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:

APPLICATION OF NGL WATER SOLUTIONS PERMIAN, LLC FOR APPROVAL OF A SALT WATER DISPOSAL WELL, LEA COUNTY, NEW MEXICO.

CASE NO. 20575
ORDER NO. R-22138

ORDER OF THE DIVISION

This case came in for hearing before the Oil Conservation Division ("OCD") at 8:15 a.m. on June 14, 2019, in Santa Fe, New Mexico.

The OCD Director, having considered the testimony, the record, the recommendations of Hearing Examiner Phillip Goetze, these findings of fact, and conclusions of law issues this Order.

FINDINGS OF FACT

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

2. NGL Water Solutions Permian, LLC ("Applicant") seeks authority to utilize its Ghost Rider SWD No. 1 Well (API No. 30-025-Pending; "Well"), located 1,585 feet from the South line and 270 feet from the East line (Unit I) of Section 30, Township 26 South, Range 35 East, NMPM, Lea County, New Mexico, as an Underground Injection Control ("UIC") Class II well for disposal of produced water into the Devonian/Silurian formation through an open-hole interval from 18,953 feet to 20,729 feet below surface.

3. On April 23, 2019, Applicant submitted an application for hearing for approval of the Well for commercial disposal of produced water, with attached Form C-108 application.

4. On June 3, 2019, the New Mexico State Land Office ("NMSLO") filed an entry of appearance in Case No. 20575.

5. On June 6, 2019, NGL Water Solutions Permian, LLC filed a pre-hearing statement in case No. 20575.

6. Applicant proposed the construction of the Well with the following casing strings and liner system: 20-inch surface casing set at 1,750 feet; 13⅜ inch intermediate casing set at 5,300 feet; 9⅝-inch Intermediate casing set at 12,900 feet; and a 7⅝-inch liner (with a weight of 39 pounds per foot) set from 12,900 feet to a total depth of 18,953 feet.

7. The Applicant states that approximately 150 feet of Woodford Shale provides an upper confining layer for the proposed disposal interval while approximately 600 feet of the remainder of the Simpson group (excluding the Ellenberger formation) provide a lower confining layer.

8. At hearing, Applicant provided testimony through affidavit summarizing the geologic and engineering evidence in support of the approval of injection authority for the Well.

9. Applicant submitted a risk assessment model (the *Fault Slip Potential* software tool; Stanford Center for Induced and Trigger Seismicity; 2017) using publicly available data that projected an extremely low probability of any induced-seismic event occurring during the operational lifespan of injection activity for the Well.

10. Applicant stated the estimated radius of maximum injection fluid migration following 20 years of disposal operation would be greater than one-half miles but less than one mile.

11. Applicant did not identify any wells that penetrate the proposed injection interval within the one-mile Area of Review of the surface location of the Well.

12. Applicant stated that there were no active disposal well with the same injection interval within 1.5-mile radius of the surface location for the Well.

13. Applicant did not identify any freshwater wells that penetrate the proposed injection interval within the one-mile Area of Review of the surface location of the Well. The average depth to water in the area is 400 ft.

14. The NMSLO appeared at hearing through legal counsel and entered a statement into the record regarding the issue of the well's close proximity to state trust land. However, the NMSLO did not oppose the granting of the application. No other party appeared at the hearing, or otherwise opposed the granting of this application.

The OCD concludes as follows:

15. Applicant provided the information required by 19.15.26 NMAC and the Form C-108 for an application to inject produced water into a Class II UIC well.

16. Applicant complied with the notice requirements of 19.15.4 NMAC.

17. Applicant affirmed in a sworn statement by a qualified person that it examined the available geologic and engineering data and found no evidence of open faults or other hydrologic

connections between the approved injection interval and any underground sources of drinking water.

18. The proposed construction of the Well will isolate and protect the two USDWs identified in the area, the Rustler formation and the Dockum group (Santa Rosa sandstone), from any disposal activities by the Well.

19. Applicant is in compliance with 19.15.5.9 NMAC.

20. Approval of disposal in the Well will enable Applicant to support existing production and future exploration in this area, thereby preventing waste while not impairing correlative rights and protecting fresh water or underground sources of drinking water.

