

**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. 16442  
ORDER NO. R-20308**

**AMENDED APPLICATION OF NGL WATER SOLUTIONS PERMIAN, LLC  
FOR APPROVAL OF A SALT WATER DISPOSAL WELL IN EDDY COUNTY,  
NEW MEXICO.**

**ORDER OF THE DIVISION**

**BY THE DIVISION:**

This case came on for hearing at 8:15 a.m. on October 4, 2018, at Santa Fe, New Mexico, before Examiners Michael A. McMillan and Phillip R. Goetze, and on October 18, 2018, before Phillip R. Goetze.

NOW, on this 31<sup>st</sup> day of December, 2018, the Division Director, having considered the testimony, the record and the recommendations of Examiner Goetze,

**FINDS THAT:**

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

(2) Cases No. 16439, No. 16441, and No. 16442 were consolidated at the hearing for testimony; however, a separate order is being issued for each case.

(3) In Case No. 16442, NGL Water Solutions Permian, LLC (the "Applicant" or "NGL") seeks an order granting authority to utilize its Red Road SWD Well No. 1 (API No. 30-015-45235; the "Subject Well") with a surface location 1107 feet from the South line and 1057 feet from the East line (Unit P) in Section 26, Township 23 South, Range 31 East, NMPM, Eddy County, as an Underground Injection Control (UIC) Class II well for commercial disposal of produced water into the Devonian and Silurian formations through an open-hole interval from approximately 16450 feet to approximately 17458 feet below surface.

(4) On September 26, 2018, the Applicant met with the Division in a pre-hearing conference and provided preliminary geologic and engineering data proposed for presentation as evidence at hearing. This data included proposed well completion, risk assessment for induced seismicity, detailed presentation of geology and stratigraphy, and an evaluation for recovery of failed tubing.

(5) At the September conference, the Division also reviewed the proposed surface location with respect to other Devonian disposal wells with similar injection capacities. The Division concluded that the proposed location would not overlap the 3/4-mile radius buffers for adjacent Devonian disposal wells.

(6) Subsequently on August 27, 2018, NGL submitted a hearing application to the Division for approval of the Subject Well for authority to inject produced water.

(7) Applicant appeared at the hearing through counsel and presented geologic and engineering evidence to the effect that:

- (a) The Applicant seeks to drill the Subject Well to an approximate total depth of 17458 feet below surface. The injection will occur through an open borehole from approximately 16450 feet to approximately 17458 feet below surface.
- (b) The Subject Well will be constructed with the following four casing strings and liner system: 20-inch surface casing set at 1000 feet; 13<sup>3</sup>/<sub>8</sub>-inch intermediate casing set at 4420 feet; 9<sup>5</sup>/<sub>8</sub>-inch intermediate casing set at 11800 feet; and a 7<sup>5</sup>/<sub>8</sub>-inch liner (with a weight of 39 pounds per foot) set from 11300 feet to a total depth of 16450 feet.
- (c) All three casings will have cement circulated to the surface while the liner will have cement circulated to the top of the liner.
- (d) The Subject Well will inject fluids through a tapered tubing set consisting of plastic-lined, 5<sup>1</sup>/<sub>2</sub>-inch outside diameter (OD) tubing within the liner and plastic-lined, 7-inch OD tubing above the liner. The tubing is attached to a packer set no shallower than 100 feet above the top of the open-hole interval.
- (e) The primary sources of produced water will be wells with production from the Wolfcamp formation, the Bone Spring formation, the Atoka formation and the Delaware Mountain group.
- (f) The analyses of produced water samples provided by Applicant showed the compatibility of the injection fluids with formation fluids in the proposed disposal interval.

