Entered October 12, 1982

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. 7678
Order No. R-7103

APPLICATION OF PHILLIPS PETROLEUM
COMPANY FOR A PRESSURE MAINTENANCE
PROJECT, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on September 15, 1982, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 12th day of October, 1982, 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, Phillips Petroleum Company, seeks authority to institute a pressure maintenance project in the Vacuum Grayburg-San Andres Pool by the injection of water into the Grayburg-San Andres formation through two wells on its Mable Lease to be drilled at unorthodox locations as follows:

WELL NO.	UNIT LETTER	LOCATION
4	E	1330' FNL and 1310' FWL
5	E	1330' FNL and 10' FWL

and also through six wells on its M. E. Hall Lease to be drilled at unorthodox locations as follows:

WELL NO.	UNIT LETTER	LOCATION
14	K	2630' FSL and 1330' FWL
15	K	2630' FSL and 2630' FWL
16	J	2630' FSL and 1330' FEL
17	N	1310' FSL and 1330' FWL
18	P	1310' FSL and 10' FEL
19	P	10' FSL and 1310' FEL

all of the above wells being in Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico.

(3) That the applicant also proposes to complete two new producing wells in said Section 35, to be drilled at unorthodox locations as follows:

WELL NO.	UNIT LETTER	LOCATION
12	O	1310' FSL and 2630' FEL
13	P	1310' FSL and 1310' FEL

(4) That the wells described in Findings Nos. (2) and (3) above, together with the presently existing wells on the aforesaid Mable and M. E. Hale leases, and the offsetting injection wells which are to be drilled by other operators in accordance with certain lease-line agreements between applicant and said offsetting operators, will provide a thorough and efficient sweep of the hydrocarbons underlying the entire project and will result in the recovery of otherwise unrecoverable oil and gas, thereby preventing waste.

(5) That the above described injection wells, some of which will be at unorthodox locations along the outer boundaries of the Hale and Mable Leases in accordance with the aforemetioned lease-line agreements, will not impair but will protect correlative rights.

(6) That the applicant seeks to have the entire Hale Lease and the entire Mable Lease designated as the Phillips Hale-Mable Pressure Maintenance Project with the project area to be congruent to the leases upon active injection into all the proposed injection wells.

(7) That the project area should comprise all of the Hale and Mable leases upon active injection into each of the proposed injection wells inasmuch as each 40-acre tract within said leases has been developed by having at least one well completed in the Vacuum Grayburg-San Andres Pool thereon.

(8) That each lease in the project area should receive its own project area allowable, and each lease's project area allowable should be equal to the sum of the individual lease's basic project allowable plus the individual lease's water injection credit allowable.

(9) That the individual lease basic project area allowable should be equal to 80 barrels of oil per day times the number of developed 40-acre proration units on the lease.

(10) That the individual lease water injection credit allowable should be based on the following formula:

$$\text{Water Injection Credit Allowable} = \left[\frac{\text{net water injected}}{\text{basic lease allowable}}\right]^{-1} \times \text{basic allowable}$$

and should be calculated in accordance with the formula and parameters set forth in Exhibits "A" and "B" attached hereto.

(11) That a weighted average project area reservoir pressure should be determined prior to commencement of water injection and at least annually thereafter.

(12) That each lease's project allowable should be permitted to be produced from the wells on that lease in any proportion.

(13) That the Division Director should have the authority to approve, without notice and hearing, the drilling of production and injection wells at unorthodox locations anywhere within the project area, provided however, that no unorthodox location should be closer than 10 feet to any quarter-quarter section line, and provided further, that no such unorthodox location should be closer than 330 feet to the outer boundary of the project unless such location is covered by a lease-line agreement with the operator of the lands offsetting such location.

(14) No well should be placed on water injection in the Hale-Mable Pressure Maintenance Area unless the Division Director has approved such well for injection. Applications for injection approval should be filed in accordance with Rule 701 of the Division Rules and Regulations.

