

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL**

DRAFT Permit

PREPARED: September 12, 2013

Permit No. UT22195-00000

Class II-R Area Injection Well Permit for

**The Portion of Brundage Canyon Located on
The Uintah and Ouray Indian Reservation, Utah**

Issued To

Berry Petroleum Company
1999 Broadway, Suite 3700
Denver, CO 80202

PART 1. AUTHORIZATION TO CONSTRUCT AND OPERATE

Under the authority of the Safe Drinking Water Act (SDWA) and Underground Injection Control (UIC) Program regulations of the U. S. Environmental Protection Agency (EPA), codified at Title 40 of the Code of Federal Regulations (40 CFR) Parts 2, 124, 144, 146, and 147, and according to the terms of this Permit, Berry Petroleum Company (Berry or Permittee) is authorized to construct and operate Class II-R injection wells according to the terms and conditions of this Permit in the portion of Brundage Canyon within the Uintah and Ouray Indian Reservation further described as and henceforth referred to as the Authorized Permit Area:

T5S, R4W Sections 5, 9, 10, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, 28, 30, 31, 32, 33, and 34; T5S, R5W Sections 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36 (S.L.B. & M.), Duchesne County, Utah.

The following areas are excluded from the area permit as they are not in Indian country:

Township 5 S, Range 4 W:

Section 10, S $\frac{1}{2}$ of SW $\frac{1}{4}$, NW $\frac{1}{4}$ of SW $\frac{1}{4}$, SW $\frac{1}{4}$ of SE $\frac{1}{4}$.

Township 5 S, Range 5 W:

Section 12, E $\frac{1}{2}$ of SE $\frac{1}{4}$

Section 16, NW $\frac{1}{4}$

Section 33, E $\frac{1}{2}$ of SE $\frac{1}{4}$

Section 34, S $\frac{1}{2}$ of NW $\frac{1}{4}$, NE $\frac{1}{4}$ of NW $\frac{1}{4}$, NW $\frac{1}{4}$ of NE $\frac{1}{4}$, NW $\frac{1}{4}$ of SW $\frac{1}{4}$.

Where a state or tribe is not authorized to administer the UIC program under the SDWA, the EPA regulates underground injection of fluids into wells so that injection does not endanger Underground Sources of Drinking Water (USDWs). EPA UIC permit conditions are based on authorities set forth at 40 CFR parts 144 and 146, and address potential impacts to USDWs. Under 40 CFR part 144, subpart D, certain conditions apply to all UIC permits and may be incorporated either expressly or by reference. This permit does not authorize any new land disturbance that has not been approved by the U.S. Bureau of Indian Affairs. Issuance of this permit does not convey property rights of any sort or any exclusive privilege, nor does it authorize injury to persons or property or invasion of other private rights, or any infringement of other Federal, State, or local laws or regulations (40 CFR § 144.35). An EPA Class II UIC permit may be issued for the operating life of the injection well or project. However, it will be reviewed at least once every five years to determine if action is required under 40 CFR § 144.36(a).

This Permit is issued for the life of the well(s) unless modified, revoked and reissued, or terminated pursuant to 40 CFR §144.33(d) or 144.40. This EPA Permit may be adopted, modified, revoked and reissued or terminated if primary enforcement authority for a UIC Program is transferred to an Indian tribe or state. Upon the effective date of program authorization, reports, notifications, questions and other correspondence should be directed to the primacy agency.

Issue Date: _____

Effective Date: _____

Derrith R. Watchman-Moore
Assistant Regional Administrator *
Office of Partnerships and Regulatory Assistance

*NOTE: Throughout this Permit the term “Director” refers to either the Assistant Regional Administrator for the Office of Partnerships and Regulatory Assistance (OPRA) or the Assistant Regional Administrator of Environmental Compliance, Enforcement and Justice (ECEJ).

PART 2. TRANSFER OF EXISTING CLASS II-R UIC PERMITS

Upon issuance of Final Area UIC Permit UT22195-00000, all existing Class II-R UIC permits issued to the Permittee for wells within the Authorized Permit Area are revoked and authorization for those wells will be issued under UIC Permit UT22195-00000. The first five numeric characters of each previously issued permit number will change to “22195” denoting authorization under Area UIC Permit UT22195-00000. The last five digits of previously issued permit numbers, referred to as the “well ID,” will remain the same.

PART 3. QUARTERLY REPORTING REQUIREMENTS

1. The Permittee shall notify the Director quarterly of all newly drilled oil-gas wells within the Authorized Permit Area and within a ¼-mile of the Authorized Permit Area, including wells with surface location beyond ¼-mile that penetrate the Confining Zone within the ¼-mile radius of the Authorized Permit Area. Such notice should be mailed to:

USEPA Region 8
UIC Permit Coordinator (8P-W-UIC)
1595 Wynkoop Street
Denver, Colorado 80202

The quarterly due dates for this information shall be the first weekday (Monday-Friday) that is not a federal holiday of the following months: January, April, July and October. Such notification shall include:

- a. a list of all newly drilled wells including their names, API numbers, location, ownership, purpose (for example, oil production, gas production, etc.) and the Permittee’s determination of whether that well is located within the Authorized Permit Area or within ¼-mile of the Authorized Permit Area;
 - b. a well bore schematic diagram for each newly drilled production well; and
 - c. a cement bond log for each newly drilled production well showing the presence or absence of cement behind the outermost casing string across the designated Confining Zone for Area UIC Permit UT22195-00000.
 - d. An updated map of the Authorized Permit Area showing the surface location and down hole location of all wells.
2. The Permittee shall submit a quarterly update of its financial responsibility demonstration to the following:

UIC Financial Responsibility Coordinator (8ENF-UFO)
1595 Wynkoop Street
Denver, CO 80202

The quarterly due dates for this information shall be the first weekday (Monday - Friday) that is not a Federal holiday of the following months: January, April, July and October. The quarterly update shall include:

- a. the total number, names and API numbers of injection wells added in the previous quarter;
- b. the total number, names and API numbers of injection wells to be added in the next quarter; AND
- c. an approved instrument increasing the amount of the financial responsibility demonstration and a revised Schedule A if any wells to be added in the next quarter are not currently covered.

