

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. 1904
Order No. R-1636-A

APPLICATION OF SUNRAY MID-CONTINENT
OIL COMPANY FOR THE PROMULGATION OF
SPECIAL RULES GOVERNING THE OPERATION
OF ITS CENTRAL BISTI LPG-GAS-WATER
INJECTION PROJECT IN THE BISTI-LOWER
GALLUP OIL POOL, 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 25, 1960, 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, and was heard de novo by the Commission on May 18, 1960.

NOW, on this 25th day of May, 1960, the Commission, a quorum being present, having considered the application and the evidence adduced, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Sunray Mid-Continent Oil Company, is the operator of the Central Bisti LPG-Gas-Water Injection Project in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, which Project comprises the following-described acreage:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 3:	SW/4
Sections 4, 5, & 6:	All
Sections 7, 8, & 9:	All
Section 10:	NW/4, W/2 SW/4
Section 15:	W/2 NW/4
Section 16:	All
Section 17:	N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 18:	NE/4, N/2 NW/4, and N/2 SE/4
Section 20:	NE/4 and NE/4 NW/4
Section 21:	N/2, N/2 SE/4, and NE/4 SW/4

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TOWNSHIP 26 NORTE, RANGE 12 WEST, NMPM

Section 31: S/2 N/2, and S/2
Section 32: S/2, S/2 N/2
Section 33: S/2 SW/4

(3) That Order Nos. R-1414, R-1414-A, and R-1414-B, insofar as they set forth the acreage in the Central Bisti LPG-Gas-Water Injection Project and promulgate special rules and regulations therefor, should be superseded.

(4) That the applicant proposes that each month an allowable be established for the Central Bisti Pressure Maintenance Project, said allowable to be determined by multiplying the current Northwest New Mexico normal unit allowable for an 80-acre proration unit times the number of 80-acre proration units in the pressure maintenance project, including in such computation those proration units having wells which are shut-in or wells which are used as injection wells.

(5) That while the Commission does not feel that the allowable provisions of Order R-1636 are unduly restrictive, it does recognize that pressure maintenance projects are beneficial conservation-wise and should be encouraged.

(6) That the project allowable proposed by the applicant is not warranted from the standpoint of conservation and the protection of correlative rights, nor is it necessary on the basis of economics.

(7) That the necessary investment in order to develop a pressure maintenance project is based in large part on the total number of injection wells required for the efficient operation of the project, and the assignment of a top unit allowable to each injection well, together with the expected increased oil recovery, is an entirely adequate incentive for an operator to initiate a pressure maintenance project.

(8) That the allowable assigned to any producing well in the project area should be no greater than the demonstrated ability of the well to produce, subject to top unit allowable for the pool. In the case of curtailed or shut-in producing wells, the allowable should be no greater than the demonstrated ability of such well to produce as reflected by a 24-hour test at a stabilized rate of production immediately prior to such shut-in or curtailment. In no event should such allowable be greater than the current normal unit allowable for the Bisti-Lower Gallup Oil Pool during the month of transfer multiplied by the well's acreage factor.

(9) That special rules and regulations for the operation of the Central Bisti LPG-Gas-Water Injection Project should be promulgated and, for operational convenience, such rules should

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provide certain flexibility in authorizing the production of the project allowable from any well or wells in the Project. Such flexibility will not, in this case, impair correlative rights.

IT IS THEREFORE ORDERED:

(1) That insofar as they describe the acreage in the Central Bisti LPG-Gas-Water Injection Project and promulgate special rules and regulations therefor, Order Nos. R-1414, R-1414-A, and R-1414-B, be and the same are hereby superseded.

(2) That Order No. R-1636 be and the same is hereby superseded.

(3) That special rules and regulations governing the operation of the Central Bisti LPG-Gas-Water Injection Project, Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, be and the same are hereby promulgated as follows, effective June 1, 1960:

SPECIAL RULES AND REGULATIONS FOR THE
SUNRAY MID-CONTINENT OIL COMPANY CENTRAL
BISTI LPG-GAS-WATER INJECTION PROJECT

RULE 1. The project area of the Sunray Mid-Continent Oil Company Central Bisti LPG-Gas-Water Injection Project shall comprise that area described as follows:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 3:	SW/4
Sections 4, 5, & 6:	All
Sections 7, 8, & 9:	All
Section 10:	NW/4, W/2 SW/4
Section 15:	W/2 NW/4
Section 16:	All
Section 17:	N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 18:	NE/4, N/2 NW/4, and N/2 SE/4
Section 20:	NE/4, NE/4 NW/4
Section 21:	N/2, N/2 SE/4, and NE/4 SW/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31:	S/2 N/2, S/2
Section 32:	S/2 N/2, S/2
Section 33:	S/2 SW/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 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, multiplied by the well's acreage factor, 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 Pool. The allowable assigned to any injection well on a 40-acre proration unit shall be one-half of 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 shall 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 (2000 to 1) for the Bisti-Lower Gallup Oil Pool shall be waived during such tests. The project operator shall notify all operators offsetting the proposed injection 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 Bisti-Lower Gallup Oil Pool multiplied by the well's acreage factor, whichever is less. Each such producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the Bisti-Lower 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 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 into the Bisti-Lower Gallup Oil Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable, for any such well receiving gas injection credit shall be determined in accordance with the following formula:

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

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 Distri-Lower 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:

$$E_g = (V_{w \text{ inj}} - V_{w \text{ prod}}) \times 5.61 \times \frac{P_a}{15.025} \times \frac{520^0}{T_r} \times \frac{1}{Z}$$

where:

- E_g = Average daily gas equivalent of net water injected, cubic feet
- $V_{w \text{ inj}}$ = Average daily volume of water injected, barrels

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- V_w 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 upper pay-zone of Bisti-Lower Gallup Oil Pool in project area, psig + 11.5, 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 145°F expressed as absolute temperature (605°R)
- Z = Compressibility factor from analysis of Bisti-Lower Gallup gas at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9950	800	.9000
100	.9900	850	.8938
150	.9825	900	.8875
200	.9775	950	.8825
250	.9725	1000	.8775
300	.9625	1050	.8713
350	.9563	1100	.8663
400	.9500	1150	.8600
450	.9425	1200	.8550
500	.9363	1250	.8500
550	.9300	1300	.8450
600	.9238	1350	.8400
650	.9175	1400	.8360
700	.9115	1450	.8325
750	.9050		

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.

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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, or the drilling of additional wells for injection, shall be done only after approval of same by the Secretary-Director of the Commission. To obtain such approval, the Project operator shall file proper application with the Commission, which application shall include the following:

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

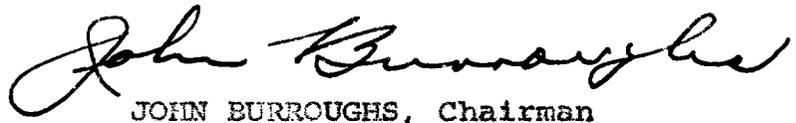
(2) A schematic drawing of the proposed injection well which fully describes the casing, tubing, perforated interval, and depth, showing that injection of gas will be confined to the Lower Gallup formation.

(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.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


JOHN BURROUGHS, Chairman


MURRAY E. MORGAN, Member


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

