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. 15116
ORDER NO. R-13864

APPLICATION OF ALAMO PERMIAN RESOURCES, LLC FOR APPROVAL OF THE HIGH LONESOME QUEEN UNIT, ESTABLISHMENT OF A WATERFLOOD PROJECT AND CERTIFICATION OF THE WATERFLOOD PROJECT AS AN ENHANCED OIL RECOVERY PROJECT PURSUANT TO THE ENHANCED OIL RECOVERY ACT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 am on May 1, 2014, at Santa Fe, New Mexico, before Examiner Phillip R. Goetze.

NOW, on this 22nd day of July, 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) The Applicant, Alamo Permian Resources, LLC ("Alamo Permian"), seeks approval for its High Lonesome Queen Unit ("Unit"), establishment of a of a waterflood project and to qualify the project for an incentive tax rate under the Enhanced Oil Recovery Act.

(3) The proposed Unit area for the High Lonesome Queen Unit consists of 680 acres, more or less, situated in Eddy County, New Mexico:

Township 16 South, Range 29 East, NMPM
Section 15: NW/4 SW/4
Section 16: All

(4) Applicant is proposing the completion of six new injection wells within the Unit for use in the waterflood operation:

(a) **High Lonesome Queen Unit Well No. 1**
API No. 30-015-Pending
1310 FNL & 10 FWL
Unit letter D, Section 16-16S-29E

(b) **High Lonesome Queen Unit Well No. 2**
API No. 30-015-Pending
1310 FNL & 1650 FEL
Unit letter B, Section 16-16S-29E

(c) **High Lonesome Queen Unit Well No. 7**
API No. 30-015-Pending
1980 FNL & 330 FEL
Unit letter H, Section 16-16S-29E

(d) **High Lonesome Queen Unit Well No. 8**
API No. 30-015-Pending
1980 FSL & 10 FWL
Unit letter L, Section 16-16S-29E

(e) **High Lonesome Queen Unit Well No. 14**
API No. 30-015-Pending
660 FSL & 1980 FWL
Unit letter N, Section 16-16S-29E

(f) **High Lonesome Queen Unit Well No. 16**
API No. 30-015-Pending
660 FSL & 660 FEL
Unit letter P, Section 16-16S-29E

(5) Applicant appeared at the hearing through counsel and presented the following testimony:

(a) The Queen formation in this area has been totally defined by development. Enhanced recovery by waterflooding has been successful for similar units in this area that have targeted the Penrose sandstone member located in the Queen formation (High Lonesome-Queen Pool; Pool code 30780). The Unit is part of a continuous east-west trend of Penrose sandstone that is at least eight miles long.

(b) Applicant has described target for enhanced recovery as a sandstone reservoir with a general gross thickness of 30 feet.

Average porosity is 11 percent; however, minimum threshold porosity for production in the reservoir is eight percent (8%).

(c) The reservoir is confined to the north by loss of permeability due to precipitation of anhydrites and salts in pore space and to the south by change in lithology with an increase in shale content. Permeability along the east and west sides of the reservoir also decreases towards the Unit boundary due to increased precipitation of evaporates in pore spaces during deposition.

(d) A pilot waterflood project was conducted between 1957 and 1959 that included a portion of the same reservoir located in Section 16. The results of the pilot project increased oil production over 200 percent (200%) for the duration of the injection in the project area.

(e) The reservoir is confined above and below by thick sequences of low-porosity, anhydritic dolostone that will prevent migration of injected fluids out of the injection interval. There are no faults or other geologic structures that would allow migration of the injected fluids out of the injection interval.

(f) Each of the new six injection wells will be properly constructed to prevent migration of the injected fluid upward to any underground source of drinking water or other hydrocarbon-producing formation.

(g) Applicant requests a maximum surface injection pressure of 1100 psi based on similar waterflood operations in the vicinity of the Unit. Applicant submitted Division Order No. R-11674-A which approved a maximum surface injection pressure of 1100 psi for the West High Lonesome (Penrose sand) Unit Waterflood Project located in Sections 17, 18, 19, and 20, Township 16 South, Range 29 East, NMPM. Applicant stated that this adjacent waterflood project had similar reservoir characteristics which necessitated a higher injection pressure to effectively and efficiently waterflood the Unit without fracturing the formation.

(h) Most of the wells in the one-half mile area of review (AOR) surrounding each of the proposed injection wells are currently plugged and abandoned. Applicant identified a total of 42 wells within the AOR that penetrate the target interval: 26 wells that are plugged and abandoned and 16 wells that are currently producing.

(i) Applicant was able to compile sufficient completion or plugged and abandoned information for all wells except the Davis Federal Well No. 1 (API No. 30-015-02719). The Sundry Notice for

abandonment was illegible; however, the drilling company, Moab Drilling Company, had abandoned two other wells in this Unit during the same time period (Skelly State Well No. 2; API No. 30-015-02742 and Skelly State Well No. 4; API No. 30-015-02745). Applicant offered that the drilling company had significant historical presence in this area for well completions and abandonments and that the Davis Federal Well No. 1 was abandoned with the same procedures as the two Skelly State wells.

