

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

APPLICATION OF OXY USA, INC. TO REOPEN CASE NO. 8352 PURSUANT TO THE PROVISIONS OF ORDER R-7737-B AND TO REMOVE CERTAIN ACREAGE LOCATED IN THE BRAVO DOME CARBON DIOXIDE GAS UNIT FROM THE TEMPORARY SPECIAL POOL RULES AND REGULATIONS CURRENTLY GOVERNING THE "WEST BRAVO DOME CARBON DIOXIDE GAS AREA", HARDING COUNTY, NEW MEXICO.

**CASE NO. 8352 (REOPENED)
ORDER NO. R-7737-C**

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 9:00 a.m. on June 4, 2013, at Santa Fe, New Mexico before Examiner Richard I. Ezeanyim.

NOW, on this 16th day of June, 2014, 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) OXY USA, Inc. ("Applicant", or "Operator" or "OXY") seeks an order to reopen Case No. 8352 pursuant to the provisions of Order No. R-7737-B, to remove certain acreage located in the Bravo Dome Carbon Dioxide Gas Unit from the Temporary Special Pool Rules and Regulations currently governing the "West Bravo Dome Carbon Dioxide Gas Unit Area", ("West BD Unit"), Harding County, New Mexico.

The Applicant appeared at the hearing through legal counsel and presented the following testimony:

(3) The Bravo Dome Carbon Dioxide Gas Unit is a large, unitized area approved by the Oil Conservation Commission ("Commission") in 1981 by Order No. R-6446-B. The unitized area includes approximately 1,174,225.43 acres, more or less, of State, Federal and fee lands located in Harding, Quay and Union Counties of New Mexico, and produces carbon dioxide gas from the Tubb formation.

(4) The Bravo Dome Unit was initially operated by Amoco Production Company and, subsequently, by BP America (BP). In 2000, the Applicant acquired BP's interests in the Bravo Dome Unit and has operated the Unit since that acquisition.

(5) In November of 1984, certain lands in Harding County to the west of the Bravo Dome Unit were unitized, and approved by the Commission as the West Bravo Dome Carbon Dioxide Gas Unit Area by Order No. R-7707 ("West BD Unit"). The West BD Unit was originally operated by Cities Service Oil & Gas Corporation ("Cities Service") and is now operated by Hess Corporation.

(6) OXY's application involves the following acreage on the western side of the Bravo Dome Unit (hereinafter called the "**Subject Acreage**"):

Township 18 North, Range 30 East, NMPM

Sections 1 and 2: All
Section 3: E/2 E/2 and SW/4 SE/4
Section 10: E/2 NE/4
Section 11: N/2
Sections 12 to 14: All
Section 23: E/2 and E/2 W/2
Section 24: All
Section 25: E/2, E/2 W/2, W/2 NW/4, and NW/4 SW/4
Section 26: NE/4, E/2 NW/4, and N/2 S/2
Section 36: All

Township 18 North, Range 31 East, NMPM

Sections 1 to 36: All

Township 19 North, Range 29 East, NMPM

Section 1: NE/4 and E/2 NW/4

Township 19 North, Range 30 East, NMPM

Section 20: W/2 NE/4 and S/2 SE/4
Sections 21 to 28: All
Section 29: NE/4
Section 32: NE/4 NE/4
Section 33: NW/4, W/2 NE/4, NE/4 NE/4, NW/4 SE/4, and NE/4 SW/4
Section 34: N/2 and E/2 SE/4
Sections 35 and 36: All

Township 19 North, Range 31 East, NMPM

Sections 19 to 36: All

(7) Carbon dioxide development in this general area occurred for many years under the Division's statewide rules providing for 160-acre spacing and proration units.

(8) In June of 1984, by Order No. R-7556, the Commission denied a request by Amoco Production Company for special rules providing for 640-acre spacing and proration units throughout the entire Bravo Dome Unit. Instead, the Commission created a "Bravo Dome 640-acre Area" in the eastern portion of the Bravo Dome Unit and

maintained the statewide 160-acre spacing in what the Commission called the "Bravo Dome 160-acre Area" in the western and southwestern portions of the Unit.

(9) The "Bravo Dome 160-acre Area" created by Commission Order No. R-7556 initially included the Subject Acreage.

(10) In November of 1984, under Case No. 8352, the Commission entertained an application by Cities Service, the operator of the West BD Unit, to adopt temporary rules providing for 640-acre spacing in what Cities Service described as the "West Bravo Dome Carbon Dioxide Gas Area."

(11) The acreage involved in Cities Service's 1984 application included not only the West BD Unit area that it operated, but for unknown reasons also included the Subject Acreage in the Bravo Dome Unit operated by Amoco Production Company.

(12) Based on the geologic interpretations presented at the hearing in Case No. 8352, the Commission issued Order No. R-7737 adopting temporary rules providing for 640-acre spacing for what was described as the "West Bravo Dome Carbon Dioxide Gas Area."

