

## Statement of Basis

**Permit Number(s):**

UT22473-12990

**Well Name (s):**

SWD 34-19-722

**How to Comment:**

The public notice and comments due date is posted at EPA Region 8 UIC program's website:

<https://www.epa.gov/node/99201#public-notice>.

The public will have 30 days from the start of the public notice to provide comments on the proposed Permit action.

Submit your comments in writing or by phone to the EPA contact listed below during the comment period. Please reference the applicant's name and Permit number(s). You may also comment during a public hearing if one is held.

**EPA Contact:**

William Gallant

gallant.william@epa.gov

Phone: 303-312-6455

**Public Hearing**

No public hearing is planned at this time. During the comment period, you may ask EPA, using the methods described in the "How to Comment" section of this fact sheet, to hold a formal public hearing. Your request must identify issues to be raised. When there is significant public interest, EPA will hold a hearing to receive public comments and will publish a notice at least 30 days prior.

**Additional Information**

For additional information, please consult the EPA contact listed above. To learn more about EPA's Underground Injection Control program, or to join our mailing list, visit <https://www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-and-wy>.

# EPA Seeks Comments on Injection Well Permit

Applicant: Middle Fork Energy Uinta, LLC

Site Location: Uintah County, Utah

**Introduction**

This Statement of Basis is the derivation of site-specific UIC permit conditions and reasons for them. Referenced sections and conditions correspond to sections and conditions in draft permit UT22473-12990 (Permit).

EPA UIC Permits regulate the injection of fluids into underground injection wells so that the injection does not endanger underground sources of drinking water (USDWs). EPA UIC permit conditions are based upon the authorities set forth in regulatory provisions at 40 CFR parts 2, 124, 144, 146 and 147, and address potential impacts to underground sources of drinking water. In accordance with 40 CFR § 144.35, issuance of this Permit does not convey any property rights of any sort or any exclusive privilege, nor authorize injury to persons or property or invasion of other private rights, or any infringement of other applicable Federal, tribal, state, or local laws or regulations. Under 40 CFR § 144 Subpart D, certain conditions apply to all UIC Permits and may be incorporated either expressly or by reference. General permit conditions for which the content is mandatory and not subject to site-specific differences (40 CFR parts 144, 146 and 147) are not discussed in this document.

Upon the Effective Date when issued, the Permit authorizes the construction and operation of injection well or wells so that the injection does not endanger USDWs. The Permit is issued for the operating life of the facility unless terminated for reasonable cause under 40 CFR § 144.40 and can be modified or revoked and reissued under 40 CFR § 144.39 or § 144.41.

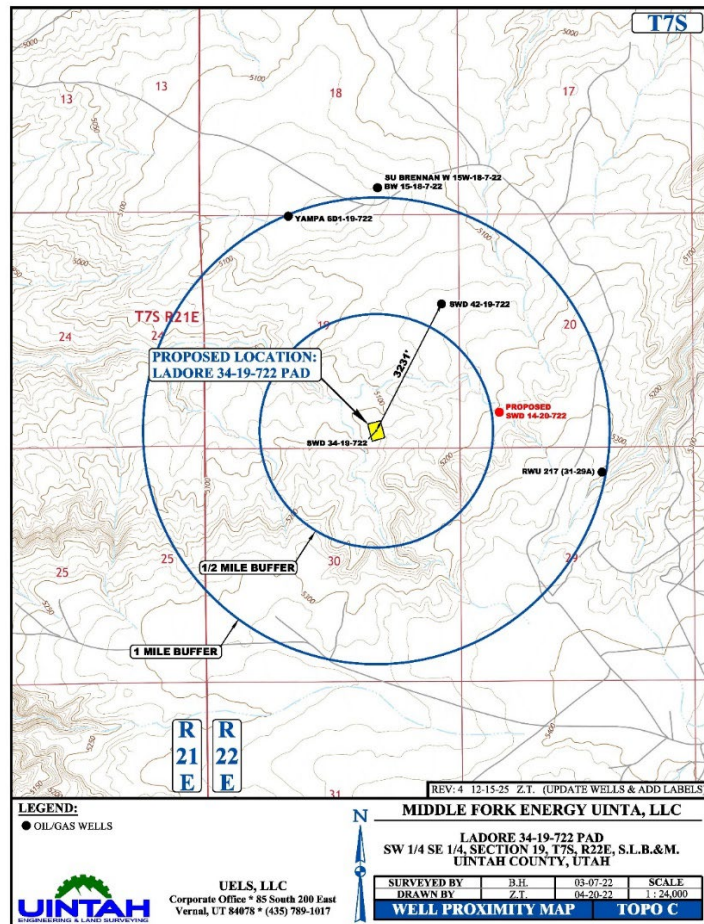
**Final Decision and Right to Appeal**

EPA will consider all comments received during the comment period and any hearing held and then issue a final decision. You have the right to appeal the decision if you make an official comment during the comment period or participate in a public hearing. If you have this right to appeal, the first appeal must be made to the Environmental Appeals Board within 30 days after the final Permit decision has been issued. The final decision can be appealed in federal court only after all agency review procedures have been exhausted. Please refer to 40 CFR §124.19, which outlines the appeal process.

## I. Background

Applicant proposes to drill a new well and inject produced water from production wells owned and/or operated by Middle Fork Energy Uinta LLC (MFEU, Permittee). This is a Class II fluid under 40 C.F.R. § 144.6(b) because the fluids are brought to the surface in connection with conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection. Fluids are being proposed for injection into the Birds Nest Aquifer which is not typically an underground source of drinking water (USDW) because it does not meet the definition as it does not 1) currently supply any public water system or 2) does not contain a sufficient quantity of groundwater to supply a public water system and does not currently supply drinking water for human consumption and contains more than 10,000 mg/l total dissolved solids (TDS).

