

STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION

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

*CASE NO. 11523*  
*ORDER NO. R-10599-B*

**APPLICATION OF PHILLIPS PETROLEUM COMPANY FOR APPROVAL OF A PRESSURE MAINTENANCE PROJECT, TO QUALIFY SAID PROJECT FOR THE RECOVERED OIL TAX CREDIT PURSUANT TO THE "NEW MEXICO ENHANCED OIL RECOVERY ACT", AND FOR THREE UNORTHODOX OIL WELL LOCATIONS, LEA COUNTY, NEW MEXICO.**

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on May 2, 1996, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

NOW, on this 27<sup>th</sup> day of September, 1996, the Division Director, having considered the record and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) At the time of the hearing Division Case Nos. 11522 and 11523 were consolidated for the purpose of testimony.

(3) By Division Order No. R-10599, issued in Case 11522 and dated May 10, 1996, as amended by Division Nunc Pro Tunc Order No. R-10599-A, dated September 16, 1996, the State-35 Unit Agreement and Area was approved for an area comprising 560 acres, more or less, of State lands underlying the N/2, E/2 SW/4, and SE/4 of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico. The "Unitized Formation" for this unit includes that stratigraphic interval underlying the Unit Area in the Vacuum-Grayburg San Andres Pool that extends from a measured depth of 4,000 feet (+ 21 feet sub-sea datum) to 4,950 feet (-929 feet sub-sea datum), both depths

as identified on the Lane Wells Acoustic Log, dated March 12, 1964, for the Phillips M. E. Hale Well No. 8 (API No. 30-025-20780), located 660 feet from the South line and 560 feet from the East line (Unit P) of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico.

(4) The applicant in this matter, Phillips Petroleum Company ("Phillips"), seeks the following:

(a) authority to institute a tertiary recovery project or pressure maintenance project within its aforementioned State-35 Unit by the injection of water and carbon dioxide ("CO<sub>2</sub>") into both the Grayburg and San Andres formations of the Vacuum Grayburg-San Andres Pool through sixteen (16) certain wells;

(b) approval for the drilling of three producing wells within said Unit Area at unorthodox oil well locations; and,

(c) to qualify this project for the recovered oil tax rate pursuant to the "New Mexico Enhanced Oil Recovery Act" (Law 1992, Chapter 38, Sections 1 through 5).

(5) Phillips as the proposed operator of the State-35 Unit Tertiary Recovery/Pressure Maintenance Project Area ("EOR Project Area") intends to recover additional oil by means of combined water and CO<sub>2</sub> gas injection ("WAG") into the Grayburg and San Andres formations of the Vacuum Grayburg-San Andres Pool within said Unit Area with seven (7) interior injection wells, nine (9) leaseline injection wells and sixteen (16) producing wells.

(6) Within the proposed 560-acre EOR Project Area:

(a) the Phillips operated Mable lease comprising the W/2 NW/4 of said Section 35 and the Phillips operated Hale lease comprising the E/2 SW/4 and SE/4 of said Section 35 were the subject of Division Order Nos. R-7103, which order authorized the Phillips Hale-Mable Vacuum Pressure Maintenance Project by means of water injection within this 320 acres, and R-7103-A, which authorized the injection of polyacrylamide polymers into the Phillips Hale-Mable Vacuum Pressure Maintenance Project Area; and,

(b) Conoco, Inc. was granted similar approval for its Conoco State H-35 Vacuum Pressure Maintenance Project comprising the NE/4 and E/2 NW/4 of said Section 35 by Division Order Nos. R-7182 and R-7182-A (Phillips has since become operator of the H-35 lease).

(7) There are currently four active secondary recovery projects within the Vacuum Grayburg-San Andres Pool that immediately offset the proposed 560-acre EOR Project Area:

(a) the Texaco Exploration and Production, Inc. Central Vacuum Unit Pressure Maintenance Project (see Division Order Nos. R-5530, R-5530-A, R-5530-B, and R-5530-C), which is also a tertiary recovery project (see Division Order No. R-5530-D) in the S/2 of Section 25 and all of Section 30, both in Township 17 South, Range 34 East, NMPM, Central Vacuum Unit Area (approved by Division Order No. R-5496), Lea County, New Mexico;

