

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. 4953
Order No. R-4549

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR A PRESSURE MAINTENANCE
PROJECT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on April 25, 1973, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 15th day of June, 1973, 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, Atlantic Richfield Company, seeks authority to institute a pressure maintenance project in the Empire-Abo Pool in its Empire-Abo Unit Area, Eddy County, New Mexico, by initially limiting reservoir voidage, and within one year by reinjection of approximately 70 percent of the produced gas, as plant residue gas, into the Abo formation through eight wells in Section 36, Township 17 South, Range 27 East, Sections 3, 4, and 9, Township 18 South, Range 27 East, and Sections 26, 31, 32, and 33, Township 17 South, Range 28 East.

(3) That the applicant further seeks the designation of the project area and the promulgation of special rules and regulations governing said project, including provision for the assignment of special allowables to wells in the project area based on reservoir voidage factors, net gas-oil ratios, the shutting in or curtailment of less efficient wells, and allowable credit for gas injection wells.

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

EDDY COUNTY, NEW MEXICO

TOWNSHIP 17 SOUTH, RANGE 27 EAST, NMPM

Section 34: S/2 SE/4
Section 36: S/2

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM

Section 25: S/2 and S/2 N/2
Section 26: S/2, S/2 NE/4, and SE/4 NW/4
Section 27: N/2 S/2, SE/4 SE/4, and SW/4 SW/4
Section 31: S/2 and S/2 N/2
Section 32: S/2, NE/4, S/2 NW/4, and NE/4 NW/4
Section 33: S/2, NE/4, S/2 NW/4, and NE/4 NW/4
Section 34: N/2, SW/4, and N/2 SE/4
Section 35: N/2 and N/2 S/2
Section 36: N/2 NW/4 and SW/4 NW/4

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM

Section 29: S/2 NW/4 and N/2 SW/4
Section 30: SW/4, S/2 N/2, and N/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM

Section 1: All
Section 2: S/2, NE/4 NE/4, SW/4 NE/4, S/2 NW/4, and
NW/4 NW/4
Section 3: All
Section 4: SE/4, S/2 NE/4, S/2 SW/4, and NE/4 SW/4
Section 8: E/2 SE/4 and SE/4 NE/4
Section 9: All
Section 10: W/2 and NE/4
Section 11: NW/4, W/2 NE/4, and NE/4 NE/4
Section 15: N/2 NW/4 and SW/4 NW/4
Section 16: N/2, SW/4, N/2 SE/4, and SW/4 SE/4
Section 17: S/2 NE/4, NE/4 NE/4, SE/4 NW/4, NE/4 SW/4,
and N/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM

Section 4: N/2 NW/4, SW/4 NW/4, and NW/4 NE/4
Section 5: NE/4 and N/2 NW/4
Section 6: NW/4, N/2 SW/4, N/2 SE/4, SW/4 SE/4,
S/2 NE/4, and NE/4 NE/4

(5) That the applicant has been a major operator in the Empire-Abo Pool and that with a majority of the other operators in said pool has conducted extensive reservoir evaluations and studies in and of said pool.

(6) That said evaluations and studies show that the Empire-Abo Pool will be more efficiently produced through the curtailment of production from high gas-oil ratio wells or by reinjection of plant residue gas or both, and operation of the pool on a net reservoir voidage basis.

(7) That said evaluations and studies show that production from the project area as described in Finding (4) of this order should be limited to the average reservoir voidage for the project area for the calendar year 1972 or 30,000 barrels of oil per day, whichever is less, except that after reinjection of approximately 70 percent of the produced gas has been achieved, the production from said project area should be limited to the average reservoir voidage for the calendar year 1972 or 40,192 barrels of oil per day, whichever is less.

(8) That to provide incentive for the reinjection of produced gas prior to achievement of the full 70 percent reinjection planned, production in excess of the aforementioned 30,000 barrels per day should be permitted within the project area. Said excess production should be computed in accordance with the following formula and should be limited to 10,192 barrels per day:

$$\begin{aligned} \text{Additional Allowable in Excess of 30,000 BOPD} &= 97.07 \left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF gas prod. previous month}} \right)^2 \right. \\ &\quad \left. + \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF gas prod. previous month}} \right) \right] \end{aligned}$$

(9) That the aforesaid pressure maintenance project, designated the ARCO Empire-Abo Unit Pressure Maintenance Project, and comprising the above-described area, is in the interest of conservation and should result in the recovery of approximately thirty million barrels of additional oil from said reservoir.

(10) That an administrative procedure should be established whereby said project area may be contracted or expanded for good cause shown and whereby additional injection wells and producing wells at orthodox and unorthodox locations in the project area may be approved without the necessity of notice and hearing.

(11) That special rules and regulations for the operation of the ARCO Empire-Abo 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 area in any proportion, provided that no well in the project area which directly or diagonally offsets a well not committed to said unit producing from the same common source of supply should be allowed to produce more than two top unit allowables for the Empire-Abo Pool.

(12) That approval of the application for a pressure maintenance project and the proposed special rules therefore is in the interest of sound conservation practices and will not cause waste or harm correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Atlantic Richfield Company, is hereby authorized to institute a pressure maintenance project in the Empire-Abo Pool in its Empire-Abo Unit Area, Eddy County, New Mexico, to be designated the ARCO Empire-Abo Unit Pressure Maintenance Project, initially by the shutting in or curtailment of production from less efficient wells within the project and within 12 months after the effective date of this order by the reinjection of approximately 70 percent of the produced gas, as plant residue gas, into the Abo formation, through the following described wells:

<u>OPERATOR</u>	<u>LEASE NAME</u>	<u>WELL NO.</u>	<u>SECTION</u>	<u>LOCATION</u>
Amoco	Malco "H" Federal	2	3	H
Amoco	Windfuhr Federal	4	4	J
Exxon	Chalk Bluff Draw Unit "A"	4	9	C

All in Township 18 South, Range 27 East, NMPM.

