VANTAGE
HORSESHOE GALLUP
INJ #169
P-28-31N-16W

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. 2519

APPLICATION OF THE ATLANTIC REFINING
COMPANY FOR A UNIT AGREEMENT, A PRES-
SURE MAINTENANCE PROJECT AND THE
RECLASSIFICATION OF TWO WELLS, 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 March 28, 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 18th day of April, 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, The Atlantic Refining Company, seeks approval of the Horseshoe-Gallup Unit Agreement covering 20,925.58 acres, more or less, of Federal, State, Indian and fee lands in Townships 30 and 31 North, Ranges 16 and 17 West, San Juan County, New Mexico.

(3) That approval of the proposed Horseshoe-Gallup Unit Agreement will, in principle, tend to promote the conservation of oil and gas and the prevention of waste.

(4) That the applicant further seeks permission to institute the Horseshoe-Gallup Unit Pressure Maintenance Project in the Horseshoe-Gallup Oil Pool by the injection of water into the Gallup formation through 112 wells within the proposed project area.

(5) 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.

(6) That Special Rules and Regulations for the operation of The Atlantic Refining Company Horseshoe-Gallup Unit 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 project area producing from the same common source of supply should be allowed to produce in excess of top unit allowable for the Horseshoe-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 Horseshoe-Gallup Oil Pool. Production of such well at a higher rate should be authorized only after notice and hearing.

(7) That the applicant further seeks the reclassification of its Ute-Federal Well No. 1, located in the SW/4 SW/4 of Section 36, Township 31 North, Range 16 West, and its Navajo-Lowe-Federal Well No. 1, located in the NE/4 NE/4 of Section 2, Township 30 North, Range 16 West, all in San Juan County, New Mexico; from Verde-Gallup Oil Pool wells to Horseshoe-Gallup Oil Pool wells.

(8) That the Verde-Gallup Oil Pool should be contracted by the deletion of the NE/4 NE/4 of Section 2, Township 30 North, Range 16 West, and the SW/4 SW/4 of Section 36, Township 31 North, Range 16 West, all in San Juan County, New Mexico.

(9) That the Horseshoe-Gallup Oil Pool should be extended to include the SE/4 SE/4 of Section 35, Township 31 North, Range 16 West, San Juan County, New Mexico, in addition to the above-described acreage to be deleted from the Verde-Gallup Oil Pool.

IT IS THEREFORE ORDERED:

(1) That the Horseshoe-Gallup Unit Agreement is hereby approved.

(2) That the Plan under which the unit area shall be operated shall be embraced in the form of a unit agreement for the development and operation of the Horseshoe-Gallup Unit Area and such plan shall be known as the Horseshoe-Gallup Unit Agreement Plan.

(3) That the Horseshoe-Gallup Unit Agreement Plan is hereby approved in principle as a proper conservation measure; provided however, that notwithstanding any of the provisions contained in

said unit agreement, this approval shall not be considered as waiving or relinquishing, in any manner, any right, duty or obligation which is now, or may hereafter be, vested in the Oil Conservation Commission of New Mexico relative to the supervision and control of operations for the exploration and development of any lands committed to the said Horseshoe-Gallup Unit, or relative to the production of oil and gas therefrom.

(4) (a) That the unit area shall be:

NEW MEXICO PRINCIPAL MERIDIAN

TOWNSHIP 30 NORTH, RANGE 16 WEST
Sections 2 through 6: All
Section 7: NE/4
Sections 8 and 9: All
Section 10: NW/4
Section 16: That portion of the N/2 NW/4 lying east of the Navajo Indian Reservation

TOWNSHIP 31 NORTH, RANGE 16 WEST
Section 17: SW/4
Section 18: W/2 and SE/4
Sections 19 through 22: All
Section 25: SW/4
Sections 26 through 35: All
Section 36: W/2 and W/2 SE/4

TOWNSHIP 30 NORTH, RANGE 17 WEST
Section 1: NE/4

TOWNSHIP 31 NORTH, RANGE 17 WEST
Sections 13 through 15: All
Section 16: E/2
Section 22: NW/4 and E/2
Sections 23 through 25: All
Section 26: E/2 and NW/4
Section 35: NE/4
Section 36: All

comprising 20,925.58 acres, more or less.

(b) That the unit may be enlarged or contracted as provided in said Plan, provided however, that administrative approval for expansion or contraction of the unit area must also be obtained from the Secretary-Director of the Oil Conservation Commission.

(5) That the unit operator shall file with the Commission an executed original or executed counterpart of the Horseshoe-Gallup Unit Agreement within 30 days after the effective date thereof. In the event of subsequent joinder by any party or

expansion of the unit area, the unit operator shall file with the Commission within 30 days of such action counterparts of the unit agreement reflecting the subscription of those interests having joined or ratified.