PART 4. REQUIREMENTS FOR ADDING INJECTION WELLS TO AREA UIC PERMIT UT22195-00000

The Permittee shall not construct injection wells or commence injection into wells until Permittee has been approved to do so in accordance with the following procedures:

1. **Authorization to Construct:** Area UIC Permit UT22195-00000 authorizes the conversion of existing production wells to injection wells only in accordance with this process. Prior to converting an existing production well to an injection well, the Permittee shall submit the following materials to the UIC Permit Coordinator:
 - a. a cover letter requesting authorization to convert the well referencing Area UIC Permit UT22195-00000 and the name and API number of the well;
 - b. a completed EPA 7520 injection well application form;
 - c. a wellbore diagram of the proposed injection well;
 - d. evidence and/or a written statement that water feed lines have been installed to the requested well and that the Permittee has the ability and intention to convert the production well to an injection well within 90 calendar days of receiving EPA authorization;
 - e. a laboratory analysis of formation fluid produced from the subject well(s) or a statement in the cover letter explaining that the water sample will be obtained during well construction and submitted with well construction materials under Part 4, paragraph 2(f) of this Permit;
 - f. a topographic map extending to at least ¼-mile radius Area of Review (AOR) for the well;
 - g. a listing of all wells penetrating the Confining Zone within the ¼-mile AOR and cementing records, including Cement Bond Logs, for any new wells within the ¼-mile AOR not previously evaluated by the EPA;
 - h. a well location plat map for the requested injection well.

EPA will review these materials to ensure that Permit conditions were complied with during well construction and that planned operating parameters are in full compliance with Area UIC Permit UT22195-00000. EPA will authorize injection by email or other written correspondence when it is satisfied that all permit conditions have been met. Following EPA authorization to inject, the injection authorization date will be recorded in the List of Wells, which is described below in Part 5.

2. **Injection Well Construction:** Area UIC Permit UT22195-00000 authorizes the Permittee to construct and test wells only in accordance with the terms and conditions of

this Permit. The Permittee shall construct a requested injection well within 90 calendar days of the EPA construction authorization date and shall notify the Director of the construction of an injection well as soon as possible but no later than 30 calendar days after the date that tubing and packer are set. Notification of well construction shall include:

- a. a cover letter referencing Area UIC Permit UT22195-00000 and the name and API number of the constructed injection well;
- b. an updated well bore schematic diagram;
- c. the results of a standard annulus pressure test and a statement of how mechanical integrity has been demonstrated according to Part 8 of this permit;
- d. a calculation of the injection zone pore pressure based on: 1) the measured hydrostatic head in the well bore; or 2) an estimate of the pore pressure of the Garden Gulch or Douglas Creek Members of the Green River Formation incorporating best available analog well data or other available information and including a short narrative description and calculations used to determine the estimate, whichever is more appropriate;
- e. the Maximum Allowable Injection Pressure (MAIP) calculated for the well including the calculation used to determine the MAIP according to Part 11 of this Permit; and
- f. if not already submitted under Part 4, paragraph 1(e) of this Permit, a laboratory analysis of formation fluid produced from the subject well(s).

EPA will review these materials to ensure that Permit conditions were complied with during well construction and that planned operating parameters are in full compliance with Area UIC Permit UT22195-00000. If EPA is satisfied that all Permit conditions have been met, EPA Region 8 will authorize injection by email or by another means of written correspondence. In addition, the injection authorization date will be recorded in the LW, which is described below in Part 5.

3. **Commencement of Injection:** Initial injection shall commence no later than 90 calendar days following the EPA injection authorization. The Permittee shall notify the Director as soon as possible but no more than 30 calendar days after placing the well on injection. Such notification shall include:

- a. a statement of the date the well was put on injection;
- b. a statement of the MAIP for the well; and
- c. a statement of any required injection logs or tests that will be conducted, as indicated in the LW for that well (for example, radioactive tracer survey or temperature log).

All injection logs or tests required by Part 8, 3(b) of this permit and referenced above in Part 4, 3(c), shall be completed within 180 calendar days of commencement of injection unless the Permittee requests and EPA provides written notification of an extension approval. Once EPA has reviewed and approved the log or test, and is satisfied that all permit conditions have been met, EPA Region 8 will provide written notification of approval to Permittee by email or other correspondence.

PART 5. LIST OF WELLS (LW) FOR AREA UIC PERMIT UT22195-00000

Due to the large scope of Area UIC Permit UT22195, the EPA intends to record information related to this permit in a document called the LW. The LW is intended to serve the administrative functions of organizing and communicating oil-gas well data, EPA requirements and EPA authorizations related to Area UIC Permit UT22195-00000 for the Permittee. Injection wells regulated by EPA and subject to the terms and conditions of this Permit are listed in the LW with EPA Permit number UT22195 and are assigned a unique well identification number by EPA.

PART 6. DRILLING OF INJECTION WELLS

The drilling of injection wells is currently not authorized under this permit. The Permittee shall notify the Director at such time the Permittee wishes to drill an injection well and request a permit modification to Area UIC Permit UT22195. Any such permit modification will require compliance with the process at 40 CFR section 144.39, including public notice and comment.

