

APPENDIX C

AUC Class I UIC Draft Permit (09-621)

STATE OF WYOMING
DEPARTMENT OF ENVIRONMENTAL QUALITY
UNDERGROUND INJECTION CONTROL PERMIT ISSUED UNDER
WYOMING WATER QUALITY RULES AND REGULATIONS
CHAPTER 13

CLASS I INJECTION WELL

- New
 Modified
 Renewal

Permit Number: **09-621**
Previous Permit: 98-092
UIC Facility Number: WYS-005-013

In compliance with the Wyoming Environmental Quality Act (W.S. 35-11-101 through 1104, specifically 301(a)(i) through 301 (a)(iv), Laws 1973, Chapter . 250, Section 1) and Wyoming Water Quality Rules and Regulations Chapter 13.

Applicant: AUC, LLC
1536 Cole Boulevard, Suite 330
Lakewood, CO 80401
(303) 953-7975

AUC, LLC, hereafter referred to as the permittee, is authorized to drill, complete, and operate proposed wells **IW-1, IW-2, IW-3, and IW-4** in Campbell County, according to the procedures and conditions of application 09-621 and requirements and conditions of this permit. Issuance of this permit does not obligate the Department of Environmental Quality to approve injection if doing so would endanger human health or the environment or if the well(s) do not comply with all the terms and conditions of this permit (Chapter 13, Section 8(e)).

This is an area permit for up to four (4) wells of the Reno Creek ISR Project. No additional wells may be constructed under this permit without prior permit modification. This permit shall become effective on the date of issuance and is valid for ten (10) years. Any proposed well not completed before expiration of this permit will not be included in a renewal or modification of this permit.

John Wagner, Administrator
Water Quality Division
Herschler Building 4-W, 122 West 25th Street
Cheyenne, WY 82002

Date

Todd T. Parfitt, Director
Department of Environmental Quality
Herschler Building 4-W, 122 West 25th Street
Cheyenne, WY 82002

Date

CMc/rm/12-1088

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A. Discharge Zones

The injection wells are authorized to inject into the Teapot and Parkman Formations of the Mesaverde Group within the intervals specified in **Table 1**:

Table 1 (Discharge Zones)

Well Name	Surface Elevation (ft)	Depth to Top of Discharge Zone (ft)	Depth to Bottom of Discharge Zone (ft)	Gross Discharge Zone Thickness (ft)	Well Depth (ft)
IW-1	5,110	7,572	8,380	808	8,450
IW-2	5,235	7,572	8,380	808	8,450
IW-3	5,160	7,572	8,380	808	8,450
IW-4	5,215	7,572	8,380	808	8,450

Perforations in the proposed wells shall be restricted to the Teapot and Parkman Formations. Additional perforations may be installed in the proposed wells within the intervals given above. Perforations above or below the intervals identified in **Table 1** require the prior written approval from the Administrator.

The confining zone above the discharge zone consists of approximately 520 feet of Lewis Shale at the Reno Creek Project area. The confining zone below the discharge zone consists of approximately 525 feet of Cody (Steele) Shale.

B. Well Locations and Areas of Review

The wells authorized by this permit are located as shown in **Table 2**.

Table 2 (Well Locations)

Well Name	Legal Description	Latitude	Longitude
IW-1	NE $\frac{1}{4}$, SW $\frac{1}{4}$, SE $\frac{1}{4}$ Section 31; T43N; R73W	43.65077	-105.67172
IW-2	SW $\frac{1}{4}$, NW $\frac{1}{4}$, NE $\frac{1}{4}$ Section 33; T43N; R73W	43.66161	-105.63233
IW-3	NW $\frac{1}{4}$, SE $\frac{1}{4}$, NE $\frac{1}{4}$ Section 1; T42N; R74W	43.64473	-105.68975
IW-4	SW $\frac{1}{4}$, SE $\frac{1}{4}$, NW $\frac{1}{4}$ Section 27; T43N; R73W	43.67223	-105.61915

The Area of Review (Chapter 13, Section 5(b)(iv)(E)) is described using the public lands survey system (PLSS) to the nearest sixteenth section in **Table 3**.

Table 3 (Legal Descriptions of the Areas of Review)

Well Name	Quarter-Quarters	Section	Township/Range
IW-1	SE $\frac{1}{4}$	31	T43N, R73W
	E $\frac{1}{2}$, SW $\frac{1}{4}$		
	N $\frac{1}{2}$, NE $\frac{1}{4}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$	6	T42N, R73W
IW-2	NE $\frac{1}{4}$	33	T43N, R73W
	E $\frac{1}{2}$ of the NW $\frac{1}{4}$		
	S $\frac{1}{2}$ of the SE $\frac{1}{2}$	28	

Well Name	Quarter-Quarters	Section	Township/Range
	SE ¼ of the SW ¼		
IW-3	NE ¼	1	T42N, R74W
	N ½ of the SE ¼		
	W ½ of the NW ¼	6	T42N, R73W
IW-4	NW ¼	27	T43N, R73W
	N ½ of the SW ¼		

Results of the area of review calculations (Chapter 13, Section 5(b)(iv)) are shown in **Table 4**. The area of review is based on the larger of the radius of a pure waste cylinder, the radius of the cone of influence, or the minimum radius (Chapter 13, Section 5(b)(iv)).

Table 4 (Area of Review)

Well Name	Radius of Pure Waste Cylinder (ft)	Radius of Cone of Influence (ft)	Minimum Radius of Area of Review (ft)
IW-1	512	1,281	1,320
IW-2	512	1,281	1,320
IW-3	512	1,281	1,320
IW-4	512	1,281	1,320

There are no wells which penetrate the confining zone within each of the Areas of Review (1/4 mile).

