

CASE 2994: Application of SKELLY
for a pressure maintenance project
in San Juan County, New Mexico.

CASE No.
2994

Application,
TRANSCRIPTS,
SMALL Exhibits
ETC.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

APPLICATION OF SKELLY OIL COMPANY FOR
AN ORDER AUTHORIZING THE INJECTION OF
WATER FOR PRESSURE MAINTENANCE AND
SECONDARY RECOVERY PURPOSES INTO THE
GALLUP (TOCITO) SANDSTONE FORMATION
UNDERLYING APPLICANT'S NAVAJO "P" AND
"M" LEASES, SECTIONS 33, 34, 35 and 36
AND THE SOUTH HALFS OF SECTIONS 25 and 26,
TOWNSHIP 32 NORTH, RANGE 17 WEST, SAN
JUAN COUNTY, NEW MEXICO, AND FOR
PROMULGATION OF SPECIAL RULES GOVERNING
THE OPERATION OF SAID PROJECT.

CASE NO. 2998

TO: THE HONORABLE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO
AND THE SECRETARY-DIRECTOR THEREOF

COMES NOW Skelly Oil Company, a Delaware Corporation,
authorized to do business in the State of New Mexico as owner and operator
of those certain oil and gas leases commonly called Navajo "P" and Navajo
"M" leases, executed by the Navajo tribe of Indians as Lessor, which leases
cover the land described above, and hereby makes application to the New
Mexico Oil Conservation Commission for an Order authorizing the injection of
water for pressure maintenance and secondary recovery purposes into the Gallup
(Tocito) Sandstone formation underlying the Navajo "P" and "M" leases, pursuant
to Rule 701 of this Commission, and for promulgation of special rules governing
the operation of said project.

In support of this application, applicant shows:

1.

There is attached hereto and made a part hereof, marked "Exhibit A,"
a plat showing the Navaho "P" and "M" leases, the location of all wells drilled
thereon and all wells drilled within a radius of two miles from the proposed
injection well hereinafter identified. Said Exhibit A also shows the location
of all wells which are producing from the Gallup (Tocito) Sandstone formation.

Said Exhibit A also shows the location of the proposed injection well for which authorization is requested herein, and the ownership of the respective leasehold interests within a radius of two miles from the proposed injection well.

2.

Exhibit A shows in outline the proposed project area which includes the following described lands, to wit:

Sections 33, 34, 35, and 36; the South $\frac{1}{2}$ of Section 25 and the South $\frac{1}{2}$ of Section 26, Township 32 North, Range 17 West, San Juan County, New Mexico.

3.

There is also attached hereto, made a part hereof, marked "Exhibit B," a diagrammatic sketch of the proposed injection well, which shows the total depth of the well, the size of production casing in the well, the depth to which the casing has been set, the estimated top of the cement used in setting the casing in the well, the perforated intervals in the well, and the completion date.

4.

The proposed injection well which has been drilled by applicant is the Navaho "B" Well No. 6, located approximately 660 feet from the south line and 660 feet from the east line of Section 35, Township 32 North, Range 17 West, San Juan County. There is attached hereto and made a part hereof an electric survey run in said well, marked "Exhibit C."

5.

Applicant proposes to inject water into its Navaho "P" 6 Well into the Gallup (Tocito) Sandstone producing formation at an interval ranging from 1303 to 1310 feet, such water to be injected at rates ranging from 90 to 125 barrels per day.

6.

Applicant has arranged to obtain the water for such injection from Humble Oil and Refining Company. If this application is granted and applicant later requests administrative approval pursuant to Rule 701 to enlarge the pressure maintenance project, applicant plans to obtain water from its own wells drilled into the Morrison formation.

7.

Applicant and The Cities Service Oil Company are the sole owners of the Navaho "P" and "M" leases, each owning a 50% interest and the Navajo Tribe of Indians is the sole royalty owner under said leases. Applicant has negotiated lease line pressure maintenance agreements by and between applicant and the operators of oil and gas leases to the south of Sections 34, 35 and 36. Applicant and said operators propose to institute pressure maintenance operations on a cooperative basis, with each operator continuing to operate its own leases.

8.

Applicant believes and asserts that it will be in the interest of conservation and the prevention of waste to inaugurate a water injection program for pressure maintenance and secondary recovery purposes as soon as possible by the injection of water into the injection well for which authority is requested, and that said project is in the interest of obtaining the greatest ultimate recovery of oil and gas from the Gallup (Tocito) Sandstone formation. Applicant therefore respectfully requests that its proposed pressure maintenance project be approved, that the area designated above be designated as the project area, that an allowable formula be fixed therefor, and in connection therewith applicant recommends the adoption of special field rules governing said project, as follows:

RULE 1. The project area of the Many-Rocks-Gallup Pressure Maintenance Project No. 1, hereinafter referred to as the Project, shall comprise the following-described area:

Sections 33, 34, 35, and 36; the South $\frac{1}{2}$ of Section 25 and the South $\frac{1}{2}$ of Section 26, Township 32 North, Range 17 West, San Juan County, New Mexico.

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

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

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 502 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less.

RULE 8. 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 Pressure Maintenance Project Operator's Report, on a form prescribed by the Commission, outlining thereon the date required, and requesting allowables for each of the several wells in the project as well as the total project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form G-120 for the Project.

RULE 9. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the project and may be produced from the wells in the project in any proportion.

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

Therefore, applicant requests that this application be set down for hearing before an Examiner, after due notice as required by law.

Respectfully submitted,

SKELLY OIL COMPANY

BY GILBERT, WHITE & GILBERT

W B Kelly

Case 2884
Heard. 2-19-64
Rec. 2-25-64

1. Grant Kelly a sec. Recor. project
to be called the Mary Rockat-Selling.
Pressure maintenance No. 2.

2. Use Same Rules & in Scrambles
#1 Project R-2541.

Thurston

MANY ROCKS-GALLUP POOL
(Many Rocks-Gallup Pressure Maintenance Project No. 1)
San Juan County, New Mexico

Order No. R-2541, Authorizing Humble Oil & Refining Company to Institute and Adopting Operating Rules for a Pressure Maintenance Project in the Many Rocks-Gallup Pool, San Juan County, New Mexico, August 7, 1963.

Application of Humble Oil & Refining Company for a Pressure Maintenance Project, San Juan County, New Mexico.

CASE NO. 2865
Order No. R-2541

ORDER OF THE COMMISSION

BY THE COMMISSION: This cause came on for hearing at 9 o'clock a.m. on July 24, 1963, at Santa Fe, New Mexico, before Daniel S. Nutter, 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 7th day of August, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, 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, Humble Oil & Refining Company, seeks authority to institute a pressure maintenance project in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup formation initially through nine wells located or to be located within the proposed project area comprising the following-described acreage:

TOWNSHIP 31 NORTH, RANGE 17 WEST, NMPM

Section 1: W/2, SE/4, and SW/4 NE/4

Section 2: NE/4 and NE/4 SE/4

Section 12: NE/4 and NE/4 NW/4

(3) That the applicant seeks the promulgation of special rules and regulations governing the proposed project similar to the special rules and regulations governing the Horseshoe-Gallup Pressure Maintenance Project No. 2 promulgated by Order No. R-1745.

(4) That the applicant proposes that the special rules and regulations provide that any producing well in the project area which directly or diagonally offsets any well outside the project area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur.

(5) That the proposed pressure maintenance project is in the interest of conservation and should result in greater ultimate recovery of oil, thereby preventing waste.

