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
(X) Modified
County: Johnson

Permit Number: **10-219**
Previous: 00-340, 97-407, 95-241, 88-545
UIC Facility Number: WYS-019-0011

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, Ch. 250, Section 1) and Wyoming Water Quality Rules and Regulations (WQRR) Chapter 13.

Applicant:

Uranium One USA, Inc.
907 N. Poplar Street, Suite 260
Casper, WY 82601
(307) 234-8235

Uranium One USA, Inc., hereafter referred as the permittee, is authorized to continue to operate Christensen Ranch 18-3 and Christensen Ranch DW No. 1 and to drill, complete, and operate the proposed wells Christensen Ranch DW No. 2 and Christensen Ranch DW No. 3 according to the procedures and conditions of application 10-219 and to the requirements and other conditions of this permit. Issuance of a permit for a proposed well 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 does not comply with all the terms and conditions of this permit (Chapter 13, Section 8(e)).

This permit replaces permit 00-340 which becomes void on the date of issuance of this permit.

The names Christensen Ranch 18-3, Christensen Ranch DW No. 1, Christensen Ranch DW No. 2, and Christensen Ranch DW No. 3 replace the previous names for the same wells: Christensen 18-3, Cogema DW No. 1, Cogema DW No. 2, and Cogema DW No. 3, respectively.

This is an area permit for four wells of the Christensen Ranch Disposal Wellfield.

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.

8/7/12

John Wagner, Administrator
Water Quality Division
Herschler Building 4-W, 122 West 25th Street
Cheyenne, WY 82002
(307)-777-7781

Date

8/7/12

John V. Corra, Director
Department of Environmental Quality
Herschler Building 4-W, 122 West 25th Street
Cheyenne, WY 82002

Date

JP/rm/12-0721

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A. Discharge Zones

The disposal wells are authorized to inject into the Lance Formation within the intervals specified in **Table 1:**

Table 1. Discharge Zones

Well Name	Surface Elevation (feet msl)	Depth to Top of Discharge Zone (feet)	Depth to Bottom of Discharge Zone (feet)	Gross Discharge Zone Thickness (feet)	Well Depth (feet)
Christensen Ranch18-3	4,800	4,009	6,496	2,487	6,566
Christensen Ranch DW No. 1	4,674	3,818	6,320	2,502	6,721
Christensen Ranch DW No. 2 (proposed)	4,660	3,800	6,500	2,700	6,500
Christensen Ranch DW No. 3 (proposed)	4,720	3,800	6,500	2,700	6,500

Perforations in the proposed wells shall be restricted to the Lance Formation. Perforations above or below the discharge intervals identified in **Table 1** require the prior written approval of the Administrator.

The shales within the Lance and Lower Fort Union Formations form the confining layer above the receiver and the shales within the lower Lance Formation form the confining layer below the Lance receiver.

B. Wells and Areas of Review

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

Table 2. Well Location(s)

Well Name	Legal Description	Latitude	Longitude
Christensen Ranch 18-3	NE ¼ NW ¼ Section 18, T44N,R76W	43.79371	-106.04051
Christensen Ranch DW No. 1	SE ¼ NW ¼ Section 7, T44N, R76W	43.80339	-106.01018
Christensen Ranch DW No. 2 (proposed)	SE ¼ NE ¼ Section 7, T44N, R76W	43.80397	-106.03239
Christensen Ranch DW No. 3 (proposed)	SW ¼ SW ¼ Section 5, T44N, R76W	43.81236	-106.02295

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

Table 3. Legal Description(s) of the Area(s) of Review

Well Name	Quarter-Quarters	Section	Township
Christensen Ranch18-3	SWSW, SESW, SWSE	7	T44N, R76W
	NWNE, SWNE, all NW	18	T44N, R76W
Christensen Ranch DW No. 1	NWNE, SWNE, all NW, NWSW, NESW, NWSE	7	T44N, R76W
Christensen Ranch DW No. 2 (proposed)	NESE, NWSE, all NE	7	T44N, R76W
	SWNW, NWSW	8	T44N, R76W
Christensen Ranch DW No. 3 (proposed)	all SW	5	T44N, R76W
	NENW, NWNW	8	T44N, R76W

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

AOR Method	Christensen Ranch 18-3	Christensen Ranch DW No. 1	Christensen Ranch DW No. 2 (proposed)	Christensen Ranch DW No. 3 (proposed)
Radius of Pure Waste Cylinder (ft)	401	443	354	354
Radius of Cone of Influence (ft)	558	850	867	867
Minimum Radius of Area of Review (ft)	1,320	1,320	1,320	1,320

In order to calculate the radius of pure waste cylinders for each well, historical injection records and proposed injection rates were evaluated. Operating reports submitted to DEQ indicate that injection did not take place from approximately June 2005 through 2011. To account for historical injection in Christensen Ranch 18-3 of approximately 4,200,000 bbl, the effects of pumping at a rate of 2,212 bbl/day from April 2, 2000 to May 30, 2005 were added to those of pumping at a rate of 2,571 bbl/day for an additional ten (10) year permit duration. To account for historical injection in Christensen Ranch DW No. 1 of approximately 5,300,000 bbl, the effects of pumping at a rate of 2,285 bbl/day from April 1, 2000 to August 30, 2005 were added to those of pumping at a rate of 2,571 bbl/day for an additional ten (10) year permit duration. For the proposed wells (Christensen Ranch DW No. 2 and DW No. 3), an average injection rate of 2,571 bbl/day and a permit duration of ten (10) years were assumed.

