U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 8
UNDERGROUND INJECTION CONTROL
CLASS VI DRAFT PERMIT

PERMIT ID: CO62455-12770

ISSUED TO:
Carbon Storage Solutions, LLC
31375 Great Western Drive
Windsor, Colorado 80550

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LIST OF ATTACHMENTS

PERMIT AUTHORIZATION

Under the authority of the Safe Drinking Water Act and Underground Injection Control (UIC) 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, hereinafter referred to as "Permit," EPA hereby authorizes the owner or operator listed below, hereinafter referred to as the "Permittee," to engage in underground injection activities as described herein.

PERMITTEE NAME AND ADDRESS
Carbon Storage Solutions, LLC
31375 Great Western Drive
Windsor, Colorado 80550

In accordance with this Permit, the Permittee is authorized to construct and operate the injection well listed below for injection of the carbon dioxide stream generated by Front Range Energy, LLC (hereinafter "Injection Well" or "Project"):

Well Name: Front Range 1-1
Latitude: 40.454962
Longitude: -104.859761

Bottom Hole Location
Latitude: 40.449494
Longitude: -104.852200

This Permit is based on representations made by the Permittee and other information contained in the administrative record. Misrepresentation of information or failure to fully disclose all relevant information may be cause for termination, revocation and reissuance, or modification of this Permit, and/or formal enforcement action. It is the Permittee's responsibility to read and understand all provisions of this Permit.

Any underground injection activity not authorized by this Permit is prohibited. All references to Title 40 of the Code of Federal Regulations are to the regulations in effect on the date that this Permit is effective.

This Permit becomes effective on the date listed below and remains in full force and effect during the operating life of the injection well, during the post-injection site care period, and until site closure is authorized and completed, unless this Permit is revoked and reissued, terminated, or modified pursuant to 40 CFR 124.5, 144.12, 144.39, 144.40, or 144.41.

Upon authorization of primary enforcement responsibility to a state or tribe, this Permit remains in effect until such time as the authorized state or tribe issues its own permit to the Permittee or the new entity adopts this Permit as its permit.

Issued Date _____**DRAFT**_____ Effective Date _____**DRAFT**_____

Authorization Signed by:

DRAFT

Douglas Minter, Manager*
Safe Drinking Water Branch
Water Division

**Director means the Regional Administrator, the State director or the Tribal director as the context requires, or an authorized representative through delegation of authority.*

PERMIT CONDITIONS

A. EFFECT OF PERMIT

The Permittee is allowed to engage in underground injection in accordance with the conditions of this Permit. The Permittee must not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of injection, annulus, or formation fluids into underground sources of drinking water (USDWs) or any unauthorized geologic zones. Any underground injection activity not specifically authorized in this Permit is prohibited. For purposes of enforcement, compliance with this Permit during its term constitutes compliance with Part C of the Safe Drinking Water Act (SDWA). Such compliance does not constitute a defense of any action brought under Section 1431 of the SDWA or any other common or statutory law other than Part C of the SDWA.

B. CHANGES TO PERMIT

B.1 - Modification, Revocation and Reissuance, or Termination— The Director may, for cause or upon request by the Permittee, modify, revoke and reissue, or terminate this Permit in accordance with 40 CFR 124.5, 144.12, 146.86(a), 144.39, 144.40, and 144.41. The filing of a request for a Permit modification, revocation and reissuance, or 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.

B.2 - Transfer of Permit— The Permittee may transfer this Permit in accordance with 40 CFR 144.38(a) only when the Director has modified or revoked and reissued the Permit to identify the new Permittee and incorporate such other requirements as may be necessary under SDWA. The Permittee must provide written notice (EPA Form 7520-7 or its equivalent) to the Director at least 30 days in advance of the proposed transfer date. Such notice must include a written agreement between the existing and proposed new Permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them, all subject to approval by the Director, and must demonstrate that the financial responsibility requirements of 40 CFR 144.52(a)(7) have been met by the proposed new Permittee. All financial responsibility cost estimates, documentation, and instruments as required by 40 CFR 146.85 and by Section G of this Permit must be updated and provided to the Director for review and approval by any new owner or operator of the well.

