

**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. 15343  
ORDER NO. R-13458-A**

**APPLICATION OF LRE OPERATING, LLC FOR APPROVAL OF A PILOT  
WATERFLOOD PROJECT, EDDY COUNTY, NEW MEXICO**

**ORDER OF THE DIVISION**

**BY THE DIVISION:**

This case came on for hearing at 8:15 a.m. on August 6, 2015, at Santa Fe, New Mexico before Examiner Michael A. McMillan.

NOW, on this 29<sup>th</sup> day of October, 2015, 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, LRE Operating, LLC ("LRE" or "Applicant") seeks approval to institute a 320-acre pilot waterflood project within the San Andres formation, Artesia; Qn-GB-SA Pool (3230), to be located within the NE/4 and the SW/4 of Section 32, Township 17 South, Range 28 East, NMPM, Eddy County, New Mexico. Applicant seeks approval to convert the following three producing San Andres wells to injection, at depths within each well from 2400 feet to 3300 feet.

|                     |                        |                   |          |
|---------------------|------------------------|-------------------|----------|
| NW State Well No. 1 | (API No. 30-015-30609) | 990 FNL 990 FEL   | (Unit A) |
| NW State Well No. 3 | (API No. 30-015-30684) | 1650 FNL 1650 FEL | (Unit G) |
| NW State Well No. 7 | (API No. 30-015-30685) | 990 FSL 990 FWL   | (Unit M) |

(3) COG Operating LLC appeared at the hearing through counsel but presented no evidence or testimony.

(4) No other party entered an appearance or otherwise opposed this application.

(5) LRE appeared through counsel and presented the following testimony:

- (a) LRE Operating, LLC and LRE Resources are affiliates. LRE Operating, LLC is a successor to LRE Resources A, L.P., the applicant in related Division Case No. 14563, which resulted in the issuance of Division Order No. R-13458 dated September 19, 2011.
- (b) The application in Case No. 14563 was for creation of a cooperative waterflood project at similar depths and over scattered tracts. The application for a cooperative waterflood was denied for reasons stated in Order No. R-13458, including non-contiguous tracts within the project area and the potential for affecting correlative rights.
- (c) LRE in this case seeks to institute a pilot project on one State Trust lease with injection wells in two separate quarter sections in order to gather reservoir response data for future use to design a waterflood project.
- (d) LRE agrees to submit a report of the pilot results to the Division and did not object to supplying a copy of this report to offsetting owner COG Operating LLC.
- (e) LRE has met with the State Land Office and obtained verbal approval to proceed with this proposed pilot project.
- (f) LRE owns rights down to separate depths for each quarter-quarter section. A predecessor to LRE drilled wells on each quarter-quarter section and so earned this acreage under farm-in language stating "100 feet below the total depth drilled".
- (g) The middle portion of the San Andres formation is the main target; however, LRE seeks authority to inject into the three wells down to depths of 3300 feet or the lower San Andres formation.
- (h) The San Andres formation is contiguous over the pilot area with a general strike from northeast to southwest and with a dip to the southeast.
- (i) In this same area, LRE also operates the shallower Northwest Artesia Unit. The Unitized Interval within the Northwest Artesia Unit comprises the Grayburg (Premier) formation between depth intervals of 1180 feet and 2100 feet and does not include any part of the depth interval for the proposed San Andres project.
- (j) LRE plans to operate the proposed project and the Northwest Artesia Unit as two separate and distinct secondary recovery projects.
- (k) The existing well density in the San Andres formation is approximately 20 acres per well and no new drilling is planned. The proposed three injection wells will be conversions of producing wells.
- (l) The wells are relatively depleted, with predicted ultimate primary oil recovery of approximately seven (7) percent of original oil in place within the NE/4 and five and one half (5.5) percent within the SW/4.
- (m) If pilot results are favorable LRE may unitize surrounding acreage and implement a waterflood pattern configured upon the indicated water movement. LRE estimates that the secondary to primary production ratio should be close to 2:1 in the NE/4 and 2.6:1 in the SW/4. The mobility ratio is favorable for waterflooding.