IT IS THEREFORE ORDERED THAT:

1. NGL Water Solutions Permian, LLC is hereby authorized by **SWD-2479** to utilize its Ghost Rider SWD Well No. 1, located in Unit I of Section 30, Township 26 South, Range 35 East, NMPM, Lea County, New Mexico, for the commercial disposal of UIC Class II fluids into the Devonian/Silurian formation.

2. Jurisdiction is retained by the OCD 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 OCD may, after notice and hearing or prior to notice and hearing in event of an emergency, terminate the disposal authority granted herein.

ADRIENNE E. SANDOVAL
DIVISION DIRECTOR

Date: 6/16/2022

AES/jat

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

UIC CLASS II PERMIT SWD-2479

APPENDIX A – AUTHORIZED INJECTION

Permittee: NGL Water Solutions Permian, LLC

OGRID No.: 372338

Well name: Ghost Rider SWD No. 1

Surface location: Lat: N 32.0113660; Long: W -103.3987960; NAD83
1,585 feet from the South line and 270 feet from the East line (Unit I) of Section 30, Township 26 South, Range 35 East, NMPM, Lea County, New Mexico.

Bottom hole location (if different): NA

Type of completion: Open Hole

Type of injection: Commercial

Injection fluid: Produced water from production wells completed in the Avalon, Bone Spring, - and Wolfcamp Formations and the formations of the Delaware Mountain Group.

Injection interval: Devonian/Silurian Formation

Injection interval thickness (feet): 18,953 to 20,729

Confining layer(s): Upper confining: base of Woodford Formation

Lower confining: upper contact of Montoya Formation

Prohibited injection interval(s): Any formation above or below the permitted injection interval including lost circulation intervals.

Liner, tubing, and packer set: 7-inch; 5.5-inch lined tubing with packer set within 100 feet of the top of the open-hole injection interval.

Maximum daily injection rate: 50,000 barrels of water.

Maximum surface injection pressure: 3,790 psi

STATE OF NEW MEXICO
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UIC CLASS II PERMIT SWD-2479

Pursuant to the Oil and Gas Act, NMSA 1978, §§70-2-1 *et seq.*, ("Act") and its implementing regulations, 19.15.1 *et seq.* NMAC, ("Rules") and the federal Safe Drinking Water Act, 42 U.S.C. 300f *et seq.*, and its implementing regulations, 40 CFR 144 *et seq.*, the Oil Conservation Division ("OCD") issues this Permit to NGL Water Solutions Permian, LLC ("Permittee") to authorize the construction and operation of a well to inject produced water at the location and under the terms and conditions specified in this Permit and Appendix A.

I. GENERAL CONDITIONS

A. AUTHORIZATION

1. Scope of Permit. This Permit authorizes the injection of produced water into the well described on Appendix A ("Well"). Any injection not specifically authorized by this Permit is prohibited. Permittee shall be the "operator" of the Well as defined in 19.15.2.7(O)(5) NMAC.

a. Injection is limited to the approved injection interval described in Appendix A. Permittee shall not allow the movement of fluid containing any contaminant into an underground source of drinking water ("USDW") if the presence of that contaminant may cause a violation of a Primary Drinking Water Regulation adopted pursuant to 40 CFR Part 142 or that may adversely affect the health of any person. [40 CFR 144.12(a)]

b. The wellhead injection pressure for the Well shall not exceed the value identified in Appendix A.

c. Permittee shall not commence to drill, convert, or recomplete the Well until receiving this approval and until OCD approves a Form C-101 Application for Permit to Drill ("APD") pursuant to 19.15.14 NMAC or receives an approved federal Form 3160-3 APD for the Well. [40 CFR 144.11; 19.15.14.8 and 19.15.26.8 NMAC]

d. Permittee shall not commence injection into the Well until the Permittee complies with the conditions in Section I. C. of this Permit.

e. This Permit authorizes injection of any UIC Class II fluid or oil field waste defined in 19.15.2.7(E)(6) NMAC.

f. This Permit does not authorize injection for an enhanced oil recovery project as defined in 19.15.2.7(E)(2) NMAC.