There are no existing wells that penetrate either the confining formations or receiving formations for all wells identified in **Table 4** (within the 1,320 foot areas of review).

C. Groundwater Classification

The groundwater within the Lance Formation (specified in **Table 4**) is classified as Class VI under Chapter 8 of Wyoming Water Quality Rules and Regulations. This classification was made because:

- The groundwater in the Lance Formation contains between 1,400 and 2,460 mg/L of total dissolved solids. The groundwater in the Lance Formation contains as much as 6,900 mg/L of benzene, 18.9 mg/L of oil and grease, 27.8 mg/L of iron, 1.04 mg/L of boron, 14.1 mg/L of zinc, 0.004 mg/L of mercury, and 0.33 mg/L of total phenolics. The benzene content of this groundwater at baseline exceeds the limits set by the Resource Conservation and Recovery Act for characteristic Hazardous Waste.

- This formation naturally contains traces of oil and gas and cannot reasonably be expected to provide a source of drinking water at this location.

This groundwater classification remains consistent with previous permit 00-340.

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 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 - Each well is allowed the maximum instantaneous injection rate shown in **Table 5** provided that the surface pressure limitations are not exceeded. The permittee shall set an alarm or kill switch to prevent injection above the permitted rate.

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)). Permit limits for the existing wells and temporary limits for the proposed wells are listed in **Table 5**. For the proposed wells the temporary limit cited will apply until recalculation of the parameters in **Table 5** 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 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 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 presssure gauges or transducers. The down hole device shall be placed within one hundred vertical feet of the packer. For a conclusive result, at least three of the injection rate steps below the fracture threshold will be colinear. 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. Step-rate data, analyses, and interpretations shall be submitted to the Administrator within thirty (30) days of completion of the test or with the next quarterly report, 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 permissible during startup and shutdown. The permittee shall set alarms or use daily observations to detect increases or decreases in annulus pressure and shall cease injection and shut the well in if a pressure change indicates the possibility of a loss of mechanical integrity. Interpretations of pressure changes 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)

	Christensen Ranch18-3	Christensen Ranch DW No. 1	Christensen Ranch DW No. 2 (proposed)	Christensen Ranch DW No. 3 (proposed)
Maximum Annulus Pressure (psig)	800	800	800	800
Minimum Annulus Pressure (psig)	200	200	200	200
Injection Rate at Fracture, R_f (bbl/day)	4,133 (a)	4,133	(e)	(e)
Maximum Injection Rate (bbl/day) $R_m = 0.9 \cdot R_f$	3,720	3,720	3,720 (d)	3,720 (d)
Depth to Gauge or Top of Perforations, D_p (ft)	3,998 (a)	3,808	3,821	3,821
Fracture Pressure, P_f (psig) $P_f = F \cdot D_p$	2,799 (a)	2,666	2,675 (b)	2,675 (b)
Fracture Gradient, (psi/ft) $F = P_f / D_p$	0.7 (a)	0.7	0.7 (b)	0.7 (b)
Temperature in Tubing (°F)	70	70	70	70
Maximum Total Dissolved Solids of Injectate (mg/L)	20,000	20,000	20,000	20,000
Density of Injectate, ρ_i (g/cm^3)	1.001	1.001	1.001	1.001
Injectate Fluid Gradient (psi/ft) $grad_j = \rho_j \cdot 12\frac{in}{ft} \cdot 16.387\frac{cm^3}{in^3} / 453.592\ \frac{g}{lb}$	0.433	0.433	0.433	0.433
Hydrostatic Pressure (psi) $P_h = D_p \cdot grad_j$	1,733	1,651	1,656	1,656
Tubing Friction Loss Factor, T (psi/1000 ft)	21	2	21	21
Pressure Loss Due to Tubing Friction (psi) $P_L = T \cdot D_p / 1000$	84	8	80	80
$MSIP = P_f - P_h + P_L$ (psig)	1,150	1,023	1099	1099
$LSIP = 0.9 \cdot MSIP$ (psig)	1,035	921	989 (c)	989 (c)

(a) Formation didn't fracture during test; data for Christensen Ranch DW No. 1 applies.
(b) Calculated from the assumed fracture gradient.
(c) 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 year of permit issuance, a step-rate injection test is required before waste injection.
(d) Estimated maximum injection rates until fracture gradient is determined after wells are completed.
(e) To be determined.

Permitted Wastes - Wastes to be injected are described as follows:

- Liquid waste generated by uranium mining using in-situ leaching at the Christensen Ranch and Irigaray Ranch mine facilities (as defined in the Land Quality Division Permit to Mine No. 478) 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, and

- Fluids produced during the drilling, completion, testing, or stimulation of wells or test holes related to mining operations at the Christensen Ranch and Irigaray Ranch 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 waste disposal 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 for new wells. Permission to discharge other non-hazardous waste may be authorized through a minor permit modification (Chapter 13, Section 8(d)(v)). Additional monitoring may be required for additional waste types.