## II. Site Characterization/Siting



Proposed Well 34-19-722 location map and vicinity

## A. Hydrogeologic Setting

The proposed SWD 34-19-722 well is located in the Uinta Basin in Uintah County, Utah approximately 20 miles south of Vernal, Utah and five (5) miles east of the Green River.

### 1. Underground Sources of Drinking Water

The Safe Drinking Water Act (SDWA) protects underground sources of drinking water (USDWs) from contamination due to underground injection. Therefore, it is important to identify USDWs in the area of the proposed injection.

USDWs are aquifers or the portions thereof which 1) currently supply any public water system or 2) contains a sufficient quantity of groundwater to supply a public water system and currently supplies drinking water for human consumption or contain fewer than 10,000 mg/l total dissolved solids (TDS), are considered to be USDWs. See 40 C.F.R. § 144.3.

The only formation likely to contain groundwater that might be considered containing USDWs is the Uinta Formation. There are no water wells within the AOR that can assess this issue. Estimates of salinity, a parameter similar to Total Dissolved Solids, from Picket Plots in zones within the Uinta formation in a well adjacent to the AOR was estimated to range from >13,406 to >14,720 ppm. Regionally, water wells in the Uinta Formation tend to be shallow and unlikely to be impacted by injection into deep geologic horizons. This proposed well is isolated from populated areas and is unlikely to be an area where groundwater would be developed for drinking water purposes. At the proposed SWD 34-19-722 well location in the Uinta Basin, the Utah Geological Survey's Special Study No. 144 indicates that the base of moderately saline groundwater (3,000–10,000 mg/L TDS) occurs from the surface to approximately 2100 feet and is considered to be a USDW. Special Study No. 144 provides approximate depths. In addition, the entire Uinta Formation should be considered a USDW to an approximate depth of 3060 feet in this well.

### 2. Injection Zone

An injection zone is a geological formation, group of formations, or part of a formation that receives fluids through a well. The proposed injection zone is within the Birds Nest Aquifer and is anticipated within the SWD 34-19-722 wellbore at depths approximately from 3,393 feet to 3,830 feet below the ground surface at the proposed well site.

Injection into the Birds Nest Aquifer at this site is consistent with the UIC regulations at 40 C.F.R. § 144.12 in this case because the Birds Nest Aquifer is expected to contain groundwater that exceeds 10,000 mg/L and is not a USDW, except potentially near recharge areas that are more than 10 miles to the Southeast. This conclusion is supported by the nearest well injecting into the Birds Nest, SWD 42-19-722 (API 43047569680000), located roughly 3,231 feet from SWD 34-19-722 in the SE-NE of Section 19, T7S-R22E, which reports formation water at 16,092 mg/L TDS. Final confirmation will be obtained through Permit-required sampling of the Birds Nest interval at the proposed site. See Section V.A. 16 of this statement of basis for additional information on this sampling requirement. If the water quality

results indicate the Birds Nest Aquifer is a USDW, an aquifer exemption will be required to permit injection and MFEU must submit an aquifer exemption application for EPA’s review and approval.

### 3. Confining Zones

A confining zone is a geological formation, part of a formation, or a group of formations that limit fluid movement above and below the injection zone. The regulations at 40 C.F.R. § 146.22(a) require that Class II wells be sited in such a fashion that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review. The confining zones at this well site meet this requirement.

The upper confining zone is the upper part of the Evacuation Creek Member from the base of the Uinta Formation at 3,060 to the top of the Birds Nest Aquifer at about 3,393 feet or 333 feet in thickness. The upper confining zone consists primarily of shale and carbonate mudstones. Approximately 66% of the formation consists of shale with an estimated permeability of < 0.001 millidarcies (mD) from other nearby wells. This unit is generally continuous across the basin and should provide an adequate upper confining zone above the Birds Nest Aquifer. MFEU provided correlated well logs and a cross section demonstrating horizontally continuous upper confinement in the area.

The lower confining zone is the Parachute Creek Member of the Green River Formation from Base of the Birds Nest Aquifer at about 3,830 feet to 3,931 feet at the top of the Mahogany Bench or 100 feet in thickness. The lower confining zone consists primarily of carbonate mudstones of low porosity. The estimated permeability of < 0.001 millidarcies (mD) indicates the unit should provide a sufficiently low permeability to prevent the migration of fluids into lower geologic units. In addition to this upper Parachute Creek Member there is 225 feet of shale, sandstone, carbonate, mudstones, and Oil Shale between 3,931 feet and 4,156 feet within the Mahogany Bench that will also act as part of the lower confining zone. This unit is generally continuous across the basin and should provide an adequate upper confining zone below the Birds Nest Aquifer. MFEU provided correlated well logs and a cross-section demonstrating horizontally continuous lower confinement in the area.

### 4. Stratigraphy

Geologic setting at SWD 34-19-722 (Estimated based on SWD 42-19-722, located 2,450 feet north-east of proposed Injection well)

| Formation Name or Stratigraphic Unit | Top MD (ft) * | Base MD (ft)* | TDS Range* (mg/l)                       | Lithology  | Designation (USDW, IZ, CZ) |
|--------------------------------------|---------------|---------------|---|--|----------------------------|
| Uinta Formation                      | 0             | 3060          | Est. Salinity from >13,406 ->14,720 ppm | Calcareous shale, mudstone and sandstone; some limestone | USDW                       |

|   |      |      |                           |   |                |
|---|------|------|---------------------------|---|----------------|
|   |      |      |                           | and shallow alluvial deposits that may contain fresh water.   |                |
| Evacuation Creek Mbr. Green River Formation                     | 3060 | 3393 | Est. Salinity >13632 ppm  | Shale, carbonate mudstones  | Confining Zone |
| Birds Nest Aquifer, Evacuation Creek Mbr. Green River Formation | 3393 | 3830 | Est. Salinity >13,606 ppm | Sandstones interbedded with lower permeability siltstones, marlstones, and minor shale breaks. Nodular Nahcolite, approximately 0.5 to 1.5 feet in diameter, is common throughout the Birds Nest aquifer. | Injection Zone |
| Parachute Creek Mbr. Green River Formation                      | 3830 | 3931 | Unknown                   | Carbonate mudstones   | Confining Zone |
| Mahogany Bench, Parachute Creek Member, Green River Formation   | 3931 | 4156 | Unknown                   | Shale, sandstone, carbonate mudstones and Oil Shale   | Confining Zone |

\* depths are approximate values interpolated from nearby wells since this well has not been drilled as yet.