C. Groundwater Classification

Groundwater within the Teapot and Parkman Formations is classified as Class VI (Unusable/Unsuitable) in accordance with Water Quality Rules and Regulations (WQRR), Chapter 8. This classification was made for the following reason(s):

- The depth and location of these aquifers makes the use of this water economically and technologically impractical (WQRR Chapter 8, Section 4.d.ix.C);

The Class VI designation extends 1,320 feet in all directions from each injection well. All waste injected over the life of this permit of ten (10) years will remain within this 1,320-foot radius, as indicated by the 10-year Pure Waste Cylinder in **Table 4**.

D. Authorized Operations

Well Design – Injection shall be conducted through tubing which has been secured by a packer set below the top of the confining zone and within five-hundred (500) feet of the top of the authorized discharge zone (**Table 1**) and within a zone of good quality cement bond (Chapter 13, Section 9(d)(xxv)). The tubing shall be isolated from the long string casing by an annulus filled with corrosion-inhibiting fluid.

Injection Rates - The wells are allowed the maximum instantaneous injection rate shown in **Table 5** provided that the surface injection pressure limitations are not exceeded.

Injection Pressure - The injection pressure in each injection well shall be limited to the fracture pressure of the receiver except as necessary during well stimulation approved by the Administrator (Chapter 13, Section 9 (d)(ii)). Temporary limits for the proposed wells are listed in **Table 5**. The temporary limit applies until recalculation of the parameters in **Table 5** occurs, following completion of a step-rate injection test. Exceeding the limiting surface injection pressure (LSIP) in **Table 5** or creating or propagating fractures within the receiver or confining zone once waste disposal has commenced are violations of this permit and shall be reported pursuant to Section K of this permit. A kill switch shall be installed on the injection tubing and set to preclude violations of LSIP limits.

For each proposed well, the permittee shall conduct a step-rate injection test within one (1) year of permit issuance to determine the actual fracture pressure of the receiver (Chapter 13, Section 9 (d)(ii)). For wells which have not been constructed within one (1) year of permit issuance, a step-rate injection test shall be required before waste injection is allowed. Such tests shall be conducted using both surface and down hole pressure gauges or transducers. The down hole device shall be placed within one-hundred (100) vertical feet of the packer. For a conclusive result, at least three (3) of the injection rate steps below the fracture threshold will be collinear. Upon completion of the test, the permittee shall recalculate the maximum surface injection pressure (MSIP) and LSIP.

If the recalculated LSIP is greater than the temporary LSIP in **Table 5**, the permittee must obtain the approval of the Administrator before operating the well at a pressure above the temporary LSIP. If the recalculated LSIP is less than the temporary LSIP in **Table 5**, the permittee must cease injection and not restart discharge until the wellhead pressure can be maintained below the recalculated LSIP. The permittee may conduct additional step-rate injection tests at its discretion to refine estimates of MSIP as injection continues. Digital data, analyses, and interpretations for the tests shall be submitted to the Administrator within thirty (30) days or with the next quarterly report after the test is done, whichever is later.

Annulus Pressure – The annulus between the injection tubing and the long string casing shall be filled with a corrosion-inhibiting fluid and be monitored and maintained in a way that allows reliable leak detection. The annulus pressure shall be maintained within the limits set in **Table 5**. During periods of continuous injection, the annulus pressure should be reasonably constant but large variations in pressure are allowed during startup and shutdown. The permittee shall set alarms or use daily observations to detect increases or decreases in annulus pressure and shall immediately cease injection and shut the well in when an alarm is triggered; or the permittee shall install a kill switch to stop injection if casing, tubing, packer, or well head leak. Settings for low- and high-pressure alarms shall take into account annulus pressure changes due to variations in temperature of the injected and annulus fluid.

**Table 5 (Maximum Injection Rates, Annulus Pressures,
and Maximum and Limiting Surface Injection Pressures (MSIP, LSIP))**

Parameter	IW-1	IW-2	IW-3	IW-4
Maximum Injection Rate (bbl/day)	2,400	2,400	2,400	2,400
Maximum Annulus Pressure (psig)	800	800	800	800
Minimum Annulus Pressure (psig)	200	200	200	200
Estimated Fracture Gradient, F_r (psi/ft)	0.56	0.56	0.56	0.56
Fracture Pressure, $P_f = F \cdot D_p$	4,240	4,240	4,240	4,240
Depth to Top of Perforations, D_p (ft)	7,572	7,572	7,572	7,572
Temperature at Mid-Point of Perforations ($^{\circ}$ F)	145	145	145	145
Maximum Total Dissolved Solids of Injectate (mg/L)	12,500	12,500	12,500	12,500
Density of Injectate, ρ_j (g/cm ³)	1.005	1.005	1.005	1.005
Injectate Fluid Gradient (psi/ft) $grad_j = \rho_j \cdot 12 \frac{in}{ft} \cdot 16.387 \frac{cm^3}{in^3} / 453.592 \frac{g}{lb}$	0.4357	0.4357	0.4357	0.4357
Hydrostatic Pressure (psi) $P_h = D_p \cdot grad_j$	3,299	3,299	3,299	3,299
Tubing Length (T_L) (feet)	7,400	7,400	7,400	7,400
Tubing Inside Diameter, d (inches)	2.441	2.441	2.441	2.441
Tubing Friction Loss Factor, T (psi/1000 ft)	19	19	19	19
Average Injection rate, q (gpm)	70	70	70	70
Pressure Loss due to Tubing Friction (psi/ft) $P_d = (4.52q^{1.85}) / (c^{1.85} d^{4.8655})$	0.01871	0.01871	0.01871	0.01871
Total Pressure Loss from Tubing Friction (psi) $P_L = P_d \cdot T_L$	138	138	138	138
$MSIP = P_f - P_h + P_L$ (psig)	1,079	1,079	1,079	1,079
$LSIP = 0.9 \cdot MSIP$ (psig)*	971*	971*	971*	971*

*Applies for the first year after permit issuance or until a new LSIP has been approved after the step-rate injection test; if the well is not drilled within one (1) year of permit issuance, a step-rate injection test is required before waste injection.

