

**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. 15497
ORDER NO. R-5897-B**

APPLICATION OF CONOCOPHILLIPS COMPANY TO MAKE PERMANENT THE AUTHORITY GRANTED UNDER ADMINISTRATIVE ORDER WFX-945 TO INJECT WATER, CARBON DIOXIDE, AND PRODUCED GAS FOR ENHANCED OIL RECOVERY WITHIN THE EAST VACUUM GRAYBURG-SAN ANDRES UNIT; TO AMEND THE SPECIAL RULES ENACTED UNDER ORDER NO. R-5897 GOVERNING ENHANCED OIL RECOVERY OPERATIONS WITHIN THE UNIT; TO ALLOW ADMINISTRATIVE APPROVAL OF ADDITIONAL INJECTION WELLS WITHIN THE UNIT WITHOUT FURTHER NOTICE AND HEARING; AND TO CLARIFY THE SURFACE INJECTION PRESSURES AND INJECTION AUTHORITY PREVIOUSLY AUTHORIZED BY THE DIVISION, LEA COUNTY, NEW MEXICO

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 a.m. on May 26, 2016, at Santa Fe, New Mexico, before Examiner William V. Jones.

NOW, on this 29th day of September, 2016, the Division Director, having considered the testimony, the record and the recommendations of the Examiner,

FINDS THAT:

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

(2) ConocoPhillips Company, Inc. ("ConocoPhillips or Applicant") seeks the following relief for the enhanced oil recovery operations within its East Vacuum Grayburg-San Andres Unit ("the Unit"):

- a. To make permanent the authority granted under Administrative Order WFX-945 to use water-alternating-gas (WAG) injection utilizing water, carbon dioxide, and produced gas in the twelve injection wells identified in the Order;
- b. To modify the Special Rules adopted under Division Order No. R-5897 governing the enhanced oil recovery operations within the Unit as follows:
 - i. To eliminate the project area allowable and associated requirements set forth in Rules 2, 3, 4, 6, 7, 15, and 16;
 - ii. To eliminate the annual determination and submission of a "weighted average project area reservoir pressure" as set forth in Rule No. 5;
 - iii. To eliminate the requirement in Rule No. 8 that wells remain at least 10 feet from any quarter-quarter section line or subdivision inner boundary within the Unit; and
 - iv. To modify Rule No. 12 and subsequent Division administrative orders as necessary to reflect that the maximum surface injection pressures for injection wells within the Unit are as follows: 1350 psi for water, 1850 psi for carbon dioxide, and 1850 psi for produced gas.
- c. To grant an exception to the requirements in 19.15.26.8.(C) NMAC and 19.15.26.8.(F) NMAC to allow for administrative approval of additional injection wells for water, carbon dioxide, and produced gas within the Unit without further notice and hearing;
- d. To confirm that the well density limitation for quarter-quarter sections set forth in Division Rule NMAC 19.15.15.9(A) NMAC does not apply to the enhanced oil recovery operations within the Unit; and
- e. To modify Administrative Order WFX-887 to reflect approval of the injection of water, carbon dioxide, and produced gas.

(3) The first injection order issued by the Division within the boundaries of the future East Vacuum Grayburg San Andres Unit was Order No. R-3150 issued in Case No. 3484 on November 14, 1966. This order authorized a pilot water flood project by the injection of water into the Grayburg-San Andres formation(s) within the Santa Fe Well No. 14 (API No. 30-025-02852). The pilot was designated the "Santa Fe-Vacuum Waterflood Project."

(4) Order No. R-5871 issued in Case No. 6366 on November 27, 1978, approved the statutory unitization of 7025.3 acres, more or less, of State lands within portions of the Vacuum Grayburg-San Andres Pool. The Unit was called the East Vacuum Grayburg-San Andres (or "GSA") Unit.

(5) That Order also identified the vertical limits of the Unit as being correlative to depths extending from 4050 feet (103 feet sub-sea) down to 5050 feet (1103 feet sub-sea) on the Lane Wells Acoustilog Run No. 1, dated April 14, 1964, in Exxon's New Mexico State "K" Well No. 19, (API No. 30-025-08546) located in Unit P of Section 28, Township 17 South, Range 35 East, NMPM, Lea County, New Mexico.