+ Salinity values approximate TDS and Based on Picket Plots from an adjacent well (SWD 42-19-722).

**Uinta Formation:** Estimated to be 3,060 feet thick. The Uinta Formation consists of calcareous shale, mudstone and sandstone, some limestone and shallow alluvial deposits. The shallow alluvial units may contain fresh water deeper zones likely contain more saline waters potentially exceeding 10,000 mg/L TDS. The Uinta Formation is considered a USDW as it may contain some sandstone or alluvial units that would produce water that may have TDS concentrations of less than 10,000 mg/L.

Evacuation Creek Member, Green River Formation: Estimated to be 333 feet thick. The Evacuation Creek Member consists primarily of shale and marlstone and acts as the upper confining zone. Approximately 66% of the unit is dominated by shale, with very low permeability (<0.001 millidarcies [mD]).

Birds Nest Aquifer, Evacuation Creek Member, Green River Formation: The Birds Nest Aquifer is estimated to be 437 feet thick and consists of sandstones interbedded with lower permeability siltstones, marlstones, and minor shale breaks and nodular nahcolite. The Birds Nest Aquifer is the primary injection zone within the Uinta Basin because of a relatively high porosity due to soluble evaporites and fracture porosity. Macroporosity and secondary vugs formed by dissolution of saline minerals (e.g. nahcolite, shortite) plus a pervasive fracture network concentrated in the saline- rich interval contribute to the generally high porosity of this unit. Interbedded Sandstone lenses are present within the interval of about 85 feet net thickness has an average effective porosity of approximately 8% by regional log analysis.

Parachute Creek Member, Green River Formation: The Parachute Creek Member is estimated to be 101 feet thick and consists primarily of carbonate mudstones of low porosity and acts as a lower confining zone. Estimated permeability has been estimated at <0.001 mD.

Mahogany Bench, Parachute Creek Member, Green River Formation: The Mahogany Bench is estimated to be 225 feet thick and consists primarily of carbonate mudstones with significant deposits of oil shale. There may be commercial quantities of oil shale from this unit in the Uinta basin. This unit should also be considered part of the lower confining zone.

#### B. Area of Review 40 C.F.R. § 146.6

The area of review (AOR) calculation is to determine the distance in which the pressures in the injection zone may cause the migration of the injection and/or formation fluids into a USDW. The AOR for each injection well must be determined by one of two methods: calculating the zone of endangering influence (ZEI) in accordance with 40 C.F.R. § 146.6(a) or determining a fixed radius in accordance with 40 C.F.R. §146.6(b).

The AOR for this Permit is ½ mile radius and was determined by using the fixed radius method. In determining the fixed radius, the following factors were taken into consideration: comparable chemistry of injected and formation fluids; comparable salinities of the produced water and the injection zone groundwater; hydrologic data indicate that the high permeability of the Birds Nest

Aquifer is a result of the occurrence of open solution vugs and enhanced fracture porosity raising the likelihood of lateral migration of injected fluids beyond the default AOR radius of ¼ mile; sparse population in the central Uinta basin reduces potential conflicts with beneficial water usage; lack of dependence on the Birds Nest Aquifer for drinking water use due to generally high total dissolved solids; and historical operations in the area utilizing the Birds Nest Aquifer for the disposal of produced water.

**1. Wells in the AOR**

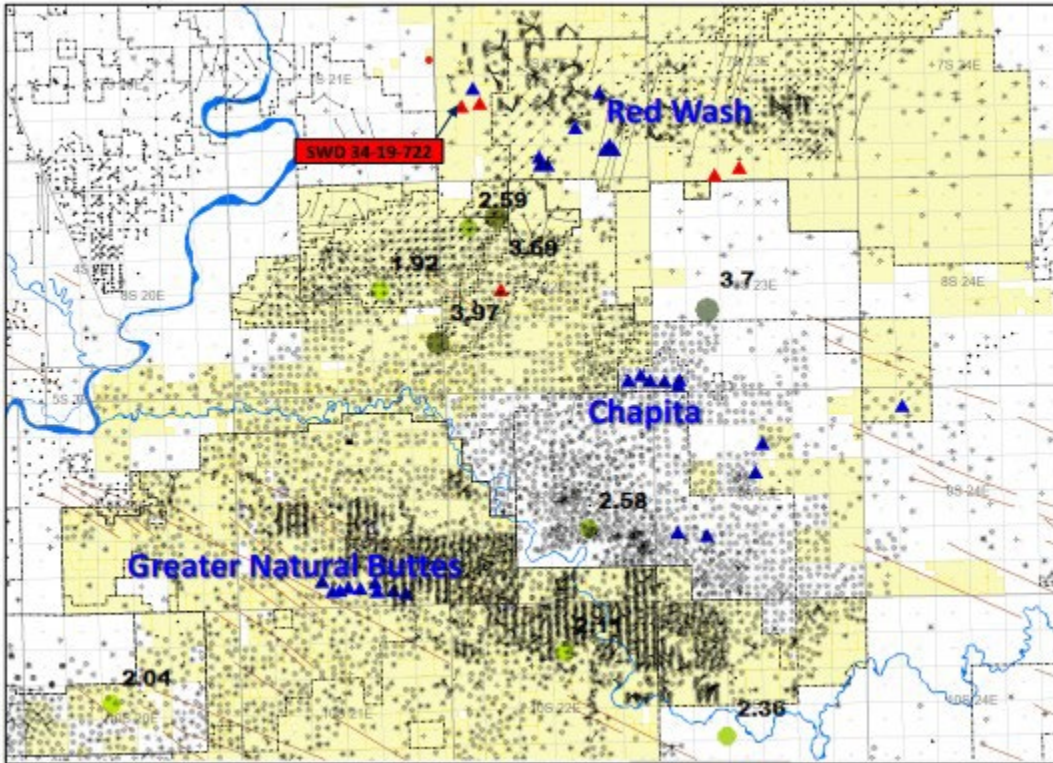
EPA reviewed information about any wells within the AOR consistent with 40 C.F.R. § 146.24(a). No wells are known within the AOR, however, the SWD 42-19-722 well is near to the AOR boundary and was included for analysis purposes. The well was drilled in May 2022 and completed in July 2022 as a Birds Nest Aquifer disposal well owned and operated by Middle Fork Energy. A wellbore diagram and well file for SWD 42-19-722 was included in the Permit application.

