**STATE OF NEW MEXICO**
**ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT**
**OIL CONSERVATION COMMISSION**

**APPLICATION OF MESQUITE SWD, INC. TO AMEND APPROVALS FOR SALT WATER DISPOSAL WELLS IN LEA AND EDDY COUNTIES.**

**CASE NO. 15654**
**ORDER NO. R-14392-A**

## ORDER OF THE COMMISSION

This matter came before the Oil Conservation Commission ("Commission") for a *de novo* hearing on November 9, 2017.

The Commission, having conducted a public hearing and having considered the testimony, the record in this case, the arguments of the applicant, and being otherwise fully advised, enters the following findings, conclusions, and order:

## THE COMMISSION FINDS THAT:

1. Notice has been given of this *de novo* hearing and the Commission has jurisdiction over the parties and the subject matter herein;

2. In Case No. 15654 the applicant, Mesquite SWD, Inc. ("Mesquite") (OGRID 161968), seeks an order amending administrative orders SWD-1667 approving the Sand Dunes SWD Well No. 2 (API 30-015-44131), SWD-1642 and SWD-1642-A approving the Scott B SWD Well No. 1 (API 30-015-44061), SWD-1638 approving the VL SWD Well No. 1 (API 30-015-pending), SWD-1558 approving the Station SWD Well No. 1 (API 30-025-43473), SWD-1636 approving the Cypress SWD Well No. 1 (API 30-015-43867), SWD-1610 approving the Gnome East SWD Well No. 1 (API 30-015-43801)[1], SWD-1602 approving the Uber East SWD Well No. 1 (API 30-015-43806), and SWD-1600 approving the Uber North SWD Well No. 1 (API 30-015-43805) (collectively referred to as the "wells"), in order to allow an increase in the size of disposal tubing from 4 ½ inches to 5 ½ inches for each well.

3. The Sand Dunes SWD Well No. 2 is located 2600 feet from the South line and 2500 from the West line, Unit K of Section 8, Township 24 South, Range 31 East, NMPM, Eddy County, for disposal of oil field produced water (UIC Class II only) through an open hole interval consisting of the Devonian and Silurian formations from 16620 feet to approximately 18010 feet.

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[1] Mesquite and the Commission have agreed to remove this well from the proceeding.

4. The Scott B SWD Well No. 1 is located 274 feet from the South line and 2165 feet from the West line, Unit N of Section 23, Township 24 South, Range 28 East, NMPM, Eddy County, for disposal of oil field produced water (UIC Class II only) through an open-hole interval within the Devonian and Silurian formations from 14152 feet to 15212 feet.

5. The VL SWD Well No. 1 is or will be located 2142 feet from the South line and 249 feet from the East line, Unit I of Section 14, Township 24 South, Range 28 East, NMPM, Eddy County, for disposal of oil field produced water (UIC Class II only) through an open-hole interval within the Devonian and Silurian formations from 15100 feet to 16300 feet.

6. The Station SWD Well No. 1 is located 2625 feet from the North line and 2315 feet from the West line, Unit letter F of Section 7, Township 24 South, Range 32 East, NMPM, Lea County, for disposal of oil field produced water (UIC Class II only) through an open-hole interval within the Devonian and Silurian formations from 16470 feet to 17975 feet.

7. The Cypress SWD Well No. 1 is located 1590 feet from the South line and 165 feet from the West line, Unit L of Section 34, Township 23 South, Range 29 East, NMPM, Eddy County, for disposal of oil field produced water (UIC Class II only) through an open-hole interval within the Devonian formation from 14780 feet to 15780 feet.

8. The Gnome East SWD Well No. 1 is located 220 feet from the North line and 305 feet from the West line, Unit D of Section 35, Township 23 South, Range 30 East, NMPM, Eddy County, for commercial disposal of oil field produced water (UIC Class II only) in the Devonian formation, through an open-hole interval from 15550 feet to 16550 feet.[2]

9. The Uber East SWD Well No. 1 is located 2345 feet from the South line and 660 feet from the East line, Unit I of Section 24, Township 23 South, Range 31 East, NMPM, Eddy County, for commercial disposal of oil field produced water (UIC Class II only) in the Devonian formation, through an open-hole interval from 16390 feet to 17500 feet.

10. The Uber North SWD Well No. 1 is located 516 feet from the North line and 2355 feet from the East line, Unit B of Section 15, Township 23 South, Range 31 East, NMPM, Eddy County, for commercial disposal of oil field produced water (UIC Class II only) in the Devonian formation, through an open-hole interval from 16500 feet to 17500 feet.