PART 7. INJECTION WELL CONSTRUCTION REQUIREMENTS

These requirements represent the approved minimum construction standards for well casing and cement, well head configuration, injection tubing and packer. Deviation from the approved construction standards without prior approval from the Director is prohibited.

1. **Casing and Cement:** Injection wells shall be cased and cemented to prevent the movement of fluids into or between USDWs. The well casing and cement shall be designed for the life expectancy of the well. Remedial cementing may be required if shown to be inadequate by cement bond log or other attempted demonstration of Part II (external) mechanical integrity.
 - a. For any production well added to the permit as an injection well where the depth of the USDW is derived from either the US Geological Survey Publication 92 or the Utah Geological Survey Special Study 144 and is shown to go very deep as is the case within Brundage Canyon, the BLM allows operators to set the surface casing at any reasonable depth and requires that the cement for the production casing overlap the surface casing shoe by at least 200 feet. This requirement will continue to be met for wells converted from production to injection. Wells with shallower USDW depths should continue to meet the BLM requirements by setting the surface casing to at least 50 feet below the lowermost USDW.
 - b. Long string casing shall be adequately cemented to at least above the base of the Confining Zone or a regular Part II (external) mechanical integrity demonstration by an approved Part II testing method is required. The depth of top of cement shall be demonstrated by cement bond log and is subject to approval by the Director.
 - c. The Permittee shall not perforate uncemented intervals of long string casing in any

injection well except to squeeze cement as required to meet the conditions of this Permit.

2. **Injection Tubing and Packer:** Injection tubing and packer are required on all injection wells authorized under Area UIC Permit UT22195-00000. The packer shall be set within 100 feet above the shallowest open perforation.
3. **Sampling and Monitoring Devices on the Well Head:** The Permittee shall install and maintain in good operating condition:
 - a. a "tap" at a conveniently accessible location on the injection flow line between the pump house or storage tanks and the injection well, isolated by shut-off valves, for collection of representative samples of the injected fluid; and
 - b. a one-half (1/2) inch female iron pipe fitting, isolated by shut-off valves and located at the wellhead at a conveniently accessible location, for the attachment of a pressure gauge capable of monitoring pressures ranging from normal operating pressures up to the Maximum Allowable Injection Pressure:
 - (1) on the injection tubing;
 - (2) on the Tubing-Casing Annulus (TCA).
 - c. a pressure actuated shut-off device attached to the injection flow line set to shut-off the injection pump when or before the Maximum Allowable Injection Pressure (MAIP) is reached at the wellhead in the injection tubing strings; and
 - d. a non-resettable cumulative volume recorder attached to the injection line.

PART 8. MECHANICAL INTEGRITY OF INJECTION WELLS

The Permittee shall maintain the mechanical integrity of all injection wells under Area UIC Permit UT22197-00000 at all times and as specified by the EPA. Injecting into a well that lacks mechanical integrity is prohibited.

1. **Definition of Mechanical Integrity:** An injection well has mechanical integrity if:
 - a. there is no significant leak in the casing, tubing, or packer (Part I); and
 - b. there is no significant fluid movement into a USDW through vertical channels adjacent to the injection well bore (Part II).
2. **Mechanical Integrity Demonstration Requirements:** The Permittee shall demonstrate mechanical integrity prior to, or within 180 days following commencement of injection and periodically thereafter as described in Part 8, 3(a) and 3(b) below or as required the Director. The Director may require additional or alternative tests if the results presented by the operator are not satisfactory to the Director to demonstrate mechanical integrity. Results of mechanical integrity tests shall be submitted to the Director as soon as possible but no more than 30 calendar days after the test is complete.

3. **Approved Methods for Demonstrating Mechanical Integrity:**

- a. Part I (Internal) mechanical integrity shall be demonstrated prior to commencement of injection and this demonstration shall be repeated no less than once every five years after the last demonstration. Any injection well requiring the use of Angard or any other annulus plugging gel or corrective measure to pass a Part I mechanical integrity test shall have a Part I mechanical integrity demonstration conducted no less than once every 365 calendar days. Part I mechanical integrity shall be demonstrated by a standard annulus pressure test or other method approved by the Director.
- b. Part II (External) mechanical integrity shall be demonstrated by:
 - (1) a Cement Bond Log (CBL) that the Director determines to show a sufficient interval of 80 percent cement bond index compressive strength or greater within the designated Confining Zone; OR
 - (2) a Radioactive Tracer Survey (RTS) showing the absence of fluid movement through vertical channels adjacent to the well bore at or near the shallowest perforation accepting fluid, to be repeated at a frequency not to exceed five years after the last RTS showing the absence of fluid movement through vertical channels adjacent to the wellbore at or near the shallowest perforations accepting fluid. The RTS shall supplement a CBL on file with the EPA showing top of cement above the base of the designated Confining Zone but an insufficient interval of 80 percent cement bond index compressive strength or greater through the designated Confining Zone.; OR
 - (3) other approved Part II mechanical integrity demonstration method including a temperature log, oxygen activation log, or noise log that shall be repeated no less than once every five years.
- c. EPA approved methods shall be used to demonstrate mechanical integrity. EPA Region 8¹ Ground Water Section Guidance No. 34 "Cement Bond Logging Techniques and Interpretation", Ground Water Section Guidance No. 37, "Demonstrating Part II (External) Mechanical Integrity for a Class II injection well permit", and Ground Water Section Guidance No. 39, "Pressure Testing Injection Wells for Part I (Internal) Mechanical Integrity" as well as guidelines for conducting radioactive tracer surveys are available online at http://www.epa.gov/region8/water/uic/deep_injection.html or copies will be provided upon request.

