

**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. 20574
ORDER NO. R-20955**

**APPLICATION OF PERMIAN OILFIELD PARTNERS, LLC FOR APPROVAL OF A
SALT WATER DISPOSAL WELL, LEA COUNTY, NEW MEXICO.**

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 a.m. on June 14, 2019, at Santa Fe, New Mexico, before Examiner Phillip R. Goetze.

NOW, on this 7th day of November 2019, 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 of the subject matter.

(2) Cases No. 20571, No. 20572, No. 20573, and No. 20574 were consolidated at the hearing for testimony; however, a separate order is being issued for each case.

(3) In Case No. 20574, Permian Oilfield Partners, LLC (the "Applicant" or "Permian") seeks an order granting authority to utilize its Vortex Federal SWD Well No. 1 (API No. 30-025-Pending; the "Subject Well") with a surface location 1151 feet from the North line and 337 feet from the East line (Lot 1) in Section 1, 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 16619 feet to approximately 18427 feet below surface.

(4) 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 18427 feet below surface. The injection will occur through an open borehole (6.5-inch diameter) from approximately 16619 feet to approximately 18427 feet below surface.
- (b) The Subject Well will be constructed with the following three casing strings and liner system: 20-inch surface casing set at 1160 feet; 13³/₈-inch intermediate casing set at 5059 feet; 9⁵/₈-inch intermediate casing set at 12198 feet; and a 7⁵/₈-inch liner (with a weight of 39 pounds per foot) set from 11998 feet to a total depth of 16619 feet.
- (c) All 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, 5¹/₂-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 Delaware Mountain group, the Bone Spring (including Avalon) and the Wolfcamp formations.
- (f) The analyses of produced water samples provided by Permian showed the compatibility of the injection fluids with formation fluids in the proposed disposal interval.
- (g) The Applicant proposes a commercial operation with an average injection rate of 40000 barrels of water per day (BWPD) and a maximum injection rate of 50000 BWPD using a maximum surface injection pressure of 3324 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 200 feet of Woodford Shale provides an upper confining layer for the proposed disposal interval while there is approximately 1300 feet of Ordovician formations (excluding the Ellenburger formation) to provide a lower confining layer.

- (j) The proposed construction of the Subject Well will isolate and protect the underground sources of drinking water (USDWs) 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 freshwater wells within one mile of the surface location of the Subject Well. Applicant stated that regional hydrologic data suggest that there are fresh water occurrences below 600 feet.
- (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) 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.
- (o) Permian provided evidence of notification of this application to all “*affected persons*” within a one-mile radius of the surface location of the Subject Well and with publication in a newspaper of general circulation in the county.

(5) The New Mexico State Land Office (NMSLO) 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.

(6) The NMSLO provided a statement that the application was being reviewed and that the NMSLO had concerns about the spacing of these types of disposal wells and their proximity to state trust lands.

The Division concludes as follows:

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

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

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

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

(11) Division records indicate Permian Oilfield Partners, LLC (OGRID 328259) as of the date of this order is in compliance with Division Rule 19.15.5.9 NMAC.

(12) 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.

(13) 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.

(14) Division records did not identify any pending C-108 applications or approved UIC permit for other disposal wells with the same proposed injection interval that has a surface location that is within a 1.5-mile radius of the surface location of the Subject Well.

(15) 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.

(16) 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*).

(17) 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) Permian Oilfield Partners, LLC (the "Operator") is hereby authorized to utilize its Vortex Federal SWD Well No. 1 (API No. 30-025-Pending; the "Subject Well") with a surface location 1151 feet from the North line and 337 feet from the East line (Lot 1) in Section 1, 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 16619 feet to approximately 19006 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 disposal 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) Well construction and testing shall be in accordance with the requirements of the Bureau of Land Management.

(4) The Operator shall take all steps necessary to ensure that the disposed water enters only the permitted disposal interval and is not allowed to escape to other formations or onto the surface. This order does not authorize 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.

(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 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 and any corresponding change in the wellhead injection pressure.

(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 (16).

(8) The Operator shall run a cement bond log (CBL) across the 7⁵/₈-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 9⁵/₈-inch casing. Copies of the CBL shall be provided to the Division's District 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 wellhead injection pressure shall be limited to **no more than 3324 psi (calculated using the gradient of 0.2 psi per foot to the top of open hole)**. 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 Subject Well shall pass an initial mechanical integrity test ("MIT") prior to commencing disposal and prior to resuming disposal each time the well has significant equipment changes including, but not limited to, the packer being unseated, tubing being pulled,

or when casing repairs have occurred. The Operator shall notify the Division's District office a minimum of 48 hours in advance of the proposed date and time of the modification of disposal equipment and of any MIT test so that the same may be inspected and witnessed. All MIT procedures and schedules shall follow the requirements in Division Rule 19.15.26.11(A) NMAC.

(15) The Operator shall provide copies of Notice of Intents and Subsequent Reports (either Form C-103 or a copy of the federal Form 3160-5) with the Division's District office for any testing of the well or for any activities that shall modify the well construction or operation.

(16) The Operator shall provide written notice of the date of commencement of disposal to the Division's District office. The Operator shall submit monthly reports of the disposal operations on Division Form C-115, in accordance with Division Rules 19.15.26.13 NMAC and 19.15.7.24 NMAC.

(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 Subject 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 Subject Well shall be tested pursuant to Rule 19.15.26.11 NMAC prior to returning to injection.

(18) Without limitation on the duties of the Operator as provided in 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 Subject 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.

(19) 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 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.

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

(22) 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.

(23) 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*.

(24) 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.

(25) 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

ADRIENNE SANDOVAL
Director