Permitted Wastes - Wastes to be injected include liquid waste generated by uranium mining using in-situ leaching at the Reno Creek ISR mine facilities, including operation bleed streams, yellowcake wash water, sand filter and ion exchange wash water, on-site laboratory waste water, reverse osmosis brine, groundwater restoration and groundwater sweep solutions, plant washdown water, wash waters used in cleaning or servicing the waste disposal system equipment, and storm water at the mine facilities. Permitted wastes also include fluids produced during the drilling, completion, testing, or stimulation of wells or test holes related to mining operations at the Reno Creek mine facilities; or during the workover or abandonment of any such well; and drilling equipment wash water.

North American Industry Classification System (NAICS) – 212291

The radionuclide-bearing waste produced at this facility by in-situ uranium mining has been defined by the Atomic Energy Act as Section 11e.(2) byproduct material and is regulated by the Nuclear Regulatory Commission (NRC) under Title 10 Code of Federal Regulations Part 40. It is not “solid waste” according to Title 40 Code of Federal Regulations Part 261.4(a)4 and is consequently not hazardous waste. Because Wyoming is a “non-agreement” state, the NRC retains jurisdiction over in-situ mining wastes and the permittee shall not use the injection wells for disposal of 11e(2) byproduct material without the proper NRC license.

Waste disposal is prohibited until the requirements for financial assurance (Section P) have been met. The permittee shall obtain written authorization from the Administrator prior to waste disposal. Permission to discharge other non-hazardous waste may be authorized through a permit modification (Chapter 13, Section 8(d)(v)). Additional monitoring may be required for additional waste types.

The expected concentrations for selected chemical species in the waste are listed in **Table 6**.

Table 6 (Water Quality of the Discharge)

Constituents	Units	Maximum	Minimum
Sodium	mg/L	30,000	350
Calcium	mg/L	1,000	50
Potassium	mg/L	50	0
Magnesium	mg/L	100	50
Bicarbonate	mg/L	8,000	340
Sulfate	mg/L	20,000	1130
Chloride	mg/L	35,000	240
pH	s.u.	9.0	6.0
Total Dissolved Solids (TDS)	mg/L	50,000	5,000
Uranium	mg/L	10	2
²²⁶ Radium	pCi/L	500	5

Permitted Corrosion Inhibitors, Anti-Scalants, and Biocides - Corrosion inhibitors, anti-scalants, and biocides may be used with the prior written approval of the Water Quality Division.

New Well Construction - The permittee shall obtain written acceptance of financial assurance from the Administrator prior to injection into any of the proposed wells.

Any well stimulation activities require prior approval by the Administrator.

Injection into a well may not begin until:

1. Well construction is complete (Chapter 13, Section 9(d)(xxix)); and
2. The permittee has submitted a well completion and testing report and the "Notification of Construction Completion of Injection Well" (available on the WQD - UIC Program website - <http://deq.state.wy.us/wqd/groundwater/uicprogram/index.asp>) for a newly constructed or modified well; and
3. The permittee has provided the Administrator with sufficient notice to allow for inspection of the well (Chapter 13, Section 9(d)(xxiv)); and
4. Mechanical integrity of the well and cement bonding of the long string casing has been proven or demonstrated to the satisfaction of the Administrator; and
5. The permittee has demonstrated financial assurance (Chapter 13, Section 17(a)); and
6. The permittee has received written approval from the Administrator to begin injection.

E. Prohibitions

This permit does not allow for the injection of any hazardous waste as defined in 40 Code of Federal Regulations (CFR) 261.3 or in Wyoming Solid Waste Management Rules and Regulations, Chapter 2. Injection of any substance defined as a hazardous waste, whether hazardous by listing or by characteristic is a violation of this permit.

No person shall conduct any authorized injection activity in a manner that results in a violation of any permit condition or representations made in the application (Chapter 13, Section 18(b)(i)).

No person shall conduct any authorized injection activity in a manner that results in a movement of fluids out of the receiver (Chapter 13, Section 18(b)(ii)).

No zone or interval other than the discharge zone shall be used as a receiver for the discharge (Chapter 13, Section 18(b)(ii)(A)).

No uncased hole may be used as a conduit for the discharge, excepting that portion of a hole in the discharge zone (Chapter 13, Section 18(b)(ii)(B)).

No annular space between the wall of the hole and the outer casing may be used as a conduit for discharge, excepting in that portion of a hole in the discharge zone (Chapter 13, Section 18(b)(ii)(C)). The annular space may receive fluids used in cementing casing during the cementing process.

No person shall construct, install, modify, or improve an authorized injection facility except in compliance with this permit (Chapter 13, Section 18(b)(iii)).

F. Operation and Maintenance

Each injection well shall be constructed, operated, and maintained to prevent movement of fluid from the well into any USDW (Chapter 13, Section 11(a)).

The permittee shall operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes mechanical integrity of the well, effective performance, adequate funding, operator staffing and training, and laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit (Chapter 13, Section 9 (d)(vi)).

The permittee is required to operate in accordance with statements, representations, and procedures presented in the complete permit application and supporting documents as accepted and approved by the Administrator. If such procedures conflict with those in this permit, the conditions in this permit shall take precedence (Chapter 13, Section 18(b)(i)).