The 2nd Quarter 2012 quarterly composite concentrations for selected chemical species in the waste are listed in **Table 6**.

Table 6. Water Quality of the Discharge

	Units	Concentration
Alkalinity	mg/L	618
pH	s.u.	8.1
Total Dissolved Solids (TDS)	mg/L	5,980
Uranium	mg/L	4.6
^{226}Radium	pCi/L	547

Permitted Corrosion Inhibitors, Anti-Scalants, and Biocides - Corrosion inhibitors, anti-scalants, and biocides may be added to the waste stream with the prior written approval of the Administrator.

New Well Construction - The permittee shall obtain written acceptance of financial assurance from WDEQ prior to construction of each 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 web site - 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 have 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 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, except that portion of a hole within 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, except in that portion of the space within 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 this 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 the facility 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 aquifers (Chapter 13, Section 13(a)(ii)).

I. Monitoring Requirements

1. 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 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.

2. 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.

3. For any new well or newly perforated zone within an existing well, the permittee shall collect a baseline groundwater quality sample from each aquifer within the new discharge zone (Chapter 13, Section 13(a)) and submit results for all the analytes and parameters in WDEQ-WQRR Chapter 8, Table 1 prior to waste injection. The methods and procedures for sample collection and analysis must be approved by the Water Quality Division prior to sampling.

4. For any new well, the permittee shall collect at least two (2) measurements of hydraulic head (or fluid density and pressure) within the lower Wasatch aquifer above the upper confining zone.

5. If the permittee determines that the authorized discharge zones within members and/or formations identified in Section A of this permit are inadequate, then a permit modification will be required. The permit modification request shall be supported by data approved by the Administrator.

6. Operational Monitoring (Chapter 13, Section 13(b)(ii)):

Injection Pressure - The permittee shall measure 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 measure the injection rate and volume continuously and record both on a strip chart recorder, circular chart recorder, or electronically (Chapter 13, Section 13(i)).

Annulus Pressure - The permittee shall measure the pressure of the casing - tubing annulus continuously 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 completed 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 transmissivity. Tests shall be analyzed by the permittee using commonly accepted methods to obtain transmissivity, permeability, 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 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 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.

Radius of Influence - The results of each pressure fall-off test shall be used to update the radius 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 radius of influence and all wells which penetrate the confining zone within the old and new radii of influence.

If the updated radius 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 radius 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 ≤ B", Chapter 13, Section 5(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 or the permittee shall use a suitable alternative to evaluate the cone of influence calculation. If any calculated time for intersection of the cone of influence with a well (not meeting requirements) 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)).

Radius of influence calculations, figures, and interpretations 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 measure 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 well and include any anti-scalants, biocides, or other additives. If any group of wells receives waste from the same pipe exiting the uranium processing plant, 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 determined quarterly. WQD may approve alternate methods to those listed 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 parameters in **Table 7** shall be measured at the sample site(s) unless other methods are approved by the Administrator. The other analyses shall be performed by an EPA-certified laboratory.

Table 7. Analyte and Parameter List for Quarterly Analyses of Injectate

EPA Analytical Method	Analyte or Parameter	CAS Number
SM2550 B	Temperature	None
120.1 or SM2510 B	Specific Conductance at 25 C	None
SM4500-H^+ B	pH	None
none listed	Specific Gravity	None
160.1 or SM2540 C	Total Dissolved Solids	None
SM2320 B	Bicarbonate	71-52-3
SM2320 B	Carbonate	3812-32-6
300.0 or 300.1	Chloride, Total	16887-00-6
300.0, 300.1, or 375.2	Sulfate, Total	14808-79-8
SM4500-S2-D, SM4500-S2-G	Hydrogen Sulfide	7783-06-4
206.5, 200.7, or 200.8	Arsenic, Total	7440-38-2
200.7 or 200.8	Selenium, Total	7782-49-2

200.7 or 200.8	Vanadium, Total	7440-62-2
908.1 or 200.8	Uranium, Total	7440-61-1
903.1	^{226}Radium (picoCuries/liter)	7440-14-4

Note: Methods preceded by "SM" are standard methods.

Limiting Concentrations of Injectate - Analyte and parameter limits for this permit are listed in **Table 8**. The upper and lower control limits and concentrations of pH 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	Upper Control Limit
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 gage 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, except for pH, which is to be reported in standard units (s.u.) and except for radium, radioactive strontium isotopes, and gross alpha particle radioactivity, which are to be reported 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 waste 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 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 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 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 rates 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 pressures for comparison and the pressures at which any alarms or kill switches are activated.

   c. The total injection volume in barrels 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 15(e)(vi)). See also paragraph 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((e)). 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 as soon as practicable 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 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 (2) part test approved by the Administrator (Chapter 13, Section 9(d)(vii)). The two (2) parts shall be conducted no more than ninety (90) days 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 pressure tested to the maximum permitted surface injection pressure or 1,000 psig whichever is greater. A pressure change of less than 10% after thirty (30) minutes shall be considered a successful test.