M. Yates III	Dooley Abo State	2	36	J
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In Township 17 South, Range 27 East, NMPM.

Hondo	State "A"	21	26	K
Amoco	State "BM"	1	31	K
Amoco	State "BV"	1	32	F
Arco	M. Yates B (ARC)	8	33	G

All in Township 17 South, Range 28 East, NMPM.

(2) That the injection should be through 2 3/8-inch internally coated tubing installed in a packer set within 100 feet of the uppermost perforations, and that the casing-tubing annulus should be fitted with a pressure gauge in order to determine leakage in the casing, tubing, or packer.

(3) That Special Rules and Regulations governing the operation of the ARCO Empire-Abo Unit Pressure Maintenance Project, Eddy County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE
EMPIRE-ABO PRESSURE MAINTENANCE PROJECT

RULE 1. The project area of the ARCO Empire-Abo Unit Pressure Maintenance Project, hereinafter referred to as the Project, shall comprise the area described as follows:

EDDY COUNTY, NEW MEXICO

TOWNSHIP 17 SOUTH, RANGE 27 EAST, NMPM

Section 34: S/2 SE/4
Section 36: S/2

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM

Section 25: S/2 and S/2 N/2
Section 26: S/2, S/2 NE/4, and SE/4 NW/4
Section 27: N/2 S/2, SE/4 SE/4, and SW/4 SW/4
Section 31: S/2 and S/2 N/2
Section 32: S/2, NE/4, S/2 NW/4, and NE/4 NW/4
Section 33: S/2, NE/4, S/2 NW/4, and NE/4 NW/4
Section 34: N/2, SW/4, and N/2 SE/4
Section 35: N/2 and N/2 S/2
Section 36: N/2 NW/4 and SW/4 NW/4

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM

Section 29: S/2 NW/4 and N/2 SW/4
Section 30: SW/4, S/2 N/2, and N/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM

Section 1: All
Section 2: S/2, NE/4 NE/4, SW/4 NE/4, S/2 NW/4, and
NW/4 NW/4
Section 3: All
Section 4: SE/4, S/2 NE/4, S/2 SW/4, and NE/4 SW/4
Section 8: E/2 SE/4 and SE/4 NE/4
Section 9: All
Section 10: W/2 and NE/4
Section 11: NW/4, W/2 NE/4, and NE/4 NE/4
Section 15: N/2 NW/4 and SW/4 NW/4
Section 16: N/2, SW/4, N/2 SE/4, and SW/4 SE/4
Section 17: S/2 NE/4, NE/4 NE/4, SE/4 NW/4, NE/4 SW/4,
and N/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM

Section 4: N/2 NW/4, SW/4 NW/4, and NW/4 NE/4
Section 5: NE/4 and N/2 NW/4
Section 6: NW/4, N/2 SW/4, N/2 SE/4, SW/4 SE/4,
S/2 NE/4, and 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. That the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project

area for the calendar year 1972 or 30,000 barrels of oil per day, whichever is less, except that after reinjection of approximately 70 percent of the produced gas has been achieved the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage for the project area for the year 1972 or 40,192 barrels of oil per day, whichever is less.

RULE 4. That after gas reinjection has commenced but before the full 70 percent reinjection has been achieved, allowable in addition to the above-described 30,000 barrels per day may be assigned to the project area, provided that said allowable shall be based on gas produced and injected in the project area and shall be computed in accordance with Rule 10 below and the following formula and shall not exceed 10,192 barrels of oil per day:

$$\begin{aligned} \text{Additional Allowable in} \\ \text{Excess of 30,000 BOPD} &= 97.07 \left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF gas prod. previous month}} \right)^2 \right. \\ &\quad \left. + \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF gas prod. previous month}} \right) \right] \end{aligned}$$

RULE 5. That all calculations of reservoir voidage shall be in accordance with the formula set out in Attachment "A" to this order utilizing the Table of Fluid Properties set out in Attachment "B" of this order.

RULE 6. Allowable credit for injection wells may be transferred to producing wells within the project area, as may the allowable credit 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 7. The allowable credit assigned to any well which is shut in or which is curtailed in accordance with the provisions of Rule 6 which allowable credit 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 9 below or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 8. The allowable credit assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the Empire-Abo Pool.

RULE 9. The allowable credit assigned to any well which is shut in or curtailed in accordance with Rule 6, 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 10. The allowable credit for residue gas injection shall be calculated in accordance with the appropriate fluid properties current in the reservoir (as determined in accordance with Attachment "B" to this Order) and shall be shown on the Pressure Maintenance Project Operator's Monthly Report.

RULE 11. The basic 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. Wells capable of producing more than top unit allowable may also receive transfer allowable, provided however, that no producing well in the project area which directly or diagonally offsets a well not committed to the unit producing from the same common source of supply shall receive an allowable or produce in excess of two times top unit allowable for the pool.

RULE 12. Each month the project operator shall 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 13. 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 not committed to the unit producing from the same common source of supply shall produce in excess of two times top unit allowable for the pool.

RULE 14. The Secretary-Director of the Commission is hereby authorized to approve such additional producing wells and injection wells at orthodox and unorthodox locations within the boundaries of the ARCO Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided

said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. 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 production or injection wells shall include the following:

- (1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.
- (2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.
- (3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed 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.