| Well Name     | Location  | Depth (ft) | Formation of Completion                   | Well Type | Date Drilled |
|---------------|---|------------|---|-----------|--------------|
| SWD 42-19-722 | SENE, 2023 FNL, 407 FEL, S19 T7S R22E<br>40.198670, -109.474825 | 3,894      | Bird’s Nest Aquifer of the Green River FM | SWD       | 5/19/2022    |

**2. Faults/fractures in the AOR**

EPA reviewed information about faults and fractures within the AOR consistent with 40 C.F.R. § 146.24(a).

There is no history of wellbore integrity being impacted by earthquakes across all Middle Fork’s acreage position and seismic correlation between disposal wells in the area. Seismic events occur as isolated events not as clusters. Clustering is not seen here. The Birds Nest injection occurs at about 3,400 feet. This shallower depth is more favorable to not causing seismicity as it is well above any faults that would be rooted in the basement (depths >15,000’). Closest measured earthquake was M2.59 and occurred in November 1991, 4 miles south of proposed well site (map of seismic activity in the vicinity of the proposed injection well). (<https://earthquake.usgs.gov/earthquakes/search/>)



Seismic activity in the vicinity of the proposed injection well

There are no faults known within project area (AOR). The Permittee must closely monitor seismic activity related to their operations as described in Section B.11 of the Permit.

C. Assessment of Seismicity

EPA reviewed USGS earthquake data from 1995-2026 within a 3-mile radius of the well. The USGS database indicates that no earthquakes have occurred within a 3-mile radius around the well from 1995-2026. Additionally, the Birds Nest Aquifer is shallow and stratigraphically isolated from the crystalline basement, and its dissolution-enhanced porosity and permeability allow it to accommodate significant fluid volumes with comparatively modest pressure buildup, reducing the likelihood of stressing distant faults.

**III. Well Construction (40 C.F.R. § 146.22)**

A. Casing and Cementing (40 C.F.R. § 146.22(b)(1); § 146.8)

Class II UIC regulations require that wells be cased and cemented to prevent the movement of fluids into or between USDWs.

Middle Fork provided detailed construction plans that included casing, cementing, tubing, and packer specifications for well SWD 34-19-722. The proposed wellbore is to be cemented behind the production casing from the true vertical depth to the surface with a surface casing cemented below the uppermost USDW from 400-ft to the surface and a packer that is seated within the upper confining zone 50-feet above the first perforation in the injection zone. This well construction as planned is protective of USDWs and is designed for the life expectancy of the well by ensuring that the mechanical components

of the well are satisfactory for use as intended. The cementing of the casing is sufficient to prevent leakage upward into any USDWs and the confining zone formations are sufficiently tight to prevent upward migration of fluids from the injection zone. These characteristics need to be closely monitored during construction to ensure the best practices are implemented. The EPA considered the following factors in determining these permit requirements: casing, cementing, tubing, packer; and the location of USDWs and confining zones.

The open hole geophysical logs listed in the table in Section V.A. below are necessary to be performed prior to casing the well to assess the stratigraphy and other well parameters. A cement bond log must be conducted after the well has been constructed to verify the location and quality of cement within the wellbore.

#### **IV. Corrective Action (40 C.F.R. §§ 144.55; 146.7)**

There is no corrective action anticipated at the present time as the proposed well has not been drilled and there are no other wells within the AOR.

#### **V. Pre-Injection Logs and Test/Authorization to Inject**

##### **A. Required logging and testing**

Appropriate logs and other tests must be conducted during the drilling and construction of Class II wells. 40 C.F.R. § 146.22(f). Consistent with this regulation, this Permit requires the following logs and tests found in Attachment V Logging and Testing Requirements of the Permit.:

1. MIT1 — The Standard Annulus Pressure Test (mechanical integrity) is a pressure test of the tubing-casing annulus with the packer set to confirm there are no leaks in the tubing, packer, or casing that would allow fluid movement into USDWs. This test is required to demonstrate “internal” mechanical integrity (40 CFR 146.8(a)(1)).
2. MIT2 — Cement Records (mechanical integrity/external isolation) are complete documentation of each cement job (volumes, returns, slurry design, cement class/additives, top of cement, stage/plug details). These records are necessary to demonstrate that cement was placed as designed across all required intervals (e.g., to surface for surface casing and across confining zones for long strings), with sufficient returns or other evidence of full coverage across critical zones (40 CFR 146.22(b), (f)).
3. MIT2 — Production/long-string Cement Evaluation Log (CBL, radial bond log, or ultrasonic imaging tool) is a cement evaluation log across the long/production casing to verify cement bond and zonal isolation around the injection and confining intervals (40 CFR 146.22(f)(2)(ii)(C)). The cement evaluation log is necessary to demonstrate that cement in the well has adequate bond and isolation across the critical zone(s) and there are no sustained channels or intervals of free pipe that could allow fluids to migrate into USDWs.