2. Notice of Commencement. Permittee shall provide written notice on Form C-103 to OCD E-Permitting and notify OCD Engineering Bureau by email of the submittal no later than two (2) business days following the date on which injection commenced into the Well. [19.15.26.12(B) NMAC]

3. Termination. Unless terminated sooner, this Permit shall remain in effect for a term of twenty (20) years beginning on the date of issuance. Permittee may submit an application for a new permit prior to the expiration of this Permit. If Permittee submits an application for a new permit, then the terms and conditions of this Permit shall remain in effect until OCD denies the application or grants a new permit.

a. This Permit shall terminate one (1) year after the date of issuance if Permittee has not commenced injection into the Well, provided, however, that OCD may grant a single extension of no longer than one (1) year for good cause shown. Permittee shall submit a written request for an extension to OCD Engineering Bureau no later than thirty (30) days prior to the deadline for commencing injection.

b. One (1) year after the last date of reported injection into the Well, OCD shall consider the Well abandoned, the authority to inject pursuant to this Permit shall terminate automatically, and Permittee shall plug and abandon the Well as provided in Section I. E. of this Permit. Upon receipt of a written request by the Permittee no later than one year after the last date of reported injection into the Well, OCD may grant an extension for good cause. [19.15.26.12(C) NMAC]

B. DUTIES AND REQUIREMENTS

1. Duty to Comply with Permit. Permittee shall comply with the terms and conditions of this Permit. Any noncompliance with the terms and conditions of this Permit, or of any provision of the Act, Rules or an Order issued by OCD or the Oil Conservation Commission, shall constitute a violation of law and is grounds for an enforcement action, including revocation of this Permit and civil and criminal penalties. Compliance with this Permit does not relieve Permittee of the obligation to comply with any other applicable law, or to exercise due care for the protection of fresh water, public health and safety and the environment. The contents of the Application and Appendix A shall be enforceable terms and conditions of this Permit. [40 CFR 144.51(a); 19.15.5 NMAC]

2. Duty to Halt or Reduce Activity to Avoid Permit Violations. Permittee shall halt or reduce injection to avoid a violation of this Permit or other applicable law. It shall not be a defense in an enforcement action for Permittee to assert that it would have been necessary to halt or reduce injection in order to maintain compliance with this Permit. [40 CFR 144.51(c)]

3. Duty to Mitigate Adverse Effects. Permittee shall take all reasonable steps to minimize, mitigate and correct any waste or effect on correlative rights, public health, or the environment resulting from noncompliance with the terms and conditions of this Permit. [40 CFR 144.51(d)]

4. Duty to Operate and Maintain Well and Facilities. Permittee shall operate and maintain the Well and associated facilities in compliance with the terms and conditions of this Permit. [40 CFR 144.51(e)]

5. Duty to Provide Information. In addition to any other applicable requirement, Permittee shall provide to OCD by the date and on the terms specified by OCD any information which OCD requests for the purpose of determining whether Permittee is complying with the terms and conditions of this Permit. [40 CFR 144.51(h)]

6. Private Property. This Permit does not convey a property right or authorize an injury to any person or property, an invasion of private rights, or an infringement of state or local law or regulations. [40 CFR 144.51(g)]

7. Inspection and Entry. Permittee shall allow OCD's authorized representative(s) to enter upon the Permittee's premises where the Well is located and where records are kept for the purposes of this Permit at reasonable times and upon the presentation of credentials to:

a. Inspect the Well and associated facilities;

b. Have access to and copy any record required by this Permit;

c. Observe any action, test, practice, sampling, measurement or operation of the Well and associated facilities; and

d. Obtain a sample, measure, and monitor any fluid, material or parameter as necessary to determine compliance with the terms and conditions of this Permit. [40 CFR 144.51(i)]

8. Certification Requirement. Permittee shall sign and certify the truth and accuracy of all reports, records, and documents required by this Permit or requested by OCD. [40 CFR 144.51(k)]

9. Financial Assurance. Permittee shall provide and maintain financial assurance for the Well in the amount specified by OCD until the Well has been plugged and abandoned and the financial assurance has been released by OCD. [40 CFR 144.52; 19.15.8.12 NMAC]

C. PRIOR TO COMMENCING INJECTION

1. Construction Requirements.

a. Permittee shall construct the Well as described in the Application, Appendix A and as required by the Special Conditions.

b. Permittee shall construct and operate the Well in a manner that ensures the injected fluid enters only the approved injection interval and is not permitted to escape to other formations or onto the surface.