(6) That the proposed special rules and regulations should be adopted in order to prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Humble Oil & Refining Company, is hereby authorized to institute a pressure maintenance project designated the Many Rocks-Gallup Pressure Maintenance Project No. 1 in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup formation through nine injection wells located or to be located

in Units F, J, L, and N of Section 1, Unit H of Section 2, and Unit B of Section 12, Township 31 North, Range 17 West, NMPM, San Juan County, New Mexico, with one injection well located on each of the above-described units.

(2) That special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 1, San Juan County, New Mexico, are hereby promulgated as follows:

**SPECIAL RULES AND REGULATIONS
FOR THE MANY ROCKS-GALLUP
PRESSURE MAINTENANCE PROJECT NO. 1**

RULE 1. The project area of the Many Rocks-Gallup Pressure Maintenance Project No. 1, hereinafter referred to as the Project, shall comprise the following-described area:

TOWNSHIP 31 NORTH, RANGE 17 WEST, NMPM

Section 1: W/2, SE/4, and SW/4 NE/4

Section 2: NE/4 and NE/4 SE/4

Section 12: NE/4 and NE/4 NW/4

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

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

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 602 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less; provided, however, that any producing well in the project area which directly or diagonally offsets a well outside the project area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur. Each producing well shall be subject to the limiting gas-oil ratio

(MANY ROCKS-GALLUP (MANY ROCKS-GALLUP
PRESSURE MAINTENANCE PROJECT NO. 1)
POOL—Cont'd.)

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

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

where:

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

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio, $\frac{P_g - I_g}{P_o}$,

to be less than 2,000 cubic feet of gas per barrel of oil produced.

RULE 8. Credit for daily average net water injected into the pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

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

where:

- E_g = Average daily gas equivalent of net water injected, cubic feet
 $V_w \text{ inj}$ = Average daily volume of water injected, barrels
 $V_w \text{ prod}$ = Average daily volume of water produced, barrels
 5.61 = Cubic foot equivalent of one barrel of water
 P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 12.01, as determined from most recent survey
 15.025 = Pressure base, psi
 520° = Temperature base of 60°F expressed as absolute temperature
 T_r = Reservoir temperature of 92°F expressed as absolute temperature (552°R)

Z = Compressibility factor from analysis gas from the pool at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9725	300	.8325	500	.6560
100	.9465	350	.8030	600	.6135
150	.9215	400	.7710	650	.5655
200	.8885	450	.7220	700	.5220
250	.8600	500	.6300	750	.4650
				800	.3935

RULE 9. 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 Pressure Maintenance 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 as well as the total project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the project and may be produced from the wells in the project in any proportion except that no well in the project which directly or diagonally offsets a well outside the project producing from the same common source of supply shall produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur.

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

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

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

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

P. O. BOX 871
SANTA FE

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

March 13, 1964

Mr. Charles White
Gilbert, White & Gilbert
Attorneys at Law
Box 787
Santa Fe, New Mexico

Re: Case No. 2994
Order No. R-2664
Applicant:
Skelly Oil Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced
Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

lr/

Carbon copy of order also sent to:

Hobbs OCC x

Artesia OCC

Astec OCC x

OTHER Mr. Ron Jacobs, Mr. Frank Irby

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. 2948
Order No. R-2622

APPLICATION OF THE ATLANTIC REFINING
COMPANY FOR A PRESSURE MAINTENANCE
PROJECT, SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on December 4, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, 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 19th day of December, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, 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, The Atlantic Refining Company, seeks authority to institute a pressure maintenance project in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup (Tocito) formation initially through 14 wells located or to be located within the proposed project area comprising the following-described acreage:

TOWNSHIP 31 NORTH, RANGE 16 WEST, NMPM

Section 6: SW/4 SW/4

Section 7: W/2 NE/4, SE/4 NE/4, NW/4,
NW/4 SW/4, E/2 SW/4, and SE/4

Section 8: SW/4

Section 17: SE/4 NE/4, W/2 NE/4, NW/4,
NW/4 SW/4, E/2 SW/4, and SE/4

Section 18: E/2 NE/4 and NW/4 NE/4

(3) That the applicant seeks the promulgation of special rules and regulations governing the proposed project similar to

the special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 1 promulgated by Order No. R-2541.

(4) That the applicant proposes that the special rules and regulations provide that the Atlantic-Navajo Well No. 17-5 located in the SE/4 SE/4 of Section 17, Township 31 North, Range 16 West, shall not produce in excess of top unit allowable for the pool until May 31, 1964, or until a Gallup pressure maintenance project has been instituted in the area offsetting said well outside the project area, whichever shall first occur.

(5) That the proposed pressure maintenance project is in the interest of conservation and should result in greater ultimate recovery of oil, thereby preventing waste.

(6) That the proposed special rules and regulations should be adopted in order to prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, The Atlantic Refining Company, is hereby authorized to institute a pressure maintenance project designated the Many Rocks-Gallup Pressure Maintenance Project No. 2 in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup (Tocito) formation through 14 injection wells located or to be located in Unit M of Section 6, Units B, H, L, and N of Section 7, Unit L of Section 8, Units C, E, G, I, K, and O of Section 17, and Units A and B of Section 18, all in Township 31 North, Range 16 West, NMPM, San Juan County, New Mexico, with one injection well located on each of the above-described units.

(2) That special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 2, San Juan County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE

MANY ROCKS-GALLUP PRESSURE MAINTENANCE PROJECT NO. 2

RULE 1. The project area of the Many Rocks-Gallup Pressure Maintenance Project No. 2, hereinafter referred to as the Project, shall comprise the following-described area:

TOWNSHIP 31 NORTH, RANGE 16 WEST, NMPM
Section 6: SW/4 SW/4
Section 7: W/2 NE/4, SE/4 NE/4, NW/4,
NW/4 SW/4, E/2 SW/4, and SE/4
Section 8: SW/4
Section 17: SE/4 NE/4, W/2 NE/4, NW/4,
NW/4 SW/4, E/2 SW/4, and SE/4
Section 18: E/2 NE/4 and NW/4 NE/4

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CASE No. 2948
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RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

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

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 502 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected, if any, into the pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be determined in accordance with the following formula:

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

where:

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

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

RULE 8. Credit for daily average net water injected into the pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

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

where:

- E_g = Average daily gas equivalent of net water injected, cubic feet
 $V_w \text{ inj}$ = Average daily volume of water injected, barrels
 $V_w \text{ prod}$ = Average daily volume of water produced, barrels
5.61 = Cubic foot equivalent of one barrel of water

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CASE No. 2948
Order No. R-2622

- P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 12.01, as determined from most recent survey
- 15.025 = Pressure base, psi
- 520° = Temperature base of 60°F expressed as absolute temperature
- T_r = Reservoir temperature of 92°F expressed as absolute temperature (552°R)
- Z = Compressibility factor from analysis of gas from the pool at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9725	300	.8325	500	.6560
100	.9465	350	.8030	600	.6135
150	.9215	400	.7710	650	.5655
200	.8865	450	.7220	700	.5220
250	.8600	500	.6900	750	.4630
				800	.3935

RULE 9. 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 Pressure Maintenance 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 as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the Project and may be produced from the wells in the project in any proportion except that the Atlantic-Navajo Well No. 17-5, located in the SE/4 SE/4 of Section 17, Township 31 North, Range 16 West, shall not produce in excess of the top unit allowable for the pool until May 31, 1964, or until a Gallup pressure maintenance project has been instituted in the area offsetting said well outside the project area, whichever shall first occur.