4. **Notification of Mechanical Integrity Testing:** Prior notification of mechanical integrity testing is not required under Area UIC Permit UT22195-00000. It is the Permittee's responsibility to ensure that mechanical integrity demonstration on all wells is conducted in accordance with Area UIC Permit UT22195-00000 and that all mechanical integrity

¹ EPA headquarters in Washington, D.C. issues national UIC Guidance documents with numbers that do not correspond to EPA Region 8 UIC Guidance documents. These may be found at <http://water.epa.gov/type/groundwater/uic/guidance.cfm>

test results are submitted to the Director as soon as possible but no more than 30 calendar days from completion.

5. **Loss of Mechanical Integrity:** If the Permittee fails to demonstrate mechanical integrity during a test or a loss of mechanical integrity becomes evident during operation (such as presence of abnormal² pressure in the Tubing-Casing Annulus (TCA), water flowing at the surface, etc.), the Permittee shall notify the Director within 24 hours (see Part 22, Paragraph 11(e) of this Permit) and the well shall be shut-in within 48 hours unless the Director requires immediate shut-in. Within five calendar days of discovering the loss of mechanical integrity, the Permittee shall submit a written report that documents test results, repairs undertaken or a proposed remedial action plan. Injection operations shall not be resumed until after the well has successfully been repaired and demonstrated mechanical integrity and has received written notification from the Director.

PART 9. WELL LOGGING and TESTING REQUIREMENTS

The Permittee shall:

1. conduct all logs and tests according to current EPA approved procedures;
2. submit all logging and testing results to the Director for review within 30 calendar days of completion of the logging or testing activity; and
3. include with any data and test results, a report describing the methods used during logging or testing and an interpretation of the test or log results by a qualified log or test analyst; and
4. submit logs and test data for newly drilled production wells and all injection well conversions to the EPA's Office of Partnerships and Regulatory Assistance (OPRA) UIC Program and submit periodically required logs and test data on existing injection wells to the EPA's Region UIC Technical Enforcement (Enforcement) Program as described below:
 - a. Mail initial logs and tests for bringing new injection wells on line to:

UIC Permit Coordinator, 8P-W-UIC
1595 Wynkoop Street
Denver, CO 80202-1129

- b. Mail periodically required logs and tests on injection wells to:

UIC Enforcement Coordinator, 8ENF-UFO
1595 Wynkoop Street
Denver, CO 80202-1129

² Abnormal pressure on the tubing-casing annulus is 100 psig or 10 percent of the injection tubing pressure, whichever is less.

PART 10. REQUIREMENTS FOR OPERATING INJECTION WELLS

1. **Injection Zone:** An *injection zone* is a geological formation, group of formations, or part of a formation that receives fluids through a well. The Injection Zone for Area UIC Permit UT22195-00000 consists of the Garden Gulch member starting at the TGR3 Top and includes the Douglas Creek, Black Shale, Castle Peak and Uteland Butte members of the Green River Formation to the top of the Wasatch Formation. The Injection Zone is located between the depths of 3,517 and 5,872 feet in the Ute Tribal 8-27D-55 Type Gamma Log for the Brundage Canyon Field. For each well authorized by UT22195-00000, the Permittee is authorized to perforate casing and emplace fluids only within the stratigraphic interval designated as the Injection Zone.
2. **Confining Zone:** A *Confining Zone* is a geological formation, group of formations, or part of a formation that is capable of limiting fluid movement above an injection zone. The designated Confining Zone for Area UIC Permit UT22195-00000 is the local confining layer which consists of kerogen-rich dolomitic, calcareous, marlstone oil shale. The Confining Zone is found between the depths of 3,370 feet to 3,517 feet in the Ute Tribal 8-27D-55 Type Gamma Log for the Brundage Canyon Field. Lower confinement is the Wasatch Formation which lies at the base of the Green River Formation (bottom of the injection zone), and is approximately 150 feet thick.
3. **Injection Volume Limitation:** The volume of approved Class II fluids injected for the purpose of enhanced recovery is not limited by this Permit.
4. **Injection Fluid Limitation:** Area UIC Permit UT22197-00000 authorizes the injection of produced Green River Formation water commingled with water from the Green River and/or municipal water from the Johnson Water District. The Permittee shall provide an annual listing of sources of injected fluids in accordance with the reporting requirements in Part 15, Paragraph 4 of this Permit. Injection of any fluid for the purpose of disposal is prohibited. Prohibited fluids include unused fracturing fluids or acids, gas plant cooling tower cleaning wastes, service wastes, and vacuum truck and drum rinsate from trucks and drums transporting or containing non-exempt waste.
5. **Tubing-Casing Annulus (TCA).**
The TCA shall be filled with water treated with a corrosion inhibitor or other fluid approved by the Director. The TCA valve shall remain closed during normal operating conditions and the TCA pressure shall be maintained at zero (0) psi. If TCA pressure cannot be maintained at zero (0) psi, the Permittee shall follow the procedures in Ground Water Section Guidance No. 35 "Procedures to follow when excessive annular pressure is observed on a well."

PART 11. MAXIMUM ALLOWABLE INJECTION PRESSURE

Previously established Maximum Allowable Injection Pressures (MAIP) for wells under existing Federal UIC Permits in the Brundage Canyon Field shall transfer to UIC Permit UT22195-00000 and will be incorporated as enforceable conditions of this permit. Requested changes to this shall follow the same procedure as described here. For

requested changes to these previously established MAIPs and for all other wells covered under this permit, the Permittee shall calculate the MAIP based on the following equation:

$$\text{MAIP} = [\text{FG} - (0.433)(\text{SG})] * \text{Depth}$$

“Depth” is the depth in feet from the Kelly Bushing to the top of the injection zone.

