

*Entered 2/16/62
A.H.P.*

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. 2484
Order No. R-2190

APPLICATION OF TENNECO 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 January 24, 1962, 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 21st day of February, 1962, 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, Tenneco Oil Company, proposes to institute a pressure maintenance project in the Totah-Gallup Oil Pool in Sections 21, 27, 28, and 33 of Township 29 North, Range 13 West, NMPM, San Juan County, New Mexico, by the injection of water into the Gallup formation initially to be through six wells located in said acreage.

(3) That the applicant proposes that an administrative procedure be established whereby said pressure maintenance project may be expanded for good cause shown, and whereby additional wells in the project area may be converted to water injection.

(4) That Special Rules and Regulations for the operation of the Tenneco Oil Company Totah-Gallup Pressure Maintenance Project should be promulgated and, for operational convenience, such rules should provide certain flexibility in authorizing the production of the project allowable from any well or wells in the project in any proportion, provided that no well in the project area which directly or diagonally offsets a well outside

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the project area producing from the same common source of supply should be allowed to produce in excess of top unit allowable for the Totah-Gallup Oil Pool until such time as the well has experienced a substantial response from water injection. When such a response has occurred, the well should be permitted to produce up to two times top unit allowable for the Totah-Gallup Oil Pool. Production of such well at a higher rate should be authorized only after notice and hearing.

IT IS THEREFORE ORDERED:

(1) That the applicant is hereby authorized to institute the Tenneco Oil Company Pressure Maintenance Project, San Juan County, New Mexico, by the injection of water into the Gallup formation through the following-described wells in Township 29 North, Range 13 West:

Callow-Federal Well No. 10, NE/4 SW/4 of Section 27;

Callow-Federal Well No. 13, NE/4 NE/4 of Section 33;

Callow-Federal Well No. 16, SW/4 SW/4 of Section 27;

Callow-Federal Well No. 18, SW/4 NW/4 of Section 28;

Callow-Federal Well No. 19, SW/4 SW/4 of Section 28;

Hagood-Federal Well No. 1, SW/4 SW/4 of Section 21.

(2) That Special Rules and Regulations governing the operation of the Tenneco Oil Company Pressure Maintenance Project, San Juan County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE

TENNECO OIL COMPANY TOTAH-GALLUP PRESSURE MAINTENANCE PROJECT

RULE 1. The project area of the Tenneco Oil Company Pressure Maintenance Project, San Juan County, New Mexico, shall comprise the area described as follows:

TOWNSHIP 29 NORTH, RANGE 13 WEST, NMPM

Section 21: S/2 SW/4

Section 27: S/2, NE/4, S/2 NW/4 and NW/4 NW/4

Section 28: All

Section 33: N/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 in the project area 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 each project, are shut-in for any of the following reasons: 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 period 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 an 80-acre proration unit shall be top unit allowable for the Totah-Gallup Oil 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 Commission Rule 502 I (a) and the limiting gas-oil ratio (2,000 to 1) for the Totah-Gallup Oil Pool shall be waived during such tests. The project operator shall notify all operators offsetting the well, as well as the Commission, of the exact time such tests are to be conducted. Tests may be witnessed by representatives of the offsetting operators and the Commission, if they so desire.

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 Totah-Gallup Oil Pool, whichever is less, provided 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 such time as the well receives a substantial response to water injection. When such a response has occurred, the well shall be permitted to produce up to two times top unit allowable for the pool. Production of such well at a higher rate shall be authorized only after notice and hearing. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the Totah-Gallup Oil Pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per

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

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

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 a datum of + 200 feet above sea level, psig + 12.00, 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 155° F expressed as absolute temperature (615° R)
- Z = Compressibility factor from analysis of Totah-Gallup gas at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Pressure Psig	Z	Pressure Psig	Z	Pressure Psig	Z
0	1.000	550	.902	1100	.856
50	.983	600	.897	1150	.852
100	.969	650	.893	1200	.848
150	.958	700	.888	1250	.845
200	.948	750	.884	1300	.841
250	.939	800	.880	1350	.837
300	.932	850	.876	1400	.833
350	.924	900	.872	1450	.829
400	.918	950	.868	1500	.825
450	.912	1000	.864	1550	.821
500	.907	1050	.860	1600	.817

RULE 9. Each month the operator of the project 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 allowable for the project. The aforesaid

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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 two times top unit allowable for the pool.

RULE 11. The conversion of any 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 include the following:

(1) A plat showing the location of the proposed injection well, all wells within the project area, and offset operators, locating wells which offset the project area;

(2) A schematic drawing of the proposed injection well which fully describes the casing, tubing, perforated interval, and depth, showing that the injection of gas or water will be confined to the Gallup formation.

(3) A letter stating 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 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators.

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

(3) That this order shall become effective upon the approval by the Secretary-Director of the Commission of a satisfactory water source.

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

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

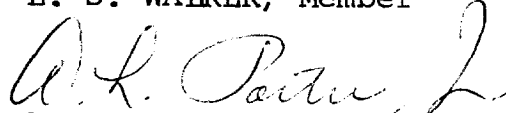
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION



EDWIN L. MECHEM, Chairman



E. S. WALKER, Member



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

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