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CASE No. 2948
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RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

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

S E A L

esr/

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. 2865
Order No. R-2541

APPLICATION OF HUMBLE OIL & REFINING
COMPANY FOR A PRESSURE MAINTENANCE
PROJECT, SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on July 24, 1963, at Santa Fe, New Mexico, before Daniel S. Nutter, 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 7th day of August, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, 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, Humble Oil & Refining Company, seeks authority to institute a pressure maintenance project in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup formation initially through nine wells located or to be located within the proposed project area comprising the following-described acreage:

TOWNSHIP 31 NORTH, RANGE 17 WEST, NMPM
Section 1: W/2, SE/4, and SW/4 NE/4
Section 2: NE/4 and NE/4 SE/4
Section 12: NE/4 and NE/4 NW/4

(3) That the applicant seeks the promulgation of special rules and regulations governing the proposed project similar to the special rules and regulations governing the Horseshoe-Gallup Pressure Maintenance Project No. 2 promulgated by Order No. R-1745.

(4) That the applicant proposes that the special rules and regulations provide that any producing well in the project area which directly or diagonally offsets any well outside the project area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur.

(5) That the proposed pressure maintenance project is in the interest of conservation and should result in greater ultimate recovery of oil, thereby preventing waste.

(6) That the proposed special rules and regulations should be adopted in order to prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Humble Oil & Refining Company, is hereby authorized to institute a pressure maintenance project designated the Many Rocks-Gallup Pressure Maintenance Project No. 1 in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup formation through nine injection wells located or to be located in Units F, J, L, and N of Section 1, Unit H of Section 2, and Unit B of Section 12, Township 31 North, Range 17 West, NMPM, San Juan County, New Mexico, with one injection well located on each of the above-described units.

(2) That special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 1, San Juan County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE

MANY ROCKS-GALLUP PRESSURE MAINTENANCE PROJECT NO. 1

RULE 1. The project area of the Many Rocks-Gallup Pressure Maintenance Project No. 1, hereinafter referred to as the Project, shall comprise the following-described area:

TOWNSHIP 31 NORTH, RANGE 17 WEST, NMPM
Section 1: W/2, SE/4, and SW/4 NE/4
Section 2: NE/4 and NE/4 SE/4
Section 12: NE/4 and NE/4 NW/4

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

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CASE No. 2865
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RULE 3. Allowables for injection wells may be transferred to producing wells within the project area, as may the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or curtailed because of high gas-oil ratio, pressure regulation, control of pattern or sweep efficiencies, or to observe changes in pressures or changes in characteristics of reservoir liquids or progress of sweep.

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 502 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less; provided, however, that any producing well in the project area which directly or diagonally offsets a well outside the project area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected, if any, into the pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be

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determined in accordance with the following formula:

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

where:

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

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

RULE 8. Credit for daily average net water injected into the pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

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

where:

- E_g = Average daily gas equivalent of net water injected, cubic feet

CASE No. 2865
Order No. R-2541

- $V_w \text{ inj}$ = Average daily volume of water injected, barrels
- $V_w \text{ prod}$ = Average daily volume of water produced, barrels
- 5.61 = Cubic foot equivalent of one barrel of water
- P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 12.01, as determined from most recent survey
- 15.025 = Pressure base, psi
- 520° = Temperature base of 60°F expressed as absolute temperature
- T_r = Reservoir temperature of 92°F expressed as absolute temperature (552°R)
- Z = Compressibility factor from analysis of gas from the pool at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9725	300	.8325	500	.6560
100	.9465	350	.8030	600	.6135
150	.9215	400	.7710	650	.5655
200	.8885	450	.7220	700	.5220
250	.8600	500	.6900	750	.4630
				800	.3935

RULE 9. 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 Pressure Maintenance 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 as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the Project and may be produced from the wells

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CASE No. 2865

Order No. R-2541

in the Project in any proportion except that no well in the Project which directly or diagonally offsets a well outside the Project producing from the same common source of supply shall produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur.

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

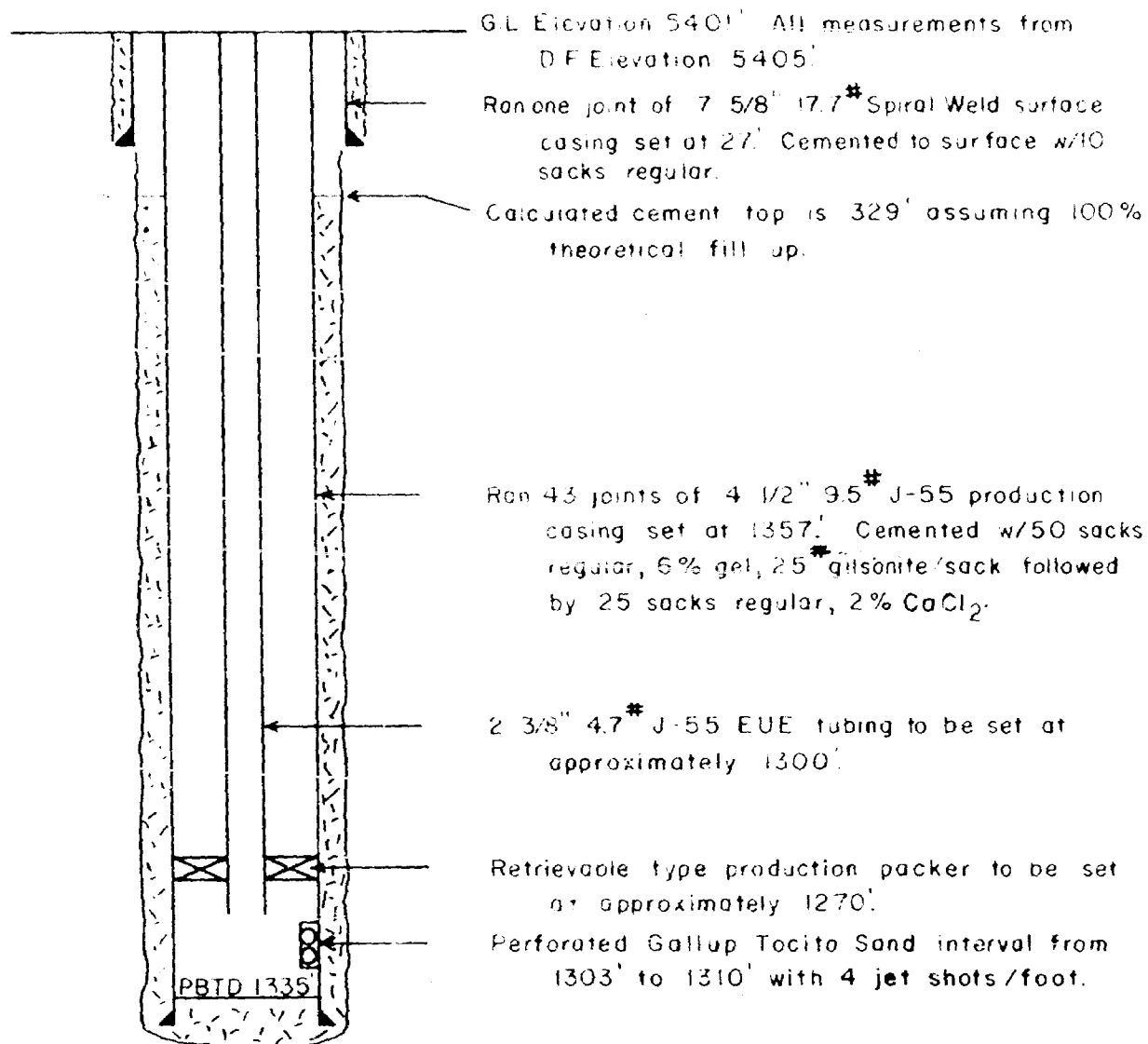
A. L. PORTER, Jr., Member & Secretary

S E A L

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EXHIBIT B
 DIAGRAMMATIC SKETCH OF
 PROPOSED INJECTION WELL

Operator: SKELLY OIL COMPANY
 Lease & Well: Navajo "P" Well No. 6
 Location: SE/4 of SE/4, Section 35,
 T32N, R17W, San Juan County,
 New Mexico
 Pool: Many Rocks Gallup



DHO 1-31-64

Case 2994

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 19, 1964

EXAMINER HEARING

IN THE MATTER OF:

Application of Skelly Oil Company for a
pressure maintenance project, San Juan
County, New Mexico.

