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. 15616
ORDER NO. R-14322

APPLICATION OF OXY USA, INC. FOR APPROVAL OF A PRESSURE MAINTENANCE PROJECT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 a.m. on February 2, 2017, at Santa Fe, New Mexico, before Examiners Phillip R. Goetze and William V. Jones.

NOW, on this 10th day of April, 2017, the Division Director, having considered the testimony, the record and the recommendations of the Examiners,

FINDS THAT:

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

(2) By this application, OXY USA, Inc. ("Applicant" or "OXY") seeks approval of a pressure maintenance project in the Bone Spring formation, Pierce Crossing; Bone Spring, East Pool (Pool code 96473), within the horizontal boundaries described below, in Eddy County, New Mexico.

Township 24 South, Range 29 East, NMPM
Section 16: All

(3) Applicant proposes to inject produced water and produced gas into the Bone Spring formation on its Cedar Canyon 16 State Lease at a true vertical depth interval from approximately 8426 feet to approximately 8739 feet below the surface, through the following two horizontal wells:

(a) Cedar Canyon 16 State Well No. 7H (API No. 30-015-41251) with a surface location of 2485 feet from the North line and 330 feet from the West line (Unit letter E) of Section 15, Township 24 South, Range 29

East, NMPM, and a terminus of 2037 feet from the North line and 535 feet from the West line (Unit letter E) of Section 16, Township 24 South, Range 29 East, NMPM.

(b) Cedar Canyon 16 State Well No. 12H (API No. 30-015-42683) with a surface location of 900 feet from the South line and 860 feet from the West line (Unit letter M) of Section 15, Township 24 South, Range 29 East, NMPM, and a terminus of 901 feet from the South line and 133 feet from the West line (Unit letter M) of Section 16, Township 24 South, Range 29 East, NMPM.

(4) Matador Production Company appeared through counsel at the hearing but did not oppose the application. No other party appeared at the hearing or otherwise opposed the application.

(5) Applicant appeared through counsel and presented engineering testimony and exhibits to the effect that:

(a) In this area of Eddy County, the 2nd Bone Spring sand is a productive interval within the Bone Spring formation and is well delineated and characterized. Applicant stated that the existing configuration of horizontal wells in Section 16 offered opportunity for studying the potential of increased recovery by utilizing injection to supplement current reservoir pressures.

(b) The Cedar Canyon 16 State Well No. 7H and the Cedar Canyon 16 State Well No. 12H (the "proposed injection wells") are horizontal wells in the Bone Spring formation currently producing from the 2nd Bone Spring sand. Both wells have declined in production over the last year.

(c) Applicant has designed a pilot pressure maintenance project limited to Section 16 utilizing the proposed injection wells along with three additional horizontal wells to monitor and assess the injection process. These wells are the Cedar Canyon 16 State Well No. 2H (API No. 30-015-41024), the Cedar Canyon 16 State Well No. 6H (API No. 30-015-41595), and the Cedar Canyon 16 State Well No. 8H (API No. 30-015-41596).

(d) Applicant proposes two distinct injection phases for the pilot project: first a "huff and puff" process followed by continuous injection to evaluate the line-drive effect in adjacent production wells.

(e) Applicant proposes first utilizing the Cedar Canyon 16 State Well No. 7H for injection due to the greater distance between the injection well and offset producing wells to the north and south. Cedar Canyon 16 State

Well No. 12H will be used in the second half of the project utilizing responses obtained during the earlier testing of Well No. 7H.

(f) Applicant will utilize produced water for injection as a component of pressure maintenance in conjunction with the produced gas injection to mitigate early offset breakthrough at low injection pressures.

(g) Applicant will utilize the proposed injection wells with existing perforations and well construction. Applicant additionally stated that the proposed injection wells will not be stimulated prior to the beginning of the pilot project.

(h) Produced water for the pilot project will be from the Cedar Canyon Treating Facility. Produced gas will be obtained from the Cedar Canyon Central Delivery Point system. Applicant provided analyses of the produced water and produced gas along with testimony demonstrating compatibility with well components and the reservoir conditions.