“FG” is the fracture gradient.

As part of the permit application, the Permittee supplied the FG value for each existing well. (See Book 2, well data, of permit application.) Each respective well FG value identified in Book 2 shall be used unless the Director approves a more accurate value, as determined by the results of a Step Rate Test.

If the Permittee learns by results of a new Step Rate Test that there is a change to the FG value, it shall submit the most current value to EPA, as determined by the current Step Rate Test. If the Director approves the new FG derived from the Step Rate Test, then that value will be plugged into the MAIP formula above, and a new MAIP will be derived based on the FG change.

The SG (specific gravity) is 1.015 throughout T5S-R4-5W and shall be used unless the Director determines otherwise through a permit modification.

Acknowledgement of the MAIP will be sent to Berry via a Record of Well Construction and Authorization to Inject.

PART 12. AREA OF REVIEW (AOR) WELL REQUIREMENTS

All wells located within a ¼-mile radius of an injection well shall have top of cement behind the outermost casing string at the depths of the Injection and Confining Zones at least above the base of the designated Confining Zone, unless the AOR well is an EPA-authorized injection well with a demonstration of part II (external) mechanical integrity. As required under Part 4 of this Permit (Process for Adding Injection wells to Area UIC Permit UT22195-00000), the Permittee shall identify all wells penetrating the Confining Zone within a ¼-mile radius of a requested injection well and provide a cement bond log for any production well that EPA has not previously evaluated. Plugged and abandoned wells in the AOR of an injection well shall either have cement behind the outermost casing string above the base of the Confining Zone or in the case of uncased, drilled and abandoned wells that penetrate the injection zone, shall have a cement plug that isolates the injection zone from USDWs.

PART 13. REQUIREMENTS FOR STIMULATING THE INJECTION ZONE USING INJECTION WELLS

The Permittee shall not stimulate or otherwise treat (for example, hydraulically fracture, polymer gel or acid treatment) the injection zone using injection wells without prior approval from the Director and shall do so according to the following procedures:

1. **Prior to Well Stimulation:** Prior to stimulating the Injection Zone through an injection well, the Permittee shall submit for review and approval a proposed well stimulation plan, including:
 - a. a cover letter referencing the well name and UIC Permit number;
 - b. a description of the proposed stimulation procedure;
 - c. a laboratory analysis or description of the fluid to be used during well stimulation;
 - d. the estimated volume of fluid to be used; and
 - e. the estimated maximum stimulation pressure to be used.
2. **During Well Stimulation:** The Permittee shall:
 - a. monitor and record the stimulation pressure, fluid density and flow rate as appropriate for the activity; and
 - b. monitor and record the pressure of every well annulus. If the pressure observed in any annulus unexpectedly increases by more than ten percent (10%) of the stimulation pressure, halt operations as quickly as operationally feasible and evaluate whether an uncontrolled loss of fluid that may endanger an underground source of drinking water has occurred; and
 - c. perform a Part I (internal) mechanical integrity test upon final completion of the well stimulation operation if any well stimulation activity resulted in either the intentional removal or accidental unseating of the injection tubing and packer assembly, or if the tubing-packer assembly was left in place and the stimulation pressure exceeded the EPA-approved pressure.
3. **After Well Stimulation:** As soon as possible but no later than 30 calendar days after the well stimulation operation, the Permittee shall submit to the Director for review:
 - a. a report of actual procedures used, detailing any unexpected events and deviations from the proposed stimulation plan;
 - b. the cumulative fluid volume used during the stimulation activity;
 - c. the volume and final disposition of any fluid flowed back after the stimulation event;
 - d. a recorded stimulation pressure vs. time plot showing the entire stimulation event, also displaying the monitored rate, fluid density, annuli pressures, and a report of the numeric maximum values of each; and
 - e. a report of any mechanical integrity test run after completing the procedure.

PART 14. REQUIREMENTS FOR WORKOVERS AND ALTERATIONS

Workovers and alterations shall meet all conditions of Area UIC Permit UT22195-00000. Prior to beginning any addition or physical alteration to an injection well that may significantly affect the tubing, packer, or casing, the Permittee shall give advance notice to the Director. The Permittee shall record all changes to well construction on a Well Rework Record (EPA Form 7520-12) and provide an updated well bore diagram and shall provide this and any other record of well workover, including logging or test data to the EPA within 30 calendar days of completion of the activity. A successful

demonstration of Part I (internal) mechanical integrity is required following the completion of any well workover or alteration which affects the casing, tubing, or packer. Injection operations shall not be resumed until the well has successfully demonstrated Part I mechanical integrity, and if the well lost mechanical integrity, the Director has provided written notice.

PART 15. MONITORING, RECORDKEEPING and REPORTING OF RESULTS

1. **Monitoring Parameters, Frequency, Records and Reports:** Monitoring parameters are specified in Table 2 of this Permit. Pressure monitoring recordings shall be taken at the wellhead. The listed parameters are to be monitored, recorded and reported at the frequency indicated in Table 2 even during periods when the well is not operating.

Table 2: Monitoring and reporting requirements for each injection well authorized by Area UIC Permit UT22195-00000.