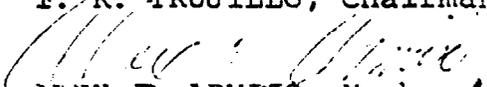
RULE 15. Expansion or contractions of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

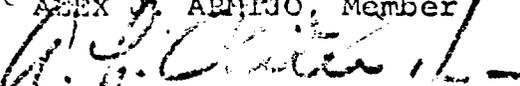
- (4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


I. R. TRUJILLO, Chairman


ALEX J. ARRILLO, Member


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

S E A L

dr/

EMPIRE ABO UNIT

Reservoir Voidage Formula:

$$\text{Equation 1: } V_{rvb} = Q_o \left[B_o + (R_{pn} - R_s) B_g \right] + (Q_{wp} - Q_{we}) B_w$$

Where:

- V_{rvb} = Reservoir voidage, bbls. per day
- Q_o = Oil production rate, Stock tank bbls. per day
- B_o = Oil formation volume factor (1), reservoir
.volumetric bbls/stock tank bbl.
- R_{pn} = Net producing gas-oil ratio, MCF/S.T.B.O.

$$R_{pn} = R_p \left(1.0 - \frac{G_i}{G_p} \right)$$

- Where: R_p = producing gas-oil ratio, MCF/BO
 G_i = daily volume of gas injected, MCF/Day
 G_p = daily volume of gas produced, MCF/Day

- R_s = Solution gas-oil ratio(2), MCF/STBO
- B_g = Gas formation volume factor(3), RVB/MCF
- Q_{wp} = Water production rate, S.T.B.W./Day
- Q_{we} = Aquifer water influx rate, S.T.B.W./Day, determined
from reservoir numeric model runs to be 1950 BWPD
- B_w = Water formation volume factor, RVBW/STBW, use 1.0

(1), (2), (3): These values calculated from Table of Fluid Properties, Attachment "B".

ATTACHMENT "A"

dr/

EMPIRE ABO UNIT AREA

Table of Fluid Properties (P Base = 15.025 P_{bp} = 2231)

Tres. = 109°F (569° R)

<u>P_r (PSIA)</u>	<u>B_O (RVBO/STBO)</u>	<u>B_g RVB/MCF</u>	<u>R_s (MCF/BBL)</u>	<u>Z</u>
15.025	1.000	194.696	0	1.0
100	1.125	28.229	.180	.965
200	1.163	13.749	.235	.940
300	1.193	8.970	.290	.920
400	1.218	6.692	.345	.915
500	1.244	5.236	.395	.895
600	1.263	4.276	.445	.877
700	1.285	3.644	.495	.872
800	1.304	3.108	.540	.850
900	1.325	2.746	.585	.845
1000	1.344	2.437	.625	.833
1100	1.364	2.178	.675	.819
1200	1.384	1.962	.725	.805
1300	1.404	1.790	.775	.795
1400	1.425	1.649	.825	.789
1500	1.445	1.516	.875	.777
1600	1.465	1.404	.925	.768
1700	1.485	1.304	.975	.758
1800	1.505	1.220	1.025	.751
1900	1.525	1.147	1.075	.745
2000	1.548	1.053	1.125	.720
2100	1.573	1.000	1.175	.718
2200	1.597	.953	1.225	.717
2231	1.606	.939	1.250	.716

P_r = Reservoir average pressure at datum -2264' subsea, lbs/in² absolute.

B_O = Oil formation volume factor, reservoir volumetric bbls/stock tank bbl.

B_g = Gas formation volume factor, reservoir volumetric bbls/thousand std. cu. ft.

R_s = Solution Gas/Oil Ratio, Thousand std. cu. ft/stock tank bbls. oil.

Z = Gas Compressibility Factor.

ATTACHMENT "B"

dr/

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. 5135
Order No. R-4549-A

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR AMENDMENT OF ORDER
NO. R-4945, EDDY COUNTY, NEW
MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on January 3, 1974, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 15th day of January, 1974, 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-4548, dated June 15, 1973, the Commission granted approval of the Empire-Abo Unit Agreement.
- (3) That by Order No. R-4549, dated June 15, 1973, the applicant, Atlantic Richfield Company, was authorized to institute a pressure maintenance project in the Empire-Abo Pool in its Empire-Abo Unit Area, Eddy County, New Mexico, designated the ARCO Empire-Abo Unit Pressure Maintenance Project.
- (4) That Order No. R-4549 further promulgated Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project.
- (5) That Finding (7) of Order No. R-4549 limits production from the project area as described in Finding (4) of said order to the average reservoir voidage for the calendar year 1972 or 30,000 barrels of oil per day, whichever is less, during the period prior to the start of gas injection.
- (6) That the allowable figure of 30,000 barrels of oil per day was based on assumptions as to the future size of the unitized project area and the estimated gas and water production expected after unitization.

(7) That since the formation of the Empire-Abo Unit Pressure Maintenance Project the following additional tracts, comprising 200.13 acres of land, within the Empire-Abo Unit Area have been committed to the unit:

EDDY COUNTY, NEW MEXICO
TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 27: SW/4 SE/4
Section 34: S/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 6: NW/4 NE/4 (Lot 2) and
SE/4 SW/4

(8) That these additional tracts were not considered in arriving at the 30,000 barrels of oil per day project allowable provided for in Order No. R-4549.

(9) That the actual production of gas and water has been less than was anticipated under unitized operations.

(10) That due to more unit area wells and greater efficiency than was expected, an increased allowable can be produced while continuing to limit reservoir voidage to the average voidage set for calendar year 1972 in Order No. R-4945.