(i) Applicant has proposed maximum surface injection pressures for each injection fluid: 1700 pounds per square inch (psi) for produced water and 4250 psi for produced gas. Applicant submitted pressure analyses using a diagnostic fracture injection test (DFIT) for calculating the formation parting pressure for the horizontal wells and in support of the two proposed maximum surface injection pressures.

(j) Applicant has proposed the placement of the packers below the kick-off point but significantly above the first perforations located in the horizontal portion of the production casing. Applicant requested an exception for the 100-foot packer setting depth requirement applied to vertical injection wells.

(k) Applicant has requested that unlined tubing be allowed for use in the injection operation. Applicant stated that the unlined tubing would be preferable due to the increased use of wireline equipment in the proposed injection wells, the use of a gas-lift operations for the huff and puff phase, and the lack of significantly corrosive fluids being used for injection.

(l) Applicant established a modified area of review (AOR) using the horizontal segment of each well (as defined by the surface location, the first take point, and the terminus) as the center line for the one-half mile radius, the AOR being defined as the area within one-half mile of any point on either horizontal well's lateral. There are 42 producing wells and one disposal well that penetrate the injection interval and are within the one-half mile AORs. Twenty of these producing wells are one-mile or longer horizontal wells. There is one plugged and abandoned well that penetrates the injection interval and is within the one-half mile AOR. All

wells in the two AORs, both producing and the plugged well, are properly cemented.

(m) Applicant found no fresh water wells within one mile of the proposed injection wells. The database of the New Mexico Office of the State Engineer identified two wells within one mile of the proposed injection wells, but both wells are shallow disposal wells associated with the Interstate Stream Commission's River Desalination Project.

(n) Applicant has provided proper notice to affected persons including the surface land owner. Applicant has also published notice of the pilot project in Carlsbad Current-Argus, a newspaper with general circulation in the county where the project is located.

(o) The pilot project is limited to Section 16 which is state trust land covered by a single lease issued by the New Mexico State Land Office. The Applicant has provided notice of this project to the State Land Office.

The Division concludes that:

(6) All of the wells (active and plugged) in the one-half mile modified AOR surrounding the two proposed injection wells appear to be adequately cased and cemented, so that none will become a conduit for the escape of injected fluid or gas from the permitted injection formation. Accordingly, there is no requirement for remedial work on any wells within the modified AOR for each of the injection wells.

(7) Applicant should be authorized to inject fluids at a surface injection pressure not to exceed 1700 psi for produced water and 4250 psi for produced gas. Applicant may apply to the Division for a higher injection pressure upon satisfactorily demonstrating that an increase in injection pressure will not result in fracturing of the injection formation or confining strata.

(8) The proposed project will, in reasonable probability, result in production of substantially more hydrocarbons from the project area that would otherwise be produced therefrom, will prevent waste, and will not impair correlative rights.

(9) Accordingly, the application should be approved.

IT IS THEREFORE ORDERED THAT:

(1) OXY USA, Inc. ("OXY" or "operator") is hereby authorized to inject produced water and produced gas into the Bone Spring formation [Pierce Crossing; Bone Spring, East pool (Pool code: 96473)], at a true vertical depth interval from approximately 8426 feet to approximately 8739 feet below the surface, through two of its horizontal wells located within the Cedar Canyon State 16 Lease.

(2) This project is hereby designated the **Cedar Canyon Pressure Maintenance Pilot Project** and shall consist of the Bone Spring formation underlying the following lands in Eddy County, New Mexico:

Township 24 South, Range 29 East, NMPM
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(3) OXY USA, Inc. (OGRID 16696) is designated operator of the project.

(4) Two existing horizontal wells (the "injection wells") are approved for injection during the pilot project:

(a) Cedar Canyon 16 State Well No. 7H (API No. 30-015-41251) with a surface location of 2485 feet from the North line and 330 feet from the West line (Unit letter E) of Section 15, Township 24 South, Range 29 East, NMPM, and a terminus of 2037 feet from the North line and 535 feet from the West line (Unit letter E) of Section 16, Township 24 South, Range 29 East, NMPM. [The injection interval being the perforations from a measured depth of 9200 feet to a measured depth of 13680 feet.]