Observe monthly and record at least once every 30 days	
Observe and Record	Injection pressure (psig)
	Annulus pressure(s) (psig)
	Injection rate (bbl/day)
	Fluid volume injected since the well began injecting (bbls)
Annually	
Analyze	Injected fluid total dissolved solids (mg/l)
	Injected fluid specific gravity
	Injected fluid specific conductivity
	Injected fluid pH
Annually	
Report	Each month's maximum and averaged injection pressures (psig)
	Each month's maximum and minimum annulus pressure(s) (psig)
	Each month's injected volume (bbl)
	Fluid volume injected since the well began injecting (bbls)
	Written results of annual injected fluid analysis
	Sources of all fluid injected during the year

Monitoring records shall include:

- a. the date, time, exact place and the results of the observation, sampling, measurement, or analysis;
 - b. the name of the individual(s) who performed the observation, sampling, measurement, or analysis; and
 - c. the analytical techniques or methods used for analysis.
2. **Monitoring Methods:** Monitoring observations, measurements, samples, etc. taken for the purpose of complying with these requirements shall be representative of the activity or condition being monitored. Methods used to monitor the nature of the

injected fluids must comply with analytical methods cited and described in Table 1 of 40 CFR 136.3 or Appendix III of 40 CFR part 261, or by other methods that have been approved in writing by the Director.

Injection pressure, annulus pressure, injection rate, and cumulative injected volumes shall be observed and recorded at the wellhead under normal operating conditions, and all parameters shall be observed simultaneously to provide a clear depiction of well operation. Pressures are to be measured in pounds per square inch (psi). Fluid volumes are to be measured in standard oil field barrels (bbl). Fluid rates are to be measured in barrels per day (bbl/day).

3. **Records Retention:** Records of calibration and maintenance, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit shall be retained for a period of at least three years from the date of the sample, measurement, report, or application. This period may be extended any time prior to its expiration by request of the Director. Records of the nature and composition of all injected fluids must be retained until three years after the completion of any plugging and abandonment procedures specified under 40 CFR section 144.52(a)(6) or under Part 146 Subpart G, as appropriate. The Director may require the Permittee to deliver the records to the Director at the conclusion of the retention period. The Permittee shall continue to retain the records after the three year retention period unless the Permittee delivers the records to the Director or obtains written approval from the Director to discard the records.
4. **Annual Reports:** Regardless of whether the well is operating or not, the Permittee shall submit an Annual Report to the UIC Enforcement Coordinator in Part 9, 4(b) of this Permit, that summarizes the results of the monitoring required by Part 15, Paragraph 1 and Table 2 of this Permit. The report of all sources of the fluids injected during the year must identify each source by the generator's name and the well name and location, and the field name or facility name. The first Annual Report shall cover the period from the effective date of the Permit through December 31 of that year. Subsequent Annual Reports shall cover the period from January 1 through December 31 of the reporting year. Annual Reports shall be submitted by February 15 of the year following data collection. EPA Form 7520-11 may be copied and shall be used to submit the Annual Report. However, the monitoring requirements specified in this Permit are mandatory even if EPA Form 7520-11 indicates otherwise.

PART 16. INACTIVE INJECTION WELLS AND CONVERTING INJECTION WELLS TO NON-INJECTION WELLS

1. **Inactive Injection Wells:** After any period of two years during which there is no injection, the Permittee shall plug and abandon the well in accordance with Part 17 of this Permit unless:
 - a. The Permittee provides written notice to the Director;
 - b. describes the actions or procedures that will be taken to ensure the well will not

- endanger USDWs during the period of inactivity, including compliance with mechanical integrity demonstration, financial responsibility and all other permit requirements; and
- c. receives written notice by the Director temporarily waiving plugging and abandonment requirements.
2. **Conversions to Non-Injection Wells:** The Director may, for cause or upon a written request from the Permittee, allow conversion of the well from a Class II injection well to a non-Class II well. Conversion may not proceed until the Permittee receives written approval from the Director. Conditions of such conversion may include but are not limited to, approval of the proposed well rework, follow up demonstration of mechanical integrity, well-specific monitoring and reporting following the conversion, and demonstration of practical use of the converted configuration.

PART 17. PLUGGING AND ABANDONMENT REQUIREMENTS

1. **Notification of Well Abandonment and Project Closure:** The Permittee shall notify the Director in writing at least forty five calendar days prior to plugging and abandoning an injection well and the closure of the Brundage Canyon Field enhanced oil recovery project.
2. **Well Plugging Requirements:** Injection wells shall be plugged with cement in a manner which isolates the injection zone and prevents the movement of fluids into or between underground sources of drinking water and in accordance with 40 CFR §146.10. Tubing, packer and other down hole apparatus shall be removed. Cement with additives such as accelerators and retarders that control or enhance cement properties may be used for plugs; however, volume-extending additives and gel cements are not approved for plug use. If cement retainers or bridge plugs are not used then plug placement shall be verified by tagging. Plugging gel of at least 9.0 lb/gal shall be placed between all plugs. A minimum 50 ft. surface plug shall be set inside the long string casing to seal pathways for fluid migration into the subsurface. The Plugging Record must be certified as accurate and complete by the person responsible for the plugging operation. Prior to placement of the cement plug(s) the well shall be in a state of static equilibrium with the mud weight equalized top to bottom, either by circulating the mud in the well at least once or by a comparable method.
3. **Approved Plugging and Abandonment Plan**

In addition to the requirements in Part 16, paragraph two, the Permittee shall:

- a. Isolate the injection zone: Remove down hole apparatus from the well and perform necessary clean out; displace well fluid with plugging gel. Set a cast iron bridge plug (CIBP) within the innermost casing string no more than 50 ft. above the top perforation with a minimum of 20 ft. cement plug on top of the CIBP.
- b. Isolate the Trona-Bird's Nest water zone and Mahogany Oil Shale: Perforate and squeeze cement up the backside of the outermost casing string across the

Mahogany Oil Shale and Trona-Bird's Nest water zone, from at least 55 ft. above the top of the Trona-Bird's Nest to at least 55 ft. below the base of Mahogany Oil Shale, unless there is existing cement across this interval.

