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. 11929
Order No. R-4430-B

APPLICATION OF MOBIL EXPLORATION & PRODUCING TX & NM INC. FOR THREE HORIZONTAL INJECTION WELLS, AN ADMINISTRATIVE PROCEDURE FOR APPROVAL OF FUTURE HORIZONTAL INJECTION WELLS WITHIN THE NORTH VACUUM ABO UNIT PRESSURE MAINTENANCE PROJECT, AND QUALIFICATION OF THESE WELLS FOR THE RECOVERED OIL TAX CREDIT PURSUANT TO THE "NEW MEXICO OIL RECOVERY ACT," LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 a.m. on February 19, 1998, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

Now, on this 25th day of August, 1998, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner,

FINDS THAT:

(1) Due public notice has been given and the Division has jurisdiction of this case and its subject matter.

(2) The North Vacuum Abo Unit, operated by Mobil Exploration & Producing TX & NM Inc. ("Mobil"), currently comprises the following described State lands in Lea County, New Mexico:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM

Section 2:	N/2 SW/4
Section 3:	SE/4
Section 10:	NE/4 and S/2
Section 11:	All
Section 12:	NE/4 and S/2
Sections 13 and 14:	All
Section 15:	E/2
Section 22:	E/2
Sections 23 and 24:	All

Section 25:	N/2 NE/4, SW/4 NE/4, and NW/4
Section 26:	All
Section 27:	E/2

TOWNSHIP 17 SOUTH, RANGE 35 EAST, NMPM

Section 19:	W/2 NW/4.

(3) By Order No. R-4430, issued in Case No. 4831 and dated October 27, 1972, as amended by Order No. R-4430-A, dated November 30, 1973, Mobil was authorized to initiate the Mobil North Vacuum Abo Pressure Maintenance Project within the above-described North Vacuum-Abo Unit Area in Lea County, New Mexico, by the injection of gas and water into the North Vacuum-Abo Pool through 34 wells. Order No. R-4430, as amended, also included "*Special Rules and Regulations for the Mobil North Vacuum-Abo Pressure Maintenance Project.*"

(4) The North Vacuum-Abo Pool itself is governed by special pool rules adopted in Order No. R-2421, as amended, which provide for 80-acre spacing.

(5) At this time Mobil, pursuant to Division General Rule 701.F. and to the New Mexico Enhanced Oil Recovery Act, seeks:

(i) approval of an expansion of the North Vacuum Abo Pressure Maintenance Project by means of a significant change in process for the displacement of crude oil with water that includes the conversion of three existing vertical injection wells into horizontal injection wells;

(ii) an administrative review process for future horizontal injection wells within the North Vacuum Abo Pressure Maintenance Project Area; and

(iii) an Order, pursuant to the "Rules and Procedures for Qualification of Enhanced Oil Recovery Projects and Certification for the Recovered Oil Tax Rate," adopted in Order R-9708, certifying that an area comprising portions of Sections 23, 26, and 27, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico containing the eight production wells listed in Exhibit "A", qualifies as an expanded Enhanced Oil Recovery ("EOR") project, certifying that a positive production response occurred in those wells in December 1997, and certifying that the recovered oil tax rate shall apply to crude oil produced from those wells beginning on January 1, 1998.

(6) Injection operations within the project area for pressure maintenance were initiated by Mobil during the 1970s on a 160-acre five-spot injection pattern. An infill drilling program from 1983 to 1986 resulted in effective 40-acre well spacing and an 80-acre five-spot injection pattern. Primary oil recovery from the project area has been 4,300,000 barrels of oil. As of December 31, 1997, total secondary oil production from the project area was 26,900,000 barrels.

(7) Within the project area there are currently 79 active production wells and 76 active injection wells. The current rate of production from the project area is approximately 1738 barrels of oil per day and 4727 barrels of water per day.

(8) The following five existing North Vacuum Abo Unit wells have previously been recompleted with high angle/horizontal drainholes that extend into the main pay zone of the North Vacuum-Abo Pool, designated by Mobil as the Abo "D" interval:

(a) Well No. 136 (**API No. 30-025-23462**), an injection well approved by Division Administrative Order PMX-138, dated November 12, 1985, as amended on April 14, 1992, located on the surface 660 feet from the North line and 860 feet from the West line (Unit D) of Section 26, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico;

(b) Well No. 156 (**API No. 30-025-23696**), an injection well also authorized by Division Administrative Order PMX-138, dated November 12, 1985, as amended on April 14, 1992, located on the surface 1893 feet from the South line and 1800 feet from the East line (Unit J) of Section 23, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico;

(c) Well No. 213 (**API No. 30-025-23982**), one of the original injection wells approved by Order No. R-4430, as amended, located on the surface 460 feet from the South line and 1980 feet from the West line (Unit N) of Section 23, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico;

(d) Well No. 244 (**API No. 30-025-28603**), a producing well located on the surface 589 feet from the South line and 1859 feet from the East line (Unit O) of Section 23, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico; and,

(e) Well No. 278 (**API No. 30-025-29235**), a producing well located on the surface 500 feet from the South line and 650 feet from the West line (Unit M) of Section 23, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico.

