOR APPROVAL OF THE CONVERSION OF TWO WELLS TO WATER INJECTION IN THE BLANCO-TOCITO OIL POOL, RIO ARRIBA COUNTY, AND FOR AMENDMENT OF THE POOL RULES OF THE SOUTH BLANCO-TOCITO OIL POOL AND AN EXCEPTION TO THE PROVISIONS OF COMMISSION RULE 502.

No. 1420

AMENDMENT TO APPLICATION

Comes now CAULKINS OIL COMPANY and EL PASO NATURAL GAS PRODUCTS COMPANY, and apply to the Oil Conservation Commission of New Mexico for permission to amend the application heretofore filed herein in so far, but only in so far as paragraph 1 thereof is concerned, amending said paragraph to read as follows:

1. Extension of the project area of the South Blanco-Tocito water injection project area to include the following lands:

Township 26 North, Range 6 West, N.M.P.M.

Section 8 - $S\frac{1}{2}NE\frac{1}{4}$, $NW\frac{1}{4}$
Section 7 - $NE\frac{1}{4}$
Section 6 - All

Except as herein amended, said application to be submitted for hearing as heretofore filed.

Respectfully submitted,

CAULKINS OIL COMPANY
EL PASO NATURAL GAS PRODUCTS COMPANY

By Jason W. Kellahin
Attorney

Kellahin and Fox
P. O. Box 1713
Santa Fe, New Mexico

Attorneys for Applicants

Docket Marked
3-25-59
BP

CASE 1627: Application of Pan American Petroleum Corporation for an oil-gas dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Gallegos Canyon Unit Well No. 84 located 990 feet from the North and West lines of Section 26, Township 28 North, Range 13 West, San Juan County, New Mexico, in such a manner as to permit the production of oil from an undesignated Gallup oil pool and the production of gas from an undesignated Dakota gas pool through parallel strings of 2-3/8 inch tubing.

CASE 1628: Application of Tidewater Oil Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its A. B. Coates "C" Well No. 22 located in the NW/4 NE/4 Section 24, Township 25 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the Justis-Blinebry Oil Pool and the production of oil from the Justis-Montoya Oil Pool through parallel strings of 2-3/8 inch tubing.

CASE 1629: Application of Humble Oil & Refining Company for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order establishing a 320-acre non-standard gas proration unit in the Eumont Gas Pool consisting of the SE/4 of Section 18 and the NE/4 of Section 19, Township 22 South, Range 37 East, Lea County, New Mexico, said unit to be dedicated to applicant's State "M" Well No. 1 located 1980 feet from the South and East lines of said Section 18.

CASE 1630: Application of Hill and Meeker for the creation of a new oil pool and the establishment of allowables therefor. Applicant, in the above-styled cause, seeks an order creating a new oil pool for Delaware production to be designated the El Mar-Delaware Pool and to consist of the NW/4 NW/4 of Section 36, Township 26 South, Range 32 East, Lea County, New Mexico, alleged by applicant to be an extension of the El Mar (Delaware) Field in Loving County, Texas. Applicant further seeks the promulgation of pool rules governing the establishment of allowables for said pool.

ir/

No. 12-59

DOCKET: EXAMINER HEARING APRIL 8, 1959

Oil Conservation Commission Office, Room 109, State Capitol, Santa Fe

The following cases will be heard before E. J. FISCHER, Examiner:

CASE 1420: Application of Caulkins Oil Company and El Paso Natural Gas Products Company for an amendment of Order No. R-1191, for approval to convert two wells to water injection, for establishment of an administrative procedure for extending the South Blanco water injection project and for including new wells in said project, for an unorthodox gas well location and for a dual completion. Applicants, in the above-styled cause, seek an order amending Order No. R-1191 to extend the project area of the South Blanco water injection project to include acreage in Sections 6, 7, and 8, Township 26 North, Range 6 West, Rio Arriba County, New Mexico, and for the establishment of an administrative procedure whereby the project area may be extended and new wells included without notice and hearing. Applicants further seek permission to convert two wells located in said Sections 6 and 7 to water injection, and to dually complete the Caulkins Well No. T-123 located in the NW/4 NE/4 of said Section 7 in such a manner as to permit production from the Dakota formation and production from, or water injection into, the Tocito formation, and for approval of an unorthodox gas well location for said well.

CASE 1624: Application of El Paso Natural Gas Company for an oil-gas dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Huerfano Unit Well No. 103 located in the NE/4 NW/4 of Section 3, Township 26 North, Range 10 West, San Juan County, New Mexico, in such a manner as to permit the production of oil from the Angels Peak-Gallup Oil Pool and the production of gas from the Dakota formation adjacent to the Angels Peak-Dakota Gas Pool through parallel strings of two-inch tubing.

CASE 1625: Application of El Paso Natural Gas Company for an oil-gas dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Huerfano Unit Well No. 105 located in the SE/4 SE/4 of Section 29, Township 27 North, Range 10 West, San Juan County, New Mexico, in such a manner as to permit the production of oil from the Gallup formation adjacent to the Angels Peak-Gallup Oil Pool and the production of gas from the Dakota formation adjacent to the Angels Peak-Dakota Gas Pool through parallel strings of two inch tubing.