(13) The acreage subject to these temporary rules includes acreage in the West BD Unit (currently operated by Hess Corporation), as well as the Subject Acreage (currently operated by OXY) that was initially part of the "Bravo Dome 160-acre Area" designated by Order No. R-7556.

(14) Order No. R-7737 provides that Case No. 8352 was to be reopened in June of 1987 to allow operators to "appear and show cause why the West Bravo Dome Carbon Dioxide Gas Area should not be developed on less than 640-acre spacing and proration units."

(15) Accordingly, at the time Order No. R-7737 was issued, the Commission created a presumption in favor of returning the acreage back to 160-acre statewide spacing, unless an operator appeared at a later hearing and demonstrated that 640-acre spacing was indeed appropriate.

(16) When Case No. 8352 was reopened in 1987, the Commission found that no production history was available to determine whether the "West Bravo Dome Carbon Dioxide Gas Area" should remain at the temporary 640-acre spacing. The Commission therefore ordered the temporary spacing to continue "for a period of two years commencing with the date of first production" and that the case be reopened "in October, 1991, or two years from the date of first production from the area, whichever occurs first".

(17) When Case No. 8352 was reopened in 1991, the Commission again found there "has been no production of carbon dioxide from said area to date." Accordingly, the Commission ordered that: "this case shall be reopened at an examiner hearing two years from the date of first production from the subject area, at which time the operators in the subject area may appear and show cause why the West Bravo Dome Carbon

Dioxide Gas Area should not be developed on less than 640-acre spacing and proration units”.

(18) The acreage to the east of the Subject Acreage is permanently spaced at 640 acres in accordance with the Commission Order No. R-7556-A.

(19) The acreage to the north and the south of the Subject Acreage remains within the “Bravo Dome 160-acre Area” designated by Order No. R-7556.

(20) Eight sections of land in the West BD Unit directly offsetting the Subject Acreage remains at 160-acre spacing and proration units.

(21) In March of 2011 and March of 2012, at the request of Hess Corporation, the Division issued administrative orders NSP-1949, NSP-1950, NSP-1951, and NSP-1956 approving four 160-acre spacing and proration units in a portion of the West BD Unit directly offsetting the Subject Acreage.

(22) OXY seeks to remove the Subject Acreage from the currently designated “West Bravo Dome Carbon Dioxide Gas Area” by Order No. R-7737, and return this acreage back to its original “Bravo Dome 160-acre Area” designated by Order No. R-7556.

(23) The Commission Orders No. R-7737 and No. R-7737-A were issued without the benefit of core data, pressure testing, or production data for any wells in the Subject Acreage. Instead, the evidence presented by Cities Service in 1984 and 1987 was limited to geologic interpretations, isochronal tests, and flow tests from wells located in West BD and the eastern portion of the Bravo Dome Unit.

(24) OXY analyzed core data from samples containing over eighty-five (85%) percent of the Tubb formation. The core data demonstrates that the mega and macro pore type matrix of the reservoir decreases from east to west across the Bravo Dome Unit.

(25) The average permeability in the eastern part of the Bravo Dome Unit is approximately 8.55 millidarcies, while the average permeability in the western part of the Bravo Dome Unit is approximately less than one millidarcy.

(26) The average porosity and permeability dramatically decreases from the east to west across the Bravo Dome Unit.

(27) The average porosity and permeability in the formation underlying the Subject Acreage is similar to that in the area to the north, which is spaced at 160 acres.

(28) The depositional environment of the Tubb formation changes from east to west across the Bravo Dome Unit area.

(29) The main pay zone in the Tubb formation is the Middle Tubb sands.

(30) The Middle Tubb sands become thinner from east to west across the Bravo Dome Unit.

(31) The thickness of the net pay decreases from east to west across the Bravo Dome Unit and the water contact point is closer to the net pay under the Subject Acreage.

(32) The proximity of the water contact point to the thinning pay zone under the Subject Acreage prevents an operator from increasing the drainage radius of a well with the hydraulic fracturing techniques utilized in the eastern area of the Bravo Dome Unit.

(33) In 2009, OXY commenced production from the wells drilled in the Subject Acreage and has now gathered almost four years of production data from these wells.

(34) As OXY's drilling program moved to the western portion of the Bravo Dome Unit, the Applicant observed "tougher" rock, increasing pressures, significant fingering of the reservoir, and closer gas/water contact.

(35) The drive mechanism for the reservoir underlying the Bravo Dome Unit area is gas expansion.

(36) The expected recovery of the original gas in place for a gas expansion drive reservoir is between 70% and 95%.

(37) The calculated average recovery efficiency for the remaining sixteen wells in the Subject Acreage at 640-acre spacing is only 18.5%.

(38) The calculated average recovery efficiency for the remaining sixteen wells in the Subject Acreage at 160-acre spacing is 74%.

(39) The evidence demonstrates that in the Subject Acreage, the expected recovery efficiencies are met only if the wells are spaced on 160 acres.

(40) Reliant Exploration and Production Company, LLC ("Reliant") appeared at the hearing through legal counsel, presented the testimony of three (3) witnesses and opposed the granting of OXY's application. After the hearing, and prior to the drafting of this order, Reliant withdrew its opposition to the granting of this application.