2. Tests and Reports. Permittee shall complete the following actions prior to commencing injection in the Well.

a. Permittee shall obtain and comply with the terms and conditions of an approved APD prior to commencing drilling of the Well, or other OCD approval, as applicable, prior to converting or recompleting the Well. If the APD is approved by the OCD, the Well shall be subject to the construction, testing, and reporting requirements of 19.15.16 NMAC.

b. Permittee shall circulate to surface the cement for the surface and intermediate casings. If cement does not circulate on any casing string, Permittee shall run a cement bond log ("CBL") to determine the top of cement, then notify the OCD Engineering Bureau and the appropriate OCD Inspection Supervisor and submit the CBL prior to continuing with any further cementing on the Well. If the cement did not tie back into next higher casing shoe, Permittee shall perform remedial cement action to bring the cement to a minimum of two hundred (200) feet above the next higher casing shoe.

c. If a liner is approved for the construction of the Well, Permittee shall run and submit to OCD E-Permitting and notify the OCD Engineering Bureau by email, a CBL for the liner to demonstrate placement cement and the cement bond with the tie-in for the casing string.

d. Permittee shall submit to the appropriate OCD Engineering Bureau the mudlog, geophysical logs, and a summary of depths (picks) for the contacts of the formations demonstrating that only the permitted formation is open for injection. OCD may amend this Permit to specify the depth of the approved injection interval within the stratigraphic interval requested in the application. If Permittee detects a hydrocarbon show during the drilling of the Well, it shall notify OCD Engineering Bureau by email and obtain written approval prior to commencing injection into the Well.

e. Permittee shall obtain and submit to the OCD E-permitting on a Form C-103 a calculated or measured static bottom-hole pressure measurement representative of the completion in the approved injection interval.

f. Permittee shall conduct an initial mechanical integrity test ("MIT") on the Well in compliance with the terms and conditions of this Permit and 19.15.26 NMAC, and shall not commence injection into the Well until the results of the initial MIT have been approved by the appropriate OCD Inspection Supervisor. [19.15.26.11(A) NMAC]

g. OCD retains authority to require a wireline verification of the completion and packer setting depths in this Well. [19.15.26.11(A) NMAC]

D. OPERATION

1. Operation and Maintenance.

a. Permittee shall equip, operate, monitor and maintain the Well to facilitate periodic testing, assure mechanical integrity, and prevent significant leaks in the tubular goods and packing materials used and significant fluid movements through vertical channels adjacent to the well bore. [19.15.26.10(A) NMAC]

b. Permittee shall operate and maintain the Well and associated facilities in a manner that confines the injected fluid to the approved injection interval and prevents surface damage and pollution by leaks, breaks and spills. [19.15.26.10(B) NMAC]

c. OCD may authorize an increase in the maximum surface injection pressure upon a showing by the Permittee that such higher pressure will not result in the migration of the disposed fluid from the approved injection interval or induced seismicity. Such proper showing shall be demonstrated by sufficient evidence, including an acceptable step-rate test.

d. If OCD has reason to believe that operation of the Well may have caused or determined to be contributing to seismic activity, Permittee shall, upon OCD's written request:

i. Take immediate corrective action, which could include testing and evaluating of the injection interval and confining layers; suspending or reducing of the rate of injection or maximum surface injection pressure, or both; and providing increased monitoring of the Well's operation; and

ii. Submit a remedial work plan or an application to modify the Permit to implement the corrective action, plug back the injection interval, or incorporate another modification required by OCD.