CASE 1626: Application of Pan American Petroleum Corporation for an oil-gas dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Gallegos Canyon Unit Well No. 83 located 990 feet from the North and East lines of Section 26, Township 28 North, Range 12 West, San Juan County, New Mexico, in such a manner as to permit the production of oil from an undesignated Gallup oil pool and the production of gas from an undesignated Dakota gas pool through parallel strings of 2-3/8 inch tubing.

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date April 22, 1959

CASE NO. 1420 HEARING DATE April 8, 1959

My recommendations for an order in the above numbered case(s) are as follows:

Recommend approval of the following—

1/ Extend Project Area of So Blanco-Tocito Oil Pool (as set out in R-1191) to include
Section 8: S/2 NE/4 - NW/4
" 7: NE/4
" 6: all Proposal is not wasteful or injurious to Correl. rts.

2/ Conversion of E P N G Prod. Co. Rincon Unit Well No. 11, in SE/4 SE/4 Sec. 6-26 No-6W. &
Calkins Oil Co. Well No. F-123, in NW/4 NE/4 Sect. 7-26 No.-6 West. Rio Arriba Co. to water injection.
However, in regard to Well # F-123. I would not recommend to the O.C.C. that authority to drill for injection of water into Tocito above Dakota production drilled in a 5½" liner be denied. (over.)

E. J. Fischer
Staff Member

6843
6812
31

3. Approve the establishment of administrative procedure for project area extension, inclusion of new wells in the area (inj. or prod.) w/credit for water inj. against [illegible] prod. penalties and procedure for transfer of allowables in accord. w/ Pool rules.

(and 5.) An exception to the provisions of (Statewide) Comm. Rule No. 502 as to daily tolerance.

6812

CAULKINS OIL COMPANY

SOUTH BLANCO-TOCITO WATER INJECTION PROJECT

Mar. 1958 - Feb. 1959

	Oil Prod. BPD	Gas Prod. MCF PD	Gas-Oil Ratio	Water Injected BPD	Water Prod. BPD	Net Water Injected BPD
March, 1958	336	1485	4412	2005	374	1631
April, 1958	555	1490	2690	2292	343	1949
May, 1958	877	2078	2369	2330	452	1878
June, 1958	881	2428	2756	2037	424	1613
July, 1958	1009	2788	2761	2634	470	2164
Aug., 1958	1091	4407	4038	2668	494	2174
Sept, 1958	821	3636	4431	2573	319	2254
Oct., 1958	756	2971	No prod. 3929	Eng. Trouble 2296	480	1816
Nov., 1958	783	2965	3786	2630	352	2278
Dec., 1958	808	3020	3736	3036	370	2666
Jan., 1959	812	3170	3906	2837	366	2471
Feb., 1959	857	3163	3691	2651	381	2270

T-157 converted to water injection 2-22-58

T-109 converted to water injection 12-7-58

No flare order October 1, 1958

BEFORE EXAMINER FISCHER
OIL CONSERVATION COMMISSION
Exhibit No. 2
Case No. 1420

Case 1420
Exhibit 2

February 23, 1959

El Paso Natural Gas Company
P. O. Box 1492
El Paso, Texas

Attention: Mr. Ed J. Coel

Re: Caulkins Oil Co. Well T-123

Gentlemen:

Caulkins Oil Company well T-123 is located 700' from the North Line and 1800' from the East Line, Section 7-26N-6W, Rio Arriba County, New Mexico. This well was drilled to a total depth of 6845' and completed in the Tocito formation December 1, 1953. Seven inch casing was set at 6843' and cemented with 200 sacks of cement.

It is our desire to deepen this well to approximately 7500' and make a completion in the Dakota formation. This would be accomplished by running a 5-1/2" O.D. liner from the bottom of the 7" casing to the new total depth. With the approval of the Conservation Commission, we propose to inject water into the Tocito formation through the casing tubing annulus, and produce the Dakota gas formation through production tubing. We are planning this water injection as a cooperative project with El Paso Natural Gas Products Company, using their Rincon #11 well for water injection.

As you know, the field rules for the Dakota formation require that a well be located at least 790' from the outer boundary lease lines. In order for us to perform this work we are requesting that El Paso Natural Gas Company consent to this proposed location.

We would appreciate receiving a letter from your company stating that you have no objection to our deepening and producing our T-123 well from the Dakota formation.

BEFORE EXAMINER FISCHER
OIL CONSERVATION COMMISSION
Exhibit No. 4
Case No. 1420

Case 1420
Exhibit #4

Yours very truly,

CAULKINS OIL COMPANY

BY:
A. F. Holland

AFH:dm

El Paso Natural Gas Company

El Paso, Texas

February 27, 1958

AIR MAIL

Caulkins Oil Company
720 NW 50th Street
Oklahoma City 18, Oklahoma

Attention: Mr. A. F. Holland

Re: Caulkins Oil Company T-183 Well
Township 26 North, Range 8 West
Section 7: NE/4
Rio Arriba County, New Mexico

Gentlemen:

El Paso Natural Gas Company has no objection to your deepening and producing the captioned well from the Dakota formation in accordance with the methods outlined in your letter of February 21, 1958, subject to approval by the New Mexico Oil Conservation Commission.

Very truly yours,

EL PASO NATURAL GAS COMPANY

By _____
Sam Smith, Manager
Land Department

SS:BMB:pc

cc: Mr. Ed Coel

Case 1420
Exhibit #4