(b) Cedar Canyon 16 State Well No. 12H (API No. 30-015-42683) with a surface location of 900 feet from the South line and 860 feet from the West line (Unit letter M) of Section 15, Township 24 South, Range 29 East, NMPM, and a terminus of 901 feet from the South line and 133 feet from the West line (Unit letter M) of Section 16, Township 24 South, Range 29 East, NMPM. [The injection interval being the perforations from a measured depth of 9704 feet to a measured depth of 14214 feet.]

(5) The operator shall take all steps necessary to ensure that the injected fluid enters only the injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

(6) The injection wells shall use the existing construction with injection occurring through perforations currently in place.

(7) Water from outside the operator's Cedar Canyon Treating Facility shall not be injected into these wells. The operator shall utilize its Cedar Canyon Central Delivery Point for the source of the produced gas to be used in the injection phases of the pilot project.

(8) Injection shall be accomplished through tubing installed in a packer set in the production casing so as to provide a proper seal while being as close as practical to the uppermost injection perforations. The limit for the upper placement of the packer in the production casing shall be no greater than 100 feet above the true vertical depth of the kick-off point for the individual well.

(9) The use of unlined tubing in either injection well is limited to the period of the pilot project and its use shall be re-evaluated at the end of the pilot project period when the operator presents a summary of results for the pressure maintenance pilot project.

(10) The injection wells shall be initially equipped with a pressure control device or acceptable substitute that will limit the maximum surface injection pressure to no more than 1700 pounds per square inch (psi) for produced water and 4250 psi for produced gas.

(11) 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 detect leakage in the casing, tubing or packer.

(12) The injection wells shall pass a mechanical integrity test prior to initial commencement of injection and prior to resumption of injection each time the packer is unseated. All testing procedures and schedules shall conform to the requirements of Rule 19.15.26.11(A) NMAC. The Division Director retains the right to require at any time wireline verification of completion and packer setting depths.

(13) The injection wells shall be monitored with a SCADA system and the operator shall ensure that additional sensor systems for each injection well, as proposed in the C-108 application, are installed and monitored.

(14) The Division Director shall have the authority to administratively authorize an increase in injection pressure upon a showing by the operator that such higher pressure will not result in fracturing of the injection formation or confining strata. The operator shall give at least 72 hours advance notice to the supervisor of the Division's District II office of the date and time (i) injection equipment will be installed, and (ii) the mechanical integrity pressure test will be conducted, so these operations may be witnessed.

(15) The operator shall provide written notice of the date of commencement of injection into each of the wells to the Division's District II office.

(16) The operator shall immediately notify the supervisor of the Division's District II office of the failure of the tubing, casing or packer in either injection well, or the leakage of water, oil, gas or other fluid from or around any producing or abandoned well within one-half mile of either injection well, and shall take all steps as may be timely and necessary to correct such failure or leakage.

(17) The Project shall be governed by Division Rules 19.15.26.8 through 19.15.26.15 NMAC. The operator shall submit monthly reports of the injection operations on Division Form C-115, in accordance with Rules 19.15.26.13 and 19.15.7.28 NMAC.

(18) The injection authority granted herein shall terminate two years after the effective date of this order if the operator has not commenced injection operations; provided, however, the Division, upon written request by the operator filed prior to the expiration of the two-year time period, may grant an extension for good cause.

(19) Two years following the commencement of injection in either injection well, the authority for injection under this order shall terminate. The operator shall make an application for a Division hearing to present the results of the pilot project and to make permanent the injection authority of this order. If the operator requires additional time for completion of the pilot project, the Division, upon written request by the operator filed prior to the expiration of the two-year period, may grant an extension for good cause.

(20) The operator shall provide written notice to the Division upon permanent cessation of injection into the Project.

(21) This Order does not relieve the operator of responsibility should its operations cause any actual damage or threat of damage to protectable fresh water, human health or the environment; nor does it relieve the operator of responsibility for complying with applicable Division rules or other state, federal or local laws or regulations.

(22) Upon failure of the operator to conduct operations (1) in such manner as will protect fresh water or (2) in a manner consistent with the requirements in this Order, the Division may, after notice and hearing (or without notice and hearing in event of an emergency, subject to the provisions of NMSA 1978 Section 70-2-23), terminate the injection authority granted herein.

(23) 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.

SEAL

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

David R. Catanach

DAVID R. CATANACH
Director