Case No. 2994

BEFORE: ELVIS A. UTZ, EXAMINER

TRANSCRIPT OF HEARING

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.
PHONE 325-1182

SANTA FE, N. M.
PHONE 981-3971

ALBUQUERQUE, N. M.
PHONE 243-6691



DEARNLEY, MEIER, WILKINS and CROWNOVER

General Court Reporting Service

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

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 19, 1964

EXAMINER HEARING

IN THE MATTER OF:

Application of Skelly Oil Company
for a pressure maintenance project,
San Juan County, New Mexico.

CASE NO. 2994

BEFORE: ELVIS A. UTZ, EXAMINER

TRANSCRIPT OF HEARING

MR. UTZ: Case 2994.

MR. DURRETT: Application of Skelly Oil Company for a
pressure maintenance project, San Juan County, New Mexico.

MR. WHITE: If the Examiner please, Charles White,
of Gilbert. White & Gilbert, Santa Fe, appearing on behalf of the
applicant. I also have associated with me, Ronald Jacobs of the
Oklahoma Bar. We have one witness to be sworn at this time.

(Witness sworn)

MR. UTZ: Are there other appearances in this case?



WILLIAM SINGLEY,

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

DIRECT EXAMINATION

BY MR. WHITE:

Q Will you state your name for the record, please?

A William Singley.

Q By whom are you employed and in what capacity?

A Skelly Oil Company, Senior Production Engineer.

Q Have you previously testified before the New Mexico Oil Conservation Commission or one of its Examiners?

A Yes, I am.

Q Will you briefly state what Skelly is seeking?

A Skelly is seeking to convert its Navajo "P" Well Number Six, which is presently producing from the Gallup formation, into a water injection well in order to maintain pressure in the reservoir and compensate for injection with Humble in this pressure maintenance project to the Southeast of our lease.

MR. WHITE: If the Examiner please, the application includes Section 33 within the project area, and we would like to delete that section from the project area.

Q (By Mr. White) Then, it is Skelly's intention to carry on this proposal in corporation with Humble?

A Yes, sir, it is.



Q Will you refer to Exhibit One and explain that, please?

A Exhibit One, Part A, is a map of the area containing all Gallup wells within a two mile radius of our proposed injection well. Some of the main features are it shows Humble's Navajo "G" lease to the southeast of ours, which is part of their Project One. In the southeast, Township 31 North, Range 16 West, it shows the area where Atlantic has requested a secondary recovery project, and to the southwest part of the map, it shows the northern part of the Horseshoe Field, which Humble had a secondary recovery project there.

Q Now, refer to Exhibit Two and explain this, please? Refer back to Exhibit One, what is designated there in red on the Humble Well Number Six?

A Skelly's Navajo "P" Number Six circled in red, that is the proposed injection well. Humble's Navajo "G" Number 15 is the well that Humble proposes to convert to injection, compensates across these boundaries.

Q That is the well circled in red, is it?

A Yes, it is.

Q Now, will you refer to Exhibit Two and explain your diagrammatic sketch?

A Exhibit Two is a diagrammatic sketch, proposed injection well, which is the Navajo "P" Well Number Six, which was initially completed on June 30, 1963 in the Many Rocks-Gallup Field. It shows that we set 27 feet of 7 5/8ths OD 17.7 spiral weld surface



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casing cemented with ten sacks of regular cement. It shows that we set 1357 feet of 4½ OD 9.5 pound, J55 production casing and that was cemented with 50 sacks of regular cement with six percent jell, 25 Gilsonate per sack, followed with 25 sacks of regular cement with 2 percent calcium chloride added. It shows we propose to run 1300 feet of 2 3/8ths OD, 4.7 pound J55 EUE tubing. We set a retrievable type production packer at approximately 1270 from the surface. It shows the perforations in this well to be from 1305 to 1310, which is in the Tociito sand.

Q Where do you obtain your source of water?

A Well, initially, we will obtain our source of water from the Humble Oil and Refining Company. Humble presently has a Morrison water supply well which furnishes water to the Horseshoe Field, and that water is being used also in Humble's pressure maintenance project, and we will be furnished water by Humble for this well.

Q What type of water will it be?

A It is a saline water. There have been no recent chemical analyses of this water to our knowledge, but on the initial completion of this well, Humble took a test and it was found to be salty.

Q Do you treat the water and if so, with what?

A We do not intend to treat the water. Humble is treating the water, furnishing it to us, they are having it treated with a bactericide at this time, and that is all I am sure of, is the



bactericide.

Q What will your rate of injection be?

A Our rate of injection into the Navajo "P" Number Six well, we will try to hold it within the lower limits of 90 barrels of water per day with an upper limit of 300 barrels of water per day. Probably maintain an average close to 150 barrels of water per day.

Q Under what pressure?

A Initially, we expect the water to be injected in a vacuum, and eventually the pressure may build up to a surface pressure of 600 pounds.

Q What will your average pressure be?

A Over the life of the field, probably be pretty close to 600 pounds.

Q In your opinion, will it be possible for any of the injected water to come in contact with any fresh water zones?

A No, it is not. These wells are drilled with air to the bottom and there are no water sands encountered.

Q Why do you consider it necessary for such a pressure maintenance program to be initiated at this time?

A It needs to be started at this time for four reasons. First, it is to maintain the reservoir pressure and prevent waste of the reservoir energy. Second, it will increase recoveries of oil. Three, it will extend the life of the field, and four, it will protect the correlative rights underneath our lease boundary.



Q Have you discussed this project with the State Engineer?

A Yes, sir, I have.

Q Do you recommend the adoption of any special pool rules?

A Yes, sir. I would recommend that project rules be granted similar to those granted by the Oil Commission in their Order Number R-2541 to Humble Oil and Refining Company.

MR. WHITE: If the Examiner please, the application sets out the proposed special rules and they were to include all the rules as contained in the Order R-2541, but through inadvertence, they failed to include all of Rule Seven of the order and Rule Eight of the order, and we would like to have all of Rule Seven and Rule Eight of Order R-2541 incorporated in the rules.

Q (By Mr. White) Briefly, what do you - -

MR. UTZ: The Examiner will take note of R-2541 in formulating rules for this project.

Q (By Mr. White) Were these exhibits prepared by you or under your direction?

A They were prepared by and under my supervision.

MR. WHITE: At this time, we offer the exhibits, and that concludes our direct.

CROSS EXAMINATION

BY MR. UTZ:

Q Did the rules in Order R-2541 include pressurability factors?



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PAGE 8

A Yes, they did, they were included in Rule Eight.

Q I see.

A Of that order, which we ask to be included in it.

Q Those same factors and other engineering data in those rules will be satisfactory for your project?

A Yes, they will.

Q I note that you are only asking for one injection well, which will be the Number Six in the Southeast of the Southeast; is that correct?

A Yes, sir, that's correct.

Q Southeast-Southeast, Section 35. Do you have plans for any further injections?