(15) Each newly drilled injection or producing well should be equipped with surface casing (minimum 350 feet) and "production" casing run to total depth (approximately 5000 feet). All casing strings should be cemented to the surface except that in any well in which an intermediate casing string has been run to below the top of the Yates formation and

cemented to the surface, the production string could be cemented back into the base of the intermediate casing.

(16) Injection should be accomplished through tubing installed in a packer set within 100 feet of the uppermost perforation. The injection tubing should be corrosion protected by a non-reactive internal lining or coating and the casing-tubing annulus in each injection well should be filled with an inert fluid and a surface pressure gauge or approved leak detection device shall be attached to the annulus.

(17) The injection wells or system should be equipped with a pressure control device or other acceptable device which will limit the surface injection pressure to no more than 0.2 psi per foot of depth to the uppermost perforation. The Division Director should be authorized to administratively authorize a pressure limitation in excess of the above upon showing by the project operator that such higher pressure will not result in fracturing of the confining strata.

(18) All wells within the individual lease project area should be equipped with risers or in some other acceptable manner as to facilitate the periodic testing of the bradenhead for pressure or fluid production.

(19) The project operator should immediately notify the Supervisor of the Hobbs District Office of the Division of the failure of the tubing or packer in any of said injection wells, the leakage of water or oil from or around any producing well, the leakage of water or oil from or around any plugged and abandoned well within the individual lease project area, or any other evidence of fluid migration from the injection zone, and should take such timely steps as may be necessary or required to correct such failure or leakage.

(20) Each month the project operator should submit to the Division a Pressure Maintenance Project Operator's Report, on a form prescribed by the Division, outlining thereon the data required and requesting allowables for each of the several wells in the Project as well as the total individual lease project area allowable.

(21) The Division should, upon review of the report and after any adjustments deemed necessary, calculate the allowable for the wells on each lease in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated should be assigned to each lease in the Project and, as provided in Finding No. (12) above, could be produced from the wells on that lease in any proportion.

(22) That the applicant, Phillips Petroleum Company, should consult with the Supervisor of the Hobbs District Office of the Division and other affected party and determine the course of action necessary to render the Conoco Inc. State H-35 Well No. 11, located 660 feet from the North line and 2180 feet from the West line of Section 35, Township 17 South, Range 34 East, NMPM, safe for nearby water injection into the San Andres formation.

(23) That an order embodying the above findings and authorizing the proposed pressure maintenance project is in the interest of conservation, will prevent waste and protect correlative rights, and should be approved.

IT IS THEREFORE ORDERED:

(1) That the applicant, Phillips Petroleum Company, is hereby authorized to institute a Vacuum Grayburg-San Andres pressure maintenance project on its Mable Lease, comprising the W/2 NW/4 of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico, and on its M. E. Hale Lease, comprising the E/2 SW/4 and SE/4 of said Section 35, by the injection of water into the Grayburg and San Andres formations through eight injection wells to be drilled at unorthodox locations (also hereby approved) as follows:

LEASE	WELL NO.	UNIT	LOCATION
Mable	4	E	1330' FNL and 1310' FWL
Mable	5	E	1330' FNL and 10' FWL
M.E. Hale	14	K	2630' FSL and 1330' FWL
M.E. Hale	15	K	2630' FSL and 2630' FWL
M.E. Hale	16	J	2630' FSL and 1330' FEL
M.E. Hale	17	N	1310' FSL and 1330' FWL
M.E. Hale	18	P	1310' FSL and 10' FEL
M.E. Hale	19	P	10' FSL and 1310' FEL

all in Section 35, Township 17 South, Range 34 East, NMPM.