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.

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 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.

If at any time injection occurs in any zone not within the discharge zone, a permit violation has occurred. The operator shall prepare an estimate of the volume and quality of all wastewaters which were injected outside of the discharge zone. In the case where any aquifer meeting the standards for Class I through IV(A) under Wyoming Water Quality Rules and Regulations, 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);
- 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 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 application or subsequently prescribed by the Administrator. Well plugging shall meet the requirements of Chapter 11, Section 65 for sealing the well annulus and of Chapter 11, Section 70(c) 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 (e.g., Title 40 Code of Federal Regulations Part 146.10)

As soon as practicable after plugging and abandonment of any well covered by this permit, the permittee shall submit a plugging and abandonment report describing all activities and detailing any deviations 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 thirty (30) days 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 to reclaim the surface facilities in a manner approved by the Administrator (Chapter 13, Section 17 (a)).

The obligation to maintain financial responsibility 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 permittee is required to maintain financial responsibility and resources in a form approved by the director, to close, plug and abandon the discharge operation, and reclaim the surface facilities in a manner prescribed by the director. The financial assurance consists of a Letter of Credit (BMCH278567OS) in the amount of $73,950 for Christensen Ranch 18-3 and $66,250 for Christensen Ranch DW No. 1 from the Bank of Montreal, Chicago, Illinois. This Letter of Credit or replacement financial instruments shall be maintained as long as these wells are covered under this permit.

The financial responsibility amount shall be increased by 3% each calendar year. Annual financial responsibility document updates shall be submitted to the Administrator no later than February 14 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)). The following special conditions are established for this permit:

- None

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:

a. The authorization is made in writing by one of the prescribed principals;
b. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity; and
c. 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. 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 should 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 should 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 be approved by the Director and 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, nor 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. WDEQ recommends that permittees 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:
USDW – underground source of drinking water (Classes I, II, III, IV(a), Special(A))
USEPA – United States Environmental Protection Agency
WDEQ – Wyoming Department of Environmental Quality
WQD – Water Quality Division of WDEQ
WQRR – WDEQ Water Quality Rules and Regulations

STATEMENT OF BASIS FOR A UIC PERMIT

I. General information.

A. UIC Permit Number: **10-219**

B. Facilities Covered: Uranium One USA, Inc., Christensen Ranch 18-3, Christensen Ranch DW No. 1, Christensen Ranch DW No. 2, and Christensen Ranch DW No. 3

C. Class of Facility: Class I Non-Hazardous (Wyoming Water Quality Rules and Regulations, Chapter 13)

II. Application reviewed for compliance with the following regulations. (Indicate yes or no for each section).

A.	Chapter 8	Yes	D.	Chapter 12	No
B.	Chapter 9	No	E.	Chapter 13	Yes
C.	Chapter 11	Yes	F.	Chapter 16	No

III. Basis for issuing a permit (Indicate yes or no for each section).

A. Review of application package indicates proposed facility will be in compliance with applicable regulations identified in Section II.

Yes

B. Permit based on deviation from applicable regulations in accordance with approved policy statement.

No

IV. Facilities not specifically covered by regulations. (Indicate the section number of the regulations and briefly summarize the regulation).

Not Applicable

Applicable. A groundwater review has been conducted to insure that no groundwater will be impacted by this system.

V. Documentation of Statement of Basis.

A. This Statement of Basis replaces any previous Statement of Basis for permit application 10-219. Additionally any previous Wyoming Department of Environmental Quality correspondence to EPA for permit application 10-219 describing proposed aquifer exemption (cylindrical) areas is rescinded.

B. This Statement of Basis replicates the original Wyoming Department of Environmental Quality Class VI ground water classification determination as originally presented and approved in Permit 00-340.

C. This Statement of Basis serves notice that permit application 10-219 is a renewal of permit 00-340 and all EPA aquifer exemption areas previously approved remain in effect and unchanged both laterally and vertically.

D. This Statement of Basis modifies the draft permit to reflect previous EPA aquifer exemption approvals as published in the Federal Register as follows:

1. **Federal Register/Vol 64. No. 58/Friday, March 26, 1999 (Effective April 26, 1999)** Final Rule – State program revision: aquifer exemption approval.

2. **Federal Register/Vol 67. No. 140/Monday, July 22, 2002 (Effective August 21, 2002)** Final Rule – State program revision: aquifer exemption approval.

E. The archive file for this permit will include adequate documentation of all sections of this Statement of Basis.

VI. Applicant and Public Participation.

A. The applicant has been provided with a draft permit prior to the permit being issued.

B. A Public Notice was published in the Gillette News Record on November 10, 2010 with a 30 day notice as required by Wyoming Water Quality Rules and Regulations, Chapter 13. No comments from the public were received.

Certification.

The issuance of this permit is based upon a review of the application package submitted in accordance with the requirements of Wyoming Water Quality Rules and Regulations, Chapter 13, Section 5. This review was performed by John A. Passehl, P.G., UIC Geology Supervisor, and completed on July 31, 2012. Permit issuance is recommended based upon statements, representations, and procedures presented in the permit application and supporting documents, permit conditions, and the items identified in this "Statement of Basis".

