

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. 3804
Order No. R-3456

APPLICATION OF PAN AMERICAN PETROLEUM
CORPORATION FOR A PRESSURE MAINTENANCE
PROJECT, ROOSEVELT COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on July 10, 1968, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 25th day of July, 1968, 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, Pan American Petroleum Corporation, seeks authority to institute a pressure maintenance project in the Milnesand-San Andres Pool on its R. E. Horton Federal Lease located in Sections 29, 30, and 31, Township 8 South, Range 35 East, NMPM, Roosevelt County, New Mexico, by the injection of water into the San Andres formation through its R. E. Horton Federal Well No. 30, located in Unit K, and through its R. E. Horton Federal Well No. 31, located in Unit M and currently authorized as a salt water disposal well, both in Section 29, Township 8 South, Range 35 East, NMPM, Roosevelt County, New Mexico.

(3) That the applicant further seeks the reclassification of the above-described R. E. Horton Federal Well No. 31 from a salt water disposal well to a pressure maintenance project injection well.

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(4) That the applicant further seeks the designation of the project area and the promulgation of special rules and regulations governing said project.

(5) That initially the project area should comprise only the following-described area:

ROOSEVELT COUNTY, NEW MEXICO
TOWNSHIP 8 SOUTH, RANGE 35 EAST, NMPM
Section 29: SW/4 NE/4, S/2 NW/4, N/2 SW/4,
 and SW/4 SW/4
Section 30: E/2 SE/4

(6) That a pressure maintenance project, designated the Pan American Milnesand-Horton Pressure Maintenance Project, comprising the above-described area is in the interest of conservation and should result in greater ultimate recovery of oil, thereby preventing waste.

(7) That the aforesaid R. E. Horton Federal Well No. 31 should be reclassified as an authorized pressure maintenance project injection well.

(8) That an administrative procedure should be established whereby said project area may be expanded for good cause shown and whereby additional wells in the project area may be converted to water injection.

(9) That special rules and regulations for the operation of the Pan American Milnesand-Horton 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 area in any proportion, provided that no well in the project area which directly or diagonally offsets a well on another lease producing from the same common source of supply should be allowed to produce in excess of top unit allowable for the Milnesand-San Andres Pool until such time as the well has experienced a substantial response to water injection. When such a response has occurred, the well should be permitted to produce up to two times top unit allowable for the Milnesand-San Andres 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, Pan American Petroleum Corporation, is hereby authorized to institute a pressure maintenance project

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in the Milnesand-San Andres Pool on its R. E. Horton Federal Lease, Roosevelt County, New Mexico, to be designated the Pan American Milnesand-Horton Pressure Maintenance Project, by the injection of water into the San Andres formation through the following-described wells in Section 29, Township 8 South, Range 35 East, NMPM, Roosevelt County, New Mexico:

R. E. Horton Federal Well No. 30, located in Unit K, and

R. E. Horton Federal Well No. 31, located in Unit M.

(2) That the applicant's above-described R. E. Horton Federal Well No. 31 is hereby reclassified from a salt water disposal well to a pressure maintenance project injection well.

(3) That each of the aforesaid water injection wells shall be equipped with tubing set in a packer, said packer being located within 100 feet of the uppermost perforation. Further, that the casing-tubing annulus shall be filled with an inert fluid and the annulus equipped with a pressure gauge or left open to facilitate detection of leakage in the tubing or packer.

(4) That Special Rules and Regulations governing the operation of the Pan American Milnesand-Horton Pressure Maintenance Project, Roosevelt County, New Mexico, are hereby promulgated as follows:

**SPECIAL RULES AND REGULATIONS
FOR THE
PAN AMERICAN MILNESAND-HORTON PRESSURE MAINTENANCE PROJECT**

RULE 1. The project area of the Pan American Milnesand-Horton Pressure Maintenance Project, hereinafter referred to as the Project, shall comprise the area described as follows:

**ROOSEVELT COUNTY, NEW MEXICO
TOWNSHIP 8 SOUTH, RANGE 35 EAST, NMPM
Section 29: SW/4 NE/4, S/2 NW/4, N/2 SW/4,
and SW/4 SW/4
Section 30: E/2 SE/4**

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area,

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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 or 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 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 Milnesand-San Andres 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 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 pool, whichever is less, provided that any producing well in the project area which directly or diagonally offsets a well on another lease producing from the same common source of supply shall not produce in excess of two times top unit allowable for the pool. Each producing well

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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
- P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 13.2, 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 115°F expressed as absolute temperature (575°R)
- Z = Compressibility factor from analysis of Milnesand-San Andres gas at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
0	.998	550	.795	1100	.570
50	.990	600	.775	1150	.555
100	.970	650	.755	1200	.540
150	.950	700	.735	1250	.525
200	.930	750	.720	1300	.510
250	.905	800	.700	1350	.500
300	.890	850	.675	1400	.490
350	.875	900	.650	1450	.482
400	.855	950	.630	1500	.480
450	.835	1000	.610	1550	.482
500	.815	1050	.590	1600	.485

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RULE 9. Each month the project operator shall, within three days after the normal unit allowable for Southeast 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 on another lease 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 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 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 San Andres 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

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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 when good cause is shown therefor.


(4) 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


DAVID F. CARGO, Chairman


GUYTON B. ELYS, Member


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



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