- (g) The Applicant proposes a commercial operation with a maximum average injection rate of 50000 barrels of water per day (BWPD) using a maximum surface injection pressure of 3290 pounds per square inch (psi).
- (h) There is one production well that penetrates the Devonian formation within the one-mile Area of Review of the Subject Well. The well (Todd 26 G Federal Well No. 1; API No. 30-015-20242) has sufficient casing and cement that seals the proposed injection interval to prevent vertical migration of fluids from the interval.
- (i) The Applicant states that approximately 150 feet of Woodford Shale provides an upper confining layer for the proposed disposal interval while approximately 500 feet of the remainder of the Simpson group (excluding the Ellenburger formation) provide a lower confining layer.
- (j) The proposed construction of the Subject Well will isolate and protect the two underground sources of drinking water (USDWs) identified in the area, the Rustler formation and the Dockum group (Santa Rosa sandstone), from any disposal activities by the Subject Well.
- (k) The Applicant provided evidence that the surface location was reviewed and confirmed by the Bureau of Land Management (BLM) as satisfactory with the provisions of Division Order No. R-111-P.
- (l) Base on the records of the New Mexico Office of the State Engineer, there are two fresh water wells within one mile of the Subject Well. The Applicant provided a water quality analysis for a well (POD Number C-02348) with production from the Dockum group.
- (m) The use of a tapered tubing configuration will decrease friction loss and provide increased disposal efficiency, thereby offsetting the need for new deep disposal wells to be completed in the same Devonian and Silurian interval.
- (n) The proposed well completion with the tapered tubing set with the available annular space of the 5½-inch OD tubing inside 7⅝-inch liner and with the annular space of the 7-inch OD tubing inside 9⅝-inch intermediate casing would be sufficient to allow the extraction of any lost tubing with standard fishing tools including overshot tools.

- (o) The estimated small increase in the reservoir pressure with the proposed injection rate of 50000 BWPD should not impact the reservoir pressures for similar disposal operations in the same injection interval located within 1.5 miles of the Subject Well.
- (p) Based on the application of a risk assessment model (the *Fault Slip Potential* software tool; Stanford Center for Induced and Trigger Seismicity; 2017) with publicly-available data, there was an extremely low probability of any induced-seismic event occurring during the operational lifespan of injection activity for the Subject Well.
- (q) The estimated radius of maximum injection fluid migration following 20 years of disposal operation would be greater than 0.5 mile but less than one mile.
- (r) The Applicant provided evidence of notification of this application to all "*affected persons*" within a one-mile radius of the Subject Well and with publication in a newspaper of general circulation in the county.

(8) Devon Energy Production Company, LLC ("Devon Energy") and Fulfer Oil & Cattle LLC appeared through counsel at hearing. Fulfer Oil & Cattle LLC did not oppose the granting of this application. No other party appeared at the hearing, or otherwise opposed the granting of this application.

(9) Devon Energy stated that the surface location for the Subject Well as provided in the application had potential to impede its proposed horizontal well drilling program in this area. Devon Energy further stated that it had withdrawn its objection to the application and was completing a negotiated agreement with NGL for a minor modification of the final surface location. Applicant stated that the Division would be notified of the final surface location along with any supplementary information on any changes to the AOR evaluation, the notice to affected parties, and the review for Division Order No. R-111-P.

(10) Following the hearing on October 18, 2018, Lonquist & Company, LLC submitted a correspondence (dated October 23, 2018) on behalf of the Applicant to the Division that:

- (a) provided an amended Form C-102 for a new surface location of the Subject Well that addressed Devon Energy's request;
- (b) confirmation that the new surface location was reviewed and confirmed by the BLM for conformity with Division Order No. R-111-P;

- (c) confirmation that the original notice to affected persons provided at hearing remained valid for the new surface location; and
- (d) there were no changes in the results of one-mile AOR for wells that penetrated the proposed injection interval.

**The Division concludes as follows:**

(11) The application has been duly filed under the provisions of Division Rule 19.15.26.8 NMAC.

(12) Applicant has presented satisfactory evidence that all requirements prescribed in Division Rule 19.15.26.8 NMAC have been met.

(13) The proposed well construction provided in the application is protective of USDWs.

(14) The new surface location, as detailed in the Lonquist correspondence of October 23, 2018, does not require either additional notice or changes in the AOR review for wells that penetrate the injection interval. Applicant also confirmed with the BLM the new surface location for conformity with Division Order No. R-111-P and the 2012 Secretarial Potash Order.

(15) There is one well within the one-mile AOR for the Subject Well that penetrate the proposed injection interval.

(16) Division records indicate NGL Water Solutions Permian, LLC (OGRID 372338) as of the date of this order is in compliance with Division Rule 19.15.5.9 NMAC.

(17) The Division is responsible for the orderly development and production of hydrocarbon resources including the authority to regulate the disposition of produced water as described in NMSA 1978, Section 70-2-12(B)(15). It is obligated to prevent waste, to protect correlative rights, and to protect human health and the environment.