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
(X) Modified
County: Johnson

Permit Number: **10-219**
Previous: 00-340, 97-407, 95-241, 88-545
UIC Facility Number: WYS-019-0011

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, Ch. 250, Section 1) and Wyoming Water Quality Rules and Regulations (WQRR) Chapter 13.

Applicant:

Uranium One USA, Inc.
907 N. Poplar Street, Suite 260
Casper, WY 82601
(307) 234-8235

Uranium One USA, Inc., hereafter referred as the permittee, is authorized to continue to operate Christensen Ranch 18-3 and Christensen Ranch DW No. 1 and to drill, complete, and operate the proposed wells Christensen Ranch DW No. 2 and Christensen Ranch DW No. 3 according to the procedures and conditions of application 10-219 and to the requirements and other conditions of this permit. Issuance of a permit for a proposed well 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 does not comply with all the terms and conditions of this permit (Chapter 13, Section 8(e)).

This permit replaces permit 00-340 which becomes void on the date of issuance of this permit.

The names Christensen Ranch 18-3, Christensen Ranch DW No. 1, Christensen Ranch DW No. 2, and Christensen Ranch DW No. 3 replace the previous names for the same wells: Christensen 18-3, Cogema DW No. 1, Cogema DW No. 2, and Cogema DW No. 3, respectively.

This is an area permit for four wells of the Christensen Ranch Disposal Wellfield.

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.

8/7/12

John Wagner, Administrator
Water Quality Division
Herschler Building 4-W, 122 West 25th Street
Cheyenne, WY 82002
(307)-777-7781

Date

8/7/12

John V. Corra, Director
Department of Environmental Quality
Herschler Building 4-W, 122 West 25th Street
Cheyenne, WY 82002

Date

JP/rm/12-0721

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A. Discharge Zones

The disposal wells are authorized to inject into the Lance Formation within the intervals specified in **Table 1:**

Table 1. Discharge Zones

Well Name	Surface Elevation (feet msl)	Depth to Top of Discharge Zone (feet)	Depth to Bottom of Discharge Zone (feet)	Gross Discharge Zone Thickness (feet)	Well Depth (feet)
Christensen Ranch18-3	4,800	4,009	6,496	2,487	6,566
Christensen Ranch DW No. 1	4,674	3,818	6,320	2,502	6,721
Christensen Ranch DW No. 2 (proposed)	4,660	3,800	6,500	2,700	6,500
Christensen Ranch DW No. 3 (proposed)	4,720	3,800	6,500	2,700	6,500

Perforations in the proposed wells shall be restricted to the Lance Formation. Perforations above or below the discharge intervals identified in **Table 1** require the prior written approval of the Administrator.

The shales within the Lance and Lower Fort Union Formations form the confining layer above the receiver and the shales within the lower Lance Formation form the confining layer below the Lance receiver.

B. Wells and Areas of Review

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

Table 2. Well Location(s)

Well Name	Legal Description	Latitude	Longitude
Christensen Ranch 18-3	NE ¼ NW ¼ Section 18, T44N,R76W	43.79371	-106.04051
Christensen Ranch DW No. 1	SE ¼ NW ¼ Section 7, T44N, R76W	43.80339	-106.01018
Christensen Ranch DW No. 2 (proposed)	SE ¼ NE ¼ Section 7, T44N, R76W	43.80397	-106.03239
Christensen Ranch DW No. 3 (proposed)	SW ¼ SW ¼ Section 5, T44N, R76W	43.81236	-106.02295

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

Table 3. Legal Description(s) of the Area(s) of Review

Well Name	Quarter-Quarters	Section	Township
Christensen Ranch18-3	SWSW, SESW, SWSE	7	T44N, R76W
	NWNE, SWNE, all NW	18	T44N, R76W
Christensen Ranch DW No. 1	NWNE, SWNE, all NW, NWSW, NESW, NWSE	7	T44N, R76W
Christensen Ranch DW No. 2 (proposed)	NESE, NWSE, all NE	7	T44N, R76W
	SWNW, NWSW	8	T44N, R76W
Christensen Ranch DW No. 3 (proposed)	all SW	5	T44N, R76W
	NENW, NWNW	8	T44N, R76W

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

AOR Method	Christensen Ranch 18-3	Christensen Ranch DW No. 1	Christensen Ranch DW No. 2 (proposed)	Christensen Ranch DW No. 3 (proposed)
Radius of Pure Waste Cylinder (ft)	401	443	354	354
Radius of Cone of Influence (ft)	558	850	867	867
Minimum Radius of Area of Review (ft)	1,320	1,320	1,320	1,320

In order to calculate the radius of pure waste cylinders for each well, historical injection records and proposed injection rates were evaluated. Operating reports submitted to DEQ indicate that injection did not take place from approximately June 2005 through 2011. To account for historical injection in Christensen Ranch 18-3 of approximately 4,200,000 bbl, the effects of pumping at a rate of 2,212 bbl/day from April 2, 2000 to May 30, 2005 were added to those of pumping at a rate of 2,571 bbl/day for an additional ten (10) year permit duration. To account for historical injection in Christensen Ranch DW No. 1 of approximately 5,300,000 bbl, the effects of pumping at a rate of 2,285 bbl/day from April 1, 2000 to August 30, 2005 were added to those of pumping at a rate of 2,571 bbl/day for an additional ten (10) year permit duration. For the proposed wells (Christensen Ranch DW No. 2 and DW No. 3), an average injection rate of 2,571 bbl/day and a permit duration of ten (10) years were assumed.