(6) Order No. R-5897 issued in Case No. 6367 on January 16, 1979, authorized injection of water into the San Andres formation of the East Vacuum Grayburg-San Andres Unit Area for purposes of pressure maintenance. The project was named the "East Vacuum Unit Pressure Maintenance Project" and given comprehensive Special Rules governing how the project would be operated. Said order further limited injection pressures on any injection well located within one half mile of wells listed on Exhibit C which were suspected of being inadequately plugged or cemented.

(7) Order No. R-5897-A issued in Case No. 14775 on May 30, 2012, revised Special Rule 11 of Order No. R-5897, in order to allow injection packer setting depths as necessary up to the top of the Unitized Formation.

(8) Order No. R-6856 issued in Case No. 7426 on December 16, 1981, approved an amendment of Order No. R-5897 to allow injection of carbon dioxide into its previously authorized pressure maintenance project. Said order authorized injection of water and carbon dioxide into 45 wells within the Unit, and allowed injection of carbon dioxide at a maximum 3150 psi average bottom hole pressure. The Division found that injection of carbon dioxide above reservoir miscibility pressure (1369 psi in this reservoir) is a recognized tertiary recovery process and defined a 4997-acre, more or less, area within the Unit as a Qualified Tertiary Recovery Project under the Crude Oil Windfall Profits Tax Act of 1980.

(9) Order No. R-6856-A issued in Case No. 7426 (reopened) on September 19, 1990, further allowed the injection of a "hydrocarbon/carbon dioxide gas stream" into the 45 wells previously approved for injection of water and carbon dioxide.

(10) Order No. R-6856-B issued in Case No. 10779 on November 12, 1993, approved five areas within the Unit (wholly within the "Qualified Tertiary Project Area") for the New Mexico Recovered Oil Tax Rate pursuant to the "Enhanced Oil Recovery Act" (Laws 1992, Chapter 38, Sections 1 through 5; subsequently codified as NMSA 1978 Sections 7-29A-1 through 7-29A-5). The order required this EOR project to be governed by provisions of Division Order No. R-9708.

(11) Division records indicate that to this date, approximately 44 pressure maintenance expansion (PMX) administrative orders and four waterflood expansion (WFX) administrative orders have been approved for the East Vacuum (GSA) Unit. Each of these orders approved one or more wells for injection.

(12) The Division's well type "Injection" includes any well permitted administratively or by hearing order, for injection within allowed secondary and tertiary

recovery projects, and does not distinguish between injection of only water, carbon dioxide, or recycled produced gas or any combination thereof. Currently within this Unit, the Division has 123 non-plugged wells classified with a Well Type of "Injection". There are 111 active injection wells, 94 of which were drilled since 1998. Eleven injection wells are permitted for drilling but have not yet been completed. One injection well has a status of Temporary Abandoned and there are 24 plugged injection wells.

(13) The Unit currently contains 170 active oil producing wells, eight newly permitted oil wells, and 88 plugged oil wells.

(14) The Division approved administrative Order WFX-945 on April 13, 2015. This order approved 11 new injection wells, allowing the injection of water, carbon dioxide, and produced gas (WAG injection) at specified depths equivalent to the top and the bottom of the Unitized interval. These wells were proposed as part of a new pilot injection project to inject fluids deeper into the residual oil interval of the Unit. This order also superseded previously issued Order WFX-912 and approved the WAG injection into the East Vacuum (GSA) Unit Well No. 400 (API No. 30-025-34025). The 11 wells in addition to Well No. 400, all approved with WFX-945, were given the same pressure limits, 1350 psi for water and 1800 psi for carbon dioxide or produced gas.

(15) Division Order WFX-945 limited the permit to one year during which the operator of the Unit was required to make application through hearing to extend the permit, to present the results of the WAG operation, and to amend existing Division orders to accommodate future expansions.

(16) The application in this case was received on April 15, 2016. The first reported injection of carbon dioxide into any of the 12 subject wells of Order WFX-945 was in June of 2016, which was after this case was heard and taken under advisement. The other 11 wells have not been completed. This application is timely according to the requirements of Order WFX-945 and the injection permits for the 12 wells listed in that order should be made permanent.

(17) Applicant appeared at the hearing through counsel and presented testimony and evidence to support its application. The proposed pilot injection into the deeper residual oil intervals of the San Andres was presented and explained.

(18) The application was properly noticed and no party appeared or otherwise objected to the proposal by ConocoPhillips.