Measuring and recording devices shall be tested and calibrated at a frequency sufficient to ensure accurate and precise measurements. A record of the date of the most recent calibration or maintenance shall be retained at the well site.

G. Entry and Inspection

The permittee shall allow the Administrator, or an authorized representative of the Administrator (upon presentation of credentials and during normal working hours) to enter the premises where a regulated facility is located, or where records are kept under the conditions of this permit; to inspect and photograph the discharge and related facilities and equipment; to review and copy reports and records required by this permit; to collect fluid samples for analysis; to measure and record pressures and water levels; to observe and record data from monitoring equipment; and to perform any other function authorized by law or regulation (Chapter 13, Section 9 (d)(xii)).

Inspectors shall not be required by the permittee to sign any waiver of liability.

H. Environmental Monitoring Program for Groundwaters of the State

The permittee shall furnish the Administrator any information necessary to establish a monitoring program if requested to do so (Chapter 13, Section 9 (d)(xiii)).

No groundwater monitoring program under this permit, other than that described in Section I, is required because of the reduction in risk of pollution due to the depth and confinement of the receiver (Chapter 13, Section 13(a)(ii)).

I. Monitoring Requirements

1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
2. The permittee shall retain records of all monitoring information (Chapter 13, Section 9 (d)(xiv)), including all calibration and maintenance records and all original chart recordings for a period of three (3) years after closure of the facility (Chapter 13, Section 15 (g)), at which time the permittee shall notify the Administrator and either deliver the records to WQD or discard them as directed by the Administrator.
3. Records of monitoring information shall include:
 - a. The date, exact place, and time of sampling or measurements;
 - b. The name(s) of individual(s) who performed the sampling or measurements;
 - c. The types of sample containers used, methods of preservation, and holding times;
 - d. The date(s) analyses were performed;
 - e. The name(s) of individual(s) who performed the analyses;
 - f. The analytical techniques or methods used;
 - g. The results and precision of such analyses.
4. For each new well or newly perforated zone within an existing well, the permittee shall collect a baseline groundwater quality sample from each aquifer or formation within the new discharge zones (Chapter 13, Section 13(a)) and submit results for all the analytes and parameters in WDEQ-WQRR Chapter 8, Table I and for the entire suite of volatile organic compounds listed in EPA Method 624, EPA 8260, or other method acceptable to the Administrator prior to waste injection. The methods and procedures for sample collection and analysis must be approved by the Water Quality Division prior to sampling.
5. For each new well the permittee shall collect at least two (2) measurements of hydraulic head (or fluid density and pressure) within each aquifer or formation within the new discharge zones.
6. For the first new well constructed, the permittee shall collect a baseline groundwater quality sample from each the Lance Formation and the Fox Hills Formation and submit results for all the analytes and parameters in WDEQ-WQRR Chapter 8, Table I and for the entire suite of volatile organic compounds listed in EPA Method 624, EPA 8260, or other method acceptable to the Administrator prior to waste injection.

7. For the first new well constructed, the permittee shall collect at least two (2) measurements of hydraulic head (or fluid density and pressure) within each the Lance and Fox Hills aquifers above the confining zone.
8. If the permittee determines that the authorized discharge zones within members and/or formations identified in Section A of this permit are inadequate (and additional discharge zones are requested) then a permit modification will be required. The permit modification request shall be supported by data approved by the Administrator.
9. Operational Monitoring (Chapter 13, Section 13(b)(ii)):

Injection Pressure - The permittee shall monitor the injection pressure continuously and record the readings on a strip chart recorder, a circular chart recorder, or electronically (Chapter 13, Section 13(i)).

Injection Rate and Volume - The permittee shall monitor the injection rate continuously and record the rates and volumes on a strip chart recorder, circular chart recorder, or electronically (Chapter 13, Section 13(i)).

Annulus Pressure - The permittee shall continuously monitor the pressure of the casing - tubing annulus and record the pressures on a strip chart recorder, a circular chart recorder, or electronically (Chapter 13, Section 13(i)).

Discharge Zone Reservoir Pressure, Reservoir Boundaries or Anomalies, Permeability, and Skin Factor - The permittee shall shut-in each well covered by this permit annually for a period of time long enough to observe a valid pressure fall-off curve (Chapter 13, Section 13(e)). For the first test, the minimum duration of injection and fall-off shall be calculated according to the equations on page A-4 of the "UIC Pressure Falloff Testing Guideline" (USEPA Region 6, August 2002), or the equivalent equations in subsequent editions. Durations for subsequent tests shall be longer than wellbore storage and skin effects and sufficient for persuasive analysis and accurate estimates of permeability. Tests shall be analyzed by the permittee using commonly accepted methods to obtain hydraulic conductivity or permeability, transmissivity, and skin factor and to identify reservoir boundaries (including flow in fractures) and other anomalies such as partial penetration or layering. The test method chosen should be justified by a review of relevant assumptions and actual well and aquifer conditions. Along with the analysis and interpretation, the permittee shall submit plots of injection rate, pressure, and the pressure derivative versus time on appropriate graphs. If the method used differs from previous methods used for the same well, the analyst should discuss the comparability of the results.

Digital data, results, analyses, and interpretations for the fall-off test shall be submitted to the Administrator at the address in paragraph K.6 within one (1) month or with the next quarterly report after the test is done, whichever is later (Chapter 13, Section 15 (f)). These data shall include pressures starting with the introduction of the pressure-measuring device into the well (or for at least one (1) hour prior to test start for a permanently installed down hole device); and injection rates starting at least twice the fall-off period before the start of the fall-off test.