(b) the Texaco Exploration and Production, Inc. Vacuum Grayburg-San Andres Pressure Maintenance Project (see Division Order Nos. R-4442 and R-6094), which is also a tertiary recovery project (see Division Order Nos. R-7010 and R-7010-A) comprising the W/2 SW/4 of Section 35, Township 17 South, Range 34 East, NMPM, and Sections 1, 2, the NE/4 NE/4 of Section 11, and the N/2 NW/4 of Section 12, Township 18 South, Range 34 East, NMPM, all within the Vacuum Grayburg San Andres Unit Area (approved by Division Order Nos. R-4433 and R-4433-A, as expanded by letter from the New Mexico Oil Conservation Division dated December 9, 1980 and by letter from the new Mexico State Land Office dated February 2, 1981), Lea County, New Mexico;

(c) the Mobil Producing Texas and New Mexico, Inc. Bridges-State Waterflood Project (see Division Order Nos. R-1244, R-3496, R-3984, R-3984-A, R-4385, R-7361, and R-7361-A), a portion of which is also a tertiary recovery project (see Division Order No. R-7405) comprising in part all of Section 26 and the E/2 of Section 27, both in Township 17 South, Range 34 East, NMPM, Lea County,

New Mexico; and,

(d) the Texaco Exploration and Production, Inc. West Vacuum Unit Waterflood Project (see Division Order Nos. R-3008 and R-4234) comprising in part all of Section 34, Township 17 South, Range 34 East, NMPM, West Vacuum Unit Area (approved by Division Order No. R-3007, as amended by Order No. R-3007-A), Lea County, New Mexico.

(8) Testimony presented by Phillips indicates that as of December 31, 1995, cumulative primary and secondary oil recovery from the proposed EOR Project Area had been 17,207,369 barrels of oil with an estimated additional one million barrels of oil to be recovered under the current mode of operations.

(9) Phillips further testified that the proposed EOR Project Area is currently producing at a rate of approximately 420 BOPD with approximately 95% watercut from sixteen (16) active producers. Further, there are currently ten (10) active lease line and four (4) active interior injector wells contributing to the current mode of operations within the two existing pressure maintenance projects within the subject 560 acres.

(10) Phillips seeks to institute tertiary recovery operations within the proposed EOR Project Area by means of a significant change in the process used for the displacement of crude oil by the initiation of the injection of water-alternate-gas injection ("WAG") by using water and carbon dioxide ("CO<sub>2</sub>") in alternating slugs of produced gas and CO<sub>2</sub> and slugs of water to be injected at a 1.4 to 1 ratio with an estimated total of 45 BCF of CO<sub>2</sub> gas to be utilized or 40% pore volume ("PV") slug.

(11) As part of this EOR Project, Phillips intends to drill another six infill producing wells of which three are to be located at locations considered to be unorthodox pursuant to Rule 104.C(1) of the General Rules and Regulations of the New Mexico Oil Conservation Division ("Division"), revised by Division Order No. R-10533, issued by the Oil Conservation Commission in Case 11,351 on January 18, 1996, however Rule 104.F(1) provides for an administrative process whereby any well within an active secondary, enhanced, or pressure maintenance project can be granted authorization in most instances by submitting a Division Form C-102; therefore, that portion of this application for unorthodox locations should be dismissed at this time and Phillips can resubmit to the supervisor of the Hobbs District Office of the Division those requests for unorthodox locations applicable to said General Rule 104.F(1).

(12) The estimated amount of recoverable oil attributed to a positive production response from the expanded use of enhanced oil recovery technology for this proposed EOR Project is an estimated 7,122,000 barrels of additional oil.

(13) The applicant testified that the initiation of pressure maintenance operations utilizing the methodology set forth in Finding Paragraph No. (10) above, should result in the recovery of an additional 7,122,000 barrels of oil for a projected cost of approximately \$8,130,000.00 which includes the drilling of the 6 additional infill producing wells and 2 replacement wells, converting 7 interior and 9 lease-line wells to water-alternate-gas (WAG) injection, construction of CO<sub>2</sub> compression and distribution facilities and upgrading of the present production and water injection facilities.

(14) At the time of the hearing Phillips requested a project allowable for the H-35 Unit of 5,000 barrels of oil per day in order to provide operational flexibility to maximize recovery from the unit and thereby prevent waste and protect correlative rights.