(19) Within Division Order No. R-5897, the Special Rules Nos. 2, 3, 4, 6, 7, 15, and 16 all relate to the following: project area oil allowable, water injection credit, regulation of allowable(s) along the Unit boundary or outside the project area, monthly well and project area reporting, and Division calculation of allowable. Reservoir fill-up has occurred within this Unit area many years ago, the reservoir pressure is above minimum miscibility pressure, and the Unit is primarily under carbon dioxide tertiary recovery. The limiting of allowable(s) and pressures along or near the Unit boundary is

not necessary as the western boundary coincides with the boundary of the Central Vacuum Unit. Excepting this boundary, the other boundaries are poor reservoir rock. The applicant provided notice of this application to surrounding owners and no one appeared or protested this hearing. The operator should still be balancing patterns, maintaining unit wide reservoir pressure at an optimum level, and working on improving conformance and sweep efficiency. However, none of the rules mentioned above is essential to this and rescinding those rules will not cause waste or impair correlative rights.

(20) The requirements in Special Rule No. 5 to annually determine and submit a Unit wide reservoir pressure were useful in that this was permitted as a pressure maintenance project transitioning from primary recovery. However, in December of 1981, a large portion of this Unit was recognized by the Division in Order No. R-6856 as a higher pressure water flood and carbon dioxide tertiary recovery project. To properly manage this reservoir, the operator should still be aware of reservoir pressure within this project, but the relationship between operating pressures and reservoir pressures should now be well understood and the project is under an automation system that constantly monitors surface pressures. Special Rule No. 5 is no longer needed by the Division to prevent waste and protect correlative rights.

(21) The applicant indicated that with the proliferation of flow lines, surface equipment and wells to various depths, there is a real need to allow wells to be closer than 10 feet from the subdivision inner boundaries or quarter-quarter section lines. Applicant stated that no participating tracts within this Unit would have correlative rights impaired by this relief. The operator should be granted this relief which was granted to the operations within the North Hobbs Unit by the Commission. However, the operator should not be allowed to drill wells directly on quarter-quarter section lines or on any subdivision inner boundary. Special Rule No. 8 should be modified to remove the following text: "no unorthodox location shall be closer than ten feet to any quarter-quarter section line, and provided further, that".

(22) There is a need to standardize limiting surface injection pressures within this Unit and, thereafter, to only make further changes to pressure limits by presentation at hearing with adequate facts and testimony. All previously permitted injection wells, whether permitted by hearing order or by the administrative process, and all future permitted injection wells within this Unit (whether issued with an injection pressure limit or no pressure limit) should hereafter be limited to the following pressures and Special Rule No. 12 should be struck in its entirety and replaced as follows:

"The injection well(s) or system shall be equipped with a pressure control device or acceptable substitute which will limit the surface injection pressure to no more than 1350 psi for water; 1850 psi for carbon dioxide; and 1850 psi for produced gas."

(23) The depth to the base of the Unitized Formation in this Unit is approximately 5050 feet. The reference to total depth of production casing in Special Rule No. 10 should be changed to read "(approximately 5050 feet)".

(24) Applicant asks for an exception to the requirements of Division Rules 19.15.26.8.(C) NMAC and 19.15.26.8.(F) NMAC to allow administrative approval of additional (water, carbon dioxide, and produced gas) injection wells within the unit without further notice and hearing. Any future application for injection anywhere within the Unit should be considered administratively after submission of form C-108. Administrative notice should still be required, but only to affected parties on lands within that portion of any Area of Review extending outside the Unit boundaries. Any submitted form C-108 should still include an evaluation of casing and cement on all wells within ½ mile of the subject well. The applicant did not ask for relief from evaluation of casing and cement within an Area of Review on future submittals and the possible "problem wells" listed on Exhibit C of Division Order No. R-5897 were not mentioned at this hearing.

(25) The ability to obtain carbon dioxide injection permits administratively throughout this Unit should be granted with the understanding that administrative injection permits do not in themselves expand the "Qualified Tertiary Recovery Project under the Crude Oil Windfall Profits Tax Act of 1980" (Division Order No. R-6856, as amended) or the "Area covered for the New Mexico Recovered Oil Tax Rate" (Division Order No. R-6856-C).

(26) The vertical oil well density limitations set forth in Division Rule 19.15.15.9(A) NMAC should not apply to wells within this Unit. Producing more than four oil wells simultaneously from any quarter-quarter section within this Unit should be permitted in order to prevent waste and protect correlative rights under enhanced oil recovery operations.