A Yes, sir. We plan to expand our pressure maintenance project as soon as we can get an agreement on the royalty between our two leases. We have separate royalty under the two leases. Before we would be able to expand the project, we would have to make some sort of arrangements for that.

Q Then, this application at the present time is actually kind of a lease line agreement until you are ready to go on your full project?

A Yes, sir, that's correct.

Q All right.

MR. UTZ: Are there other questions of the witness?



CROSS EXAMINATION

BY MR. IRBY:

Q Mr. Singley, this injection is to be through tubing. Is this tubing lined?

A On our initial conversion of this one well, we do not intend to line the tubing. When we go into a full field, we will probably make other arrangements.

Q What about fluids in the annulus, do you plan anything on that, between the tubing and the casing?

A It is planned that we will inhibit the fluid between the annulus with some sort of chemical to make it non-corrosive.

Q That will be inhibited water?

A Yes, sir.

Q Now, you said that you drilled by air, and encountered no water sands. Did you find any fluid or gas whatever?

A No, sir, we did not.

Q Now, your application says in the Item Six that you may possibly later drill a well into the Morrison to supply your own water rather than taking it from Humble. Have you determined what that location would be?

A Yes, sir. That location would be a twin- - That location would be located in the Northwest-Northwest of Section 35. It will be approximately a twin to our Navajo "P" Number 11.

Q What was that township and range, please?



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A Township 32 North, Range 17 West.

Q Do you anticipate the water will have approximately the same chemical quality as that of Humble's Navajo "F" water well Number One?

A Yes, sir, I do.

Q Now, this analysis of the Humble water well that I have is dated December 16, '59. Did you state in your testimony that no subsequent analysis had been taken?

A I do not know of any subsequent analysis having been made. I cannot say there have not been, but I do not know of any.

Q Can you advise me at a later date as to whether this has been done?

A I will do so.

Q And if so, furnish me a copy of the later analysis?

A I sure will. I will contact Humble on their analysis.

MR. IRBY: That is all the questions I have. Thank you.

* * * *

RE CROSS EXAMINATION

BY MR. UTZ:

Q Did you state whether, or not you intended to put a pressure gauge on the annulus on your inhibited fluid so you can readily detect any leakage that might occur?

A We will put a gauge on our annulus.

Q Do you know of your knowledge what the general



characteristics of the Morrison water in this area, or any other area of the basin?

A The Morrison water in this general area here is saline and it has a bacteria in the water which makes the water corosive. There are two methods of treating this type water. Both methods you put a bactericide in the water to eliminate that part of the corosion. Then, you can either line all your strings to prevent future corosion outside of bacteria, or you may add chemicals to make the water inert, and as I understand it, Humble and Atlantic each have taken different methods toward treating this water. Humble does not add the other chemical to their water, and Atlantic does, or could be reversed. I am not sure on that.

Q Generally speaking, is the Morrison water in the San Juan Basin pretty sorry water?

A Yes, it is. It is sorry water.

MR. UTZ: Are there any other questions?

CROSS EXAMINATION

BY MR. DURRETT:

Q Mr. Singley, am I correct that you do not have a lease line agreement with Humble?

A There is a lease line agreement with Humble. We were waiting on this hearing to have it signed. On that lease line agreement, we agree to inject in our Navajo "P" Well Number Six and they agree to inject into their Navajo "G" Number 15.



Q But, it just hasn't been executed as of this date?

A That's correct.

Q Now, was the Humble pressure maintenance project instituted with this Order No. R-2541, which would be approximately sometime in August of '63?

A Yes, it was.

Q They are injecting in this well No. 16, is that correct, Section 2?

A They are injecting in Well No. 18 in Section 2 and also in Well No. 16 and 25 in Section 1, and we do not have any information as such, but Well Number 21 was drilled for an injection purpose.

Q Are you, or have you received any response from this Well Number 18?

A No, sir.

Q Would you give us briefly some production history on your Well Number Six, proposed injector? It is a producing oil well?

A Yes, sir, it is a producing oil well. Well Number Six was initially completed on June 30, 1963. At that time, it pumped 132 barrels in 24 hours. The well has now declined in the neighborhood of 70 barrels per day.

MR. UTZ: What date was that completion?

A June 30, 1963. The well is approximately eight months old.



MR. UTZ: Declined to how much?

A Approximately 70.

Q (By Mr. Durrett) Wouldn't you say this is a fairly substantial decline in a very short period of time?

A Yes, it is. I have made some reservoir calculations, which indicate after the well gets below the proration capacity, which is 70 barrels per day, which is top allowable, they would decline at a rate of roughly 50 percent per year.

Q Well, now, is that on all the wells that you have in this area?

A That is roughly for all wells of the Many Rocks-Gallup Field.

Q Well Number Three, which is a direct west offset, what is it making per day approximately now?

A We have not taken a recent test on that well.

Q Do you have any idea what it is producing?

A No, I do not. I could not say.

Q Is it making its allowable or do you know that?

A I would say that it is probably in the neighborhood of 70 or below at this time. Our lease has now gotten to where it has started to decline below the proration.

Q Do you feel that your wells on this lease will become what you would term stripper wells in the near future?

A I would say that- - By stripper wells, I am not sure of the Commission's definition of that. Is that wells that are



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say, marginal in classification, down in the ten barrel limit;
is that- -

Q Well, I am not sure of the Commission's definition of
that either, but I would say- -

A I would say within two years, perhaps the wells would
be approaching stripper classification without pressure maintenance
project of some sort.

Q Now, if you institute your pressure maintenance project,
the Commission approves it, how long do you feel it would take
for the wells to reach that category?

A If we instigate a pressure maintenance project in the
near future, I would say our lease would not be classified in the
stripper stage--I couldn't say in the individual wells, but our
lease would probably not be what we would call stripper production
for perhaps six years.

MR. DURRETT: Thank you.

* * * *

RE CROSS EXAMINATION

BY MR. UTZ:

Q Is it your opinion that the oil in the vicinity of
your Number Six well can be recovered through other wells in the
area?

A Yes, sir, it is. We think they can be recovered from



our Navajo "P" Number Three, and Number 12, and some of it be recovered by our Navajo "P" Number Seven.

Q As well as some of it from Humble's Number 11?

A Yes, sir.

MR. UTZ: Are there other questions of the witness?

The witness may be excused. Are there statements in this case?

The case will be taken under advisement.

* * * *

STATE OF NEW MEXICO

COUNTY OF BERNALILLO

I, ROY D. WILKINS, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill, and ability.

WITNESS my Hand and Seal of Office, this 29th day of February, 1964.

NOTARY PUBLIC

My Commission Expires:

September 6, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2994.

Heard by me on Feb 19, 1964.

Examiner
New Mexico Oil Conservation Commission



DEARNLEY, MEIER, WILKINS and CROWNOVER

General Court Reporting Service

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

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. 2994
Order No. R-2664

APPLICATION OF SKELLY OIL COMPANY
FOR A PRESSURE MAINTENANCE PROJECT,
SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on
February 19, 1964, at Santa Fe, New Mexico, before Examiner
Elvis A. Utz.

NOW, on this 13th day of March, 1964, the Commission, a
quorum being present, having considered the testimony, the record,
and the recommendations of the Examiner, and being fully advised
in the premises,

FINDS:

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

(2) That the applicant, Skelly Oil Company, seeks authority
to institute a pressure maintenance project in the Many Rocks-
Gallup Oil Pool, San Juan County, New Mexico, by the injection of
water into the Gallup (Tocito) sandstone formation underlying its
Navajo "P" and "M" Leases in Sections 25, 26, 34, 35, and 36,
Township 32 North, Range 17 West, NMPM, San Juan County, New
Mexico, initially through its Navajo "P" Well No. 6 located in
Unit P of said Section 35.