Cone of Influence - The results of each pressure fall-off test shall be used to update the cone of influence calculation for each discharge zone (**Table 1**). These annual updates shall account for historical injection and remaining project life. The permittee shall provide a map showing the updated Cone of influence and all wells which penetrate the confining zone within the old and new radii of influence.

If the updated cone of influence encompasses wells not previously identified as within the area of review, construction and plugging and abandonment records for those wells shall be submitted to the Administrator.

For each potentially endangering well which lies within the updated cone of influence, the permittee shall calculate the expected hydraulic head increase at the end of the permit life (10 years) due to all disposal wells close enough to significantly affect hydraulic head at the well location. For those wells in which $[\rho_m \cdot H_m / \rho_i] \leq H_i$ (where H_m is the hydraulic head in a borehole filled with mud of known density, or with 9.0 pound/gallon mud if mud density is unknown, H_i is the final expected hydraulic head in the injection zone, ρ_m is the density of the mud, and ρ_i is the density of the fluid in the injection zone; i.e., "W/G \leq B", Chapter 13, Sec5(b)(iv)(A)), the permittee shall also calculate how long injection could continue at the permittee's proposed rate, or at the maximum monthly injection rate during the prior year, before $[\rho_m \cdot H_m / \rho_i] = H_i$ at the well location. If any calculated time is less than one (1) year, the permittee shall cease injection, reduce the injection rate(s) to new limits approved by the Administrator, or submit a corrective action plan to prevent movement of fluid into any USDW through a potentially endangering well. Upon approval by the Administrator, this plan shall be incorporated as a permit condition (Chapter 13, Section 5(b)(x)).

Cone of influence calculations and figures shall be submitted to the Administrator at the address in paragraph K.6 within thirty (30) days of the annual pressure fall-off test or with the next quarterly report after the test is done, whichever is later (Chapter 13, Section 15(f)).

Physical and Chemical Properties of the Injectate - The permittee shall monitor the quality of the injectate quarterly (Chapter 13, Section 15 (c)(v)), and when significant process changes occur, and when operating changes may significantly alter the waste stream (Chapter 13, Section 13(h)). The samples must be representative of the waste as it enters the disposal wells. If any group of wells receives waste from the same pipe exiting the uranium processing plant or waste collection area, a single sample may be collected for that group from that pipe rather than at individual well locations. **Table 7** lists the analytes and parameters to be analyzed quarterly. WQD may approve alternate methods to those in **Table 7** upon receipt of a written request describing the procedures, precision, and accuracy of the proposed method and a comparison of the proposed method with that in **Table 7**.

The first three (3) parameters in **Table 7** shall be measured at the sample site unless other methods are approved by the Administrator. Specific conductance shall be reported for the actual sample temperature and the equivalent value at a temperature of 25° C. The other analyses shall be performed by an EPA-certified laboratory.

Table 7 (Analyte and Parameter List for Quarterly Analyses of Injectate)

Sampling Schedule	Analyte or Parameter	EPA Analytical Method	CAS Number
Quarterly January 1 – March 31 April 1 – June 30 July 1 – Sept 30 October 1 – December 31	pH	SM4500-H ⁺ B	None
	Specific Conductance at 25°C	120.1 or SM2510 B	None
	Temperature	SM2550 B	None
	Specific Gravity	none listed	None
	Total Dissolved Solids	160.1 or SM2540 C	None
	Bicarbonate	SM2320 B	71-52-3
	Carbonate	SM2320 B	3812-32-6
	Chloride, Total	300.0 or 300.1	16887-00-6
	Sulfate, Total	300.0, 300.1, or 375.2	14808-79-8
	Hydrogen Sulfide	SM4500-S2-D, SM4500-S2-G	7783-06-4
	Arsenic, Total	206.5, 200.7, or 200.8	7440-38-2
	Selenium, Total	200.7 or 200.8	7782-49-2
	Vanadium, Total	200.7 or 200.8	7440-62-2
	Uranium, Total	908.1 or 200.8	7440-61-1
²²⁶ Radium (picoCuries/liter)	903.1	7440-14-4	

Note: Table 7 Methods preceded by “SM” are standard methods.

Limiting Concentrations of Injectate - Upper control limits for this permit are listed in **Table 8**. pH has both upper and lower control limits and concentrations must remain within the range indicated in **Table 8**. Exceedances of these values are a violation of this permit and require notification under Section K of this permit.

Table 8 (Control Limits for Injected Waste)

Analyte or Parameter	Lower and Upper Control Limits
pH	2.0 < pH < 11 s.u.

J. Sampling and Test Procedures

The following units are to be used where applicable: pounds (mass) per square inch for pressure with gauge or absolute pressure noted (psig or psia); standard oil field barrels (bbl, equivalent to 42 gallons) for fluid volume; standard oil field barrels per day (bbl/day) for fluid flow rates; milligrams per liter (mg/L) for analyte concentrations other than pH in standard logarithmic units (s.u.) or radium, radioactive strontium isotopes, and gross alpha particle radioactivity in picocuries per liter (pCi/L). The permittee may report equivalent quantities in other units in addition to those above.

Procedures and methods for sample collection and analyses shall be implemented by the permittee to ensure that the samples are representative of the groundwater, water, or wastes being sampled (Chapter 13, Section 14(a)).

A trip blank of distilled water shall be collected for each quarterly sampling date and a duplicate sample shall be collected at least once per year. Blank and duplicate results and chain-of-custody forms shall be included in the quarterly reports.

Procedures for mechanical integrity tests are described in Section M.

Procedures for pressure fall-off tests are described under Operational Monitoring in Section I.

Procedures for step-rate injection tests are described under Injection Pressure in Section D.