(27) The Division approved administrative Order WFX-887 on June 1, 2011, permitting East Vacuum (GSA) Unit Well Nos. 506 and 507 (API Nos. 30-025-39996 and 30-025-40032, respectively) for injection of water. The advertised application was evaluated for water and carbon dioxide and the omission of permission for injection of carbon dioxide in the permit was unintended. Applicant in this case also asks for permission for injection of produced gases. This is consistent with Division Order No. R-6856-A and should be allowed. Administrative Order WFX-887 should be amended to allow injection of water, carbon dioxide, and produced gases.

(28) Applicant's proposal will prevent waste and protect correlative rights and should be granted.

IT IS THEREFORE ORDERED THAT:

(1) ConocoPhillips Company, Inc.'s application concerning the East Vacuum (GSA) Unit **is hereby approved** making permanent the authority granted under administrative Order WFX-945, modifying administrative Order WFX-887 to reflect approval of the injection of water, carbon dioxide, and produced gas, allowing administrative approval of additional water, carbon dioxide, and produced gas injection wells within the Unit without hearing, confirming that oil well density limitations do not

apply, and amending various Special Rules of Division Order No. R-5897 as specified below.

(2) The permit to inject granted for the 12 wells listed in administrative Order WFX-945 is hereby made permanent.

(3) The following changes shall be made to Ordering Paragraph No. 4 of Division Order No. R-5897:

- a. Special Rules Nos. 2, 3, 4, 6, 7, 15, and 16 are rescinded.
- b. Special Rule No. 5 is rescinded.
- c. Special Rule No. 8 is modified to remove the following text: "no unorthodox location shall be closer than ten feet to any quarter-quarter section line, and provided further, that". This modification of Special Rule No. 8 shall not be construed as permission to drill wells **directly on** quarter-quarter section lines or any subdivision inner boundary.
- d. The reference to total depth of production casing in Special Rule No. 10 shall be changed to read "(approximately 5050 feet)".
- e. Special Rule No. 12 shall be struck in its entirety and replaced as follows:
"The injection well(s) or system shall be equipped with a pressure control device or acceptable substitute which will limit the surface injection pressure to no more than 1350 psi for water; 1850 psi for carbon dioxide; and 1850 for produced gas."

(4) All previously permitted injection wells, whether permitted by hearing order or by the administrative process, and all future permitted injection wells within this Unit (whether issued with an injection pressure limit or no pressure limit) should hereafter be limited to the surface wellhead pressures as specified in Special Rule No. 12 of Ordering Paragraph No. 4 of Order No. R-5897.

(5) All future applications to change injection pressure limits within this Unit shall be presented for approval only at hearing with adequate facts and testimony.

(6) Any future applications for injection anywhere within the Unit shall optionally be considered administratively after submission of form C-108 with requirement of notice to affected parties within the Area of Review on lands located (only) outside Unit boundaries. Any submitted form C-108 shall include an evaluation of casing and cement on all wells within ½ mile of the subject well.

(7) The ability to obtain carbon dioxide injection permits administratively throughout this Unit shall be granted with the understanding that administrative injection permits do not in themselves expand the "Qualified Tertiary Recovery Project under the

Crude Oil Windfall Profits Tax Act of 1980" (Division Order No. R-6856, as amended) or the "Area covered for the New Mexico Recovered Oil Tax Rate" (Division Order No. R-6856-C).

(8) The vertical oil well density limitations set forth in Division Rule 19.15.15.9(A) NMAC shall not apply to wells within this Unit. Producing more than four oil wells simultaneously from any quarter-quarter section within this Unit shall be permitted.

(9) Administrative Order WFX-887 is hereby amended to allow injection of water, carbon dioxide, and produced gases into the two wells permitted for injection.

(10) Except as specifically modified hereby, all orders pertaining to this Unit or its enhanced oil recovery project, shall continue in effect to the same extent as immediately prior to the issuance of this Order. This includes Order No. R-5897, as amended, Order No. R-6856, as amended, and all administrative orders.

(11) Any operator who in the future becomes the operator of record of this Unit and its wells shall make application within six months of the Division approved operator change to appear before the Division at hearing to update the Division as to performance and future plans for the enhanced recovery project within the Unit. Failure to do so shall subject the operator to the penalty provisions of NMAC 19.15.5.10.

(12) 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.



STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

Handwritten signature of David R. Catanach in cursive script.

DAVID R. CATANACH
Director