(n) Section 33 located directly east of this proposed project is covered by the Washington 33 State Lease Waterflood Project now operated by Apache Corporation. That project was permitted by Division Order No. R-12658 issued November 7, 2006, and covers a greater vertical depth than this proposed project. That project has been successful and can be considered as roughly analogous.

(o) All wells within the one-half mile area of review of the proposed three injection wells are cased and cemented over the proposed injection interval.

(p) There are no known faults or wells that would act as conduits between the proposed injection interval and underground sources of fresh water.

(q) Injection waters will be sourced from this lease and from outside leases operated by LRE.

(r) Injection waters will be contained by surrounding producers within both of the two quarter sections proposed for this pilot project and should not influence production off lease.

The Division concludes that:

(6) LRE has secured preliminary approval from the State Land Office, has provided proper notice of its proposed pilot project, has provided notice of its intent to convert the three proposed wells to injection, and has received no objections.

(7) The evidence presented indicates that all wellbores within ½ mile of the proposed injection wells contain adequate casing and cement in order to isolate the proposed injection interval. The San Andres injection should not impact the shallower Grayburg formation waterflood or vice-versa. The proposed injection should be contained within the two subject quarter sections by offsetting production wells and should not adversely impact offsetting tracts or other owners. The proposed injection operation will not pose a threat to protectable underground sources of drinking water.

(8) LRE has offered evidence showing that the San Andres formation is largely depleted under primary recovery and secondary recovery is needed and will likely result in the recovery of additional oil reserves. LRE also showed that the application for secondary recovery will be economical and technically reasonable and has not been prematurely filed.

(9) The proposed pilot waterflood project will prevent waste, protect correlative rights, and should be approved and designated the NW State Pilot Waterflood Project. The project should be governed by Division Rules 19.15.26 NMAC.

(10) The three proposed injection wells, as they will be located, will not cause issues with surrounding tracts of land, and are optimally located so as to yield the information needed. In order to prevent unfavorable issues with surrounding tracts, the pilot project should not be allowed to expand administratively and should only be expanded after notice and hearing.

(11) Within three (3) months after issuance of this order, LRE should ensure that all available electric logs run on wells within this lease including temperature surveys and cement bond logs are available on the Division's online imaging system. Logs not appearing on this system should be copied and provided to the Artesia district office for scanning.

(12) LRE should, within six months after January 1, 2018, present the Division with a written update of the status of this pilot project including details such as injection and production history and plans on how best to proceed with secondary recovery from this reservoir.

(13) LRE should also supply a copy of this report to COG Operating LLC or its successor operator within the NW/4 of Section 32.

**IT IS THEREFORE ORDERED THAT:**

(1) The application of LRE Operating, LLC ("LRE") to institute a 320-acre pilot waterflood project by injection into the San Andres formation, Artesia; Qn-GB-SA Pool (Pool Code 3230), is hereby approved.

(2) The following three wells, all located within Section 32, Township 17 South, Range 28 East, NMPM, Eddy County, New Mexico are approved for conversion from production to injection:

|                     |                        |                   |          |
|---------------------|------------------------|-------------------|----------|
| NW State Well No. 1 | (API No. 30-015-30609) | 990 FNL 990 FEL   | (Unit A) |
| NW State Well No. 3 | (API No. 30-015-30684) | 1650 FNL 1650 FEL | (Unit G) |
| NW State Well No. 7 | (API No. 30-015-30685) | 990 FSL 990 FWL   | (Unit M) |

(3) Injection into each of these three wells shall be limited in depths from 2400 to 3300 feet and accomplished through plastic-lined tubing installed in packers located within 100 feet of the uppermost injection perforation. The wellhead injection pressure on each well shall be limited to **no more than 488 psi**.

(4) The project shall be situated on one State Land Office lease and limited in size to the NE/4 and the SE/4 of Section 32. The project shall be designated as the NW State Pilot Waterflood Project. The operator of the project shall be LRE Operating, LLC (OGRID 281994).

(5) This project shall not be expanded administratively. Any expansion of the lands within this project or the addition of other injection wells or the substitution of injection wells shall be done only after notice and hearing.

(6) LRE shall, within six (6) months after January 1, 2018, present the Division with a written update of the status of this pilot project including details such as injection and production history and plans on how best to proceed with secondary recovery from this reservoir.