- c. Isolate the Uinta Formation from the Green River Formation: Perforate and squeeze a minimum of 110 ft. cement up the backside of the outermost casing string to isolate the contact between the Uinta Formation and the Green River Formation, unless there is existing cement across this interval. Set a minimum 110 ft. cement plug in the innermost casing string, centered on the contact between the Green River Formation and Uinta Formation.
- d. Isolate Surface Fluid Migration Paths:
 - (1) If the depth of the lowermost USDW is above the base of surface casing, perforate the outermost casing string 50 ft. below the base of surface casing and circulate cement to the surface, unless there is existing cement across this interval; OR
 - (2) If the depth of the lowermost USDW is below the base of surface casing, perforate the outermost casing string 50 ft. below the base of the lowermost USDW and circulate cement to surface; AND
 - (3) Set a cement plug inside the innermost casing string from 50 ft. below the base of the surface casing to surface.
- 4. **Plugging and Abandonment Report:** Within sixty calendar days after plugging a well, the Permittee shall submit a report (EPA Form 7520-13) and a well bore diagram of the plugged well to the Director. The plugging report shall be certified as accurate by the person who performed the plugging operation. The report shall consist of either:
 - a. statement that the well was plugged in accordance with the approved plugging and abandonment plan; or
 - b. where actual plugging differed from the approved plugging and abandonment plan, an updated version of the plan, on the form supplied by the Director, specifying the differences.

PART 18. EFFECT OF PERMIT

The Permittee is allowed to engage in underground injection in accordance with the conditions of this Permit. The Permittee shall not construct, operate, maintain, convert, plug, abandon, or conduct any other activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 141 or may otherwise adversely affect the health of persons. Any underground injection activity not authorized by this Permit or by rule is prohibited. Issuance of this Permit does not convey property rights of any sort or any

exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of any other Federal, State or local law or regulations. Compliance with the terms of this Permit does not constitute a defense to any enforcement action brought under the provisions of Section 1431 of the Safe Drinking Water Act (SDWA) or any other law governing protection of public health or the environment, for any imminent and substantial endangerment to human health or the environment, nor does it serve as a shield to the Permittee's independent obligation to comply with all UIC regulations. Nothing in this Permit relieves the Permittee of any duties under applicable regulations.

PART 19. CHANGES TO PERMIT CONDITIONS

1. **Modification, Reissuance, or Termination:** The Director may, for cause or upon a request from the Permittee, modify, revoke and reissue, or terminate this Permit in accordance with 40 CFR §124.5, 144.12, 144.39, and 144.40. Also, this Permit is subject to minor modification for causes as specified in 40 CFR 144.41. The filing of a request for modification, revocation and reissuance, termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any condition of this Permit.
2. **Transfer of Permit:** Under 40 CFR 144.38, this Permit is transferable provided the current Permittee notifies the Director at least 30 calendar days in advance of the proposed transfer date (EPA Form 7520-7) and provides a written agreement between the existing and new Permittees containing a specific date for transfer of Permit responsibility, coverage and liability between them. The notice shall adequately demonstrate that the financial responsibility requirements of 40 CFR 144.52(a)(7) will be met by the new Permittee. The Director may require modification or revocation and reissuance of the Permit to change the name of the Permittee and incorporate such other requirements as may be necessary under the Safe Drinking Water Act; in some cases, modification or revocation and reissuance is mandatory.
3. **Permittee Change of Address:** Upon the Permittee's change of address, or whenever the operator changes the address where monitoring records are kept, the Permittee must provide written notice to the Director within 30 calendar days.

PART 20. SEVERABILITY

The Provisions of this Permit are severable, and if any provision of this 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.

PART 21. CONFIDENTIALITY

In accordance with 40 CFR Part 2 and 40 CFR §144.5, information submitted to the EPA pursuant to this Permit may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of

submission, the EPA may make the information available to the public without further notice. If a claim is asserted, the validity of the claim will be assessed in accordance with the procedures in 40 CFR Part 2 (Public Information). Claims of confidentiality for the following information will be denied: The name and address of the Permittee, and information which deals with the existence, absence or level of contaminants in drinking water.

PART 22. GENERAL PERMIT REQUIREMENTS

1. **Duty to Comply:** The Permittee must comply with all conditions of this Permit. Any noncompliance constitutes a violation of the Safe Drinking Water Act (SDWA) and is grounds for enforcement action; for Permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application; except that the Permittee need not comply with the provisions of this Permit to the extent and for the duration such noncompliance is authorized in an emergency permit under 40 CFR 144.34. All violations of the SDWA may subject the Permittee to penalties and/or criminal prosecution as specified in Section 1423 of the SDWA.
2. **Duty to Reapply:** If the Permittee wishes to continue an activity regulated by this Permit after the expiration date of this Permit, under 40 CFR §144.37 the Permittee must apply for a new permit prior to the expiration date.
3. **Need to Halt or Reduce Activity Not a Defense:** It shall not be a defense for a 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 this Permit.
4. **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.
5. **Proper Operation and Maintenance:** The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate 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.
6. **Permit Actions:** This Permit may be modified, revoked and reissued or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.
7. **Property Rights:** This Permit does not convey any property rights of any sort, or any exclusive privilege.