(3) That the applicant seeks the promulgation of special
rules and regulations governing the proposed project similar to
the special rules and regulations governing the Many Rocks-Gallup
Pressure Maintenance Project No. 1 promulgated by Order No. R-2541.

(4) That the proposed pressure maintenance project is in
the interest of conservation and should result in greater ultimate
recovery of oil, thereby preventing waste.

(5) That the proposed special rules and regulations should
be adopted in order to prevent waste and protect correlative rights.

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CASE No. 2994
Order No. R-2664

IT IS THEREFORE ORDERED:

(1) That the applicant, Skelly Oil Company, is hereby authorized to institute a pressure maintenance project designated the Many Rocks-Gallup Pressure Maintenance Project No. 3 in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup (Tocito) Sandstone formation initially through its Navajo "P" Well No. 6 located in Unit P of Section 35, Township 32 North, Range 17 West, NMPM, San Juan County, New Mexico.

(2) That special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 3, San Juan County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE
MANY ROCKS-GALLUP PRESSURE MAINTENANCE PROJECT NO. 3

RULE 1. The project area of the Many Rocks-Gallup Pressure Maintenance Project No. 3, hereinafter referred to as the Project, shall comprise the following-described area:

SAN JUAN COUNTY, NEW MEXICO
TOWNSHIP 32 NORTH, RANGE 17 WEST, NMPM
Section 26: W/2 SW/4
Section 34: NE/4, NE/4 NW/4, and N/2 SE/4
Section 35: NW/4 and S/2

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

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

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 502 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected, if any, into the pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be determined in accordance with the following formula:

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

where:

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

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CASE No. 2994
Order No. R-2664

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

RULE 8. Credit for daily average net water injected into the pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

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

where:

- E_g = Average daily gas equivalent of net water injected, cubic feet
- $V_w \text{ inj}$ = Average daily volume of water injected, barrels
- $V_w \text{ prod}$ = Average daily volume of water produced, barrels
- 5.61 = Cubic foot equivalent of one barrel of water
- P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 12.01, as determined from most recent survey
- 15.025 = Pressure base, psi
- 520° = Temperature base of 60°F expressed as absolute temperature
- T_r = Reservoir temperature of 92°F expressed as absolute temperature (552°R)
- Z = Compressibility factor from analysis of gas from the pool at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

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CASE No. 2994
Order No. R-2664

Reservoir Pressure	Allowable Production	Reservoir Pressure	Allowable Production
50	.9125	200	.6325
100	.9160	300	.6080
150	.9215	400	.7710
200	.9380	450	.7220
250	.9600	500	.6900
		550	.6500
		600	.6135
		650	.5655
		700	.5220
		750	.4600
		800	.3935

RULE 9. 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 Pressure Maintenance 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 as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the project and may be produced from the wells in the Project in any proportion.

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

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CASE No. 2994
Order No. R-2664

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

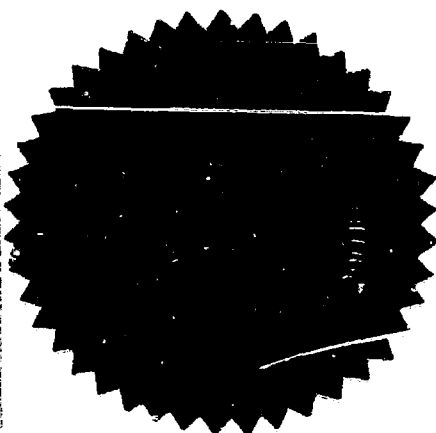
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

E. S. Walker
E. S. WALKER, Member

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



esr/

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 19, 1964

9 A. M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 2991: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Dwight L. Smith and all other interested parties to appear and show cause why the Walker Well No. 1, located 2290 feet from the South line and 500 feet from the East line of Section 21, Township 15 South, Range 11 East, Otero County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.

CASE 2992: Application of Consolidated Oil & Gas, Inc., for an unorthodox location, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval of the unorthodox location of their Hoyt Well No. 3-5, located 1850 feet from the North line and 110 feet from the West line of Section 5, Township 26 North, Range 4 West, Blanco Me averde Pool, Rio Arriba County, New Mexico.

CASE 2993: Application of Sinclair Oil & Gas Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Southwest Jal Unit Area comprising 6401 acres, more or less, of State, Federal and fee lands in Townships 25 and 26 South, Range 36 East, Lea County, New Mexico.

CASE 2994: Application of Skelly Oil Company for a pressure maintenance project, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pressure maintenance project in the Gallup formation underlying its Navajo "P" and "M" leases in Sections 25, 26, 33, 34, 35, and 36, Township 32 North, Range 17 West, Many Rocks-Gallup Oil Pool, San Juan County, New Mexico. Initial injection will be through applicant's Navajo "P" Well No. 6 located in Unit P of said Section 35. Applicant further seeks the promulgation of special rules governing the operation of said project.

CASE 2995: Application of Deane H. Stoltz for two non-standard oil proration units, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of two 80-acre non-standard oil proration units in the North Bagley-Upper Pennsylvanian Pool, Lea County, New Mexico, the first to comprise the SE/4 NE/4 and NE/4 SE/4 of Section 22, Township 11 South, Range 33 East, to be dedicated to a well completed in the SE/4 NE/4 of Section 22; the second to comprise the SW/4 NE/4 and the NW/4 SE/4 of

CASE 2995: said Section 22 to be dedicated to a well to be re-entered
(Cont.) in the SW/4 NE/4 of said Section 22.

CASE 2984: (Continued from the February 5th Examiner Hearing)

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

CASE 2996: Application of Nearburg & Ingram for the creation of a new gas pool and for special temporary pool rules, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for San Andres production in Sections 10, 11, 12, 13, 14 and 15, Township 8 South, Range 37 East, Roosevelt County, New Mexico, and for the establishment of temporary rules therefor, including provisions for 320 acre spacing.

CASE 2739: (Reopened)

In the matter of Case No. 2739 being reopened pursuant to the provisions of Order No. R-2421, which order established temporary 80-acre proration units for the North Vacuum-Abo Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

CASE 2740: (Reopened)

In the matter of Case No. 2740 being reopened pursuant to the provisions of Order No. R-2422, which order established temporary 80-acre proration units for the Vacuum-Wolfcamp Oil Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

CASE 2741: (Reopened)

In the matter of Case No. 2741 being reopened pursuant to the provisions of Order No. R-2423, which order established temporary 80-acre proration units for the Vacuum-Devonian Oil Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

CASE 2742: (Reopened)

In the matter of Case No. 2742 being reopened pursuant to the provisions of Order No. R-2424, which order established temporary 80-acre oil proration units for the Fowler-Blinebry Oil Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

CASE 2743: (Reopened)

In the matter of Case No. 2743 being reopened pursuant to the provisions of Order No. R-2425, which order established temporary 320-acre spacing units for the Fowler-Tubb Gas Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 160-acre spacing units.

CASE 2744: (Reopened)

In the matter of Case No. 2744 being reopened pursuant to the provisions of Order No. R-2426, which order established temporary 320-acre spacing units for the Fowler-Paddock Gas Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 160-acre spacing units.

CASE 2997: Application of Socony Mobil Oil Company, Inc., for the abolishment of an existing pool and the creation of two new oil pools, and for special temporary pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool for lower Pennsylvanian production in Section 26, Township 17 South, Range 34 East, Lea County, New Mexico, and for the establishment of temporary rules therefor, including provisions for 80-acre units and for the establishment of a gas-oil ratio limitation of 6000 cubic feet of gas per barrel of oil produced. Said pool would be created by the abolishment of the Vacuum-Pennsylvanian Pool in Township 17 South, Range 34 East, and the subsequent creation of the Vacuum Upper Pennsylvanian and Vacuum Lower Pennsylvanian Pools.