(6) That this order shall become effective upon the approval of said unit agreement by the Commissioner of Public Lands for the State of New Mexico and by the Director of the United States Geological Survey and shall terminate ipso facto upon the termination of said unit agreement. The last unit operator shall notify the Commission immediately in writing of such termination.

(7) That the applicant is hereby authorized to institute the Horseshoe-Gallup Unit Pressure Maintenance Project in the Horseshoe-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup formation through 112 wells located within the project area as hereinafter-described.

(8) That Special Rules and Regulations governing the operation of The Atlantic Refining Company Horseshoe-Gallup Unit Pressure Maintenance Project, San Juan County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE ATLANTIC REFINING COMPANY
HORSESHOE-GALLUP UNIT PRESSURE MAINTENANCE PROJECT

RULE 1. The project area of The Atlantic Refining Company Horseshoe-Gallup Unit Pressure Maintenance Project, hereinafter referred to as the Project, shall comprise the following-described acreage in San Juan County, New Mexico:

NEW MEXICO PRINCIPAL MERIDIAN

TOWNSHIP 30 NORTH, RANGE 16 WEST

Section 2:	All
Section 3:	All
Section 4:	All
Section 5:	N/2, SE/4, N/2 SW/4, SE/4 SW/4
Section 6:	N/2 NE/4, SE/4 NE/4
Section 8:	N/2 NE/4, SE/4 NE/4
Section 9:	N/2, SE/4, N/2 SW/4, SE/4 SW/4
Section 10:	NW/4
Section 16:	NE/4 NW/4

TOWNSHIP 31 NORTH, RANGE 16 WEST

Section 19:	S/2, NW/4, S/2 NE/4
Section 20:	S/2
Section 21:	S/2
Section 22:	S/2 SW/4
Section 26:	S/2
Section 27:	S/2, NW/4, S/2 NE/4, NW/4 NE/4

TOWNSHIP 31 NORTH, RANGE 16 WEST - CONTINUED

Section 28: All
Section 29: All
Section 30: All
Section 31: N/2, SE/4, N/2 SW/4, SE/4 SW/4
Section 32: All
Section 33: All
Section 34: All
Section 35: All
Section 36: W/2 SW/4

TOWNSHIP 31 NORTH, RANGE 17 WEST

Section 13: SW/4, S/2 SE/4, NW/4 SE/4, SW/4 NW/4
Section 14: All
Section 15: NE/4, N/2 NW/4, SE/4 NW/4, N/2 SE/4, SE/4 SE/4
Section 23: NE/4, N/2 NW/4, SE/4 NW/4, N/2 SE/4, SE/4 SE/4
Section 24: All
Section 25: N/2, SE/4, NE/4 SW/4
Section 36: NE/4 NE/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 a 40-acre proration unit shall be top unit allowable for the Horseshoe-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 Horseshoe-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 Horseshoe-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 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 Horseshoe-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, if any, into the Horseshoe-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 Horseshoe-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:

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

where:

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

$V_{w\ inj}$ = Average daily volume of water injected, barrels

$V_{w\ prod}$ = 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 the pay zones of Horseshoe-Gallup Oil Pool in project area, psig + 12.01, as determined from most recent survey

15.025 = Pressure base, psi

520^o = Temperature base of 60^oF expressed as absolute temperature

T_r = Reservoir temperature of 87^oF expressed as absolute temperature (547^oR)

Z = Compressibility factor from analysis of Horseshoe-Gallup gas 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	.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 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.

(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 when good cause is shown therefor.

(9) That the applicant's Ute-Federal Well No. 1, located in the SW/4 SW/4 of Section 36, Township 31 North, Range 16 West, and Navajo-Lowe-Federal Well No. 1, located in the NE/4 NE/4 of Section 2, Township 30 North, Range 16 West, all in San Juan County, New Mexico, are hereby reclassified from Verde-Gallup Oil Pool wells to Horseshoe-Gallup Oil Pool wells.

(10) That the Verde-Gallup Oil Pool, as heretofore classified, defined and described, is hereby contracted by the deletion of the SW/4 SW/4 of Section 36, Township 31 North, Range 16 West, and the NE/4 NE/4 of Section 2, Township 30 North, Range 16 West, all in San Juan County, New Mexico.

(11) That the Horseshoe-Gallup Oil Pool, as heretofore classified, defined and described, is hereby extended to include the above-described acreage deleted from the Verde-Gallup Oil Pool and the SE/4 SE/4 of Section 35, Township 31 North, Range 16 West, San Juan County, New Mexico.

(12) 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

EDWIN L. MECHEM, Chairman

S E A L

E. S. WALKER, Member

esr/

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