OCD may approve the remedial work plan, modify the Permit or issue an emergency order or temporary cessation order as it deems necessary.

2. Pressure Limiting Device.

a. The Well shall be equipped with a pressure limiting device, which is in workable condition and can be tested for proper calibration at the well site, that shall limit surface tubing pressure to the maximum surface injection pressure specified in Appendix A.

b. Permittee shall test the pressure limiting device and all gauges and other metering requirement to ensure their accuracy and proper function no less than every five (5) years.

3. Mechanical Integrity. Permittee shall conduct a MIT prior to commencing injection, at least every five (5) years after the date of the previous MIT, and whenever the tubing is removed or replaced, the packer is reset, mechanical integrity is lost, Permittee proposes to transfer the Well, or requested by OCD.

a. MITs shall be conducted in accordance with 19.15.26 NMAC.

b. Permittee shall submit a sundry notice on Form C-103 of intent to install or replace injection equipment or conduct a MIT no later than three (3) business days prior to the event.

c. Permittee shall report the result of a MIT no later than two (2) business days after the test.

d. Permittee shall cease injection and shut-in the Well no later than twenty-four (24) hours after discovery if:

i. The Well fails a MIT; or

ii. Permittee observes conditions at the Well that indicate the mechanical failure of tubing, casing, or packer.

e. Permittee shall take all necessary actions to address the effects resulting from the loss of mechanical integrity in accordance with 19.15.26.10 NMAC.

f. Permittee shall conduct a successful MIT pursuant to 19.15.26.11 NMAC, including written approval from OCD prior to recommencing injection and the requirements contained in Section I G.3.

4. Additional Tests. Permittee shall conduct any additional test requested by OCD, including but not limited to step-rate tests, tracer surveys, injection surveys, noise logs, temperature logs, and casing integrity logs [19.15.26.11(A)(3) NMAC]

5. Records.

a. Permittee shall retain a copy of each record required by this Permit for a period of at least five (5) years and shall furnish a copy to OCD upon request. [40 CFR 144.51(h)]

b. Permittee shall retain a record of each test, sample, measurement, and certification of accuracy and function collected for the Well, including:

i. Date, location, and time of sample, measurement or calibration;

ii. Person who conducted the sample event, -measurement or calibration;

iii. Calibration of gauge or other equipment in accordance with the manufacturer's specifications;

iv. Description of method and procedures;

v. Description of handling and custody procedures; and

vi. Result of the analysis.

E. PLUGGING AND ABANDONMENT

1. Upon the termination of this Permit, Permittee shall plug and abandon the Well and restore and remediate the location in accordance with 19.15.25 NMAC.

2. If Permittee has received an extension pursuant to Section I. A. 2. b., Permittee shall apply for approved temporary abandonment pursuant to 19.15.25 NMAC.

3. If this Permit expires pursuant to 19.15.26.12 NMAC and OCD has not issued a new permit, then Permittee shall plug and abandon the Well and restore and remediate the location in accordance with 19.15.25 NMAC.

4. Permittee's temporary abandonment of the Well shall not toll the abandonment of injection in accordance with 19.15.26.12(C) NMAC.

F. REPORTING

1. Monthly Reports. Permittee shall submit a report using Form C-115 using the OCD's web-based online application on or before the 15th day of the second month following the month of injection, or if such day falls on a weekend or holiday, the first workday following the 15th, with the number of days of operation, injection volume, and injection pressure. [19.15.26.13 NMAC; 19.15.7.24 NMAC]

2. Corrections. Permittee shall promptly disclose to OCD any incorrect information in the Application or any record required by this Permit and submit corrected information. [40 CFR 144.51(h)(8)]

G. CORRECTIVE ACTION

1. Releases. Permittee shall report any unauthorized release of injection fluid at the Well or associated facilities in accordance with 19.15.29 and 19.15.30 NMAC.