CASE 2998: Application of Tenneco Oil Company for a gas well-water injection well, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to dually complete its Central Totah Unit Well No. 24 located in Unit O of Section 11, Township 28 North, Range 13 West, San Juan County, New Mexico, to produce gas from the Basin-Dakota Gas Pool through 1 1/2 inch tubing and to inject water into the Gallup formation, Totah-Gallup Oil Pool, through 2 1/16 inch tubing with separation of the zones by a packer set at 5766 feet.

CASE 2999: Application of Phillips Petroleum Company for two non-standard oil proration units, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the approval of an 80-acre non-standard oil proration unit for each of two pools, the Vacuum Wolfcamp Pool and the North Vacuum Abo Pool, said units to comprise the NW/4 SW/4 and the SW/4 NW/4 of Section 31, Township 17 South, Range 35 East, Lea County, New Mexico, to be dedicated to applicant's Santa Fe Well No. 87, located 2310 feet from the South line and 660 feet from the West line of said Section 31.

CASE 3000: Application of Franklin, Aston & Fair Inc. for the creation of a San Andres Gas Pool and for special pool rules, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new San Andres Gas Pool comprising all or portions of Sections 22, 23, 25, 26, 27 and 28, Township 7 South, Range 35 East, and the establishment of special pool rules, including 320 acre spacing and fixed well locations, Roosevelt County, New Mexico.

CASE 2979: (Continued from February 5, 1964, Examiner Hearing)

Application of Pan American Petroleum Corporation for salt water disposal, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Abo formation through its U.S.A. Malco Refineries 'G' Well No. 13, located 2302 feet from the South line and 1650 feet from the West line of Section 10, Township 19 South, Range 27 East, Empire Abo Pool, Eddy County, New Mexico.

MAIN OFFICE OCC

1964 MAR 2 AM 8:30

February 28, 1964

Re: OCC Case 2994

Mr. J. W. George
Assistant District Superintendent
Skelly Oil Company
Drawer 510
Farmington, New Mexico

Dear Mr. George:

Receipt of your letter of February 26, 1964 and the attached recent analysis of the water from Humble Oil and Refining Company's Navajo F waterflood source well 1 is gratefully acknowledged.

Very truly yours,

S. E. Reynolds
State Engineer

By:

Frank E. Irby
Chief
Water Rights Div.

FBI/ma

cc-A. L. Porter, Jr.

MAIN OFFICE OCC

1964 FEB 27 PM 1:24

Drawer 510
Farmington, New Mexico
February 26, 1964

Re: Morrison Water Analysis
Mary Rocks Gallup Field Area
San Juan County, New Mexico

Mr. Frank E. Irby
New Mexico State Engineer
Santa Fe, New Mexico

Dear Mr. Irby:

In response to your request to Mr. William Singley of this office at the Oil Conservation Commission Hearing of Case 2994 regarding a water analysis from Humble Oil & Refining Company's Morrison Water Supply well, attached is a copy of an analysis run by Core Laboratories on August 26, 1963.

If you should require any additional data concerning this matter please contact us.

Yours very truly,
SHELLY OIL COMPANY

J. W. George
J. W. George
Assistant District Superintendent

WS:ga

Attach: (2)

cc: Mr. Elvis A. Utz
Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico

bcc: Mr. H. E. Aab - also attached is an analysis of the Gallup Water.



CORE LABORATORIES, INC.
Petroleum Research Laboratories
DALLAS, TEXAS
WATER ANALYSIS

File **RP-3-WA-506**
Company **HUMBLE OIL & REFINING COMPANY** Well Name _____ Sample No. **2**
Formation **MORRISON** Depth _____ Sampled From **MORRISON SOURCE WATER**
Location _____ Field **HORSESHOE GALLUP** County **SAN JUAN** State **NEW MEXICO**
Date Sampled _____ Date Analyzed **8-26-63** Engineer **McCOMAS**

Total Dissolved Solids **6201** mg. L. **calc.**

Sp. Gr. **1.001** @ **82** F.

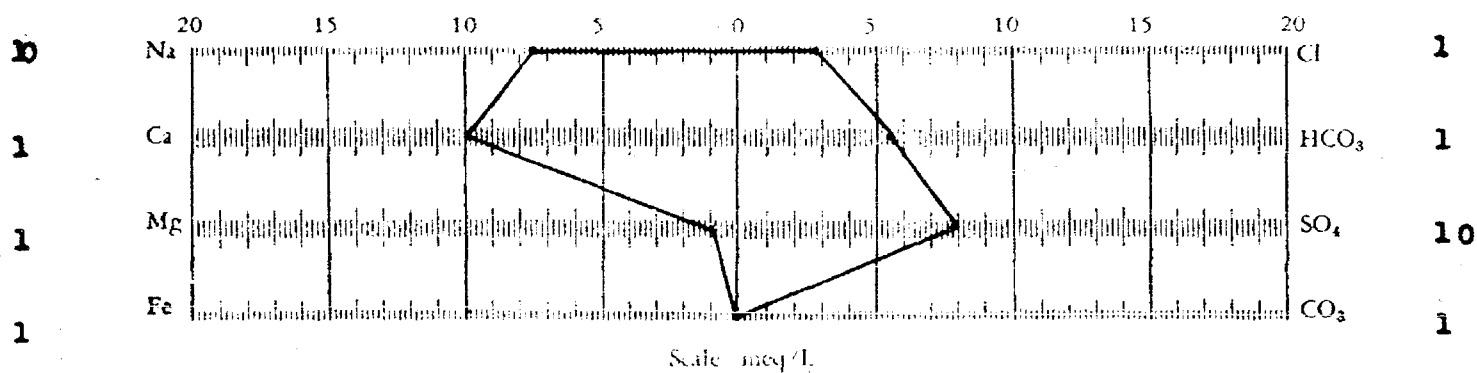
Resistivity **1.325** ohm-meters @ **82** F. **meas.**

Hydrogen Sulfide **ABSENT**

pH **7.5**

Constituents	meq. L.	mg. L.
Sodium	76.7	1764
Calcium	9.9	200
Magnesium	0.8	10
Iron	ABSENT	
Barium	ABSENT	

Constituents	meq. L.	mg. L.
Chloride	2.8	99
Bicarbonate	5.6	341
Sulfate	79.0	3800
Carbonate	ABSENT	
Hydroxide	ABSENT	



All analyses except iron determination performed on a filtered sample.