11. Each of the administrative orders listed in paragraph 2 requires that injection occur through a 4 ½ inch or smaller tubing, and establishes a maximum wellhead injection pressure for each well. (Mesquite Ex. 2).

[2] Mesquite and the Commission have agreed to remove this well from the proceeding

12. Mesquite submitted a written request to the Oil Conservation Division ("Division") to increase the tubing size for each of the wells from a maximum of 4 ½ inches to 5 ½ inches. The Division did not approve the request and asked that Mesquite file an application to set the matter for hearing. (Ex. 1). Mesquite presented Case No. 15654 to the Division Hearing Examiners on March 30, 2017, and Order No. R-14392 was issued by the Division on July 21, 2017. Order No. R-14392 denied Mesquite's requests to upsize disposal tubing, indicating that further study was needed.

13. On August 18, 2017, Mesquite submitted an application for a *de novo* hearing before the Commission pursuant to NMSA 1978, §70-2-13.

14. On November 9, 2017, a Commission hearing was held and Mesquite appeared at the hearing through counsel and presented 5 witnesses: Riley Neatherlin, Kate Zeigler, Scott Wilson, Dr. Susan Bilek and Stephen Nave. Mesquite offered evidence demonstrating the following:

a. Notice of the application was provided to all affected parties. (Ex. 5).

b. The wells, which are the subject matter of this application, are spaced out and not located closer than 5 miles from one other. There are no other active injection wells that Mesquite is aware of which are located within a one-mile radius of each of the wells.

c. The injection zone for each of the wells is located below the Woodford Shale. The Woodford Shale is an Upper Devonian unit which has low porosity and permeability and consists predominantly of mudstone with some carbonate bed. The Woodford Shale acts as a permeability boundary to prevent fluids from moving upward out of the underlying formations. The Woodford Shale formation in the areas where the wells are located is between 80 feet to 140 feet thick. (Ex. 6)

d. Below the injection zone for the wells is the Simpson Group which contains sequences of shale that make up approximately 55% of the total thickness of the formation in any given place and can likewise act as a permeability boundary which prevents fluids from migrating downwards into deeper formations and the basement rock. In the areas where the wells are located, the Simpson Group is between 200 and 800 feet thick and, as a result, there is a significant thickness in this lower shale. Below the Simpson Group is the Ellenburger Formation, which is up to 1,000 feet thick. (Ex. 9).

e. The wells will primarily be injecting fluids into the Wristen Group and Fusselman formations, with some fluids potentially being injected into the Upper Montoya Group. Each of these sub-formations or zones are located within what is commonly referred to by operators and the Division as the "Devonian" and "Devonian Silurian" formations. These zones consist of a

very thick sequence of limestone and dolostone which has significant primary and secondary porosity and permeability that is collectively between 1,500 to 3,000 feet thick. (Ex. 7).

f. There is no risk to freshwater resources for injection within the Wristen Group, Fusselman, and Upper Montoya Group because of the depth of these sub-formations and the shale permeability boundary.

g. There are no currently recognized production shales within the Wristen Group, Fusselman, and Upper Montoya Group. While there may be some isolated traps located within these sub-formations, it takes significant ability with imaging to be able to locate these deposits in order to properly target them; and no operators appeared at the hearing indicating that correlative rights would be impacted by the wells. (Ex. 8).

h. Mesquite showed through expert testimony that a large percentage of surface pressure it was encountering using 4 ½ inch tubing was a result of friction pressure. In Case No. 15720 evidence had been presented to the Division showing that up to 85% of this surface pressure was due to friction. Increasing the tubing size from 4 ½ inches to 5 ½ inches would reduce friction and would conserve forced power.

i. Mesquite further showed that increasing the tubing size to 5 ½ inches would not significantly increase reservoir pressures over a twenty-year time period. The injection zone is located within a reservoir with significant thickness which consists of high permeability rocks, which results in only very small pressure increases even when injection is increased to a rate of 40,000 barrels per day over a 20-year period. (Ex. 18-22).

j. Mesquite's expert witness testified that wellhead pressures are set at a maximum that is below the formation fracture pressure and, as a result, it is impossible to get above the formation fracture pressure. Consequently, Mesquite showed that it is highly unlikely that increasing the tubing size in the wells would result in fractures to the formation.