2. Failures and Noncompliance. Permittee shall report the following incidents to appropriate OCD Inspection Supervisor and OCD Engineering Bureau verbally and by e-mail no later than 24 hours after such incident:

a. Any mechanical integrity failures identified in Section I. D. 3. d;

b. The migration of injection fluid from the injection interval [19.15.26.10 NMAC]; or

c. A malfunction of the Well or associated facilities that may cause waste or affect the public health or environment, including: (a) monitoring or other information which indicates that a contaminant may affect a USDW; or (b) noncompliance or malfunction which may cause the migration of injection fluid into or between USDWs. [40 CFR 144.51(l)(6)]

3. Corrective Action. Permittee shall submit a written report describing the incident in Sections I.G.1 or I.G.2, including a corrective active plan, no later than five (5) calendar days after discovery of the incident. [40 CFR 144.51(l)(6)] For an unauthorized release, Permittee also shall comply with the site assessment, characterization and remediation requirements of 19.15.29 and 19.15.30 NMAC.

4. Restriction or Shut-In. OCD may restrict the injected volume and pressure or shut-in the Well if OCD determines that the Well has failed or may fail to confine the injected fluid to the approved injection interval or has caused induced seismicity until OCD determines that Permittee has identified and corrected the failure. [19.15.26.10(E) NMAC]

H. PERMIT CHANGES

1. Transfer. This Permit shall not be transferred without the prior written approval of OCD. Permittee shall file Form C-145 for a proposed transfer of the Well. OCD may require, as a condition of approving the transfer, that this Permit be amended to ensure compliance and consistency with applicable law. If the Well has not been spud prior to the transfer, the OCD may require that the new operator reapply and submit to the OCD a new Form C-108 prior to constructing and injecting into the well. [19.15.26.15 NMAC; 19.15.9.9 NMAC]

2. Insolvency. Permittee shall notify OCD Engineering Bureau of the commencement of a voluntary or involuntary proceeding in bankruptcy which names Permittee or

an entity which operates the Well on behalf of Permittee as a debtor no later than ten (10) business days after the commencement of the proceeding.

3. OCD Authority to Modify Permit and Issue Orders

a. The OCD may amend, suspend, or revoke this Permit after notice and an opportunity for hearing if it determines that:

i. The Permit contains a material mistake;

ii. Permittee made an incorrect statement on which OCD relied to establish a term or condition of the Permit or grant this Permit;

iii. this Permit must be amended to ensure compliance and consistency with applicable law, including a change to the financial assurance requirements;

iv. The Well's operation may affect the water quality of fresh water;

v. Injected fluid is escaping from the approved injection interval;

vi. Injection may be caused or contributed to seismic activity: or

vii. Injection may cause or contribute to the waste of oil, gas or potash resources or affect correlative rights, public health, or the environment.

b. OCD retains jurisdiction to enter such orders as it deems necessary to prevent waste and to protect correlative rights, protect public health, and the environment.

c. OCD retains jurisdiction to review this Permit as necessary and no less than once every five (5) years, and may determine whether this Permit should be modified, revoked and reissued, or terminated. [40 CFR 144.36(a)]

4. Permittee Request to Modify Permit. Permittee may apply to modify the terms of this Permit.

a. **Minor Modifications**. OCD may make a minor modification to this Permit without notice and an opportunity for hearing for:

i. Non-substantive changes such as correction of typographical errors;

ii. Requirements for more frequent monitoring or reporting;

iii. Changes to the Well construction requirements provided that any alteration shall comply with the conditions of the Permit and does not change the Area of Review considered in the application for the Permit;

iv. Amendments to the plugging and abandonment plan;

v. Changes in the types of fluids injected which are consistent with sources listed in the application for the Permit and do not change the classification of the Well;

vi. Corrections of the actual injection interval if within the approved formation; or

vii. Transfer of a Permit for a Well that has been spud. [40 CFR 144.41]

b. **Major Modifications.** OCD shall require notice and an opportunity for hearing for any modification that is not minor. For such modifications, Permittee shall submit Form C-108 and comply with the notice requirements of 19.15.26 NMAC.

II. SPECIAL CONDITIONS

Permittee shall comply with the following special conditions: No special conditions.

III. ATTACHMENT

Well Completion Diagram as Provided in the C-108 Application for Case No. 20575.