K. Records and Reports

1. Record Retention - The permittee shall retain copies of all reports required by this permit, and records of all data used to complete the application for this permit until the permit expires. As described in Section I.2, monitoring records shall be retained for three (3) years after well closure (Chapter 13, Section 15(g)).
2. Electronic Data Deliverable (EDD) Reporting – The permittee shall use EDD reporting if required by the Administrator.
3. Compliance Schedule Reports – If a compliance schedule is required by the Administrator, reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any such schedule shall be submitted no later than thirty (30) days following each schedule date (Chapter 13, Section 9 (d)(xx)).
4. Noncompliance Event Reports – See Section S.
5. Other Noncompliance Reports - The permittee shall report all instances of noncompliance not reported otherwise and submit the information listed for the written report in Section S with the next quarterly report (Chapter 13, Section 9 (d)(xxii)).
6. Quarterly Reports - Quarterly reports shall be submitted to the Administrator no later than thirty (30) days after the end of each calendar quarter ((Chapter 13, Section 15 (a) and 15(c)). The mailing address is: UIC Program Supervisor, DEQ – Water Quality Division, Herschler Building – 4W, 122 W. 25th St., Cheyenne, WY 82002. The quarterly results shall also be submitted online at <https://gem.wqd.apps.deq.wyoming.gov/Default.aspx>, within forty-five (45) days of the end of quarter. The written quarterly report for each well shall include the following information:
 - a. The minimum, volume-weighted average, and maximum instantaneous injection rates for each well for each month of the quarter. The page showing the maximum injection rates shall also show the maximum permitted injection rate for comparison.
 - b. The minimum, average, and maximum daily injection pressures for each well for each month of the quarter (Chapter 13, Section 15 (c)(i)). The table or graph showing the maximum injection pressures shall also show the maximum permitted injection

- pressure for comparison and the pressures at which any alarms or kill switches are activated.
- c. The total injection volume in barrels for each well for each month of the quarter, the total for the quarter, and the total cumulative volume of waste injected to date (Chapter 13, Section 15 (c)(iv)).
 - d. The maximum and minimum annulus pressures for each month of the quarter. The table or graph showing the annulus pressures shall also show the pressures at which any alarms or kill switches are activated.
 - e. Any quarterly analytical results required by Section I of this permit (Chapter 13, Section 15 (c)(v)). Sample collection dates should allow ample time to receive analytical results prior to reporting deadlines.
 - f. Any permit exceedances within the quarter.
 - g. Any events that triggered alarms or shutdowns and the responses taken during the quarter shall be fully described (Chapter 13, Section 15 (c)(iii)).
 - h. Any well tests conducted more than thirty (30) days before the end of the quarter (e.g. mechanical integrity, pressure fall-off, or step-rate injection) (Chapter 13, Section 15 (f)) and reports of well workovers (Chapter 13, Section (c)(vi)). See also K.8.
7. Annual Reports - Annual reports shall be submitted to the Administrator at the same address as the quarterly reports. They are due no later than thirty (30) days after the end of each calendar year (Chapter 13, Section 15 (c)). The annual report for each well shall include the following information in addition to that required for the quarterly report:
- a. A graphical representation of the injection pressures and volumes for the previous five (5) year's operation and a digital file (e.g., .csv, .txt., .xls, .xlsx) containing these data. The graph shall have calendar dates as the abscissa and pressure and volume as the ordinates.
 - b. Graphical representations of the quality of the injected waste over time and a digital file (e.g., .csv, .txt., .xls, .xlsx) containing these data. The graphs shall show the injectate quality for the previous five (5) year's operation and shall be prepared on scales appropriate to the variation observed.
8. Well Tests – Reports of well tests conducted less than thirty (30) days before the end of a calendar quarter shall be submitted within thirty (30) days of test completion (Chapter 13, Section 15 (f)). Otherwise, they shall be submitted with the next quarterly report (see paragraph K.6.h).
9. Reports for Aborted Operations - A comprehensive report for any aborted or curtailed operation, which results in the complete termination of discharge or associated activity,

shall be submitted to the Administrator within thirty (30) days of termination in lieu of an annual report (Chapter 13, Section 15 (d)).

10. Reports of Plugging and Abandonment – A report of plugging and abandonment (Section N) shall be submitted within thirty (30) days after a well is plugged (Chapter 13, Section 9 (d)(xxvii)).
11. Well Completion Report – A report of well construction, completion, and testing and “Notification of Construction Completion of Injection Well” shall be submitted prior to injection into a new or modified well (see New Well Construction in Section D).
12. Step-rate Injection Test Report - A step-rate injection test is required within one (1) year of permit issuance (Chapter 13, Section 9(d)(ii)) or at the time of well completion and prior to waste injection.

L. Permit Conditions

This permit is issued for a period of ten (10) years (Chapter 13, Section 9 (a)). If the permittee wishes to continue injection after the expiration date of this permit, he should apply to the Administrator at least four (4) months prior to the expiration date of this permit (Chapter 13, Section 9 (d)(iii)).

It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit (Chapter 13, Section 9 (d)(iv)).

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation.

The filing of a request by the permittee, or at the instigation of the Administrator, for permit modification, revocation, or termination, or the notification of planned changes or anticipated noncompliance shall not stay any condition of this permit (Chapter 13, Section 9(d)(ix)).

After notice and opportunity for a hearing, the Administrator may modify or revoke a permit, in whole or in part, during its term for cause. Causes include, but are not limited to, the following:

1. Noncompliance with terms or conditions of this permit (Chapter 13, Section 8(e)(i));
2. Failure in the application or during the issuance process to disclose fully all relevant facts, or misrepresenting any relevant facts at any time (Chapter 13, Section 8(e)(ii)); or
3. Failure of the casing, cement, or the confining layer; or
4. A determination that the activity endangers human health or the environment and can only be regulated to acceptable levels by a permit modification or termination (Chapter 13, Section 8(e)(iii)).