(11) That the project allowable should be increased to 33,000 barrels of oil per day effective retroactively to January 1, 1974.

(12) That increasing the project allowable to 33,000 barrels of oil per day is in the interest of conservation, prevention of waste and protection of correlative rights.

IT IS THEREFORE ORDERED:

(1) That Order No. R-4945 is hereby amended to include within the Empire-Abo Unit Pressure Maintenance Project the following tracts which comprise 200.13 acres:

EDDY COUNTY, NEW MEXICO
TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 27: SW/4 SE/4
Section 34: S/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 6: NW/4 NE/4 (Lot 2) and
SE/4 SW/4

(2) That the project allowable is increased to 33,000 barrels of oil per day effective retroactively to January 1, 1974.

-3-

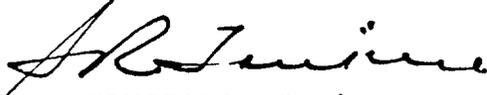
Case No. 5135

Order No. R-4549-A

(3) 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



I. R. TRUJILLO, Chairman



ALEX J. ARMIJO, Member



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

S E A L

dr/

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. 5177
Order No. R-4549-B

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR THE AMENDMENT OF ORDER
NO. R-4549, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 27, 1974, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 30th day of April, 1974, 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, Atlantic Richfield Company, is the operator of the Empire-Abo Pressure Maintenance Project, Empire-Abo Pool, Eddy County, New Mexico, which project was authorized by Commission Order No. R-4549, and is governed by operating rules included in said order as amended by Order No. R-4549-A.
- (3) That the applicant seeks the amendment of said Order No. R-4549, as amended, to include an increase in the maximum project allowable from 40,192 barrels of oil per day to 40,555 barrels of oil per day because of additional lands committed to the unit and participating in the project and to provide that the maximum project allowable of 40,555 barrels of oil per day would be achieved upon injection of "all available residue gas" rather than "70 percent of the produced gas," as now provided in the project rules.
- (4) That the applicant further seeks the amendment of Order No. R-4549, as amended, to include a provision for administrative approval for water injection wells and to include a reservoir voidage replacement credit for water injected into the Abo formation within the project area, and to provide for the establishment of a gas injection credit "bank", against which

injection credit could be drawn in order to maintain full allowables during such times that full gas injection cannot be maintained because of injection plant shutdowns or other mechanical problems.

(5) That the increase in maximum allowable for the Empire-Abo Pressure Maintenance Project from 40,192 barrels of oil per day to 40,555 barrels of oil per day is justified inasmuch as the original 40,192 barrels was based on numeric model studies of the reservoir assuming only those tracts actually committed to the unit at the time of the original hearing would participate; that additional tracts have now been committed to the unit and the maximum permissible allowable should therefore be increased accordingly to 40,555 barrels of oil per day.

(6) That the aforesaid maximum allowable should be made available upon injection of 95 percent of all available residue gas rather than upon injection of 70 percent of the produced gas as is presently provided by Rule 3 of the Project Rules as promulgated by Order No. R-4549, as amended by Order No. R-4549-A; that "Available Residue Gas" should be defined as being all gas produced from the unitized formation less plant shrinkage and plant fuel and lease fuel required for operations; that there should be a prohibition against the sale of gas from the project except during emergency situations of temporary nature.

(7) That in addition to the administrative procedure currently in effect pursuant to Order No. R-4549 for approval of the injection of gas into the Abo formation without notice and hearing, an administrative procedure should be adopted whereby approval could be given for the injection of water into said formation within the project area without notice and hearing, provided certain restrictions regarding proximity to non-participating tracts are observed.

(8) That credit should be allowed in the project's Reservoir Voidage Formula for water injected into the reservoir as well as for gas, as now provided.

(9) That in order to allow for the maintenance of full allowables and full production schedules during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of 95 percent of all available residue gas, a provision should be made in the project rules for the establishment of a system for the accumulation of gas injection credits which could be applied in the "Additional Allowable" formula contained in Rule 4 of the project rules; that monthly gas injection credits which may be accumulated should be limited to the volume of gas injected which exceeds 95 percent of the residue gas available for injection during any given month; and that the maximum amount of gas injection credits which should be permitted to

accrue to the gas injection credit bank should be equal to 100 percent of the average of the total monthly injection volumes for the previous three months, not including the month being reported.

IT IS THEREFORE ORDERED:

(1) That Rule 3 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project as promulgated by Order No. R-4549, as amended by Order No. R-4549-A, is hereby amended to read in its entirety as follows:

"RULE 3. That the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,513 reservoir barrels) or 33,000 barrels of oil per day, whichever is less, except that when injection of 95 percent of all available residue gas is achieved, the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,513 reservoir barrels) or 40,555 barrels of oil per day, whichever is less."

(2) That Rule 4 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 4. That upon commencement of gas injection and for as long thereafter as such injection continues, extra allowable in addition to the 33,000 barrels per day described above may be assigned to the project area, provided that such additional allowable shall be based upon the proportion of residue gas available for injection which is actually injected into the unitized formation and shall be computed in accordance with the following formula:

$$\begin{aligned} \text{Additional Allowable} \\ \text{in Excess of 33,000} \\ \text{BOPD} \end{aligned} = 39.76 \left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available prev. month}} \right)^2 \right. \\ \left. + \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available previous month}} \right) \right]$$

That the maximum additional allowable which may be earned by gas injection shall be 7,555 barrels per day. That this maximum may be earned by the injection of 95 percent of the available residue gas into the unitized formation; that gas volumes in excess of said 95 percent which are injected into the unitized formation shall be credited each month to a gas injection bank account which shall be permitted to accrue such gas injection credits up to 100 percent of the average of the total monthly injection volumes for the three previous months, not including the month being reported; that during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of at least 95 percent of the available residue gas, said gas injection bank account may be charged a sufficient volume to add to the actual volume of injection achieved to equal 95 percent of the available residue gas for the month. In the event there are insufficient credits accrued to the gas injection bank account to bring actual injection plus applied credits up to 95 percent of available residue gas, production shall be reduced to 33,000 barrels of oil per day plus the amount which the actual injection plus the accrued credits will actually earn. Production beyond this amount shall be considered overproduction and shall be compensated for by underproduction during the following month.