(j) Based on the available information and the assessment of the Davis Federal Well No. 1 abandonment, Applicant contends that each of the wells in the AOR is properly plugged and abandoned so that it will not become a conduit to allow migration of injected fluids out of the injection zone.

(k) The water that will be injected is produced water from Yeso wells from a different operator in the vicinity. This water has a general quality of approximately 238,000 parts per million Total Dissolved Solids (ppm TDS) which is lower than the produced water of the Unit. The Applicant intends to blend captured water from production with the Yeso formation water as the project matures. There are no fluid compatibility issues.

(l) Applicant did not find any water wells within one-mile radius of the proposed injection wells. There is no known hydrologic connection between the injection zone and any underground source of drinking water.

(m) Applicant provided the required notices to affected persons pursuant to Subsection C of Division Rule 19.15.26.8 NMAC.

(n) The Unit consists of three State of New Mexico leases of which Applicant has 100 percent ownership. No fee or federal leases are located within this Unit.

(o) The Commissioner of Public Lands has given preliminary approval of the Unit and waterflood proposal.

(6) No other party appeared at the hearing or otherwise opposed the application.

The Division concludes that:

(7) The proposed 680-acre Unit consists of three (3) state leases which are owned one hundred percent (100%) by Alamo Permian.

(8) The New Mexico State Land Office has given preliminary approval of the High Lonesome Queen Unit and has designated Alamo Permian as the operator.

(9) All of the completed and plugged and abandoned wells in the AOR appear to be adequately plugged so that none of them will become a conduit for the escape of injected fluid from the permitted injection interval.

(10) Applicant's request for a maximum surface injection pressure of 1100 psi is based on a study conducted for the West High Lonesome (Penrose Sand) Unit Waterflood. This study included step-rate tests conducted on five injection wells, frac-height logs, and the results of historical injection in the unit at a gradient of 0.2 psi per foot. The Division finds that the West High Lonesome (Penrose Sand) Unit Waterflood Project has comparable stratigraphy, reservoir conditions and reservoir characteristics as the proposed project.

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

(12) This application and proposed project should be approved.

IT IS THEREFORE ORDERED THAT:

(1) The High Lonesome Queen Unit Agreement executed by Alamo Permian Resources, LLC ("Alamo Permian" or "Operator"), is hereby approved and designated the **High Lonesome Queen Unit Waterflood Project** ("Project") for all oil and gas in all formations from the surface to 100 feet below the base of the Penrose sandstone interval of the Queen formation underlying the following described 680 acres, more or less, of State of New Mexico lands ("Project Area") in Eddy County, New Mexico.

Township 16 South, Range 29 East, NMPM
Section 15: NW/4 SW/4
Section 16: All

(2) The application of Alamo Permian for authorization to inject produced water in the High Lonesome Queen Unit is hereby approved. Alamo Permian is authorized to inject produced water into the High Lonesome-Queen Pool (Pool Code 30780) through perforations in the proposed injection wells from 1700 feet to 2000 feet.

(3) The "Unitized Formation" as defined in the Unit Agreement for the High Lonesome Queen Unit Waterflood is the "stratigraphic interval occurring between the surface to 100 feet below the base of the Penrose sandstone interval of the Queen formation, said Penrose sandstone interval base occurring at 1865 feet in the Moab Drilling Company Skelly State Well No. 3 located 1980 feet from the North line and 1980 feet from the West line of Section 16, Township 16 South, Range 29 East, NMPM,

Eddy County, New Mexico as recorded on the radioactive log of said well dated July 1, 1955".

(4) The Unitized Interval for this Order shall comprise the Penrose sandstone member occurring within the Queen formation that underlies the Project Area. The vertical extent of the Unitized Interval is the stratigraphic equivalent of the Penrose sandstone from 1835 feet to 1865 feet below surface as shown on the Gamma Ray and Density Neutron Logs for the Skelly State Well No. 3 (API No. 30-015-02744) located 1980 feet from the North line and 1980 feet from the West line (Unit letter F) of Section 16, Township 16 South, Range 29 East, NMPM, Eddy County, New Mexico.