Permits will be automatically terminated after closure and release of financial responsibility by the Administrator (Chapter 13, Section 8(i)).

This permit will be reviewed by WQD at least once every five (5) years, and may be reviewed more frequently (Chapter 13, Section 9(b)). Permits that do not satisfy the review criteria are subject to modification, revocation and reissuance, or termination (Chapter 13, Section 9(c)).

The conditions in this permit supersede any application content (Chapter 13, Section 18(b)(i)).

M. Mechanical Integrity

Mechanical integrity shall be maintained continuously and tested at intervals of no longer than five (5) years. The test used to determine mechanical integrity shall be a two part test approved by the Administrator (Chapter 13, Section 9 (d)(vii)). The two parts shall be conducted no more than three (3) months apart unless prior approval is obtained from the Administrator.

Part I of the mechanical integrity test shall demonstrate the absence of leaks through the packer, tubing, and casing (Chapter 13, Section 9(d)(vii)(A)). Prior to operational injection and at least once every five (5) years the casing-tubing annulus of each well shall be tested at a pressure equal to the maximum permitted surface injection pressure (of each well) or 1,000 psig, whichever is greater. A pressure change of less than 10% over a thirty (30) minute test period shall be considered successful.

Part II of the mechanical integrity test shall demonstrate the absence of fluid movement behind the casing (Chapter 13, Section 9 (d)(vii)(B)) above the topmost perforation. Prior to the commencement of waste injection and at intervals of no longer than five (5) years thereafter, and more frequently if required by the Administrator, each well shall be logged using a radioactive tracer survey (or oxygen activation log) and a temperature survey. The static temperature log shall start more than two (2) hours and preferably more than twenty-four (24) hours for an active well, after injection has ceased. The results and their interpretation shall be submitted to the Administrator along with the next quarterly report.

Other types of pressure tests may be substituted for Part I of the mechanical integrity test if they satisfy Chapter 13, Section 9(d)(vii) and are first approved by the Administrator.

Other types of logs may be substituted for Part II of the mechanical integrity test if they satisfy Chapter 13, Section 9 (d)(vii) and are first approved by the Administrator.

WQD shall be notified a minimum of thirty (30) days prior to a mechanical integrity test.

Data, results, analyses, and interpretations for the tests shall be submitted to the Administrator at the address in paragraph K.6 within thirty (30) days or with the next quarterly report after the test is done, whichever is later (Chapter 13, Section 15(f)).

In the case of a failed mechanical integrity test in a well that has begun waste disposal, the well shall be immediately shut-in (Chapter 13, Section 9 (d) (viii)). The Administrator shall be notified by telephone at (307) 777-7781 within twenty-four (24) hours of the test and a written report shall be submitted within seven (7) days. Injection shall not resume until the well has been repaired, a complete mechanical integrity test has been passed, and written permission to resume operation has been obtained from the Administrator.

Injection into any zone not within the discharge zone is a violation of this permit. The operator shall immediately cease injection and prepare and submit to the Administrator an estimate of the volume and quality of all wastewaters that were injected outside of the discharge zone. In the case where any aquifer meeting the standards for Class I through IV(A) under WQRR, Chapter 8, has been contaminated due to out of zone injection, the operator shall prepare and implement a plan to recover these solutions. Injection shall not resume until the well has been repaired, a complete mechanical integrity test has been passed, and written permission to resume operation has been obtained from the Administrator.

N. Plugging and Abandonment

Any well under this permit shall be plugged and abandoned within six (6) months after:

- Permit expiration (unless application for a new permit has been made and has not been denied by the Administrator) or termination;
- Final cessation of injection activities; or
- The permittee has removed equipment required for the proper operation and monitoring of the well (except for temporary removal during well maintenance).

The permittee shall notify the Administrator of plans to convert or abandon a well at least ninety (90) days prior to the start of any conversion or abandonment activity (Chapter 13, Section 9 (d) (xxvi)). The permittee shall follow the plugging and abandonment procedure described in the original application or subsequently prescribed by the Administrator. The procedure shall include well plugging, abandonment, surface reclamation and seeding of the well site, closure of related surge ponds, and removal or purging and plugging of any underground piping. Well plugging shall meet the requirements of Wyoming Water Quality Rules and Regulations Chapter 26, Section 6 for sealing the well annulus and of Chapter 26, Section 9 for sealing within casing. In no case shall the procedure be less stringent than that required by USEPA for Class I non-hazardous waste disposal wells at the time of abandonment (Title 40 CFR Part 146.10).

Within thirty (30) days after plugging and abandonment of any wells covered by this permit, the permittee shall submit a plugging and abandonment report, detailing the compliance with the plugging and abandonment procedures outlined in the original permit application, and describing any deviation from the original plan (Chapter 13, Section 9 (d)(xxvii)).

O. Duties of the Permittee

Duty to Comply - The permittee shall comply with all conditions of this permit (Chapter 13, Section 9(d)(i)), all rules and regulations of the Department of Environmental Quality, and all applicable state and federal laws. Nothing in this permit relieves the permittee of any duties under applicable regulations.

Duty to Mitigate - The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit (Chapter 13, Section 9(d)(v)).

Duty to Give Notice of Changes - The permittee shall give advance notice to the Administrator as soon as possible of any planned physical alteration or additions, other than authorized operation and maintenance, to the permitted facility and receive authorization prior to implementing the proposed alteration or addition (Chapter 13, Section 9(d)(xvi)).

Duty to Warn of Noncompliance - The permittee shall give advance notice to the Administrator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements (Chapter 13, Section 9(d)(xvii)).