4. The Surface Casing Cement Evaluation Log (CBL, radial bond, or ultrasonic) is a cement evaluation across the surface casing to verify full cement coverage and bonding where surface casing is intended to protect USDWs (40 CFR 146.22(f)(2)(i)(B)).
5. The Step-Rate Test (fracture/parting pressure) is an injection pressure test at successively higher rates to identify the pressure at which the formation begins to part/accept fluid via fractures. This test is necessary to establish the Maximum Allowable Injection Pressure (MAIP) so injection does not initiate/propagate fractures that could compromise confinement (see 40 CFR 146.22(g)(2); 146.23(a)(1)).
6. The Injection Formation Fluid Pressure is a measurement of the static (shut-in) reservoir pressure of the injection zone, measured or reliably estimated.
7. The Mud Logging Records are geological and operational observations during drilling (lithology, gas/hydrocarbon shows, fluids, losses/gains, cuttings descriptions). The logs are necessary to support the identification of confining zone(s) and the injection interval to corroborate with wireline and other logs.
8. The Porosity Log encompasses a number of logs such as the density-neutron, sonic and other logs that provide porosity values to quantify reservoir storage and quality assessments. This log is necessary to confirm that the reservoir has the capacity to receive fluids for this injection activity and correlate with other logs (40 CFR 146.22(f)(2)(ii)(A)).
9. The Gamma Ray Log identifies shale vs. clean formations, correlates stratigraphy, and helps pick confining shales/seals and sands/limestones (40 CFR 146.22(f)(2)(ii)(A)). The log is necessary to establish depths of the injection interval, confining zone(s), and USDW-related intervals with correlations consistent across all logs and drilling records.
10. The Resistivity Log distinguishes fluid-filled permeable zones from shales and helps assess salinity contrasts; these are consistent with “electric logs” referenced in 40 CFR 146.22(f)(2)(i)(A). The resistivity log can be used to identify water-bearing zones above the injection interval and correlate them with water samples and other logs.
11. The Bulk Density Log (RHOB) measures formation bulk density for porosity calculations and helps estimate overburden and fracture gradients near key boundaries. The RHOB is necessary to support the selection/confirmation of confining zones and establish density data across the specified boundaries and adjacent sections that, together with step-rate and other logs, support a defensible fracture gradient and MAIP.
12. The Spontaneous Potential (SP) Log is an electric log that aids in bed boundary and correlation, and highlights permeability/salinity contrasts between shales and permeable beds. This log is necessary to demonstrate consistent correlation of permeable zones and shales with resistivity and gamma logs and support accurate placement of cement tops and selection of injection/confining intervals.

13. The Caliper Log measures borehole diameter to identify washouts, breakouts, and gauge hole condition. This log is critical for cement job design and evaluation (40 CFR 146.22(f)(2)(i)(A)). This log ensures that there are no severe washouts across USDWs or confining intervals that would compromise cement placement.
14. Deviation Checks are surveys at intervals to verify the well did not create diverging holes/branches that could become vertical avenues for fluid movement (40 CFR 146.22(f)(1)). These checks are necessary to demonstrate a continuous single wellbore without diverging holes and within acceptable limits for safe casing/cementing and zonal isolation.
15. The Injection Zone Water Sample is a chemical characterization (e.g., TDS, major ions, pH, alkalinity, H<sub>2</sub>S, CO<sub>2</sub>, iron, scaling indices) of the injection formation water to assess compatibility with the injected fluid and to establish a baseline for reservoir monitoring (40 CFR 146.22(g)(3)). This analysis is necessary to create a chemical profile sufficient to evaluate compatibility and corrosion/scale risk, a monitoring baseline, and a determination if the injection formation is or is not a USDW (does or does not exceed 10,000mg/L TDS). If incompatibilities are identified, the operating plan must include appropriate mitigation (e.g., treatment, corrosion inhibitors). An application of an Aquifer Exemption will need to be submitted if the TDS is found to be <10,000 mg/L.
16. A Radioactive Tracer Survey (RTS) is a diagnostic method using small amounts of radioactive isotopes (commonly Iodine-131) to trace fluid movement, detect leaks, and verify well integrity. The Permit requires a radioactive tracer survey and temperature log be conducted to demonstrate External (Part II) MIT if the CBL does not show adequate bonding.
17. A Temperature Log is used to determine flow profiles, check mechanical integrity, detect fluid movement outside of the well casing, and verify confinement of injected fluids within the injection formation. The Permit requires a radioactive tracer survey and temperature log be conducted to demonstrate External (Part II) MIT if the CBL does not show adequate bonding.

#### B. Authorization to Inject

The Permit prohibits injection until after a written authorization to inject (ATI) is issued by the Director. In order to receive an ATI, the Permit requires that the operator perform the above listed tests, make the required demonstrations, and submit the results in order to get an ATI from the Director.

Prior to ATI, the operator must provide the following (40 C.F.R. § 146.24(c)):

1. All items in Attachment V Logging and Testing Requirements in the Permit, which includes logs and tests during construction, a demonstration of mechanical integrity pursuant to § 146.8 and results of the formation testing program;
2. The anticipated maximum pressure and flow rate at which the Permittee will operate; and
3. The actual injection procedure.