(2) That the applicant is hereby authorized to drill two producing wells at the following unorthodox locations in Section 35, Township 17 South, Range 34 East, NMPM:

LEASE	WELL NO.	UNIT	LOCATION
M.E. Hale	12	O	1310' FSL and 2630' FEL
M.E. Hale	13	P	1310' FSL and 1310' FEL

(3) That the project herein authorized shall be known as the Phillips Hale-Mable Vacuum G-SA Pressure Maintenance Project

and shall be governed by special rules and regulations hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE
PHILLIPS HALE-MABLE VACUUM G-SA
PRESSURE MAINTENANCE PROJECT

RULE 1. The Phillips Hale-Mable Vacuum G-SA Pressure Maintenance Project shall, in the absence of unitization, actually be considered two separate and distinct pressure maintenance projects, one on the Mable Lease comprising the W/2 NW/4 of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico, and the other on the M. E. Hale Lease comprising the E/2 SW/4 and SE/4 of said Section 35. Allowables and Water Injection Credits, as well as production accounting, shall be on an individual lease basis.

RULE 2. The overall Project Area of the Hale-Mable Vacuum G-SA Pressure Maintenance Project shall consist of those proration units within the M. E. Hale and Mable leases, upon which is located an injection well and any directly or diagonally offsetting proration unit which contains a producing well.

RULE 3. The individual lease project area shall receive a project area allowable, and said project area allowable shall be the sum of the individual lease basic project area allowable plus the individual lease water injection credit allowable.

RULE 4. The individual lease basic project area allowable shall be equal to 80 barrels of oil per day times the number of developed 40-acre proration units in the lease project area.

RULE 5. The individual lease water injection credit allowable shall be contingent upon full reservoir voidage replacement of all produced fluids and shall be based upon the following formula:

$$\text{Water Injection Credit Allowable} = \left[\frac{\text{net water injected}}{\text{basic project area}}\right]_{\text{reservoir voidage}} -1 \times \text{basic project area allowable}$$

The water injection credit allowable shall be calculated in accordance with the procedures and parameters depicted on Exhibits "A" and "B".

In no event shall the individual lease water injection credit allowable be less than zero, i.e., negative numbers derived from application of the above formula shall be ignored.

RULE 6. The weighted average project area reservoir pressure shall be determined prior to commencement of injection of water into the reservoir and at least annually thereafter. The weighted average project area pressure shall be determined from the pressures in representative wells selected by the project operator and the Supervisor of the Hobbs District Office of the Division.

RULE 7. The individual lease project area allowable may be produced from the wells within the individual lease project area in any proportion, provided however, that any proration unit outside the individual lease project area shall not be permitted to produce in excess of 80 barrels of oil per day.

RULE 8. Those wells within the Hale-Mable Leases that are not included within the project area as defined above, shall be prorated in accordance with the Rules and Regulations of the Division.

RULE 9. The Division Director shall have the authority to approve, without notice and hearing, the drilling of wells at unorthodox locations anywhere within the project boundary, provided that no such unorthodox location shall be closer than 330 feet to the outer boundary of the project, unless such well is covered by a lease-line agreement with the operator of the lands offsetting such well, and a copy of the lease-line agreement accompanies the application for such unorthodox location, or unless such offset operator has waived objection to the proposed unorthodox location in writing, and his waiver accompanies the application.

RULE 10. No well other than those originally authorized for injection shall be placed on water injection in the Hale-Mable Vacuum G-SA Pressure Maintenance Project unless the Division Director has approved such well for injection. Applications for injection approval shall be filed in accordance with Rule 701 of the Division Rules and Regulations.

RULE 11. Each newly drilled injection or producing well shall be equipped with surface casing (minimum 350 feet) and "production" casing run to total depth (approximately 5000 feet). All casing strings shall be cemented to the surface except that in any well in which an intermediate casing string has been run to below the top of the Yates formation and

cemented to the surface, the production string may be cemented back into the base of the intermediate casing.

RULE 12. Injection shall be accomplished through tubing installed in a packer set within 100 feet of the uppermost perforation. The injection tubing shall be corrosion protected by a non-reactive internal lining or coating. The casing-tubing annulus in each injection well shall be filled with an inert fluid and a surface pressure gauge or approved leak detection device shall be attached to the annulus.