(7) LRE shall supply a copy of this report to COG Operating LLC or its successor operator within the NW/4 of Section 32.

(8) Prior to February 1, 2016, the operator shall ensure that all available electric logs including temperature surveys and cement bond logs run on wells located within the two quarter sections of this pilot project are available on the Division's online imaging system. Logs not appearing on this system shall be copied and provided to the Artesia district office for scanning.

(9) The operator shall conduct injection operations in accordance with Division Rules 19.15.26 NMAC.

(10) The casing-tubing annulus shall be filled with an inert, noncorrosive fluid, and a gauge or approved leak-detection device shall be attached to the annulus in order to determine leakage in the casing, tubing, or packer. The construction of each injection well shall be as was proposed in this application, except well construction details except for injection depths may be modified administratively.

(11) The wells shall pass an initial mechanical integrity test ("MIT") prior to initially commencing injection and prior to resuming injection each time the packer is unseated. All MIT procedures and schedules shall follow the requirements in Division Rule 19.15.26.11A. NMAC. The Division Director retains the right to require at any time wireline verification of completion and packer setting depths in each injection well.

(12) The operator shall notify the supervisor of the Division's district office of the date and time of the installation of injection equipment and of any MIT so that the same may be inspected and witnessed. The operator shall provide written notice of the date of commencement of injection to the Division's district office. The operator shall submit monthly reports of the injection operations on Division Form C-115, in accordance with Division Rules 19.15.26.13 and 19.15.7.24 NMAC.

(13) Each injection well shall be equipped with a pressure limiting device in workable condition which shall, at all times, limit surface tubing pressure to the maximum allowable pressure for these wells. The Division Director retains the right to require at any time the operator to install and maintain a chart recorder showing casing and tubing pressures during injection operations.

(14) The Director of the Division may authorize an increase in maximum allowable tubing pressure, upon a proper showing by the operator that such higher pressure will not result in the fracturing of the injection formation, or confining strata or damage to the reservoir or migration of the injected fluid from the target formation. Such proper showing shall be demonstrated by sufficient evidence including but not limited to an acceptable Step-Rate Test.

(15) The operator shall give 72 hours advance notice to the supervisor of the Division's district office of the date and time (i) injection equipment will be installed, and (ii) the mechanical integrity pressure test will be conducted on the approved injection well, so that these operations may be witnessed.

(16) The operator shall take all steps necessary to ensure that injected water enters only the approved injection interval and is not permitted to escape to other formations or onto the surface. Without limitation on the duties of the operator as provided in Division Rules 19.15.29 and 19.15.30 NMAC, or otherwise, the operator shall immediately notify the Division's district office of any failure of the tubing, casing or packer in the well, or of any leakage or release of water, oil or gas from or around any produced or plugged and abandoned well in the area, and shall take such measures as may be timely and necessary to correct such failure or leakage.

(17) 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 well that will be transferred prior to approving transfer of authority to inject.

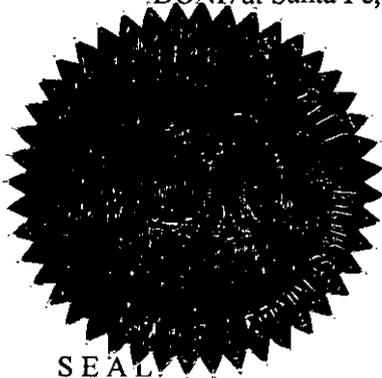
(18) The Division may revoke this order after notice and hearing if the operator is in violation of Rule 19.15.5.9 NMAC.

(19) The injection authority granted herein shall terminate two (2) years after the effective date of this order if the operator has not commenced injection operations into at least one of the subject injection wells. One year after injection into this project has ceased, the Division shall consider the project abandoned, and the authority to inject into any well in this project shall terminate *ipso-facto*. The Division, upon written request mailed by the operator prior to the termination date or the project abandonment date, may grant an extension thereof for good cause.

(20) Compliance with this order does not relieve the operator of the obligation to comply with other applicable federal, state or local laws or rules, or to exercise due care for the protection of fresh water, public health and safety and the environment.

(21) Jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (1) to protect fresh or protectable waters or (2) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, terminate the injection authority granted herein.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.



STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

DAVID R. CATANACH  
Director