#### VI. Well Operation (40 C.F.R. § 146.23)

#### A. Injection interval

The Permit requires that injection must only occur in the Birds Nest Aquifer. Movement of fluid outside of this approved injection zone is prohibited. This requirement is consistent with the UIC regulations at 40 C.F.R. §§ 144.12 and 146.22(a).

#### B. Injection fluid limitation

Fluids injected into Class II wells must meet the definition at 40 C.F.R. § 144.6(b). These include: fluids (1) which are brought to the surface in connection with conventional oil or natural gas production that may be commingled with waste waters from gas plants which are an integral part of production operations unless those waters are classified as a hazardous waste at the time of injection, (2) used for enhanced recovery of oil or natural gas, and (3) used for storage of hydrocarbons which are liquid at standard temperature and pressure. Waste not exempted from RCRA Subtitle C hazardous waste such as unused fracturing fluids or acids, gas plant cooling tower cleaning wastes, service wastes and vacuum truck wastes are not approved for injection.

This Permit authorizes injection of the following Class II fluid: Specifically, injection for the SWD 34-19-722 well is limited to the Class II fluids produced water as a byproduct of Middle Fork operated wells. If the Permittee wishes to change the source of wastewater received, the requirements for modification are located in Section B. Well Operation, 6. Injection Fluid Limitation of the Permit. This is a Class II fluid under 40 C.F.R. § 144.6(b) because it consists of brines and other fluids associated with oil and gas production that may be commingled with wastewaters from gas plants integral to production operations, unless those waters are classified as a hazardous waste at the time of injection, which fits 40 C.F.R. § 144.6(b)(1).

The Permit requires baseline sampling prior to authorization to inject and before introducing any new source of injectate. Required parameters include pH, TDS, conductivity, and specific gravity, using methods consistent with 40 CFR 136.3 and/or 40 CFR 260.11, to ensure compatibility with the injection zone and protect USDWs.

### C. Volume limitation

There is no limitation on the volume of fluid Permitted to be injected into the SWD 34-19-722 well. The distance from the well to a location where groundwater in the Birds Nest Aquifer may be less than 10,000 mg/L is estimated to be more than 12 miles to the southeast of this well location based upon Utah Geological Survey Special Study 147, Geological Characterization of the Birds Nest Aquifer, Uinta Basin, Utah; therefore, the injectate is not expected to contaminate any USDWs. The injection volume at the SWD 34-19-722 well will be controlled by the Maximum Allowable Injection Pressure (MAIP), injection rate, and the non-endangerment standard, to ensure fluids remain contained within the designated zone and prevent contamination. As specified in the Permit, in no case shall injection pressure exceed the MAIP except when performing stimulation or short-term testing requirements (e.g., Step Rate Testing).

### D. Injection Pressure limitation

Injection pressure (MAIP) at the wellhead must not exceed a maximum calculated to ensure that the pressure during injection does not initiate new fractures or propagate existing fractures in the confining zone adjacent to the USDWs. See 40 C.F.R. § 146.23(a)(1). The Permit also prohibits injection pressure that would cause the movement of injection or formation fluids into a USDW. See permit condition under Section I (1) – Prohibition on Movement of Fluid Into a USDW. See Sec A(4).

To limit the injection pressure, the Permit requires that the Permittee calculate the MAIP using the formula provided in the Permit under Section B – Well Operation, 4. Injection Pressure Limitation. The initial MAIP calculation utilizes values specified in Attachment II - Operating Requirements, 3. Maximum Allowable Injection Pressure (MAIP).

The values the Permittee must use in the equation are determined by the following, as specified in Attachment II of the Permit:

**Fracture Gradient:** The FG value for each well must be determined by conducting a step rate test. The results of the test will be reviewed and approved by the Director.

**Specific Gravity:** The value for SG must be obtained from the fluid analysis of a representative sample of the injection fluid, as required in Attachment III.

**Depth:** The value for D is the depth of the top perforation of the as-built well.

Upon issuance, the Permit will contain an initial MAIP based on values submitted. However, because the Permit utilizes an equation to determine the MAIP, the MAIP will be recalculated when the values for the equation change. MAIP recalculations are triggered in the following circumstances:

1. A new step-rate test is conducted

2. A new analysis of the injection fluid indicates that the specific gravity sample results are greater than (SG + Specific Gravity Fluctuation Factor (SGFF)<sup>1</sup>) previously reviewed and approved
3. Perforations are added to the well above the previous perforations
4. The Permittee requests a change to the MAIP

If any of the above circumstances occurs, the Permittee must provide written notification to the Director and submit documentation that one or more of the circumstances has occurred. A new MAIP will only become effective after the Director has reviewed and approved the submittal and has provided written notification of a new effective MAIP. The Permit administrative record will be updated.

The Permit allows the Director to set a MAIP lower than the calculated MAIP in certain circumstances to protect USDWs. For example, if during testing, the Permittee did not or is unable to perform the test at the Permitted MAIP, a new MAIP will be calculated utilizing the pressure at which the test was conducted.

The table below provides a specific gravity value from a water sample and an initial formation fracture pressure based on step rate test (SRT) data from a nearby well (SWD 42-19-722) injecting into the BNA. The MAIP will be recalculated with the information submitted to obtain the authorization to commence injection and thereafter in accordance with the Permit [Section B.4(d)].

Injection Zone Fracture Pressure

| Formation Name or Stratigraphic Unit | Top Perforation Depth (est.)(ft) | Specific* Gravity | Fracture* Gradient (psi/ft) | Friction Loss (psi) est. |
|--------------------------------------|----------------------------------|-------------------|-----------------------------|--------------------------|
| Birds Nest Aquifer                   | 3394                             | 1.013             | 0.526                       | 0                        |

\*Values provided from nearby injection well SWD 42-19-722

**VII. Mechanical Integrity (MI) (40 C.F.R. § 146.8)**

The Permit requires MI to be maintained at all times. This requirement is to ensure that the injection well does not provide a conduit for fluid movement into USDWs.