(15) In accordance with Division General Rule 701, the applicant provided evidence, exhibits and testimony which justifies the approval of the 16 proposed WAG injection wells all as identified on Exhibit "A" attached hereto and made a part hereof.

(16) Maximum injection pressures have been established for this project based upon actual San Andres fracture gradients and therefore the injection wells or pressurization system should be initially equipped with a pressure control device or acceptable substitute which will limit the surface injection pressure to no more than 1850 psig.

(17) Further evidence presented by Phillips indicated that the subject "Project Area" meets all the criteria for certification by the Division as a qualified "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (Laws 1992, Chapter 38, Sections 1 through 5).

(18) The certified "EOR Project Area" should initially comprise the area within the H-35 Unit Area as described in Finding Paragraph No. (3) above, provided, however, that the "Project Area" eligible for the recovered oil tax rate may be contracted and reduced dependent upon the evidence presented by the applicant in its demonstration of the occurrence of a positive production response.

(19) To be eligible for the EOR tax credit, the operator should advise the Division when WAG injection commences in the project area and requests the Division certify such phases or area to the New Mexico Taxation and Revenue Department.

(20) At such time as a positive production response occurs from WAG injection operations and within five years from the date of the Certificate of Qualification, the applicant must apply to the Division for certification of positive production response, which application shall identify the area actually benefitting from enhanced recovery operations. The Division may review the application administratively or set it for hearing. Based upon evidence presented, the Division will certify to the Department of Taxation and Revenue those lands which are eligible for the credit.

(21) The proposed tertiary recovery/pressure maintenance project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(22) The applicant testified that there are no "problem wells" within the one-half mile "area of review" and a review of applicant's Form C-108 confirms that all plugged and abandoned wells and all producing wells are cemented in a manner adequate to confine the injected fluid to the proposed injection interval.

(23) Prior to commencing injection operations, the applicant should be required to submit to the Santa Fe Office of the Division an executed copy of an Injection Lease-Line Agreement with the offset projects currently operated by Texaco in the West Vacuum Unit, the Vacuum Grayburg San Andres Unit and the Central Vacuum Unit.

(24) If not previously equipped each of the injection wells shown on Exhibit "A" should be accomplished through internally plastic-lined tubing installed in a packer set within 100 feet of the uppermost injection perforation or casing shoe; the casing-tubing annulus should be filled with an inert fluid; and a gauge or approved leak-detection device should be attached to the annulus in order to determine leakage in the casing, tubing or packer.

(25) The operator should give advance notification to the supervisor of the Hobbs District Office of the Division if applicable of the date and time of the installation of any new injection equipment and if applicable of the mechanical integrity pressure tests in order that the same may be witnessed.

(26) The application should be approved and the project should be governed by the provisions of Rule Nos. 701 through 708 of the Oil Conservation Division Rules and Regulations.

(27) Approval of this application will prevent waste, result in the recovery of hydrocarbons which might not otherwise be recovered, protect corrective rights and promote the interests of conservation.

**IT IS THEREFORE ORDERED THAT:**

(1) The applicant, Phillips Petroleum Company ("Phillips"), is hereby authorized to institute a tertiary recovery/pressure maintenance project by means of combined water and carbon dioxide ("CO<sub>2</sub>") gas injection ("WAG") in its State-35 Unit Area (approved by Division Order Nos. R-10599 and R-10599-A) comprising 560 acres, more or less, underlying the N/2, E/2 SW/4, and SE/4 of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico, by the injection of water and carbon dioxide ("CO<sub>2</sub>") into the Grayburg and San Andres formations of the Vacuum Grayburg-San Andres Pool, through the gross perforated and/or open hole interval that extends from a measured depth of 4,000 feet (+ 21 feet sub-sea datum) to 4,950 feet (-929 feet sub-sea datum), both depths as identified on the Lane Wells Acoustic Log, dated March 12, 1964, for the Phillips M. E. Hale Well No. 8 (API No. 30-025-20780), located 660 feet from the South line and 560 feet from the East line (Unit P) of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico, into sixteen (16) certain wells, all of which are existing, as shown on Exhibit "A", attached hereto and made a part hereof.

**IT IS FURTHER ORDERED THAT:**

(2) Any previous injection authority not in conflict with the provisions set forth in this order shall remain in full force and effect.