B.3 - Permittee Change of Name or Address—The Permittee must notify the Director at least 30 days in advance of changes in the Permittee's legal name or address or address where records are kept. The Permit may be subject to modification in accordance with the Modification, Revocation and Reissuance, or Termination, section B.1, of this Permit.

B.4 - Injection Well Conversion— The Permittee must notify the Director at least 30 days in advance of planned well conversion to another type of injection or non-injection well. The notice must include the type of well to which the existing well will be converted and a completed 7520-19 form or its equivalent. Such notice must also include demonstration that the existing injection well has internal and external mechanical integrity (MI) and documentation that the agency

with regulatory authority over the new well type has been notified. The Permittee must not begin conversion of the well without written approval from the Director that the requirements of this Permit have been met nor without a proper UIC permit/authorization if the well is being converted to a different type of injection well. The Permittee must convert the well(s) in a manner which will not allow the movement of fluids into or between USDWs.

B.5 - Permit Expiration— The Permit will expire in two years from its effective date if the Permittee fails to commence well construction unless a written request for an extension of this two-year period has been submitted and approved by the Director. The Permittee must submit such requests prior to the Permit's expiration deadline. Each request must explain the reason for the delay, give an estimated well completion date, and list any additional wells that penetrate the designated confining zone within the area of review (AoR) that were not included in the initial permit application, including well construction diagrams, cement records, and cement bond logs. If the construction of the well has not commenced for six years from the effective date, the Permit expires and may not be extended. The Permittee may request an expiration of the permit at any time, provided no construction on the well has commenced. Prior to permit expiration, any monitoring wells and equipment must be plugged and abandoned and/or removed.

C. CONFIDENTIALITY

In accordance with 40 CFR Part 2, Subpart B and 40 CFR 144.5, any information submitted to EPA under this Permit may be claimed as a trade secret or confidential business information (collectively Proprietary Business Information or PBI). Any such claim must be asserted at the time of submission by clearly marking the words "proprietary business information" on every page containing such information. Information covered by a PBI claim will be disclosed by the EPA only to the extent, and by means of the procedures, set forth in 40 CFR Part 2, Subpart B. If no claim is made at the time of submission, EPA may make the information available to the public without further notice to the Permittee.

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.

D. DEFINITIONS

All terms used in this Permit that are defined in the UIC regulations specified at 40 CFR parts 2, 124, 144, 146, and 147 will have the definition in the regulations as they exist on the day this Permit becomes effective. Unless specifically stated otherwise, all references to "days" in this Permit should be interpreted as calendar days.

E. DUTIES AND REQUIREMENTS

E.1 - Prohibition of Movement of Fluid into a USDW—The Permittee must not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity for the injection well covered by this Permit and associated monitoring wells in a manner that allows the movement of a fluid containing any contaminant into USDWs. If any water quality monitoring of a USDW

indicates the movement of any contaminant into the USDW, the Permittee must report this to the Director within 24 hours and execute the Emergency Remedial and Response Plan (See Attachment F). The Director will prescribe additional requirements for construction, corrective action, operation, monitoring, or reporting (including closure of the injection or monitoring well(s)) as are necessary to remediate and prevent such movement. The Director may also take enforcement actions for violations of 40 CFR 144.12(a) and (b) and may take emergency actions consistent with 40 CFR 144.12(e).

E.2 - Duty to Comply—The Permittee must comply with all conditions of this Permit. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and reissuance, or modification except that the Permittee need not comply with the provisions of this Permit to the extent that, such noncompliance is authorized in an emergency under 40 CFR 144.34.

E.3 - Penalties for Violations of Permit Conditions—The Permittee may be subject to penalties, criminal prosecution, and/or other enforcement action under the SDWA, 42 USC 300h-2, for violating the requirements and conditions of this Permit, the SDWA, and regulations promulgated under the SDWA.

E.4 - Need to Halt or Reduce Activity Not a Defense—It shall not be a defense for the Permittee in an enforcement action to claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit.