(9) Under the authority of Division Administrative Order DD-177(H), dated June 30, 1997, Mobil sidetracked vertical production Well Nos. 244 and 278 and began operating them as horizontal production wells on September 11, 1997 and August 16, 1997, respectively. The bottom or end of each horizontal producing wellbore is located as follows:

(a) Well No. 244: 589 feet from the South line and 1859 feet from the East line (Unit O) of Section 23; and

(b) Well No. 278: 431 feet from the North line and 188 feet from the East line (Unit A) of Section 27.

(10) After sidetracking vertical injection Well Nos. 136, 156 and 213 and obtaining temporary permission from the Division to conduct active water injection operations, Mobil commenced water injection into Well No. 136 on December 27, 1997; Well No. 156 on December 31, 1997; and Well No. 213 on January 6, 1998.

(11) The three horizontal injection wells, which were directionally drilled under the provisions of Division Rule 111, revised by Division Order No. R-10817 in Case No. 11762 on July 14, 1997, are currently completed in the following manner:

(a) Well No. 136: A window was cut in the 5-1/2 inch production casing at a depth of 8395 feet. Drilling kicked-off at 8403 feet in a northeasterly direction, built angle and proceeded horizontally for an approximate distance of 879 feet to an end point located 217 feet from the North line and 1618 feet from the West line (Unit C) of Section 26. The well was completed with 8355 feet of 2-3/8 inch plastic lined tubing in a packer set at a depth of 8349 feet. Injection is into the open-hole interval.

(b) Well No. 156: A window was cut in the 5-1/2 inch production casing at a depth of 8348 feet. Drilling kicked-off at 8354 feet in a southeasterly direction, built angle and proceeded horizontally for an approximate distance of 960 feet to an end point located 1231 feet from the South line and 1104 feet from the East line (Unit P) of Section 23. The well was completed with 8641 feet of 2-3/8 inch plastic lined tubing in a packer set at a depth of 8604 feet. Injection is into the open-hole interval.

(c) Well No. 213: A window was cut in the 5-1/2 inch production casing at a depth of 8283 feet. Drilling kicked-off at 8292 feet in a southeasterly direction, built angle and proceeded horizontally for an approximate distance of 1055 feet to an end point located 228 feet from the North line and 2780 feet from the West line (Unit B) of Section 26. The well was completed with 2-3/8 inch plastic lined tubing in a packer set at a depth of 8209 feet. Injection is into the open-hole interval.

(12) The area within the North Vacuum Abo Unit to be established as the EOR Expansion Area should consist of that acreage that is being directly influenced by this newly established injection/production pattern of the North Vacuum Abo Unit Well Nos. 136, 156, 213, 244, and 278. Since the pressure maintenance project is on 40-acre effective spacing, those associated 40-acre tracts that directly offset any of the three horizontal injection wells and any 40-acre tract that is receiving injected fluids directly into the Abo "D" interval should be combined in establishing this EOR Expansion Area.

(13) The following described area consisting of 520 acres, more or less, should be established as the EOR Expansion Area:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM
Section 23: SW/4, NE/4 SW/4, S/2 SW/4, and SE/4
Section 26: NW/4 NE/4, N/2 NW/4, and SW/4 NW/4
Section 27: NE/4 NE/4.

(14) Under current Division Rules, an administrative procedure exists for obtaining approval for both directional wells and pressure maintenance expansions. See Rules 111 and 701, respectively. This being the first case where an operator is seeking to inject through horizontal injection wells into an oil producing interval for the purpose of secondary recovery/enhanced recovery, the Division requested this matter be set for hearing in order to establish a record and to set a precedent for such requests in the future.

(15) Such a procedure, although unique in New Mexico at this time, has proven to be an effective secondary recovery procedure elsewhere within the oil and gas industry. The current review procedures for the Division are adequate to address any future horizontal injection wells; therefore any future applications to drill new wells or convert or recomplete existing wells as horizontal injectors within the North Vacuum Abo Unit Secondary Recovery Project should be submitted accordingly.

(16) 25 wellbores penetrate the Abo formation within the one-half mile area of review of the three horizontal injection wells.