The Division Concludes as Follows:

(41) In 1984, 1987, and 1991, when the temporary rules for the West Bravo Dome Carbon Dioxide Gas Unit Area were adopted by the Commission, no production data, core data, or other forms of hard evidence was presented on the production characteristics of the Tubb formation underlying the Subject Acreage:

(42) In 1984, 1987, and 1991, the Commission by Orders No. R-7556 through No. R-7556-B expressed the need for operators to gather sufficient well performance data

and production history from the area in order to establish permanent spacing requirements.

(43) There is now sufficient well performance data and production history to determine the proper spacing for the Subject Acreage in the Tubb formation.

(44) Orders No. R-7556 and No. R-7556-B create a presumption in favor of returning the Subject Acreage to the normal 160-acre spacing provided by the Division's statewide rules.

(45) The carbon dioxide reservoir underlying the Subject Acreage is more similar to the Bravo Dome 160-acre area to the north and the south of the Subject Acreage than the Bravo Dome 640-acre area to the east.

(46) The evidence establishes that the average well in the Subject Acreage will not effectively and efficiently drain 640 acres.

(47) Spacing is based on what an average well in the subject area will effectively and efficiently drain.

(48) The commercial economics of an operator, the leasehold obligation of an operator, or the acreage position held by an operator is not determinative of proper spacing.

(49) Correlative rights is defined as "the opportunity afforded, as far as it is practicable to do so, to the owner of each property in a pool to produce without waste the owner's just and equitable share of the oil or gas in the pool, being an amount, so far as can be practically determined, and so far as can be practicably obtained without waste, substantially in the proportion that the quantity of recoverable oil or gas under the property bears to the total recoverable oil or gas in the pool, and for the purpose to use the owner's just and equitable share of the reservoir energy"

(50) Granting OXY's application will not impair correlative rights since each operator in the Subject Acreage continues to have the opportunity to produce its just and equitable share of the underlying reserves without waste.

(51) In contrast, maintaining the temporary spacing at 640 acres in the Subject Acreage may impair correlative rights in that working interest owners will be forced into a spacing unit where a single well will not efficiently and effectively drain the underlying reserves.

(52) Granting OXY's application will ensure that the reserves underlying the Subject Acreage are adequately drained, thereby preventing waste.

(53) OXY's application should be approved.

IT IS THEREFORE ORDERED THAT:

(1) OXY's application seeking an order to reopen Case No. 8352 pursuant to the provisions of Order No. R-7737-B, to remove certain acreage located in the Bravo Dome Carbon Dioxide Gas Unit from the Temporary Special Pool Rules and Regulations currently governing the West Bravo Dome Carbon Dioxide Gas Unit Area, Harding County, New Mexico, is hereby approved.

(2) The following acreage is hereby removed from the West Bravo Dome Carbon Dioxide Gas Area described on Exhibit C of Order No. R-7737 and placed back within the Bravo Dome 160-acre Area described on Exhibit A of Order No. R-7556:

Township 18 North, Range 30 East, NMPM

Sections 1 and 2: All
Section 3: E/2 E/2 and SW/4 SE/4
Section 10: E/2 NE/4
Section 11: N/2
Sections 12 to 14: All
Section 23: E/2 and E/2 W/2
Section 24: All
Section 25: E/2, E/2 W/2, W/2 NW/4, and NW/4 SW/4
Section 26: NE/4, E/2 NW/4, and N/2 S/2
Section 36: All

Township 18 North, Range 31 East, NMPM

Sections 1 to 36: All

Township 19 North, Range 29 East, NMPM

Section 1: NE/4 and E/2 NW/4

Township 19 North, Range 30 East, NMPM

Section 20: W/2 NE/4 and S/2 SE/4
Sections 21 to 28: All
Section 29: NE/4
Section 32: NE/4 NE/4
Section 33: NW/4, W/2 NE/4, NE/4 NE/4, NW/4 SE/4, and NE/4 SW/4
Section 34: N/2 and E/2 SE/4
Sections 35 and 36: All

Township 19 North, Range 31 East, NMPM

Sections 19 to 36: All

(3) The lands described in Ordering Paragraph (2) above, as with the other acreage within the Bravo Dome 160-acre Area established by Order No. R-7556, shall be developed and spaced in accordance with the Division's statewide rules set forth in Rule 19.15.15.10 (C) NMAC.

(4) The locations of all wells presently drilling to or completed in the acreage described in Ordering Paragraph (2) above at the time of the entry of this order are hereby approved, and the operator of any wells having an unorthodox location under the Division's statewide rules shall notify the Santa Fe District Office in writing of the name and location of the well on or before August 11, 2014.

(5) The operators of all wells presently drilling to or completed in the acreage described in Ordering Paragraph (2) above at the time of the entry of this order, shall file amended Forms C-102 with the Division as necessary to conform with the dedicated spacing unit of this order on or before August 11, 2014.

(6) 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

A handwritten signature in cursive script, appearing to read "Jami Bailey".

JAMI BAILEY
Director