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. 16439
ORDER NO. R-20322

AMENDED APPLICATION OF NGL WATER SOLUTIONS PERMIAN, LLC FOR APPROVAL OF A SALT WATER DISPOSAL WELL IN LEA 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 23rd day of January, 2019, 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. 16439, NGL Water Solutions Permian, LLC (the "Applicant" or "NGL") seeks an order granting authority to utilize its McCloy Central SWD Well No. 1 (API No. 30-025-Pending; the "Subject Well") with a surface location 762 feet from the North line and 383 feet from the East line (Unit A) and a bottom-hole location 762 feet from the North line and 256 feet from the East line (Unit A), both in Section 24, Township 24 South, Range 32 East, NMPM, Lea 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 17424 feet to approximately 18533 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 ¾-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 18533 feet below surface. The injection will occur through an open borehole from approximately 17424 feet to approximately 18533 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 1250 feet; 13⅜-inch intermediate casing set at 4950 feet; 9⅝-inch intermediate casing set at 12300 feet; and a 7⅝-inch liner (with a weight of 39 pounds per foot) set from 11800 feet to a total depth of 17424 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, 5½-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 Bone Spring and the Wolfcamp formations.

(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 3484 pounds per square inch (psi).

(h) There are no production or disposal wells that penetrate the Devonian formation within the one-mile Area of Review (AOR) of the surface location and the bottom-hole location for the Subject Well.

(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) Based on the records of the New Mexico Office of the State Engineer, there are no fresh water wells within one mile of the surface location of the Subject Well.

(l) 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.

(m) 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.

(n) 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.

(o) 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.

(p) 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.

(q) The Applicant provided evidence of notification of this application to all *"affected persons"* within a one-mile radius of both the surface and bottom-hole locations of the Subject Well and with publication in a newspaper of general circulation in the county.

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

The Division concludes as follows:

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

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

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

(12) There are no wells that penetrate the proposed injection interval within the one-mile AOR for the Subject Well.

(13) 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.

(14) 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.

(15) 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.

(16) 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.

(17) 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*).

(18) 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 McCloy Central SWD Well No. 1 (API No. 30-025-Pending; the "Subject Well") with a surface location 762 feet from the North line and 383 feet from the East line (Unit A) and a bottom-hole location 762 feet from the North line and 256 feet from the East line (Unit A), both in Section 24, Township 24 South, Range 32 East, NMPM, Lea 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 17424 feet to approximately 18533 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 provide to the Division's District a Notice of Intent on Division Form C-103 with the anticipated date and time for the well to be spud. This initial Notice shall be filed with the District at least 72 hours prior to commencing drilling.

(5) 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 I 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.

(6) 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.

(7) 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 (15).

(8) As provided in testimony, the Operator shall circulate to surface the cement for all casings and to the top of liner for the 7⅝-inch liner. The tie-in of the 7⅝-inch liner with the 9⅝-inch casing shall be equal to or greater than 200 feet. The Operator shall run a cement bond log ("CBL" or equivalent) across the 7⅝-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 9⅝-inch casing. Copies of the CBL shall be provided to the Division's District I office.

(9) 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.

(10) 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.

(11) The wellhead injection pressure shall be limited to **no more than 3485 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.

(12) 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.

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

(14) 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.

(15) The Operator shall notify the supervisor of the Division's District I 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 I 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 and 19.15.7.24 NMAC.

(16) 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) 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.

(18) 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 I 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 I (attached to a Form C-103) and made part of the well file for future availability.

(19) 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.

(20) 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.

(21) The disposal authority granted herein shall terminate one year 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.

(22) 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.*

(23) 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.

(24) 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.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

GABRIEL WADE
Acting Director

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