(5) The following proposed wells are approved for injection under this Order:

(a) **High Lonesome Queen Unit Well No. 1**
API No. 30-015-Pending
1310 FNL & 10 FWL
Unit letter D, Section 16-16S-29E

(b) **High Lonesome Queen Unit Well No. 2**
API No. 30-015-Pending
1310 FNL & 1650 FEL
Unit letter B, Section 16-16S-29E

(c) **High Lonesome Queen Unit Well No. 7**
API No. 30-015-Pending
1980 FNL & 330 FEL
Unit letter H, Section 16-16S-29E

(d) **High Lonesome Queen Unit Well No. 8**
API No. 30-015-Pending
1980 FSL & 10 FWL
Unit letter L, Section 16-16S-29E

(e) **High Lonesome Queen Unit Well No. 14**
API No. 30-015-Pending
660 FSL & 1980 FWL
Unit letter N, Section 16-16S-29E

(f) **High Lonesome Queen Unit Well No. 16**
API No. 30-015-Pending
660 FSL & 660 FEL
Unit letter P, Section 16-16S-29E

(6) Alamo Permian Resources, LLC (OGRID 274841) is hereby designated the Operator of the Unit and the waterflood project.

(7) 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.

(8) Injection shall be accomplished through plastic-lined tubing installed in a packer set in the casing below the top of the Queen formation and within 100 feet of the uppermost injection perforations. 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.

(9) Each injection well shall pass a mechanical integrity test prior to initial commencement of injection and prior to resumption of injection each time the injection packer is unseated. All testing procedures and schedules shall conform to the requirements of Division 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.

(10) Prior to commencing injection, the Operator will conduct a step-rate test on one of the six new injection wells to confirm the correlation in reservoir characteristics to the adjacent West High Lonesome (Penrose Sand) Unit Waterflood Project. Selection of the well shall be at the discretion of the Operator. The Operator shall give at least 72 hours advance notice to the supervisor of the Division's Artesia District Office of the date and time the step-rate test will be conducted, so that the test may be witnessed.

(11) Each of the injection wells shall be initially equipped with a pressure control device or acceptable substitute that will limit the surface injection pressure on the well. The maximum surface injection pressure on any injection well within this waterflood project shall be limited to **no more than 1100 psi unless the result of the step-rate test conducted in Ordering Paragraph (11) indicates a significant deviation from the test results submitted in evidence for Division Order No. R-11674-A**. If there is significant deviation in the test results, the Operator shall be required to submit an application to the Division Director for approval of a new maximum surface pressure based on the result of the step-rate test.

(12) The Division Director may administratively authorize an increase in the maximum injection pressure upon a showing by the Operator that such higher pressure will not result in fracturing of the injection formation or confining strata.

(13) The Division Director may administratively authorize additional injection wells within the Unit as provided in Division Rule 19.15.26.8G.(5) NMAC without the necessity for further hearings.

(14) For each injection well, the Operator shall give at least 72 hours advance notice to the supervisor of the Division's Artesia District Office of the date and time (i) injection equipment will be installed, and (ii) the mechanical integrity pressure tests will be conducted, so that these operations may be witnessed.

(15) The operator shall provide written notice of the date of commencement of injection operations into each well to the Artesia District Office.

(16) The High Lonesome Queen Unit Waterflood Project is hereby certified to the New Mexico Taxation and Revenue Department as an "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (NMSA 1978 Sections 7-29A-1 through 7-29A-5).

(17) The area to be affected by the enhanced oil recovery project shall consist of the area within the High Lonesome Queen Unit; however, the area and/or the producing wells eligible for the enhanced oil recovery (EOR) tax rate may be contracted or expanded based upon the evidence presented by the unit operator in its demonstration of a positive production response.

(18) At such time as a positive production response occurs, and within five years from the date the project was certified to the New Mexico Taxation and Revenue Department, the unit Operator must apply to the Division for certification of a "positive production response." This application for "positive production response" shall identify the area benefiting from enhanced oil recovery operations and the specific wells eligible for the EOR tax rate.

(19) The Division may review the application administratively or set it for hearing. Based upon the evidence presented, the Division will certify to the New Mexico Taxation and Revenue Department those wells that are eligible for the EOR tax rate.

(20) The injection authority granted under this Order is not transferable except upon Division approval. The Division may require the operator to demonstrate mechanical integrity of any injection well that will be transferred prior to approving transfer of authority to inject.

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

(22) The Project shall be governed by applicable provisions of Division Rules 19.15.26.8 through 26.15 NMAC. Operator shall submit monthly reports of the injection operations on Division Form C-115, in accordance with Division Rules 19.15.26.13 and 19.15.7.28 NMAC.

(23) 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.

(24) In accordance with Division Rule 19.15.26.12.C NMAC, the injection

authority granted herein shall terminate, if after injection commences, any continuous period of one year elapses without reported injection into any authorized injection well in the project area occurring; provided, however, the Division, upon written request by Operator filed prior to the expiration of the one-year period of non-injection, may grant an extension for good cause.

(25) Operator shall provide written notice to the Division upon permanent cessation of injection into the Project.

(26) This Order does not relieve 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.

(27) 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), terminate the injection authority granted herein.

(28) This Order is subject to final approval of the High Lonesome Queen Unit by the New Mexico State Land Office.

(29) 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

JAMI BAILEY
Director