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<sup>1</sup> The Permit requires submission of fluid analysis that reports SG annually. For the SG value, the Permit only requires a change of MAIP when the absolute difference of the newly submitted SG and that of the previous year is greater than 0.05. This is because the equation includes an SGFF, a factor of 0.05, that is added to the SG. This adjustment factor allows for the MAIP to be recalculated only if the newly submitted SG is greater than 0.05 from the previous year's SG, without exceeding the fracture pressure of the formation.

A Permittee is required to demonstrate both internal (Part I) and external (Part II) integrity of the well. Part I MI corresponds to 40 C.F.R. § 146.8(a)(1), and Part II MI to 40 C.F.R. § 146.8(a)(2).

For Part I MIT, internal tests are used to verify that the tubing-casing annulus is sealed and there are no significant leaks in the packer, casing, or tubing. This is done through pressure testing of the tubing-casing annulus, which is specified in Section C and Attachment V of the Permit. The Permit requires a demonstration of internal MI at the following times: prior to receiving an ATI; following any workover operation that affects the tubing, packer, or casing; after a loss of MI; and at least once every five (5) years; at conversion to another well class; or during plugging and abandonment (Section C of the Permit). Additional guidance for Internal (Part I) MI can be found at <https://www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-and-wy#guidance>.

For Part II MIT, external tests are used to demonstrate that fluids are not migrating out of the authorized zone through cement channels behind the casing, by evaluating the cement bond log (CBL) to show that adequate cement exists to prevent significant movement of fluid out of the approved injection zone through the casing annular cement (i.e., 80% cement bond index across the confining zone.) If the CBL does not show adequate bonding, the Permit requires a radioactive tracer survey and temperature log be conducted to demonstrate External (Part II) MIT. The Permit requires a demonstration of external MI at the following times: If the Director's review of the CBL indicates inadequate bond that may allow fluid movement, a radioactive tracer survey (RTS) and temperature log are required. The RTS results must be submitted prior to receiving Authorization to Inject (ATI) and annually thereafter. The baseline temperature log must be submitted prior to receiving ATI. The initial temperature log must be conducted between six (6) to twelve (12) months after receiving ATI and subsequent logs must be repeated no less than annually after the last successful external (Part II) MI demonstration. The Permit specifies that the Director may request a Part II MI demonstration at any time. Guidance on the logging and interpretation of the cement bond log (CBL) can be found at <https://www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-and-wy#guidance>.

#### **VIII. Monitoring, Recordkeeping and Reporting (40 C.F.R. § 146.23(b), (c))**

The Permit requires monitoring of key parameters (such as tubing pressures, injection rate, and cumulative volumes) in accordance with 40 C.F.R. §146.23(b), with records maintained that include detailed measurement, calibration, and maintenance logs for at least three years. Monitoring intervals are set to meet or exceed regulatory minimums, with any deviations justified based on operational or equipment considerations. In addition, comprehensive reports (including annual data submissions and immediate incident notifications) are required per 40 C.F.R. §146.23(c) to ensure prompt detection of any noncompliance or system issues.

#### **IX. Plugging and Abandonment (40 C.F.R. §§ 144.51(o); 146.10; 146.24(d))**

Prior to abandonment, the well must be plugged in a manner that isolates the injection zone and prevents movement of fluid into or between USDWs. In accordance with 40 C.F.R. § 144.51(o), the operator submitted a plugging and abandonment plan that meets the requirements of 40 C.F.R. § 146.10 and has been incorporated into the Permit at Attachment VI. Specifically, the plan meets 40 C.F.R. § 146.10(a)(2) by using a method approved by the Director to ensure complete isolation of the injection zone. The plan meets 40 C.F.R. § 146.10(a)(3) by ensuring the well is in a state of static equilibrium with the mud weight equalized from top to bottom by circulating the mud in the well at least once. This process ensures that the hydrostatic pressure is balanced, preventing any movement of fluids during the plugging operation.

**X. Financial Responsibility (40 C.F.R. § 144.52(a)(7))**

The Permittee is required to maintain financial responsibility and resources to close, plug, and abandon the underground injection operation in a manner prescribed by the Director. In accordance with 40 C.F.R. § 146.24(a)(9), the Permittee has provided appropriate assurance of financial responsibility through a Rider to existing Bond EACX4014406 with an increase dollar value of \$59,344.

**XI. Compliance with Applicable Federal Laws (40 C.F.R. § 144.4)**

A. National Historic Preservation Act (NHPA)

Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), 54 U.S.C. § 306108, requires federal agencies to consider the effects of their undertakings on historic properties and provide the Advisory Council on Historic Properties a reasonable opportunity to comment on the undertaking. Federal undertakings include any project, activity, or program funded by or under the jurisdiction of a federal agency. The EPA has determined that a decision to issue a Class II injection well Permit constitutes an undertaking subject to the NHPA and its implementing regulations at 36 CFR part 800.

**Area of Potential Effects**

The EPA defines the Area of Potential Effects (APE) for SWD 34-19-722 as the 35-acre block centered on the well pad plus 100-foot-wide corridors for the co-located powerline, pipelines, and access road within the project footprint. This APE encompasses the LADORE 34-19-722 WELL PAD (Project) to include areas of direct ground disturbance and the limited corridors where construction and operation could alter the character or use of historic properties. Because fluids will be delivered to the well through underground pipeline, there will not be an increase of truck traffic or potential for spills.