(17) The applicant should take all steps necessary to ensure that the water injected into the three horizontal injectors enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

(18) The evidence and testimony indicate the presence of zones above and below the Abo formation that will effectively confine injection fluids in the Abo formation.

(19) The evidence and testimony indicate that the horizontal injection wells will serve to sweep portions of the reservoir that were not swept or displaced by those wells when operated as vertical injectors.

(20) The evidence and testimony indicate that the horizontal injection wells will concentrate the injection of fluids into productive zones more effectively than when those wells were operated as vertical injectors, which should result in the recovery of otherwise unrecoverable reserves and thereby prevent waste.

(21) The applicant seeks authorization to continue injecting water into the three horizontal injection wells at a surface pressure of 4200 psi (Division Order No. R-4430, as amended, does not restrict injection pressure and the previously approved expansion wells authorized by Division Administrative Order PMX-138 were authorized by letter dated April 14, 1994 to operate at an injection pressure between 4000 and 4200 psi).

(22) The evidence and testimony, including data from step rate tests, indicate that the surface injection pressure of 4200 psi will not cause the already pressured injection interval to be fractured.

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

(24) The granting of this application will prevent waste and protect correlative rights, is in the best interest of conservation, and promotes sound engineering practices.

(25) The proposed pressure maintenance expansion should be approved and governed by the provisions of Division Rules 701 through 708.

(26) Within the EOR Expansion Area, the applicant has taken steps to achieve a significant change in the process used for the displacement of crude oil by converting Well Nos. 136, 156 and 213 from vertical injectors to horizontal injectors and by converting Well Nos. 244 and 278 from vertical producers to horizontal producers.

(27) The applicant's costs for the change in operations within the EOR Expansion Area are estimated to be $2,020,000.00 for sidetracking these five wells.

(28) The applicant estimates that the change in operations within the EOR Expansion Area will increase crude oil production by 326,000 barrels and crude oil revenue by $5,937,500.00 and will increase gas production by 209,900 MCF and gas revenue by $451,500.00.

(29) The evidence and testimony presented in this case indicate that:

(a) the sidetracking of the three injection wells (Exhibit "A") and the two production wells (Exhibit "C") in the EOR Expansion Area should result in a substantial increase in the amount of crude oil ultimately recovered from the area;

(b) because the EOR Expansion Area had been produced by a pattern of vertical injection and vertical recovery wells in place for approximately 25 years, it was prudent to sidetrack the five wells to increase the total fluid processing rates and to maximize the ultimate recovery of crude oil from the area; and

(c) the expansion is economically and technically feasible and has not been prematurely filed.

(30) The application should be approved and should be governed by the provisions of the "Rules and Procedures for Qualifications of Enhanced Oil Recovery Projects and Certification for the Recovered Oil Tax Rate," adopted in Order No. R-9708.

(31) The EOR Expansion Area within the Project Area, as defined in Finding Paragraph (13) above, and the eight production wells within the EOR Expansion Area should qualify as an "Enhanced Oil Recovery Project" pursuant to the Enhanced Oil Recovery Act (Chapter 7, Article 29A, NMSA 1978).

(32) The evidence and testimony presented in this case indicate that oil production from the North Vacuum Abo Unit Wells Nos. 244 and 278 (two of the eight wells in Exhibit "A") in the EOR Expansion Area increased immediately after those wells were sidetracked in September 1997 and August 1997, respectively. A significant portion of the oil produced from those horizontal production wells would not have been produced for many years, if ever, had those wells not been sidetracked.

(33) The evidence and testimony presented in this case indicate that oil production is expected to increase from the remaining vertical production wells (six of the eight wells in Exhibit "A") in the EOR Expansion Area shortly after the three horizontal injection wells began operation in late December 1997 and early January 1998.

(34) The applicant has requested that the Division certify a positive production response for the eight production wells within the EOR Expansion Area effective January 1, 1998.

(35) Based upon evidence and testimony presented, the Division should certify to the New Mexico Department of Taxation and Revenue that two of the eight wells (Nos. 244 and 278) are eligible for the recovered oil tax rate effective January 1, 1998. The applicant should apply for certification of a positive production response for the remaining six wells after such response occurs.