SKELLY OIL COMPANY

Exhibits

N. M. C. C. Case No. 2994

Examiner Hearing

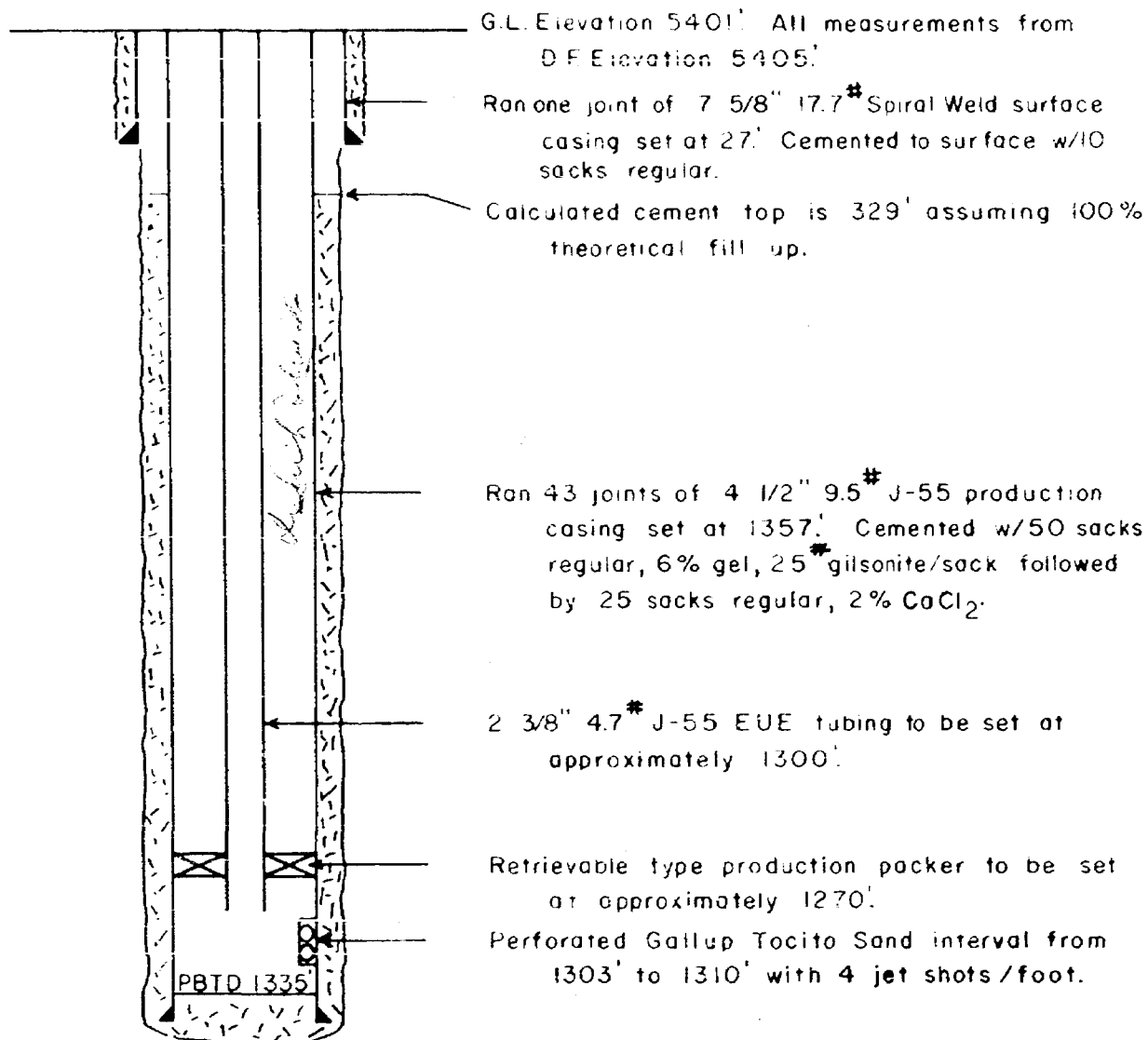
February 19, 1964

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

EXHIBIT B
 DIAGRAMMATIC SKETCH OF
 PROPOSED INJECTION WELL

BEFORE EXAMINER UTZ
 OIL CONSERVATION COMMISSION
 OF 299 EXHIBIT NO. 2
 CASE NO. 2994

Operator: SKELLY OIL COMPANY
 Lease & Well: Navajo "P" Well No. 6
 Location: SE/4 of SE/4, Section 35,
 T 32N, R 17W, San Juan County,
 New Mexico
 Pool: Many Rocks Gallup



DHO 1-31-64

DRAFT
JMD/esr

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. 2994

Order No. R- 2664

APPLICATION OF SKELLY OIL COMPANY
FOR A PRESSURE MAINTENANCE PROJECT,
SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on February 19, 1964, at Santa Fe, New Mexico, before Examiner Elvis A. Utz, ~~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 day of March, 1964, the Commission, a quorum being present, having considered the ~~applicant's testimony,~~ the record, evidence adduced, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

- (1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.
- (2) That the applicant, Skelly Oil Company, seeks authority to institute a pressure maintenance project in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup (Tocito) Sandstone formation underlying its Navajo "P" and "M" Leases in Sections 25, 26, 34, 35, and 36, Township 32 North, Range 17 West, NMPM, San Juan County, New Mexico, initially through its Navajo "P" Well No. 6 located in Unit P of said Section 35.
- (3) That the applicant seeks the promulgation of special rules and regulations governing the proposed project similar to the special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 1 promulgated by Order No. R-2541.

CASE No. ~~2665~~ 2994
Order No. R-~~3544~~

(4) That the applicant proposes that the special rules and regulations provide that any producing well in the project area which directly or diagonally offsets any well outside the project area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur.

(5) That the proposed pressure maintenance project is in the interest of conservation and should result in greater ultimate recovery of oil, thereby preventing waste.

(6) That the proposed special rules and regulations should be adopted in order to prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Skelly Oil Company, is hereby authorized to institute a pressure maintenance project designated the Many Rocks-Gallup Pressure Maintenance Project No. 3 in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup (Tocito) Sandstone formation underlying its Navajo "p" and "m" leases in Sections 25, 26, 34, 35, and 36 (Township 32 North, Range 17 South, Range 17 West, NMPM, San Juan County, New Mexico) initially through its Navajo "p" Well No. 6 located in Unit P of said Section 35.

(2) That special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 3, San Juan County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE

MANY ROCKS-GALLUP PRESSURE MAINTENANCE PROJECT NO. 3

RULE 1. The project area of the Many Rocks-Gallup Pressure Maintenance Project No. 3, hereinafter referred to as the Project, shall comprise the following-described area:

SAN JUAN COUNTY, NEW MEXICO

TOWNSHIP 32 NORTH, RANGE 17 WEST, NMPM

~~Section 25: S/2~~

Section 26: ~~S/2~~ W/2 SW/4

Section 34: ~~All~~ NE/4, NE/4 NW/4, and N/2 SE/4

Section 35: ~~All~~ NW/4 and S/2

~~Section 36: All~~

RULE 2.

of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

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CASE No. ~~2965~~ 2994

Order No. R-~~2544~~

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

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 502 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less, ~~provided, however, that any producing well in the project area which directly or diagonally offsets a well outside the project area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur.~~ Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected, if any, into the pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be

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CASE No. ~~2863~~ 2994

Order No. R~~2343~~

- $V_w \text{ inj}$ = Average daily volume of water injected, barrels
- $V_w \text{ prod}$ = Average daily volume of water produced, barrels
- 5.61 = Cubic foot equivalent of one barrel of water
- P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 12.01, as determined from most recent survey
- 15.025 = Pressure base, psi
- 520° = Temperature base of 60°F expressed as absolute temperature
- T_r = Reservoir temperature of 92°F expressed as absolute temperature (552°R)
- Z = Compressibility factor from analysis of gas from the pool at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9725	300	.8325	550 550	.6560
100	.9465	350	.8030	600	.6135
150	.9215	400	.7710	650	.5655
200	.8885	450	.7220	700	.5220
250	.8600	500	.6900	750	.4630
				800	.3935

RULE 9. 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 Pressure Maintenance 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 as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the Project and may be produced from the wells

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in the Project in any proportion, ~~except that no well in the Project which directly or diagonally offsets a well outside the Project producing from the same common source of supply shall produce in excess of top unit allowable for the pool until January 1, 1964, or until the operators of such offset well outside the project area have instituted a pressure maintenance project in the area of such well, whichever shall first occur.~~

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

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

S E A L

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