There are no existing wells that penetrate either the confining formations or receiving formations for all wells identified in **Table 4** (within the 1,320 foot areas of review).

C. Groundwater Classification

The groundwater within the Lance Formation (specified in **Table 4**) is classified as Class VI under Chapter 8 of Wyoming Water Quality Rules and Regulations. This classification was made because:

- The groundwater in the Lance Formation contains between 1,400 and 2,460 mg/L of total dissolved solids. The groundwater in the Lance Formation contains as much as 6,900 mg/L of benzene, 18.9 mg/L of oil and grease, 27.8 mg/L of iron, 1.04 mg/L of boron, 14.1 mg/L of zinc, 0.004 mg/L of mercury, and 0.33 mg/L of total phenolics. The benzene content of this groundwater at baseline exceeds the limits set by the Resource Conservation and Recovery Act for characteristic Hazardous Waste.

- This formation naturally contains traces of oil and gas and cannot reasonably be expected to provide a source of drinking water at this location.

This groundwater classification remains consistent with previous permit 00-340.

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 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 - Each well is allowed the maximum instantaneous injection rate shown in **Table 5** provided that the surface pressure limitations are not exceeded. The permittee shall set an alarm or kill switch to prevent injection above the permitted rate.

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)). Permit limits for the existing wells and temporary limits for the proposed wells are listed in **Table 5**. For the proposed wells the temporary limit cited will apply until recalculation of the parameters in **Table 5** 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 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 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 presssure gauges or transducers. The down hole device shall be placed within one hundred vertical feet of the packer. For a conclusive result, at least three of the injection rate steps below the fracture threshold will be colinear. 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. Step-rate data, analyses, and interpretations shall be submitted to the Administrator within thirty (30) days of completion of the test or with the next quarterly report, 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 permissible during startup and shutdown. The permittee shall set alarms or use daily observations to detect increases or decreases in annulus pressure and shall cease injection and shut the well in if a pressure change indicates the possibility of a loss of mechanical integrity. Interpretations of pressure changes 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)

	Christensen Ranch18-3	Christensen Ranch DW No. 1	Christensen Ranch DW No. 2 (proposed)	Christensen Ranch DW No. 3 (proposed)
Maximum Annulus Pressure (psig)	800	800	800	800
Minimum Annulus Pressure (psig)	200	200	200	200
Injection Rate at Fracture, R_f (bbl/day)	4,133 (a)	4,133	(e)	(e)
Maximum Injection Rate (bbl/day) $R_m = 0.9 \cdot R_f$	3,720	3,720	3,720 (d)	3,720 (d)
Depth to Gauge or Top of Perforations, D_p (ft)	3,998 (a)	3,808	3,821	3,821
Fracture Pressure, P_f (psig) $P_f = F \cdot D_p$	2,799 (a)	2,666	2,675 (b)	2,675 (b)
Fracture Gradient, (psi/ft) $F = P_f/D_p$	0.7 (a)	0.7	0.7 (b)	0.7 (b)
Temperature in Tubing (°F)	70	70	70	70
Maximum Total Dissolved Solids of Injectate (mg/L)	20,000	20,000	20,000	20,000
Density of Injectate, ρ_j (g/cm^3)	1.001	1.001	1.001	1.001
Injectate Fluid Gradient (psi/ft) $grad_j = \rho_j \cdot 12\frac{in}{ft} \cdot 16.387\frac{cm^3}{in^3}/453.592\ \frac{g}{lb}$	0.433	0.433	0.433	0.433
Hydrostatic Pressure (psi) $P_h = D_p \cdot grad_j$	1,733	1,651	1,656	1,656
Tubing Friction Loss Factor, T (psi/1000 ft)	21	2	21	21
Pressure Loss Due to Tubing Friction (psi) $P_L = T \cdot D_p/1000$	84	8	80	80
$MSIP = P_f - P_h + P_L$ (psig)	1,150	1,023	1099	1099
$LSIP = 0.9 \cdot MSIP$ (psig)	1,035	921	989 (c)	989 (c)

(a) Formation didn't fracture during test; data for Christensen Ranch DW No. 1 applies.
(b) Calculated from the assumed fracture gradient.
(c) 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 year of permit issuance, a step-rate injection test is required before waste injection.
(d) Estimated maximum injection rates until fracture gradient is determined after wells are completed.
(e) To be determined.

Permitted Wastes - Wastes to be injected are described as follows:

- Liquid waste generated by uranium mining using in-situ leaching at the Christensen Ranch and Irigaray Ranch mine facilities (as defined in the Land Quality Division Permit to Mine No. 478) 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, and

- Fluids produced during the drilling, completion, testing, or stimulation of wells or test holes related to mining operations at the Christensen Ranch and Irigaray Ranch 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 waste disposal 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 for new wells. Permission to discharge other non-hazardous waste may be authorized through a minor permit modification (Chapter 13, Section 8(d)(v)). Additional monitoring may be required for additional waste types.