For the purpose of these rules, "Available Residue Gas" shall be defined as being all gas produced from the unitized formation less plant shrinkage, plant fuel, and lease fuel required for operation of the lease.

No raw gas nor plant residue gas attributable to the project shall be sold or otherwise disposed of by any means other than injection into the unitized formation except during emergency situations of temporary nature."

(3) That Rule 5 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 5. That all calculations of reservoir voidage shall be made in accordance with the formula set forth in Attachment "A" to this order entitled "EMPIRE-ABO UNIT AREA-Reservoir Voidage Formula - Gas and Water Injection Credit" utilizing the reservoir and fluid data set forth in Attachment "B" to this order entitled EMPIRE-ABO UNIT AREA - Table of Fluid Properties."

(4) That Rule 14 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 14. The Secretary-Director of the Commission is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and unorthodox locations within the boundaries of the ARCO Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. 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 production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

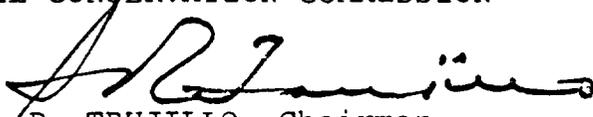
The Secretary-Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators."

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

-b-
Case No. 5177
Order No. R-4549-B

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


I. R. TRUJILLO, Chairman

ALEX J. ARMIJO, Member


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

S E A L

dr/

EMPIRE ABO UNIT AREA

Reservoir Voidage Formula - Gas and Water Injection Credit

$$\text{Equation 1: } V_{rvb} = Q_o \left[B_o + (R_{pn} - R_s) B_g \right] + \left[Q_{wp} - (Q_{we} + Q_{wi}) \right] B_w$$

Where:

- V_{rvb} = Reservoir voidage, bbls. per day
- Q_o = Oil Production rate, Stock tank bbls. per day
- B_o = Oil formation volume factor (1), reservoir volumetric bbls/stock tank bbl.
- R_{pn} = Net producing gas-oil ratio, MCF/S.T.B.O.

$$R_{pn} = R_p \left(1.0 - \frac{G_i}{G_p} \right)$$

Where:

- R_p = producing gas-oil ratio, MCF/BO
- G_i = daily volume of gas injected, MCF/Day
- G_p = daily volume of gas produced, MCF/Day

- R_s = Solution gas-oil ratio (2), MCF/STBO
- B_g = Gas formation volume factor (3), RVB/MCF
- Q_{wp} = Water production rate, S.T.B.W./Day
- Q_{we} = Aquifer water influx rate, S.T.B.W./Day, determined from reservoir numeric model runs to be 1950 BWPD
- Q_{wi} = Daily volume of water injected, S.T.B.W./Day
- B_w = Water formation volume factor, RVBW/STBW, use 1.0

(1), (2), (3): These values calculated from Table of Fluid Properties, Attachment "B".

Attachment "A" Order No. R-4549-B

EMPIRE ABO UNIT AREA

Table of Fluid Properties

$P_{base} = 15.025 \text{ psia}$ $P_{bp} = 2231 \text{ psia}$ $T_{res} = 109^\circ \text{ F (569}^\circ \text{ R)}$

P_r (PSIA)	B_o (RVBO/STBO)	B_g RVB/MCF	R_s (MCF/BBL)	Z
15.025	1.000	194.696	0	1.0
100	1.125	28.229	.180	.965
200	1.163	13.749	.235	.940
300	1.193	8.970	.290	.920
400	1.218	6.692	.345	.915
500	1.244	5.236	.395	.895
600	1.263	4.276	.445	.877
700	1.285	3.644	.495	.872
800	1.304	3.108	.540	.850
900	1.325	2.746	.585	.845
1000	1.344	2.437	.625	.833
1100	1.364	2.178	.675	.819
1200	1.384	1.962	.725	.805
1300	1.404	1.790	.775	.795
1400	1.425	1.649	.825	.789
1500	1.445	1.516	.875	.777
1600	1.465	1.404	.925	.768
1700	1.485	1.304	.975	.758
1800	1.505	1.220	1.025	.751
1900	1.525	1.147	1.075	.745
2000	1.548	1.053	1.125	.720
2100	1.573	1.000	1.175	.718
2200	1.597	.953	1.225	.717
2231	1.606	.939	1.250	.716

P_r = Reservoir average pressure at datum -2264' subsea, lbs/in² absolute.

B_o = Oil formation volume factor, reservoir volumetric bbls/stock tank bbl.

B_g = Gas formation volume factor, reservoir volumetric bbls/thousand std. cu. ft.

R_s = Solution Gas/Oil Ratio, Thousand std. cu. ft/stock tank bbls. oil.

Z = Gas Compressibility Factor.