(18) The Division supports the use of Devonian and Silurian formations as suitable disposal intervals to lessen the potential impact upon production of hydrocarbon resources and associated correlative rights that occur in shallower Permian formations. The Division recognizes the necessity to increase the efficiency of these deeper disposal wells with their increased cost associated with the deeper disposal interval.

(19) Under Division Order No. R-14392 (Case No. 15654), the Division determined that the increase in tubing size and the corresponding increase in injection rates necessitated additional information not previously incorporated into an administrative application for disposal wells with injection capacities greater than 20000

BWPD. This included, but was not limited to, the following specific subjects:

- (a) the potential cumulative impacts to a common injection interval utilized by multiple disposal wells in close proximity;
- (b) the consideration that the area of review for penetrating wells based on a one-mile radius from the disposal well's surface location was adequate;
- (c) the consideration that the notification of affected persons based on a one-half mile radius from the disposal well's surface location was protective of correlative rights; and
- (d) addressing the induced-seismicity issue, especially with regards to the potential impacts of increased injection volumes into reservoirs with faulting and the determination of a lower confining layer to ensure injection fluids do not migrate out the permitted disposal interval.

(20) The Applicant offered evidence and testimony to sufficiently respond to the items of concerns brought forth by the Division in the findings of Division Order No. R-14392 as listed previously and later addressed in Commission Order No. R-14392-A (*de novo*).

(21) To avoid the drilling of additional disposal wells, protect correlative rights, and prevent waste while affording the Applicant the opportunity to fully utilize the disposal potential of the Subject Well in a manner that safeguards the public health and the environment, this application should be approved.

**IT IS THEREFORE ORDERED THAT:**

(1) NGL Water Solutions Permian, LLC (the "Operator" or "NGL") is hereby authorized to utilize its Red Road SWD Well No. 1 (API No. 30-015-45235; the "Subject Well") with a surface location 1107 feet from the South line and 1057 feet from the East line (Unit P) in Section 26, Township 23 South, Range 31 East, NMPM, Eddy County, New Mexico, as a commercial disposal well for UIC Class II fluids.

(2) Disposal shall be through open hole in the Devonian and Silurian formations (below the lower contact of the Woodford Shale) from approximately 16450 feet to approximately 17458 feet below surface (the "permitted disposal interval"). Injection is to be through a plastic-lined, tapered tubing set and a packer placed within 100 feet above the top of the permitted interval. This order shall approve the use of a tapered tubing set consisting of 5½-inch (OD) or smaller tubing placed within the 7⅝-inch liner (with a weight of 39 pounds per foot) and 7-inch (OD) or smaller tubing placed in the 9⅝-inch intermediate casing above the 7⅝-inch liner.

(3) The Operator shall take all steps necessary to ensure that the disposed water enters only the permitted disposal interval and is not permitted to escape to other formations or onto the surface. This order does not allow disposal into formations below the Silurian formations including the Montoya formation and the Ellenburger formation (lower Ordovician) or lost circulation intervals directly on top and obviously connected to these formations.

(4) The Operator shall complete a mudlog over the permitted disposal interval sufficient to demonstrate the hydrocarbon potential. The Operator shall notify the Division's District II office and the Santa Fe engineering bureau office of significant hydrocarbon shows that are observed during drilling of the permitted disposal interval. The Operator shall provide the District office with copies of the log.

(5) Prior to commencing disposal, the operator shall submit mudlog and geophysical logs information, to the Division's District geologist and Santa Fe engineering bureau office, showing evidence agreeable that only the permitted formation is open for disposal including a summary of depths (picks) for contacts of the formations which the Division shall use to amend this order for a final description of the depth for the injection interval.

(6) Prior to commencing disposal, the operator shall obtain a **bottom-hole pressure measurement** representative of the injection interval and submit this data with the information required in Ordering Paragraph (14).

(7) As provided in testimony, the Operator shall circulate to surface the cement for all casings and to the top of liner for the 7 $\frac{7}{8}$ -inch liner. The tie-in of the 7 $\frac{7}{8}$ -inch liner with the 9 $\frac{5}{8}$ -inch casing shall be equal to or greater than 200 feet. The Operator shall run a cement bond log ("CBL" or equivalent) across the 7 $\frac{7}{8}$ -inch liner from 500 feet above the liner to the bottom of the liner to demonstrate placement cement across the length of the liner and the cement bond with the tie-in with the 9 $\frac{5}{8}$ -inch casing. Copies of the CBL shall be provided to the Division's District II office.