Energy Partners LP

NGL Ghost Rider SWD #1

Vertical Injection - Devonian, Silurian, Fusselman

Location - Sec. 30 R26S T35E
Lea County, NM

Rig - ??

AFE Number

Estimated Drilling Cost

TD - 20,729'

GL/KB - 3172'/3192'

Directions to Site: From Jal, NM - Head South on NM-205 S (Frying Pan Road). Travel 6.8 miles and turn right (W) onto Beckham Rd. Continue on Beckham Road for 2.3 miles (past house on right). Location will be on the right (SE) side.
Lat/Long: 32.01281/-103.40131

Geologic Tops (MD ft)	Section	Problems	Bit/BHA	Mud	Casing	Logging	Cement (HOLD)	Injection String
Triassic - 25' Rustler Anhydrite - 1,034' Base of Silicates 1,581' **Surface TD - 1,750'**	**Surface** Drill 24" 0' - 1750' Set and Cement 20" Casing	Loss Circulation Hole Cleaning Wellbore stability in the Red Beds Anhydrite in the Rustler	24" PDC Bit + 9-5/8" X 8" 7/8 4.0 Combo MM w/17" NBS + 1X8" DC + 17" IBS + 1X8" DC + SS + 4X8" DC's + X/O +5" HWDP	Spud Mud MW< 9.0	1750' of 20" 133# J55 BTC Centralizers - bottom 2 joints and every 3rd jt thereafter, Cement basket 5th jt from surface	Mud loggers on site by Drillout of Surf.	**LEAD:** 741 sx of 13.7 ppg EXTANDACEM, 1.694 ft3/sk @ 75% Excess (750' of fill) **TAIL:** 1252 sx of 14.8 ppg HALCEM, 1.342 ft3/sk @ 75% Excess (1000' of fill)	
Top of Salt - 1,806' **1st Int. DV Tool - 1,850'** Castile - 2,816' Base Salt - 4,788' **1st Int TD - 5,300'**	**1st Intermediate** Drill 3550' of 17-1/2" Hole 1750' - 5300' Set and Cement 13-3/8" Casing in 2 Stages	Seepage Losses Possible H2S Anhydrite Salt Sections	17-1/2" Varel PDC Bit + 9-5/8"X 8" 7/8 4.0 Combo MM w/ 17" Steel NBS + 17" IBS + 2X8" DC's + Thruster + 4X8" DC's + 18X6" DC's + X/O + HWDP	Brine Water MW 10-10.5	5300' of 13-3/8" 68# HCL80 BTC 5M A Section Casing Bowl Centralizers - bottom jt, every 3rd joint in open hole and 2 jt inside the surface casing	Gyro Survey	**Stage 2:** 1128 sx of 13.7 ppg HALCEM, 1.747 ft3/sk @ 50% Excess (0' - 1850') **Stage 1:** 2157 sx of 13.7 ppg HALCEM, 1.777 ft3/sk @ 50% Excess (1850' - 5300')	12300' of 7" P110 26# TCPC
Delaware Mtn Group - 5,340' Lamar Limestone - 5,343' Bell Canyon - 5,378' **2nd Int. DV Tool/ACP - 5,400'** Cherry Canyon - 6,588' Brushy Canyon - 7,823' **2nd Int. DV Tool - 9,000'** Bone Spring - 9,306' **3rd Int Liner Top - 12,400'** Wolfcamp - 12,804' **2nd Int TD - 12,900'**	**2nd Intermediate** Drill 7600' of 12-1/4" Hole 5300' - 12900' Set 9-5/8" Intermediate Casing and Cement in 3 Stages	Hard Drilling in the Brushy Canyon (watch for stick-slip) Seepage to Complete Losses/ Water Flows in DMG Some Anhydrite and H2S possible Production in the Bone Spring and Wolfcamp Ballooning is possible in Cherry Canyon and Brushy if Broken Down	12-1/4" Smith XS 716S AxeBlade PDC Bit, sub, 8" 7/8 4.0 0.16 MM w/ 12" NBS, ALS Roller Reamer