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. 5505
Order No. R-4549-C

THE APPLICATION OF THE ATLANTIC
RICHFIELD COMPANY FOR PRESSURE
MAINTENANCE PROJECT EXPANSION,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on June 10, 1975,
at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 1st day of July, 1975, 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, The Atlantic Richfield Company,
is the operator of the Empire-Abo Pressure Maintenance Project,
Empire-Abo Pool, Eddy County, New Mexico, which project was
authorized by Commission Order No. R-4549, expanded by Order
No. R-4549-A, and is operated pursuant to Special Rules and
Regulations promulgated by Order No. R-4549, as amended by
Orders Nos. R-4549-A and R-4549-B.

(3) That the applicant seeks the further expansion of
the pressure maintenance project area as defined by said
Order No. R-4549 and expanded by said Order No. R-4549-A by
the inclusion of the following described lands, which are to
be committed to the Empire Abo Unit Area:

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 27: SE/4 SW/4, being 40.00 acres

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 4: NE/4 NE/4, being 40.03 acres
Section 5: SE/4 NW/4, being 40.00 acres

(4) That in conjunction with the expansion of said project area, applicant also seeks the amendment of Rule 3 of the Special Rules and Regulations for the Empire Abo Pressure Maintenance Project as promulgated by Order No. R-4549 and amended by Orders Nos. R-4549-A and R-4549-B to provide that the maximum daily project allowable will result in average daily reservoir voidage no greater than the reservoir voidage in the project area, as expanded, for calendar year 1972 (56,912 reservoir barrels) or 33,242 barrels of oil per day, whichever is less, except that when injection of 95 percent of all available residue gas is achieved, the project allowance would be an amount of oil no greater than would result in average daily reservoir voidage in the project area, as expanded, for calendar year 1972 (56,912 reservoir barrels) or 41,041 barrels of oil per day, whichever is less.

(5) That to accomplish the aforesaid increase in project base allowable and maximum project allowable, certain modifications to Rule 4 of the project rules would be necessary.

(6) That the proposed expansion of the Empire-Abo Pressure Maintenance Project Area and the concurrent increase in base allowable and maximum project allowable is in the interest of increased recovery of oil and gas, will prevent waste and will not violate correlative rights, and should be approved.

IT IS THEREFORE ORDERED:

(1) That the project area for the Empire-Abo Pressure Maintenance Project is hereby expanded to include therein:

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 27: SE/4 SW/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 4: NE/4 NE/4
Section 5: SE/4 NW/4

being 120.03 acres, all in Eddy County, New Mexico.

(2) That Rule 3 of the Special Rules and Regulations for ~~the Empire-Abo Pressure Maintenance Project as promulgated by~~ Order No. R-4549, as amended by Orders Nos. R-4549-A and R-4549-B, is hereby amended to read in its entirety as follows:

"RULE 3. That the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,912 reservoir barrels) or 33,242 barrels of oil per day,

whichever is less, except that when injection of 95 percent of all available residue gas is achieved, the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,912 reservoir barrels) or 41,041 barrels of oil per day, whichever is less."

(3) That Rule 4 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 4. That upon commencement of gas injection and for as long thereafter as such injection continues, extra allowable in addition to the 33,242 barrels per day described above may be assigned to the project area, provided that such additional allowable shall be based upon the proportion of residue gas available for injection which is actually injected into the unitized formation and shall be computed in accordance with the following formula:

$$\begin{aligned}
 &\text{Additional Allowable} \\
 &\text{in Excess of 33,242} = 41.05 \left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available prev. month}} \right) \right] \\
 &\text{BOPD} \\
 &+ \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available previous month}} \right)
 \end{aligned}$$

2

That the maximum additional allowable which may be earned by gas injection shall be 7,799 barrels per day. That this maximum may be earned by the injection of 95 percent of the available residue gas into the unitized formation; that gas volumes in excess of said 95 percent which are injected into the unitized formation shall be credited each month to a gas injection bank account which shall be permitted to accrue such gas injection credits up to 100 percent of the average of the total monthly injection volumes for the three previous months, not including the month being reported; that during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of at least 95 percent of the available residue gas, said gas injection bank account may be charged a sufficient volume to add to the actual volume of injection achieved to equal 95 percent of the available residue gas for the month. In the event there are insufficient credits accrued to the

gas injection bank account to bring actual injection plus applied credits up to 95 percent of available residue gas, production shall be reduced to 33,242 barrels of oil per day plus the amount which the actual injection plus the accrued credits will actually earn. Production beyond this amount shall be considered overproduction and shall be compensated for by underproduction during the following month.

For the purpose of these rules, "Available Residue Gas" shall be defined as being all gas produced from the unitized formation less plant shrinkage, plant fuel, and lease fuel required for operation of the lease.

No raw gas nor plant residue gas attributable to the project shall be sold or otherwise disposed of by any means other than injection into the unitized formation except during emergency situations of temporary nature."

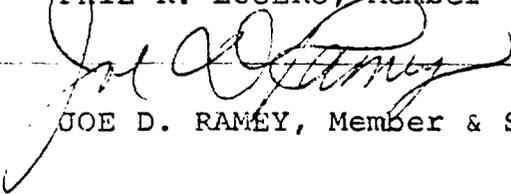
(4) That the effective date of this order shall be the effective date of ratification of the unit agreement by the parties concerned.

(5) 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


PHIL R. LUCERO, Member


JOE D. RAMEY, Member & Secretary

S E A L

dr/

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. 5577
Order No. R-4549-D

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR AMENDMENT OF ORDER NO.
R-4549, AS AMENDED, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on October 22, 1975, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 17th day of November, 1975, 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 pursuant to Commission Order No. R-4549, dated June 15, 1973, as amended by Orders Nos. R-4549-A, R-4549-B, and R-4549-C, dated January 15, 1974, April 30, 1974, and July 1, 1975, respectively, the applicant Atlantic Richfield Company is conducting pressure maintenance operations in the Empire Abo Unit Area, Empire-Abo Pool, Eddy County, New Mexico.