The 2nd Quarter 2012 quarterly composite concentrations for selected chemical species in the waste are listed in **Table 6**.

Table 6. Water Quality of the Discharge

	Units	Concentration
Alkalinity	mg/L	618
pH	s.u.	8.1
Total Dissolved Solids (TDS)	mg/L	5,980
Uranium	mg/L	4.6
^{226}Radium	pCi/L	547

Permitted Corrosion Inhibitors, Anti-Scalants, and Biocides - Corrosion inhibitors, anti-scalants, and biocides may be added to the waste stream with the prior written approval of the Administrator.

New Well Construction - The permittee shall obtain written acceptance of financial assurance from WDEQ prior to construction of each 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 web site - 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 have 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 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, except that portion of a hole within 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, except in that portion of the space within 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 this 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 the facility 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 aquifers (Chapter 13, Section 13(a)(ii)).

I. Monitoring Requirements

1. 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 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.

2. 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.

3. For any new well or newly perforated zone within an existing well, the permittee shall collect a baseline groundwater quality sample from each aquifer within the new discharge zone (Chapter 13, Section 13(a)) and submit results for all the analytes and parameters in WDEQ-WQRR Chapter 8, Table 1 prior to waste injection. The methods and procedures for sample collection and analysis must be approved by the Water Quality Division prior to sampling.

4. For any new well, the permittee shall collect at least two (2) measurements of hydraulic head (or fluid density and pressure) within the lower Wasatch aquifer above the upper confining zone.

5. If the permittee determines that the authorized discharge zones within members and/or formations identified in Section A of this permit are inadequate, then a permit modification will be required. The permit modification request shall be supported by data approved by the Administrator.

6. Operational Monitoring (Chapter 13, Section 13(b)(ii)):

Injection Pressure - The permittee shall measure 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 measure the injection rate and volume continuously and record both on a strip chart recorder, circular chart recorder, or electronically (Chapter 13, Section 13(i)).

Annulus Pressure - The permittee shall measure the pressure of the casing - tubing annulus continuously 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 completed 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 transmissivity. Tests shall be analyzed by the permittee using commonly accepted methods to obtain transmissivity, permeability, 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 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 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.

Radius of Influence - The results of each pressure fall-off test shall be used to update the radius 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 radius of influence and all wells which penetrate the confining zone within the old and new radii of influence.

If the updated radius 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 radius 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 ≤ B", Chapter 13, Section 5(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 or the permittee shall use a suitable alternative to evaluate the cone of influence calculation. If any calculated time for intersection of the cone of influence with a well (not meeting requirements) 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)).

Radius of influence calculations, figures, and interpretations 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 measure 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 well and include any anti-scalants, biocides, or other additives. If any group of wells receives waste from the same pipe exiting the uranium processing plant, 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 determined quarterly. WQD may approve alternate methods to those listed 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 parameters in **Table 7** shall be measured at the sample site(s) unless other methods are approved by the Administrator. The other analyses shall be performed by an EPA-certified laboratory.

Table 7. Analyte and Parameter List for Quarterly Analyses of Injectate

EPA Analytical Method	Analyte or Parameter	CAS Number
SM2550 B	Temperature	None
120.1 or SM2510 B	Specific Conductance at 25 C	None
SM4500-H^+ B	pH	None
none listed	Specific Gravity	None
160.1 or SM2540 C	Total Dissolved Solids	None
SM2320 B	Bicarbonate	71-52-3
SM2320 B	Carbonate	3812-32-6
300.0 or 300.1	Chloride, Total	16887-00-6
300.0, 300.1, or 375.2	Sulfate, Total	14808-79-8
SM4500-S2-D, SM4500-S2-G	Hydrogen Sulfide	7783-06-4
206.5, 200.7, or 200.8	Arsenic, Total	7440-38-2
200.7 or 200.8	Selenium, Total	7782-49-2

200.7 or 200.8	Vanadium, Total	7440-62-2
908.1 or 200.8	Uranium, Total	7440-61-1
903.1	^{226}Radium (picoCuries/liter)	7440-14-4

Note: Methods preceded by "SM" are standard methods.

Limiting Concentrations of Injectate - Analyte and parameter limits for this permit are listed in **Table 8**. The upper and lower control limits and concentrations of pH 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	Upper Control Limit
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 gage 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, except for pH, which is to be reported in standard units (s.u.) and except for radium, radioactive strontium isotopes, and gross alpha particle radioactivity, which are to be reported 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 waste 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 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 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 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 rates 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 pressures for comparison and the pressures at which any alarms or kill switches are activated.

   c. The total injection volume in barrels 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 15(c)(vi)). See also paragraph 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 as soon as practicable 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 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 (2) part test approved by the Administrator (Chapter 13, Section 9(d)(vii)). The two (2) parts shall be conducted no more than ninety (90) days 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 pressure tested to the maximum permitted surface injection pressure or 1,000 psig whichever is greater. A pressure change of less than 10% after thirty (30) minutes shall be considered a successful test.

