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. 5213
Order No. R-4808

APPLICATION OF CITIES SERVICE
OIL 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 10, 1974, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 11th day of June, 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, Cities Service Oil Company, seeks authority to institute a pressure maintenance project in the Empire-Abo Pool in its Citgo Empire-Abo Unit Area, Eddy County, New Mexico, by the injection of gas into the Abo formation through a well to be drilled at an unorthodox location 990 feet from the South line and 2635 feet from the East line of Section 35, Township 17 South, Range 27 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 operation of the project under a net GOR rule and the establishment of a gas injection credit "bank" against which injection credit could be drawn in order to maintain full allowables during such times as injection plant shut-downs and similar problems.

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

EDDY COUNTY, NEW MEXICO
TOWNSHIP 17 SOUTH, RANGE 27 EAST, NMPM
Section 35: SE/4, S/2 SW/4, and NE/4 SW/4

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM
Section 2: NE/4 NW/4 and NW/4 NE/4

(5) That the applicant is the operator of the Citgo Empire-Abo Unit, which embraces the above-described lands.

(6) That the Citgo Empire-Abo Unit embraces lands immediately adjacent to the Atlantic Richfield Empire-Abo Unit Area, which area is also under pressure maintenance by the injection of gas, and injection of gas in the Citgo Empire-Abo Unit Area is in the interest of more efficient operation of the pool as a whole.

(7) That the production permitted the Atlantic Richfield Empire-Abo Pressure Maintenance Project is limited to reservoir voidage equal to or less than the average reservoir voidage for the project area for the calendar year 1972.

(8) That the evidence indicates that the portion of the Empire-Abo Pool underlying the Citgo Empire-Abo Unit Area will be more efficiently produced by operating under a reservoir voidage formula similar to that used for said Atlantic Richfield project.

(9) That reinjection of produced gas at a location 990 feet from the South line and 2635 feet from the East line of Section 35, Township 17 South, Range 27 East, will efficiently aid in maintaining pressures in the Abo formation in the unit area, and an injection well at that location should be approved.

(10) That the production from the project area should be limited to the average reservoir voidage for the project area for the calendar year 1972 (2213 reservoir barrels) or 852 barrels of oil per day, whichever is less.

(11) That special rules and regulations for the operation of the Citgo 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 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.

(13) That approval of the application for a pressure maintenance project and the proposed special rules therefor is in the interest of sound conservation practices and will not cause waste nor harm correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Cities Service Oil Company, is hereby authorized to institute a pressure maintenance project in the Empire-Abo Pool in the Citgo Empire-Abo Unit Area, Eddy County, New Mexico, to be designated the Citgo Empire-Abo Unit Pressure Maintenance Project, by the shutting in or curtailment of production from less efficient wells and/or the reinjection of produced gas as raw gas or plant residue gas into the Abo formation.

(2) Initial injection of gas shall be through a well to be drilled at an unorthodox location 990 feet from the South line and 2635 feet from the East line of Section 35, Township 17 South, Range 27 East, NMPM, which location is hereby approved.

(3) 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.

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

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

RULE 1. The project area of the Citgo 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 35: SE/4, S/2 SW/4, and NE/4 SW/4

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM
Section 2: NE/4 NW/4 and NW/4 NE/4

RULE 2. The allowable for the project shall be computed monthly based on the estimated net reservoir voidage for the succeeding month.

RULE 3. 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 calendar year 1972 (2213 reservoir barrels) or 852 barrels of oil per day, whichever is less.

RULE 4. The allowable assigned to the project area may be produced from any well or wells within the project area in any proportion, provided 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 produce in excess of two times top unit allowable for the pool and provided that individual well allowables have been requested in accordance with Rule 5 below.

RULE 5. 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 6. 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.

RULE 7. That the volume of gas required to be injected in any month to maintain average daily reservoir voidage in the project area at 2213 reservoir barrels shall be known as "Reservoir Voidage Balance Gas."

RULE 8. 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" to this order.

RULE 9. A gas "bank" shall be established for the project against which injection credit may be drawn in order to maintain allowable production during such times as injection compressor shutdowns and similar problems. The gas bank shall operate under and be subject to the following provisions:

(a) That volume of gas injected in the project in any month in excess of Reservoir Voidage Balance Gas shall be credited to the gas bank and be carried cumulatively forward.

(b) The gas bank balance shall not exceed a maximum of the average monthly total Reservoir Voidage Balance Gas volumes for the previous three (3) months, not including the month being reported.

(c) The operator shall report monthly to the Commission the status of the gas bank in a form acceptable to the Commission. The report shall be designed to show the status of the gas bank over a twelve (12) month period and shall be revised monthly to a current basis.

(d) The accumulated gas bank may be applied to the injection volume during any future month in which the gas injection volume is less than the Reservoir Voidage Balance Gas volume.

(e) In the event there are insufficient credits accrued to the gas bank to bring actual injection plus applied credits up to the Reservoir Voidage Balance Gas requirement during any given production month, production for that month shall be reduced to an amount commensurate with the average daily reservoir voidage set forth in Rule 3 above. Production beyond this amount shall be considered overproduction and shall be compensated for by underproduction during the following month.

RULE 10. 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 Citgo Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said producing 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:

(a) 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.

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

(c) 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 11. Expansion or contractions of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

(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 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

CITGO EMPIRE ABO UNIT AREA

Reservoir Voidage Formula - Gas Injection Credit

Equation 1: $Vrvb = Qo \quad [Bo + (Rpn - Rs)\ Bg]$

Where:

Vrvb = Reservoir voidage, bbls. per day
Qo = Oil Production rate, Stock tank bbls. per day
Bo = Oil formation volume factor (1), reservoir volumetric bbls/stock tank bbl.
Rpn = Net producing gas-oil ratio, NCF/S.T.B.O.

$$Rpn = Rp\ (1.0 - \frac{Gi}{Gp})$$

Where:

Rp = producing gas-oil ratio, MCF/BO
Gi = daily volume of gas injected MCF/Day
Gp = daily volume of gas produced, MCF/Day

Rs = Solution gas-oil ratio (2), MCF/STBO
Bg = Gas formation volume factor (3), RVB/MCF

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

CITGO EMPIRE ABO UNIT AREA

Table of Fluid Properties

P_{base} = 15.025 psia P_{bp} = 2231 psia T_{res} = 109°F (569° R)

P_r	B_o	B_g	R_s	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/in absolut

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"
Order No. R-4308