(3) That said pressure maintenance operations include the reinjection of casinghead gas produced from said Empire-Abo Pool back into the reservoir from which it came.

(4) That even with the reinjection of all available casinghead gas produced from said pool, there still remains considerable reservoir voidage resulting from the production of liquid hydrocarbons from the reservoir.

(5) That the applicant seeks to minimize this reservoir voidage by the injection into the Abo formation of extraneous gas brought in from other sources.

(6) That the injection of from 25 million to 35 million cubic feet of extraneous gas per day into the Abo formation will virtually eliminate the net voidage of the reservoir underlying the Empire Abo Unit Area, will result in the recovery of additional oil, thereby enhancing the recovery of oil from the reservoir and otherwise prevent waste, will not impair correlative rights, and should be approved.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project, as promulgated by Commission Order No. R-4549, and as amended by Commission Order Nos. R-4549-A, R-4549-B, and R-4549-C, are hereby further amended by the addition of the following Rule 4(A):

"RULE 4(A).

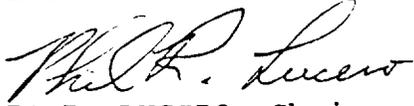
That in addition to the injection of available residue gas and the establishment of an available residue gas injection bank as described in Rules 3 and 4 above, the project operator may inject up to and including 35 million cubic feet of extraneous gas per day into the Abo formation underlying the project area; further, that withdrawals of said extraneous gas may be made, but pending reservoir blow-down, during not more than 30 days in any one 180-day period; provided however, that pending blow-down, the daily rate of withdrawal shall not exceed the average daily rate of injection of such extraneous gas during the preceding 180-day period; provided further, that the project operator shall establish and maintain an "Extraneous Gas Bank Statement" which shall be filed with the Commission each month concurrently with the project operator's "Empire-Abo Pressure Maintenance Project Monthly Report" and "Abo Gas Bank Statement", and which shall show thereon each month the volume of extraneous gas injected, the cumulative volume of such gas injected, the volume of gas delivered back to the supplier of extraneous gas, the cumulative volume of gas delivered back to the supplier, and the net cumulative extraneous gas bank."

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

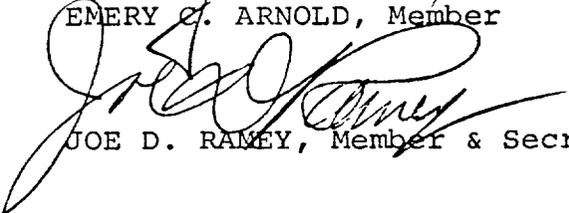
-3-
Case No. 5577
Order No. R-4549-D

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


PHIL R. LUCERO, Chairman


EMERY C. ARNOLD, Member


JOE D. RAMEY, Member & Secretary

S E A L

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6742
Order No. R-4549-E

APPLICATION OF ARCO OIL AND GAS
COMPANY FOR AN ADMINISTRATIVE
PROCEDURE, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on November 28, 1979, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 28th day of January, 1980, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, ARCO Oil and Gas Company, is the operator of the Empire Abo Pressure Maintenance Project, Empire-Abo Pool, Eddy County, New Mexico, which project was authorized by Division Order No. R-4549, and is governed by operating rules included in said order as amended by Orders Nos. R-4549-A through R-4549-D.

(3) That the applicant seeks the amendment of Rule 14 of the Special Rules and Regulations for said project adopted by Order No. R-4549, as amended, to additionally provide for an administrative procedure for authorizing the drilling, for production or injection purposes, of "horizontal drainholes" within such project.

(4) That the drilling of said horizontal drainholes within the boundaries of said project should result in the recovery of oil and gas therefrom which might not otherwise

be produced thereby preventing waste.

(5) That correlative rights will not be violated provided that no perforated or openhole portion of any horizontal drainhole shall be closer than 330 feet to the outer boundary of the Empire Abo Unit or any tract not committed to said unit nor, in the case of a well to be used for injection, closer than 1650 feet to such boundary or tract.

(6) That the application for administrative procedure should be approved by amending said Rule 14 to read in its entirety as shown on Exhibit "A" attached to this order.

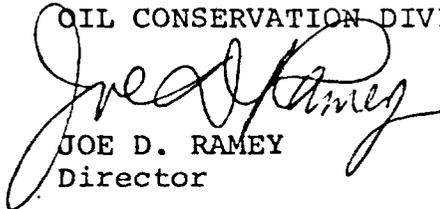
IT IS THEREFORE ORDERED:

(1) That Rule 14 of the Special Rules and Regulations for the Empire Abo Pressure Maintenance Project is hereby amended to read in its entirety as shown on Exhibit "A" to this order.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION


JOE D. RAMEY
Director

S E A L

fd/

EXHIBIT "A"
ORDER NO. R-4549-E

RULE 14 A. The Director of the Division is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and unorthodox locations within the boundaries of the ARCO Empire Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the Division Director, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 B. The Director of the Division is hereby authorized to approve the drilling of "horizontal drainholes" for the purposes of production or injection within the boundaries of the ARCO Empire Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided no perforated or openhole portion of said wells shall be closer than 330 feet to the outer boundary of said unit or to any tract not committed to such unit nor, in the case of a well to be used for injection closer than 1650 feet to such boundary or tract. To obtain such approval, the project operator shall file proper application with the Division Director, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) Schematic drawings of the proposed well which fully describes the casing, tubing, perforated or open-hole interval, kick-off point, and proposed trajectory of the drainhole section.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 C. The Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Director may grant immediate approval, provided waivers of objection are received from all offset operators.