8. **Duty to Provide Information:** The Permittee shall furnish to the Director, within a time specified, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this Permit. The Permittee is required to submit any information required by this Permit or by the Director to the mailing address designated in writing by the Director.
9. **Inspection and Entry:** The Permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:
- a. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;
 - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;
 - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
 - d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the SDWA, any substances or parameters at any location.
10. **Signatory Requirements:** All applications, reports or other information submitted to the Director shall be signed and certified according to 40 CFR §144.32. This section explains the requirements for persons duly authorized to sign documents, and provides wording for required certification.
11. **Reporting Requirements:**
- a. The Permittee shall give prior notice to the Director as soon as possible of any planned changes, physical alterations or additions to the permitted facility.
 - b. Anticipated noncompliance: The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
 - c. Monitoring Reports: Monitoring results shall be reported at the intervals specified in this Permit.
 - d. Compliance schedules: Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Permit shall be submitted no later than 30 calendar days

following each schedule date.

- e. Twenty-four hour reporting: The Permittee shall report to the Director any noncompliance which may endanger human health or the environment, including:
 - (1) Any monitoring or other information which indicates that any contaminant may cause endangerment to a USDW; or
 - (2) Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between USDWs.

Information shall be provided, either directly or by leaving a message, within 24 hours from the time the permittee becomes aware of the circumstances by telephoning (800) 227-8917 and requesting the EPA Region 8 UIC Program Compliance and Technical Enforcement Director, or by contacting the EPA Region 8 Emergency Operations Center at (303) 293-1788. In addition, a follow up written report shall be provided to the Director within five calendar days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance including exact dates and times, and if the noncompliance has not been corrected the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

- f. Oil Spill and Chemical Release Reporting: The Permittee shall comply with all reporting requirements related to the occurrence of oil spills and chemical releases by contacting the National Response Center (NRC) at (800) 424-8802, (202) 267-2675, or through the NRC website <http://www.nrc.uscg.mil/index.htm>.
- g. Other Noncompliance: The Permittee shall report all instances of noncompliance not reported under paragraphs Part 22, Paragraph 11(b) or Paragraph 11(e) at the time the monitoring reports are submitted. The reports shall contain the information listed in Paragraph 11(e) of Part 22.
- h. Other information: Where the Permittee becomes aware that it failed to submit any relevant facts in the permit application, or submitted incorrect information in a permit application or in any report to the Director, the Permittee shall promptly submit such facts or information to the Director.

PART 23. FINANCIAL RESPONSIBILITY

- 1. **Method of Providing Financial Responsibility.** The Permittee shall demonstrate and maintain continuous compliance with the requirement to maintain financial responsibility and resources to close, plug and abandon the underground injection well(s) covered by this permit. The Director may, on a periodic basis, require the holder of a permit to revise the estimate of the resources needed to plug and abandon the well(s) to reflect changes in such costs and may require the Permittee to provide a revised demonstration of financial responsibility. No substitution of a demonstration of financial responsibility shall become effective until the Permittee receives written

notification from the Director that the alternative demonstration of financial responsibility is acceptable.

2. **Types of Adequate Financial Responsibility.** Adequate financial responsibility to properly plug and abandon injection wells under the federal UIC requirements must include completed original versions of one of the following:
 - a. a surety bond with a standby trust agreement,
 - b. a letter of credit with a standby trust agreement,
 - c. a fully funded trust agreement, OR
 - d. an independently audited financial statement with a Chief Financial Officer's letter.

A surety bond acceptable to the Director shall contain wording identical to EPA's model language and shall be issued by a surety bonding company found to be acceptable to the U.S. Department of Treasury, which can be determined by review of that department's Circular #570, currently available on the internet at <http://fms.treas.gov/c570/c570.html>.

A letter of credit acceptable to the Director shall contain wording identical to EPA's model language and be issued by a bank or other institution whose operations are regulated and examined by a State or federal agency.

A fully funded trust agreement acceptable to the Director shall contain wording identical to EPA's model language. Annual reports from the financial institution managing the trust account shall be submitted to the Director showing the available account balance.

An independently audited financial statement with Chief Financial Officer's letter acceptable to the Director shall contain wording identical to EPA's model language and shall demonstrate the Permittee meets or exceeds certain financial ratios. If this financial instrument is used, it must be resubmitted annually, within 90 days after the close of the Permittee's fiscal year, using the financial data available from the most recent fiscal year.

A standby trust agreement acceptable to the Director shall contain wording identical to EPA's model language. Annual reports from the financial institution managing the standby trust account shall be submitted to the Director showing the available account balance.

3. **Determining How Much Coverage is Needed.** The Permittee when periodically requested to revise the plugging and abandonment cost estimate discussed above must submit 3 current independent plugging and abandonment cost estimates for EPA to accurately determine the likely cost to plug the well(s).
4. **Insolvency.** In the event of:

- a. the bankruptcy of the trustee or issuing institution of the financial mechanism; OR
- b. suspension or revocation of the authority of the trustee institution to act as trustee;
OR
- c. the institution issuing the financial mechanism losing its authority to issue such an instrument;

The Permittee must notify the Director in writing, within 10 business days, and the Permittee must establish other financial assurance or liability coverage acceptable to the Director within 60 days after any event specified in (a), (b), or (c) above. The Permittee must also notify the Director by certified mail of the commencement of voluntary or involuntary proceedings under Title 11 (Bankruptcy), U.S. Code naming the owner or operator as debtor, within 10 business days after the commencement of the proceeding. A guarantor, if named as debtor of a corporate guarantee, must make such a notification as required under the terms of the guarantee.