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.

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 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.

If at any time injection occurs in any zone not within the discharge zone, a permit violation has occurred. The operator shall prepare an estimate of the volume and quality of all wastewaters which were injected outside of the discharge zone. In the case where any aquifer meeting the standards for Class I through IV(A) under Wyoming Water Quality Rules and Regulations, 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):
- 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 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 application or subsequently prescribed by the Administrator. Well plugging shall meet the requirements of Chapter 11, Section 65 for sealing the well annulus and of Chapter 11, Section 70(c) 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 (e.g., Title 40 Code of Federal Regulations Part 146.10)

As soon as practicable after plugging and abandonment of any well covered by this permit, the permittee shall submit a plugging and abandonment report describing all activities and detailing any deviations 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 thirty (30) days 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 to reclaim the surface facilities in a manner approved by the Administrator (Chapter 13, Section 17 (a)).

The obligation to maintain financial responsibility 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 permittee is required to maintain financial responsibility and resources in a form approved by the director, to close, plug and abandon the discharge operation, and reclaim the surface facilities in a manner prescribed by the director. The financial assurance consists of a Letter of Credit (BMCH278567OS) in the amount of $73,950 for Christensen Ranch 18-3 and $66,250 for Christensen Ranch DW No. 1 from the Bank of Montreal, Chicago, Illinois. This Letter of Credit or replacement financial instruments shall be maintained as long as these wells are covered under this permit.

The financial responsibility amount shall be increased by 3% each calendar year. Annual financial responsibility document updates shall be submitted to the Administrator no later than February 14 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)). The following special conditions are established for this permit:

- None

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:

a. The authorization is made in writing by one of the prescribed principals;
b. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity; and
c. 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. 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 should 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 should 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 be approved by the Director and 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, nor 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. WDEQ recommends that permittees 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:
USDW – underground source of drinking water (Classes I, II, III, IV(a), Special(A))
USEPA – United States Environmental Protection Agency
WDEQ – Wyoming Department of Environmental Quality
WQD – Water Quality Division of WDEQ
WQRR – WDEQ Water Quality Rules and Regulations

STATEMENT OF BASIS FOR A UIC PERMIT

I. General information.

A. UIC Permit Number: **10-219**

B. Facilities Covered: Uranium One USA, Inc., Christensen Ranch 18-3, Christensen Ranch DW No. 1, Christensen Ranch DW No. 2, and Christensen Ranch DW No. 3

C. Class of Facility: Class I Non-Hazardous (Wyoming Water Quality Rules and Regulations, Chapter 13)

II. Application reviewed for compliance with the following regulations. (Indicate yes or no for each section).

A.	Chapter 8	Yes	D.	Chapter 12	No
B.	Chapter 9	No	E.	Chapter 13	Yes
C.	Chapter 11	Yes	F.	Chapter 16	No

III. Basis for issuing a permit (Indicate yes or no for each section).

A. Review of application package indicates proposed facility will be in compliance with applicable regulations identified in Section II.

Yes

B. Permit based on deviation from applicable regulations in accordance with approved policy statement.

No

IV. Facilities not specifically covered by regulations. (Indicate the section number of the regulations and briefly summarize the regulation).

Not Applicable

Applicable. A groundwater review has been conducted to insure that no groundwater will be impacted by this system.

V. Documentation of Statement of Basis.

A. This Statement of Basis replaces any previous Statement of Basis for permit application 10-219. Additionally any previous Wyoming Department of Environmental Quality correspondence to EPA for permit application 10-219 describing proposed aquifer exemption (cylindrical) areas is rescinded.

B. This Statement of Basis replicates the original Wyoming Department of Environmental Quality Class VI ground water classification determination as originally presented and approved in Permit 00-340.

C. This Statement of Basis serves notice that permit application 10-219 is a renewal of permit 00-340 and all EPA aquifer exemption areas previously approved remain in effect and unchanged both laterally and vertically.

D. This Statement of Basis modifies the draft permit to reflect previous EPA aquifer exemption approvals as published in the Federal Register as follows:

1. **Federal Register/Vol 64. No. 58/Friday, March 26, 1999 (Effective April 26, 1999)** Final Rule – State program revision: aquifer exemption approval.

2. **Federal Register/Vol 67. No. 140/Monday, July 22, 2002 (Effective August 21, 2002)** Final Rule – State program revision: aquifer exemption approval.

E. The archive file for this permit will include adequate documentation of all sections of this Statement of Basis.

VI. Applicant and Public Participation.

A. The applicant has been provided with a draft permit prior to the permit being issued.

B. A Public Notice was published in the Gillette News Record on November 10, 2010 with a 30 day notice as required by Wyoming Water Quality Rules and Regulations, Chapter 13. No comments from the public were received.

Certification.

The issuance of this permit is based upon a review of the application package submitted in accordance with the requirements of Wyoming Water Quality Rules and Regulations, Chapter 13, Section 5. This review was performed by John A. Passehl, P.G., UIC Geology Supervisor, and completed on July 31, 2012. Permit issuance is recommended based upon statements, representations, and procedures presented in the permit application and supporting documents, permit conditions, and the items identified in this "Statement of Basis".