DeMag , UBHO sub, ALS 12" RR/UBHO/NMDC, 6 jts: 8" DC, X/O sub, 18 jts: 6" DC, X/O sub, 8" Drilling Jars HWDP + 5" DP to Surface	Freshwater MW 8.6 - 9.2 High visc. Sweeps and mud up for tight spots (<10 FL, 30-35 visc.)	10M B Section 12,900' of 9-5/8" 53.5# HCP110 BTC **Special Drift to 8.535"** **Externally Coat 3600' Between DV Tools** **DV Tool at at 9000'** **ECP/DV Tool @ top of loss zones (HOLD)** Centralizers - bottom jt, 100' aside of DV tool, every 3rd joint in open hole and 5 within the surface casing	**12.25" Open Hole:** MWD GR Triple combo, Caliper , CBL of 13-3/8" Casing to surface **Cased Hole:** CBL/Pressure pass to 1000 psi **IF** cement is not circulated on 2nd and 3rd Stages	**Stage 3:** 1120 sx of 13.7 ppg HALCEM, 1.777 ft3/sk @ 10% Excess (Upper DV Tool to Surface) **Stage 2:** 827 sx of 11.9 ppg HALCEM, 1.713 ft3/sk @ 50% Excess (Between Upper and Lower DVT) **Stage 1:** 1302 sx of 15.6 ppg HALCEM, 1.232 ft3/sk @ 30% Excess (TD to Lower DVT)	6603' of 5-1/2" P110 17# TCPC Duoline Internally Coated Injection Tubing
Penn - 13,206' Strawn - 14,488' Atoka - 15,006' Morrow - 15,564' Miss Lst - 16,654' Woodford - 18,659' **Perm Packer - 18,903'** **3rd Int TD - 18,953'**	**3rd Intermediate** Drill 6053' of 8-1/2" Hole 12900' - 18953' Set 7-5/8" Liner and Cement in Single Stage	High Pressure (up to 15ppg) and wellbore instability (fracturing) expected in the Atoka Production in the Wolfcamp Atoka and Morrow Hard Drilling in the Morrow Clastic	8-1/2" Smith XS 716S AxeBlade PDC Bit, sub, 6-3/4" 7/8 5.7 MM w/ 8" NBS, UBHO sub, 8" NMIBS/UBHO/NMDC, Thruster, 18 jts: 6" DC 6" Drilling Jars HWDP + 5" DP to Surface	AES-VERT OBM MW 13.0-14.5 UBD/MPD using ADA	6553' of 7-5/8" 39# HCV150 USS Liberty FJM Centralizers on and 1 jt above shoe jt and then every 2nd jt.	**8.5" Open Hole:** MWD GR Triple combo, Caliper of 8.5" Open Hole/CBL of 9-5/8" Casing **Cased Hole:** SCBL/Pressure Pass to 1000 psi of 7-5/8" Liner before drillout	**LEAD:** 209 sx of 11.9 ppg HALCEM, 2.053 ft3/sk @ 20% Excess over caliper volume or 25% (17953' - 12400') **TAIL:** 147 sx of 13.2 ppg HALCEM, 1.439 ft3/sk @ 20% Excess over caliper volume or 25% (2000' of fill)	7-5/8" x 5-1/2" TCPC Permanent Packer with High Temp Elastomer and full Inconel 925 trim
Devonian - 18,953' Silurian - 19,954' Fusselman - 20,224' Montoya - 20,629' TD - 20,729'	**Injection Interval** Drill 1910' of 6-1/2" hole 18953' to 20729'	Chert is possible Loss of Circulation is expected BHT estimated at 280F	6-1/2" Smith U611S PDC Bit, sub, 5" 7/8 2.6 0.26 1.5FBH MM w/ 6" NBS, 6" NMIBS, UBHO/NMDC, Thruster, X/O sub, 24 jts: 4-3/4" HWDP + 4" DP to Surface	Cut Brine - low grav for possible losses	Openhole completion	MWD GR Triple Combo with FMI + CBL of 7-5/8"	Displace with 3% KCl (or heavier brine if necessary)	