RULE 13. The injection wells or system shall be equipped with a pressure control device or other acceptable device which will limit the surface injection pressure to no more than 0.2 psi per foot of depth to the uppermost perforation. The Division Director may administratively authorize a pressure limitation in excess of the above upon showing by Phillips Petroleum Company that such higher pressure will not result in fracturing of the confining strata.

RULE 14. All wells within the individual lease project area shall be equipped with risers or in some other acceptable manner as to facilitate the periodic testing of the bradenhead for pressure or fluid production.

RULE 15. The project operator shall immediately notify the Supervisor of the Hobbs District Office of the Division of the failure of the tubing or packer in any of said injection wells, the leakage of water or oil from or around any producing well, the leakage of water or oil from or around any plugged and abandoned well within the individual lease project area, or any other evidence of fluid migration from the injection zone, and shall take such timely steps as may be necessary or required to correct such failure or leakage.

RULE 16. Each month the project operator shall submit to the Division a Pressure Maintenance Project Operator's Report, on a form prescribed by the Division, outlining thereon the data required and requesting allowables for each of the several wells in the Project as well as the total individual lease project area allowable.

RULE 17. The Division shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for the wells on each lease in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to each lease in the Project and, as provided under Rule 7 above, may be produced from the wells on that lease in any proportion.

(4) That the applicant, Phillips Petroleum Company, shall consult with the Supervisor of the Hobbs District Office of the Division and with any other affected party and determine the course of action necessary to ensure the integrity of the Conoco Inc. State H-35 Well No. 11, located 660 feet from the North line and 2180 feet from the West line of Section 35, Township 17 South, Range 34 East, NMPM, prior to placing Mable Wells Nos. 4 or 5, or M. E. Hale Wells Nos. 14 or 15, on active water injection.

(5) 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

HALE - MABLE
PRESSURE MAINTENANCE PROJECT

VACUUM GRAYBURG-SAN ANDRES POOL, LEA COUNTY, NEW MEXICO

_____ LEASE

WATER INJECTION CREDIT ALLOWABLE CALCULATION DATA

ATTACHMENT TO_____, 19__, REPORT

$$\text{Water Injection Credit Allowable} = \left[\frac{W_i - W_p}{BPAA\left\{\beta_o + \frac{(R_p - R_s)}{(1{,}000)}\beta_g\right\}} - 1 \right] BPAA$$

W_i = _____ = Average daily water injection, barrels per day, project area only.

W_p = _____ = Average daily water produced, barrels per day, project area only.

BPAA = _____ = Basic project area allowable, 80 bopd X _____ (number of developed 40-acre tracts in project area).

_____ = Weighted average project area reservoir pressure, psig, from_____, 19___, survey data.

β_o _____ = Oil formation volume factor, reservoir barrels per stock tank barrel (Exhibit B).