Duty to Provide Information for Permit Modification - The permittee shall furnish the Administrator within a reasonable time, any information which the Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. (Chapter 13, Section 9(d)(xi)).

Duty to Provide Records - The permittee shall furnish the Administrator, upon request, copies of records required to be kept by this permit (Chapter 13, Section 9(d)(xi)).

Duty to Amend Permit - Any modification that will result in a violation of any permit condition shall be reported to the Administrator through the submission of a new or amended permit application and shall not be implemented until a new or modified permit has been issued (Chapter 13, Section 9(d)(xvii)).

Duty to Correct - The permittee shall report all instances where it becomes aware that it failed to submit any relevant facts in the permit application, or where it submitted incorrect information in a permit application or in any report to the Administrator, and shall promptly submit such facts or information (Chapter 13, Section 9(d)(xxiii)).

Duty to Monitor - Monitoring results shall be obtained and reported at the intervals specified elsewhere in this permit (Chapter 13, Section 9(d)(xix)).

Duty to Test - Test results shall be obtained and reported at the intervals specified elsewhere in this permit.

Duty to Provide Current Contact Information - The permittee shall report any changes to physical or mailing address, phone, or email, and any changes of the personnel responsible for complying with this permit to WQD within one (1) month of the change.

P. Financial Responsibility

The permittee is required to maintain financial assurance in a form approved by the Administrator to close, plug and abandon the injection well operation, and reclaim the surface facilities in a manner prescribed by the Administrator (Chapter 13, Section 17(a)).

The obligation to maintain financial assurance survives the termination of the permit or the cessation of injection (Chapter 13, Section 17(c)).

If the institution issuing the financial instrument files for bankruptcy or loses its authority to issue financial instruments, the permittee shall notify the Administrator within two (2) weeks and obtain other financial assurance within two (2) months. If the permittee is named as debtor in any voluntary or involuntary bankruptcy proceeding, it must notify the Administrator within two (2) weeks.

The financial assurance instrument for reclamation and restoration of the Reno Creek mine facilities shall include a minimum of \$134,000 per well for plugging and abandonment upon completion of each well, but prior to the start of injection. The permittee may alternatively submit a separate financial assurance instrument only for the proposed wells to be constructed to the Administrator for approval. In that case, injection shall not proceed prior to written acceptance by the Administrator. This financial instrument shall be maintained as long as any of the wells are covered under this permit.

The financial assurance amount shall be increased by 3% each calendar year. Annual financial responsibility document updates shall be submitted to the Administrator no later than February 14th of each year.

Q. Special Permit Conditions

In addition to the conditions required of all permits, the Administrator may establish specific conditions so as to prevent the migration of fluids into USDWs (Chapter 13, Section 9(e)).

R. Signatories Requirement

All reports filed in conjunction with this permit shall contain the following certification (Chapter 13, Section 9(d)(xv)):

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.” (Chapter 13, Section 5(c)(xv)).

All reports required by this permit and other requested information shall be signed by a responsible officer as described in WQRR Chapter 13, Section 5(b)(xiv);

or

By a duly authorized representative. A person is a duly authorized representative only if:

1. The authorization is made in writing by one of the prescribed principals;
2. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity; and

3. The written authorization is submitted to the Administrator.

If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the Administrator prior to, or together with, any reports or information to be signed by the new authorized representative.

S. Noncompliance

Any permit noncompliance constitutes a violation of WQRR Chapter 13 and is grounds for enforcement action, permit termination, revocation, or modification (Chapter 13, Section 9 (d)(i)). Confirmed noncompliance resulting in a migration of injected fluid outside the discharge zone shall be reported to the Administrator at (307) 777-7781 within twenty-four (24) hours from the time the permittee becomes aware of the circumstances and a written report shall be provided within five (5) days (Chapter 13, Section 9 (d)(xxi)).

The oral report shall include:

- a. Any monitoring or other information which indicates that any contaminant may cause an endangerment to a useable groundwater of the state.
- b. Any noncompliance with a permit condition or malfunction of the discharge (injection) system which may cause fluid migration into or between useable groundwaters of the state.

The written report shall include:

- a. A description of the noncompliance and its cause;
- b. The period of noncompliance, including exact dates and times;
- c. If the noncompliance has not been corrected, the anticipated time it is expected to continue; and
- d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance (Chapter 13, Section 9(d)(xxi)).

T. Permit Transfer

Any transfer of this permit shall be accomplished by the submission of the proper forms for permit transfer to the Administrator. Transfer of this permit must first be approved by the Administrator and no transfer shall be approved unless the proposed permittee agrees to correct any and all noncompliance issues (Chapter 13, Section 9 (d)(xviii) and Chapter 13, Section 8(k)).

The permittee is alone responsible for the operation of the facility covered by this permit. Operation of this facility by another entity is a violation of this permit unless a transfer of this permit has first been accomplished.

U. Property Rights

This permit does not convey any property rights or any exclusive privileges. This permit does not authorize any injury to private property or any invasion of personal rights, or any infringement of federal, state, or local laws or regulations (Chapter 13, Section 9(d)(x)).

The State of Wyoming recently passed Wyoming statute §34-1-152 and amended Wyoming statute §34-1-202, regarding the ownership of pore space within the subsurface. The Permittee shall consider how these laws may apply to their injection of material into the subsurface.

V. Severability

The provisions of this permit are severable, and if any provision of the permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

Abbreviations:

USEPA – United States Environmental Protection Agency (EPA)

USDW – underground source of drinking water (Classes I, II, III, IV(A), Special(A))

WDEQ – Wyoming Department of Environmental Quality

WQD – Water Quality Division of WDEQ

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