(3) WAG injection operations for the 16 subject injection wells shown on Exhibit "A" shall be accomplished through plastic lined tubing installed in a packer set within approximately 100 feet of the uppermost injection perforation or casing shoe; the casing-tubing annulus shall be filled with an inert fluid and a gauge or approved leak-detection device shall be attached to the annulus in order to determine leakage in the casing, tubing or packer.

(4) The 16 WAG injection wells or pressurization system shall be equipped with a pressure control device or acceptable substitute which will limit the surface injection pressure to not more than 1850 psig.

(5) The Division Director shall have the authority to administratively authorize a pressure limitation in excess of the above pressure limit upon a showing by the operator that such higher pressure will not result in the fracturing of the injection formation or confining strata.

(6) Prior to commencing injection operations into the wells identified on Exhibit "A", the casing in each well shall be pressure-tested throughout the interval from the surface down to the proposed packer setting depth, to assure the integrity of such casing.

(7) Prior to commencing WAG injection operations, the applicant shall submit to the Santa Fe Office of the Division an executed copy of an Injection Lease-Line Agreement with Texaco Exploration and Producing, Inc., the operator of the offsetting waterflood/pressure maintenance project.

(8) The operator shall give advance notification to the Supervisor of the Hobbs District Office of the Division of the date and time of the installation of any applicable WAG injection equipment and of the mechanical integrity pressure tests, in order that the same may be witnessed.

(9) The operator shall immediately notify the supervisor of the Hobbs District Office of the Division of the failure of the tubing, casing or packer in any of the injection wells, the leakage of water, natural gas, CO<sub>2</sub>, or oil from or around any producing well, or the leakage of water, natural gas, CO<sub>2</sub>, or oil from any plugged and abandoned well within the project area, and shall take such steps as may be necessary to correct such failure or leakage.

(10) The subject tertiary recovery/pressure maintenance project is hereby designated the State-35 Unit Tertiary Recovery/Pressure Maintenance Project and shall be governed by the provisions of Rules Nos. 701 through 708 of the Oil Conservation Division Rules and Regulations.

(11) Monthly progress reports of the tertiary recovery/pressure maintenance project herein authorized shall be submitted to the Division in accordance with Rules 706 and 1115 of the Division Rules and Regulations.

(12) The project allowable shall be established at 5,000 barrels of oil per day which may be produced from any combination of wells in the unit including the transfer of allowables between or among wells within the project area.

(13) The subject tertiary recovery/pressure maintenance project is hereby certified as a qualified "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (Laws 1992, Chapter 38, Sections 1 through 5).

(14) The certified and approved "EOR Project Area" shall initially coincide with the boundaries of the State-35 Unit, described in Decretory Paragraph No. (1), above, provided however, the "EOR Project Area" eligible for the recovered oil tax rate may be contracted and reduced dependent upon the evidence presented by the applicant in its demonstration of the occurrence of a positive production response.

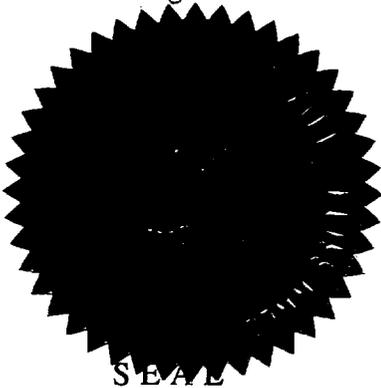
(15) To be eligible for the EOR credit, prior to commencing WAG injection operations, the operator must request from the Division a Certificate of Qualification, which certificate will specify the proposed project area as described above.

(16) At such time as a positive production response occurs and within five years from the date of the Certificate of Qualification, the operator must apply to the Division for certification of positive production response, which application shall identify the area actually benefitting from enhanced recovery operations. The Division may review the application administratively or set it for hearing. Based upon evidence presented, the Division will certify to the Department of Taxation and Revenue those lands and wells which are eligible for the credit.