k. The closest known fault line is located approximately 16 miles away from where the wells are located. (Ex. 10, 11).

l. New Mexico Tech has gathered seismic monitoring data in areas near where the wells are located for several decades. This seismic data, along with data compiled from other sources, shows there has not been significant seismic activity within the areas where the wells are located.

m. Mesquite's expert seismology witness ran several different fault slip probability analyses, using a tool created by Stanford University. These

fault slip potential models showed low probability of slip or earthquakes to known mapped faults. (Ex. 23-29).

n. Finally, Mesquite presented expert witness testimony on the feasibility of performing fishing operations when 5 ½ inch tubing is utilized. Mesquite's fishing expert has been performing fishing operations on wells since 1980 and testified that the use of 5 ½ inch tubing provides more flexibility when fishing operations are required to be performed. 5 ½ inch tubing is a standard tubing size used for producing wells, so there are more tools available to conduct fishing operations. Mesquite's expert concluded that the use of 5 ½ inch tubing inside of 7 5/8 inch casing would not negatively impact fishing operations on the wells. (Ex. 30-33).

15. Black River Water Management Company, LLC appeared through counsel at the hearing and took no position as to Mesquite's application. No other party appeared at the hearing, or otherwise opposed the granting of the application.

**THE COMMISSION CONCLUDES THAT:**

16. The Commission has jurisdiction over the parties and the subject matter of this case.

17. Proper notice of Mesquite's application has been given.

18. Mesquite's request to increase the approved tubing size from 4 ½ inches to 5 ½ inches in the Sand Dunes SWD Well No. 2 (API 30-015-44131), Scott B SWD Well No. 1 (API 30-015-44061), VL SWD Well No. 1 (API 30-015-pending), Station SWD Well No. 1 (API 30-025-43473), Cypress SWD Well No. 1 (API 30-015-43867), Uber East SWD Well No. 1 (API 30-015-43806), and Uber North SWD Well No. 1 (API 30-015-43805) will reduce tubing friction but will not result in significant increases to reservoir pressures.

19. The evidence presented in this particular case indicates that an increase in tubing diameter, as proposed, will result in higher disposal rates without exceeding allowable surface or bottom hole pressures.

20. The evidence presented indicates that the approved injection zones for each of the wells at issue are located below the base of the Woodford Shale formation and above the Simpson Group formation, which consists of significant shale deposits. Evidence indicates that shale formations located above and below the approved injection zones will likely restrict fluids from migrating beyond the approved injection zones for the wells.

21. Mesquite also presented sufficient evidence and testimony in this particular case which indicates that the increased injection rates, achieved through the use of 5 ½ inch tubing, is unlikely to create fault slippage or induced seismicity. This is, in

part, due to the distance between the wells at issue in Mesquite's application and the distance from the wells to known fault lines.

22. The evidence presented further indicated that fishing operations could successfully be performed on the wells when 5 ½" tubing is utilized within 7 5/8" casing.

**IT IS THEREFORE ORDERED THAT:**

1. The application of Mesquite SWD, Inc. to amend administrative orders SWD-1667 approving the Sand Dunes SWD Well No. 2 (API 30-015-44131), SWD-1642 and SWD-1642-A approving the Scott B SWD Well No. 1 (API 30-015-44061), SWD-1638 approving the VL SWD Well No. 1 (API 30-015-pending), SWD-1558 approving the Station SWD Well No. 1 (API 30-025-43473), SWD-1636 approving the Cypress SWD Well No. 1 (API 30-015-43867), SWD-1602 approving the Uber East SWD Well No. 1 (API 30-015-43806), SWD-1600 approving the Uber North SWD Well No. 1 (API 30-015-43805) to allow an increase in the size of the tubing in the injection interval from a maximum of 4 ½ inches to a maximum of 5 ½ inches for each well is hereby granted.

2. All other provisions of Administrative Orders SWD-1667, SWD-1642, SWD-1642-A, SWD-1638, SWD-1558, SWD-1636, SWD-1602, and SWD-1600 remain in full force and effect.

3. The Commission directs the Division to continue conducting a work group on UIC Class II wells in order to develop best management practices and advise the Commission concerning the need to develop new regulations related to disposal wells.

4. Jurisdiction is hereby retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico on the 7th day of December, 2017.

**STATE OF NEW MEXICO**
**OIL CONSERVATION COMMISSION**

ROBERT BALCH, Member

EDWARD MARTIN, Member

DAVID R. CATANACH, Chair

SEAL