(8) After installation of tubing, the casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge or an approved leak detection device in order to determine leakage in the casing, tubing, or packer. The casing shall be pressure tested from the surface to the packer setting depth to assure casing integrity.

(9) The well shall pass an initial mechanical integrity test ("MIT") prior to commencement of disposal and prior to resumption of disposal each time the disposal packer is unseated. All MIT procedures and schedules shall follow the requirements in Division Rule 19.15.26.11(A) NMAC.

(10) The wellhead injection pressure shall be limited to **no more than 3290 psi**. In addition, the Subject 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 this well.

(11) The Director of the Division may authorize an increase in tubing pressure upon a proper showing by the Operator of said well that such higher pressure will not result in migration of the disposed fluid from the approved injection interval. Such proper showing shall be demonstrated by sufficient evidence including but not limited to an acceptable Step-Rate Test.

(12) Further, the Subject Well shall be limited to a maximum injection rate of **no more than 50000 barrels of water per day.**

(13) The Director of the Division may authorize an increase in the injection rate upon a proper showing by the Operator of said well that such increase in injection rate will not result in migration of the disposed fluid from the approved injection interval. Such proper showing shall be demonstrated by sufficient evidence including but not limited to an amended assessment of induced-seismicity risks and calculation of a radius of influence representative of the proposed injection rate.

(14) The Operator shall notify the supervisor of the Division's District II office of the date and time of the installation of disposal equipment and of any MIT test so that the same may be inspected and witnessed. The Operator shall provide written notice of the date of commencement of disposal to the Division's District II office. The Operator shall submit monthly reports of the disposal operations (maximum surface injection pressure, injection volume and days of operation) using the online version of Division Form C-115, in accordance with Division Rules 19.15.26.13 NMAC and 19.15.7.24 NMAC.

(15) Without limitation on the duties of the Operator as provided in Division Rules 19.15.29 NMAC 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 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.

(16) If the Subject Well fails a MIT or if there is evidence that the mechanical integrity of said well is impacting correlative rights, the public health, any underground sources of fresh water, or the environment, the Division Director shall require the well to be shut-in within 24 hours of discovery and the operator shall redirect all disposal waters to another facility. The operator shall take the necessary actions to address the impacts resulting from the mechanical integrity issues in accordance with Division Rule 19.15.26.10 NMAC, and the well shall be tested pursuant to Rule 19.15.26.11 NMAC prior to returning to injection.

(17) The Division further stipulates the following "best management practices" shall be included as conditions of the approved application:

- (a) The Subject Well shall be included in a Supervisory Control and Data Acquisition (SCADA) system for operation as an injection well.
- (b) The Operator shall first contact the Division's District II supervisor for approval of proposed remedial actions prior to initiating any recovery attempts should a failure of tubing occur with a loss of a tubing section within the Subject Well.
- (c) The Operator shall submit all well tests and performance reports to Division's District II (attached to a Form C-103) and made part of the well file for future availability.

(18) 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.

(19) The Division may revoke this injection permit after notice and hearing if the Operator is in violation of Division Rule 19.15.5.9 NMAC.

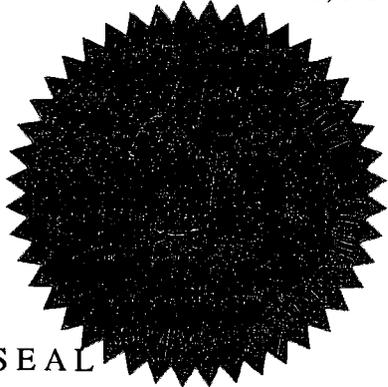
(20) The disposal authority granted herein shall terminate two years after the effective date of this order if the Operator has not commenced injection operations into the proposed well, provided however, the Division, upon written request, mailed by the Operator prior to the termination date, may grant an extension thereof for good cause.

(21) One year after disposal into the Subject Well has ceased, said well will be considered abandoned and the authority to dispose will terminate *ipso facto*.

(22) 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.

(23) 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, or prior to notice and hearing in event of an emergency, terminate the disposal authority granted herein.

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



SEAL

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

Handwritten signature of Heather Riley

HEATHER RILEY  
Director