**Historical Properties in the APE**

The EPA reviewed the National Park Service National Register of Historic Places database to identify known historic properties. The EPA did not identify historic properties within a 10-mile radius of the APE. The EPA identified seven properties within 20 miles, all in Vernal, Utah, an area north of the well location and outside the APE. There are no activities associated with the Project in Vernal, UT.

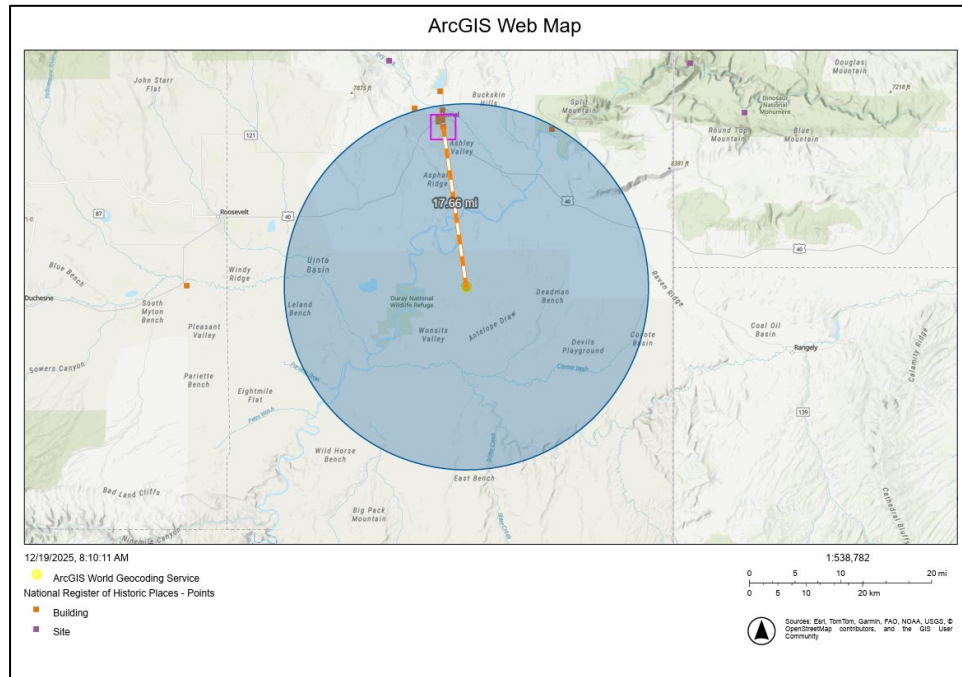


Figure 1 Historic properties located within 20 miles of well site

## Cultural Resources Survey

Certus Environmental Solutions and Outlaw Engineering (the Outlaw Team) conducted an intensive Class III pedestrian cultural resource survey on behalf of Middle Fork Energy. The survey reviewed approximately a 76-acre search area defined as a combination of a 35-acre block centered on the pad and 100-foot-wide corridors for the pipeline, powerline, and road. Investigative transects were spaced no more than 15 meters (50 feet) apart; no cultural resources were identified. The survey report recommended “No Historic Properties Affected” for the well site and ancillary facilities. The EPA and BLM independently reviewed the cultural resources survey and arrived at the same conclusion.

The EPA’s defined APE for this permitting action is consistent with the area of the Class III cultural resource survey of the Project, which included the 6D1-19-722 production well. Subsequent to the survey, the Permittee later submitted a sundry notice to BLM to convert the approved Application for Permit to Drill (APD) for the 6D1-19-722 production well to the proposed SWD 34-19-722 injection well. BLM approved the APD change on November 10, 2025.



## Final Determination

Based on the EPA’s review of the Class III cultural resource survey, the absence of historic properties in the APE, and the EPA’s consultation with the Ute THPO, the EPA finds that issuance of this Permit will result in “No Historic Properties Affected” under 36 CFR 800.4(d)(1).

Additionally, the BLM Environmental Assessment supports this finding. The BLM transmitted two “No Historic Properties Affected” findings for the same project area and to the Ute Indian Tribe THPO on August 5, 2022, for U21HY0372 and on June 29, 2022, for U22HY0302. The UTE Indian Tribe did not object to the BLM’s findings within 30 days. The BLM concluded its Section 106 responsibilities consistent with 36 CFR 800.4(d)(1)(i)4).

As recommended in the cultural resources report and incorporated into the BLM’s approval conditions, should the operator discover cultural materials or fossils, the operator must cease work within 50 feet of the discovered object and notify the BLM and not resume until authorized.

### A. Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act (ESA), 16 U.S.C. § 1536 (a)(2), requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of federally-listed threatened or endangered species (T&E) or result in the destruction or adverse modification of habitat of such species.

EPA utilized the U.S. Fish & Wildlife Service Information for Planning and Consultation (IPaC) tool to identify federally listed or proposed species and designated or proposed critical habitat potentially present in the action area and to inform its assessment of potential effects to such species or critical habitat. The IPaC (2026-0016028) Report for this project identified the following species:

|                | Species   | Status              |
|----------------|---|---------------------|
| <b>Fish</b>    | Bonytail<br>( <i>Gila elegans</i> )                       | Endangered          |
|                | Colorado Pikeminnow<br>( <i>Ptychocheilus lucius</i> )    | Endangered          |
|                | Humpback Chub<br>( <i>Gila cypha</i> )                    | Threatened          |
|                | Razorback Sucker<br>( <i>Xyrauchen texanus</i> )          | Endangered          |
| <b>Insects</b> | Monarch Butterfly<br>( <i>Danaus plexippus</i> )          | Proposed Threatened |
|                | Suckley's Cuckoo Bumble Bee<br>( <i>Bombus suckleyi</i> ) | Proposed Endangered |

There is no designated or proposed critical habitat within the action area. The EPA will proceed in a manner consistent with ESA requirements including documenting its findings as part of its final permit decision administrative record.