IT IS, THEREFORE, ORDERED THAT:

(1) The previously approved recompletions by the applicant, Mobil Exploration & Producing TX & NM Inc. ("Mobil"), of the following described three vertical injection wells to horizontal injection wells shall be considered an expansion of the Mobil North Vacuum Abo Pressure Maintenance Project, pursuant to Division General Rule 701.F:

> (a) Well No. 136 (**API No. 30-025-23462**), an injection well approved by Division Administrative Order PMX-138, dated November 12, 1985, as amended on April 14, 1992, located on the surface 660 feet from the North line and 860 feet from the West line (Unit D) of Section 26, Township 17 South, Range 34 East, NMPM, North Vacuum Abo Unit, North Vacuum-Abo Pool, Lea County, New Mexico;

(b) Well No. 156 (**API No. 30-025-23696**), an injection well also authorized by Division Administrative Order PMX-138, dated November 12, 1985, as amended on April 14, 1992, located on the surface 1893 feet from the South line and 1800 feet from the East line (Unit J) of Section 23, Township 17 South, Range 34 East, NMPM, North Vacuum Abo Unit, North Vacuum-Abo Pool, Lea County, New Mexico;

(c) Well No. 213 (**API No. 30-025-23982**), one of the original injection wells approved by Order No. R-4430, as amended, located on the surface 460 feet from the South line and 1980 feet from the West line (Unit N) of Section 23, Township 17 South, Range 34 East, NMPM, North Vacuum Abo Unit, North Vacuum-Abo Pool, Lea County, New Mexico.

(2) All previous orders, rules, and policies applicable to these three wells shall remain in full force and affect until further notice.

(3) The applicant shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

(4) The three injection wells (Exhibit "A") shall be equipped with a pressure control device or acceptable substitute that will limit the surface injection pressure to no more than 4200 psi.

(5) The Division Director shall have the authority to administratively approve a pressure limitation in excess of the 4200 psi herein authorized upon a showing by the operator that such higher pressure will not result in the fracturing of the injection formation or confining strata.

(6) These three injection wells shall be governed by all provisions of Oil Conservation Commission Order No. R-4430 and Division Rules 701-708.

IT IS FURTHER ORDERED, THAT:

(7) The application of Mobil to qualify the following described 520 acres, more or less, ("EOR Expansion Area") within the Mobil North Vacuum Abo Pressure Maintenance Project in Lea County, New Mexico and the eight producing wells located within the EOR Expansion Area, listed in Exhibit "A", for the recovered oil tax rate under the Enhanced Oil Recovery Act (Chapter 7, Article 29A, NMSA 1978) is hereby approved:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM
Section 23: SW/4, NE/4 SW/4, S/2 SW/4, and SE/4
Section 26: NW/4 NE/4, N/2 NW/4, and SW/4 NW/4
Section 27: NE/4 NE/4.

(8) The Division certifies its approval of the above-described expansion of the Mobil North Vacuum Abo Pressure Maintenance Project.

(9) All production wells within the EOR Expansion Area listed in Exhibit "A" qualify for the recovered oil tax rate.

(10) The Division certifies that a positive production response has occurred in the EOR Expansion Area for two of the eight wells (Nos. 244 and 278) listed in Exhibit "A" prior to January 1, 1998. The applicant should apply for certification of positive production response for the remaining six wells after such response occurs.

(11) The recovered oil tax rate shall apply to crude oil produced from two of the eight wells (Nos. 244 and 278) listed in Exhibit "A" beginning on January 1, 1998.

(12) The EOR Expansion Area and the eight production wells shall be governed by the "Rules and Procedures for Qualifications of Enhanced Oil Recovery Projects and Certification for the Recovered Oil Tax Rate," adopted in Order No. R-9708.

FURTHERMORE:

(13) All future high angle/horizontal injection wells in the Mobil North Vacuum Abo Pressure Maintenance Project shall be considered for approval under current Division Rules for both directional wells and pressure maintenance expansions. See Rules 111 and 701, respectively.

(14) Jurisdiction of this case 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.

S E A L

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

LORI WROTENBERY
Director

Exhibit "A"
Case No. 11929
Order No. R-4430-B

Mobil Exploration & Producing TX & NM Inc.
Abo Producing Wells Within the EOR Expansion Area
North Vacuum Abo Unit
Township 17 South, Range 34 East, NMPM, North Vacuum-Abo Pool, Lea County, New Mexico.

Well Number	API Number	Footage Location (Surface)	Unit	Section
Well No. 234	30-025-28314	1980' FSL & 545' FEL	I	23
Well No. 243	30-025-28586	657' FNL & 1839' FWL	C	26
Well No. 244	30-025-28603	589' FSL - 1859' FEL	O	23
Well No. 245	30-025-28604	1932' FSL & 2155' FWL	K	23
Well No. 249	30-025-28722	1850' FNL & 660' FWL	E	26
Well No. 277	30-025-29234	790' FNL & 650' FEL	A	27
Well No. 278	30-025-29235	500' FSL & 650' FWL	M	23
Well No. 280	30-025-29237	2000' FNL & 1850' FEL	G	23