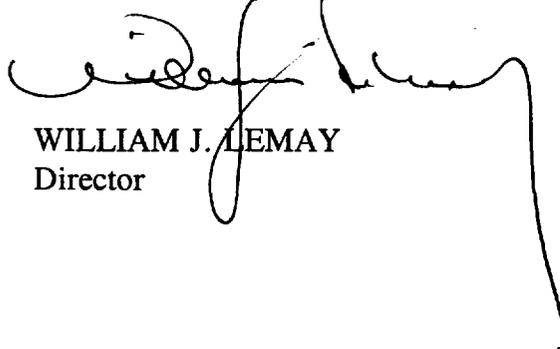
(17) The injection authority granted herein for the 16 WAG injection wells shall terminate one year after the effective date of this order if the operator has not commenced WAG injection operations into these wells, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

(18) Jurisdiction is hereby 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



WILLIAM J. LEMAY  
Director

EXHIBIT "A"  
CASE NO. 11523  
ORDER NO. R-10599-A  
PHILLIPS PETROLEUM COMPANY  
STATE -35 UNIT TERTIARY RECOVERY/PRESSUREMAINTENANCEE REPORT

PROPOSED STATE-35 UNIT "WAG" INJECTION WELLS TO BE OPERATED BY PHILLIPS PETROLEUM COMPANY LOCATED IN SECTION 35, TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM, VACUUM GRAYBURG SAN ANDRES POOL, LEA COUNTY, NEW MEXICO

FORMER WELL NAME AND NUMBER	API NO.	NEW WELL DESIGNATION	LOCATION FOOTAGE (UNIT)	CURRENT STATUS	PREVIOUS INJECTION AUTHORITY
STATE "H-35" NO. 15	30-025-28047	STATE "35" NO. 6W	1295' FNL - 2615' FWL (C)	TA INJ.	R-7182
STATE "H-35" NO. 14	30-025-28046	STATE "35" NO. 7W	1345' FNL - 1210' FEL (H)	PRODUCING	R-7182
M.E. HALE NO. 14	30-025-28057	STATE "35" NO. 14W	2630' FSL - 1330' FWL (K)	INJECTION	R-7103
M.E. HALE NO. 15	30-025-28058	STATE "35" NO. 16W	2630' FS & WL (K)	INJECTION	R-7103
M.E. HALE NO. 16	30-025-28059	STATE "35" NO. 17W	2630' FSL - 1330' FEL (J)	INJECTION	R-7103
M.E. HALE NO. 17	30-025-28060	STATE "35" NO. 23W	1310' FSL - 1330' FWL (N)	INJECTION	R-7103
M.E. HALE NO. 12	30-025-28055	STATE "35" NO. 25W	1260' FSL - 2630' FEL (O)	INJECTION	PMX-170
M.E. HALE NO. 21	30-025-30615	STATE "35" NO. 26W	1194' FSL - 2040' FEL (O)	PRODUCING	N/A
M.E. HALE NO. 13	30-025-28056	STATE "35" NO. 27W	1360' FSL - 1210' FEL (I)	INJECTION	PMX-170
M.E. HALE NO. 18	30-025-28061	STATE "35" NO. 29W	1410' FSL - 10' FEL (I)	INJECTION	R-7103
M.E. HALE NO. 19	30-025-28062	STATE "35" NO. 37W	10' FSL - 1210' FEL (P)	INJECTION	R-7103

PROPOSED NON-UNIT "WAG" INJECTION WELLS TO BE OPERATED BY TEXACO EXPLORATION AND PRODUCING, INC. LOCATED IN EITHER SECTION 36, TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM OR IN SECTION 2, TOWNSHIP 18 SOUTH, RANGE 34 EAST, NMPM, VACUUM GRAYBURG SAN ANDRES POOL, LEA COUNTY, NEW MEXICO:

WELL NAME AND NUMBER	API NO.	FOOTAGE	LOCATION	UNIT SECTION	CURRENT STATUS	PREVIOUS INJECTION AUTHORITY
CENTRAL VACUUM UNIT WELL NO. 159W	30-025-27969	1310' FNL - 100' FWL	(D)	36	INJECTION	PMX-121
CENTRAL VACUUM UNIT WELL NO. 160W	30-025-27970	2602' FNL - 35' FWL	(E)	36	INJECTION	PMX-121
CENTRAL VACUUM UNIT WELL NO. 161W	30-025-27971	180' FSL - 10' FWL	(M)	36	INJECTION	PMX-121
VACUUM GRAYBURG SAN ANDRES UNIT WELL NO. 62W	30-025-27973	65' FNL - 1330' FWL	(C)	2	INJECTION	PMX-120
VACUUM GRAYBURG SAN ANDRES UNIT WELL NO. 63W	30-025-27974	50' FNL - 2630' FEL	(B)	2	INJECTION	PMX-120