

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. 3555
Order No. R-3229

APPLICATION OF COASTAL STATES GAS
PRODUCING COMPANY FOR A PRESSURE
MAINTENANCE EXPANSION, LEA COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on April 26, 1967, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 3rd day of May, 1967, 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 by Order No. R-3033, entered in Case No. 3366 on February 3, 1966, Coastal States Gas Producing Company was authorized to institute a pilot pressure maintenance project designated the Coastal States Flying "M" Pressure Maintenance Project in the Flying "M" San Andres Pool, Lea County, New Mexico, by the injection of water into the San Andres formation through three injection wells in Sections 15, 21, and 33, Township 9 South, Range 33 East, NMPM, Lea County, New Mexico.

(3) That by Administrative Order PMX No. 23, dated December 27, 1966, Coastal States Gas Producing Company was authorized to expand said project by the conversion to water injection of its FM "B" Well No. 3 located in Unit F of Section 17, Township 9 South, Range 33 East, NMPM, Lea County, New Mexico.

(4) That Coastal States Gas Producing Company is the operator of the Flying "M" San Andres Unit approved by Order No. R-3220 on April 26, 1967.

(5) That the applicant, Coastal States Gas Producing Company, seeks authority to expand the pressure maintenance project in its Flying "M" San Andres Unit by the injection of water into the San Andres formation through four additional injection wells located in Sections 16, 20, 22, and 29, Township 9 South, Range 33 East, NMPM, Lea County, New Mexico.

(6) That a pressure maintenance project comprising the Flying "M" San Andres Unit Area is in the interest of conservation and should result in greater ultimate recovery of oil, thereby preventing waste.

(7) That the applicant further seeks the promulgation of special rules and regulations governing said pressure maintenance project, and the establishment of an administrative procedure whereby additional wells in the project area may be converted to water injection.

(8) That special rules and regulations for the operation of the Coastal States Gas Producing Company Flying "M" San Andres 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 the Flying "M" San Andres Unit Area producing from the same common source of supply should be allowed to produce in excess of top unit allowable for the Flying "M" 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 Flying "M" San Andres Pool. Production of such well at a higher rate should be authorized only after notice and hearing.

(9) That Order No. R-3033 and Administrative Order PMX No. 23 should be superseded.

IT IS THEREFORE ORDERED:

(1) That Order No. R-3033 and Administrative Order PMX No. 23 are hereby superseded.

(2) That the applicant, Coastal States Gas Producing Company, is hereby authorized to operate a pressure maintenance project in its Flying "M" San Andres Unit Area, Flying "M" San Andres Pool, Lea County, New Mexico, to be designated as the Coastal States Gas Producing Company Flying "M" San Andres Pressure Maintenance Project, by the injection of water into the San Andres formation through the following-described wells in Township 9 South, Range 33 East, NMPM, Lea County, New Mexico:

Coastal States Gas Producing Company

Flying "M" San Andres Unit Tract 11, Well No. 1,
located in Unit L of Section 15;

Flying "M" San Andres Unit Tract 5, Well No. 2,
located in Unit D of Section 16;

Flying "M" San Andres Unit Tract 3, Well No. 3,
located in Unit F of Section 17;

Flying "M" San Andres Unit Tract 12, Well No. 5,
located in Unit F of Section 20;

Flying "M" San Andres Unit Tract 17, Well No. 2,
located in Unit L of Section 22;

Flying "M" San Andres Unit Tract 1-A, Well No. 1,
located in Unit B of Section 29; and

Flying "M" San Andres Unit Tract 1-B, Well No. 4,
located in Unit D of Section 33.

(3) That Special Rules and Regulations governing the operation of the Coastal States Gas Producing Company Flying "M" San Andres Pressure Maintenance Project, Lea County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS

FOR THE

COASTAL STATES GAS PRODUCING COMPANY

FLYING "M" SAN ANDRES PRESSURE MAINTENANCE PROJECT

RULE 1. The project area of the Coastal States Gas Producing Company Flying "M" San Andres Pressure Maintenance Project, hereinafter referred to as the Project, shall comprise the area described as follows:

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LEA COUNTY, NEW MEXICO
TOWNSHIP 9 SOUTH, RANGE 33 EAST, NMPM
Section 15: W/2 W/2
Section 16: All
Section 17: All
Section 20: E/2 and E/2 NW/4
Section 21: All
Section 22: W/2 W/2
Section 27: W/2 NW/4
Section 28: N/2, SW/4, and W/2 SE/4
Section 29: E/2 and E/2 W/2
Section 32: NE/4 and E/2 NW/4
Section 33: W/2 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 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 an 80-acre proration unit shall be top unit allowable for the Flying "M" 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 outside the project area 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 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 + 14.0, 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 Flying "M" San Andres gas at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
50	.986	500	.847	1000	.694
100	.970	600	.816	1100	.663
200	.940	700	.786	1200	.633
300	.909	800	.755		
400	.878	900	.724		

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 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 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.

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(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 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. HAYS, Member

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

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