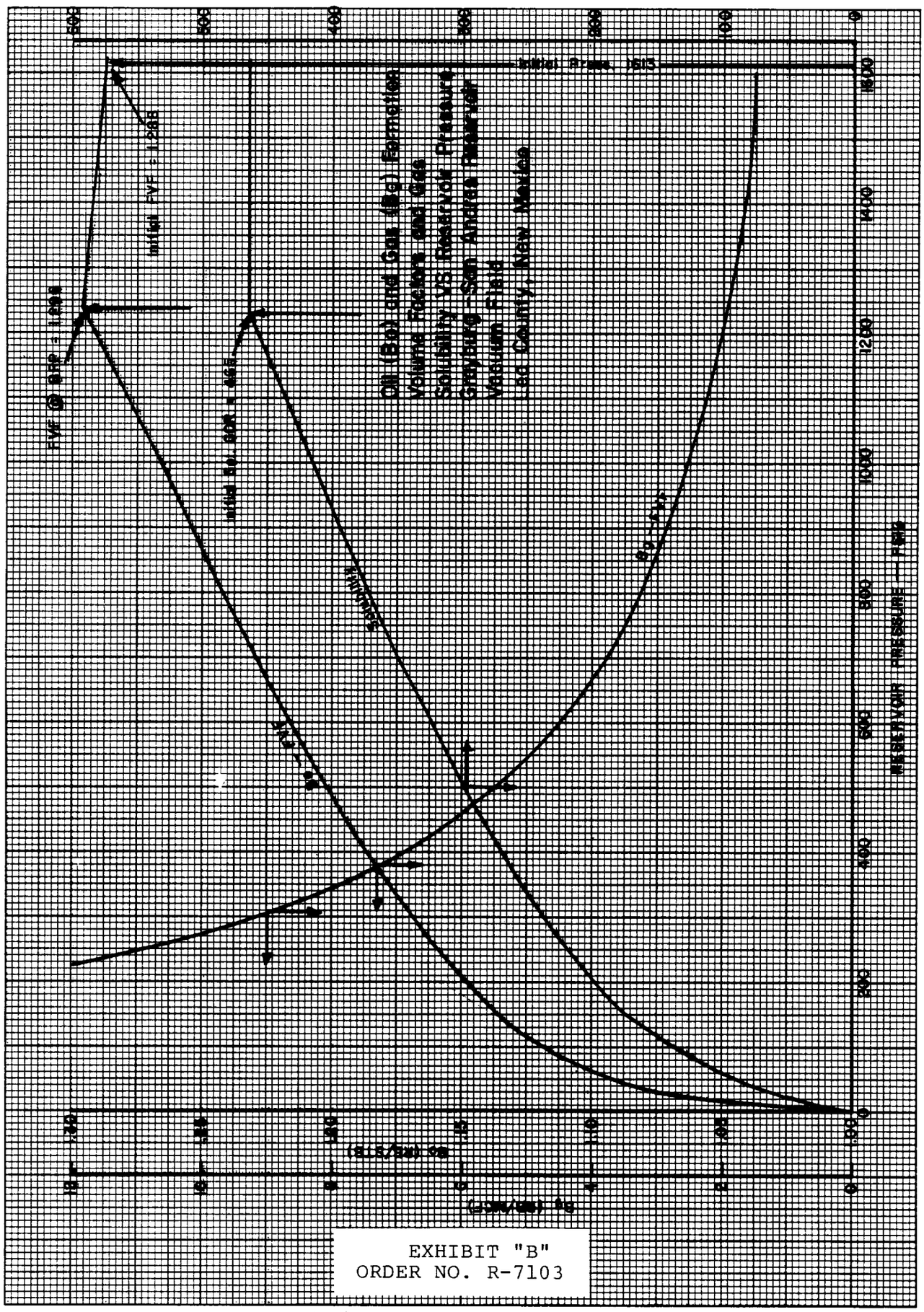
R_p _____ = Producing gas-oil ratio, cubic feet per barrel, project area only.

R_s _____ = Solution gas-oil ratio, cubic feet per barrel, (Exhibit B).

β_g _____ = Gas formation volume factor, reservoir barrels per Mcf (Exhibit B).

Water injection credit allowable for_____, 19__. = _____ barrels of oil per day.

EXHIBIT "A"
ORDER NO. R-7103


SOLUTION GAS — STD. CU. FT./STB
Initial Pressure, 1613
Initial FVF = 1.268
FVF @ 600 = 1.098
Initial Sol. @ 600 = 455
Oil (Bo) and Gas (Bg) Formation Volume Factors and Gas Solubility vs Reservoir Pressure
Grayburg-San Andres Pool
Vacuum Field
Lea County, New Mexico
Saturation
Bo
Rs
Bg
RESERVOIR PRESSURE — PSIG
(RCF/STB) Bg
(BBL/STB) Bo
EXHIBIT "B"
ORDER NO. R-7103