RULE 14 D. Within 20 days following completion of any horizontal drainhole the operator shall submit a report to the Division Director with sufficient detail to locate the kick-off point and the trajectory of the deviated portion of the well bore with respect to any quarter-quarter section(s) penetrated by such well and any 40-acre tract directly or diagonally offsetting such quarter-quarter section(s).

The Director may approve the final location of the horizontal drainhole by acceptance of such report.

The Director may rescind the authority for any horizontal drainhole if the perforated or openhole portion of such hole is located closer to the unit boundary or any uncommitted tract than permitted by these rules or if it should appear that such rescission is necessary to prevent waste or protect correlative rights.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 8060
Order No. R-4549-F

APPLICATION OF ARCO OIL & GAS
COMPANY FOR AMENDMENT OF ORDER
NO. R-4549, AS AMENDED, EDDY
COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:00 a.m. on February 1, 1984, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 20th day of April, 1984, the Division Director 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 Division has jurisdiction of this cause and the subject matter thereof.
- (2) That the applicant, Arco Oil & Gas Company, is the operator of the Empire-Abo Pressure Maintenance Project, Empire-Abo Pool, Eddy County, New Mexico, which project was authorized by Division Order No. R-4549 and is governed by operating rules contained in the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project included in said Order as amended by Orders Nos. R-4549-A through R-4549-E.
- (3) That said special rules and regulations provide for well allowables based upon reservoir voidage.
- (4) That the applicant seeks the rescission of such rules for setting allowables and the establishment of a maximum daily project allowable of 65 MMCFD.
- (5) That the evidence presented in this case established that this proposed method of setting allowables will result in the greater recovery of liquid hydrocarbons from such project.

(6) That the proposed amendment of said special rules will not result in violation of correlative rights.

(7) That the application for amendment of said special rules should be approved.

IT IS THEREFORE ORDERED:

(1) That Rules 3, 4, 4(A), 5, 6, 7, 8, 9, 10, 11, 12, and 13 of the Special Rules and Regulations for the Empire-Abc Pressure Maintenance Project contained in Division Order No. R-4549, as amended, are hereby rescinded.

(2) That said special rules are hereby amended by the adoption of new Rules 3, 4, 5, and 6 which read in their entirety as follows:

"RULE 3: That the maximum daily project allowable shall be an amount of oil which will result in monthly average associated gas production of no more than 65 MMCF per day.

For the purpose of these rules, "Available Residue Gas" shall be defined as being all gas produced from the unitized formation less plant shrinkage, plant fuel, and lease fuel required for operation of the lease.

"RULE 4: That all available unit residue gas shall be reinjected. No raw gas nor plant residue gas attributable to the project shall be sold or otherwise disposed of by any other means. That in addition to the injection of available residue gas, the project operator may inject up to and including 35 million cubic feet of extraneous gas per day into the Abo formation underlying the project area; further, that withdrawals of said extraneous gas may be made, but pending reservoir blow-down, during not more than 30 days in any one 180-day period; provided however, that pending blow-down, the daily rate of withdrawal shall not exceed the average daily rate of injection of such extraneous gas during the preceding 180-day period; provided further, that the project operator shall establish and maintain an "Extraneous Gas Bank Statement" which shall be filed with the Division each month concurrently with the project operator's "Empire-Abo Pressure Maintenance Project Monthly Report", and which shall show thereon each month the volume of extraneous gas injected, the cumulative volume of such gas injected, the volume of gas

delivered back to the supplier of extraneous gas, the cumulative volume of gas delivered back to the supplier, and the net cumulative extraneous gas bank.

"RULE 5. Allowables shall be assigned to unit wells in accordance with nominations submitted by the unit operator during the months of March, July, and November of each year. That such nominations shall accompany the Pressure Maintenance Project Operator's Report filed for that month.

The allowables assigned shall result in production of casinghead gas averaging not more than 65 MMCF per day for the month, provided however, that on a cumulative basis, the unit operator may carry gas overproduction of 325 MMCF.

That no producing well in the project area which directly or diagonally offsets a well not committed to the unit, and producing from the same common source of supply, shall receive an allowable or produce in excess of two times the top unit allowable for the pool.

"RULE 6. Each month the project operator shall submit to the Division a Pressure Maintenance Project Operator's Report on a form prescribed by the Division. The report shall show all project wells, production of oil, gas, and water; volumes of water, residue gas, and extraneous gas injected; total production of oil, gas, and water, and such other data as the Division may require"

(3) That Rule 14A, 14B, 14C, and 14D of said Special Rules are hereby redesignated Rule 7A, 7B, 7C and 7D, respectively.

(4) That Rule 15 of said Special Rules is hereby redesignated Rule 8 and is amended to read in its entirety as follows:

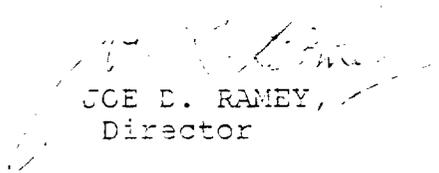
"RULE 8. Expansion or contraction of the project area may be approved by the Director of the Division administratively when good cause is shown therefor."

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

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Case No. 8060
Order No. R-4549-F

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

STATE OF NEW MEXICO
WILDLIFE CONSERVATION DIVISION


JOE D. RAMEY,
Director

S E A L