E.5 - Duty to Mitigate—The Permittee must take all timely and reasonable steps necessary to minimize or correct any adverse impact on the environment resulting from noncompliance with this Permit.

E.6 - Actions Not Authorized—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 state or local laws or regulations.

E.7 – Enforceability During Permittee Requested Changes—The filing of a request for a permit modification, revocation and reissuance, termination, 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.

E.8 - Proper Operation and Maintenance—The Permittee must at all times properly operate and maintain all facilities and systems of treatment and control and related appurtenances that are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance include but is not limited to: 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 backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit.

E.9 - Duty to Provide Information—The Permittee must furnish to the Director within the time specified, unless otherwise specified by the Director, 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 must also furnish to the Director, upon request within a time specified, electronic copies of records required to be kept by this Permit.

E.10 - Inspection and Entry—The Permittee must 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 which are required to 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 purposes of assuring permit compliance or as otherwise authorized by the SDWA, any substances or parameters at any location, including facilities, equipment, or operations regulated or required under this Permit.

E.11 - Monitoring and Records – Samples and measurements taken for the purpose of monitoring must be representative of the monitoring activity. The Permittee must maintain complete and accurate monitoring records, calibration certificates, testing reports, and corrective action documentation. Record retention requirements are provided in Section O.7 of this permit. Records must be readily available for inspection and submitted to the Director upon request in accordance with 40 CFR 144.51(j)(1)(2), (3) and (4).

E.12 - Signatory and Certification Requirements — All reports, notifications, or any other information required to be submitted by this Permit or requested by the Director must be signed and certified in accordance with 40 CFR 144.32. The Permittee must ensure that all signed documents include the following certification statement: "*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*"

E.13 - Reporting Requirements – Copies of all reports and notifications required by this Permit must be signed and certified in accordance with the requirements under Section E.12- *Signatory and Certification Requirements* of this Permit and submitted in a manner approved by the Director. All correspondence must reference the well name, well location, and EPA Permit number.

Reports and notifications required by this Permit should follow the Procedures for Submitting Required Reports and Notifications found at: https://www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-and-wy#contact.

(a) Sampling and Monitoring Reports. Sampling and monitoring results must be reported at the intervals specified in Attachment C.

(b) Planned changes. The Permittee must give notice to the Director as soon as possible of any planned changes, physical alterations, or additions to the permitted well, and prior to commencing such changes.

(c) Anticipated noncompliance. The Permittee must give at least 14 days' advance written notice to the Director of any planned changes in the permitted facility or activity that may result in noncompliance with Permit requirements.

(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 must be submitted no later than 30 calendar days following each schedule date.

(e) Twenty-four-hour reporting. The Permittee must report to the Director any circumstance that may endanger human health or the environment, including:

(i) any monitoring or other information indicating that any contaminant may cause an endangerment to a USDW, including any loss or suspected loss of MI; or

(ii) any noncompliance with a permit condition or malfunction of the injection system that may cause fluid migration into or between USDWs.

(iii) See Section O.3 for additional requirements.

(f) Other Noncompliance. The Permittee must report all instances of noncompliance not reported under paragraphs (a), (d), or (e) of this section at the time that monitoring reports are submitted.

(g) Other information. Where the Permittee becomes aware of a failure to submit any relevant facts in a permit application, submitted incorrect information in a permit application, or submitted incorrect information in any report to the Director, the Permittee must promptly submit such facts and information to the Director.

(h) Oil Spill and Chemical Release Reporting. The Permittee must comply with all reporting requirements related to the occurrence of oil spills and chemical releases that may endanger USDWs by contacting the National Response Center (NRC) at (800) 424-8802 or NRC@uscg.mil.

F. AREA OF REVIEW AND CORRECTIVE ACTION

The Permittee must maintain and comply with the approved Area of Review (AoR) and Corrective Action Plan included as Attachment B of this Permit. In accordance with this Permit and UIC regulations, the Permittee must do the following:

F.1 - Reevaluation of Area of Review and Corrective Action Plan—At a minimum frequency not to exceed every five years as specified in the AoR and Corrective Action Plan, or more frequently when monitoring and operational conditions warrant and as specified in the AoR and Corrective Action Plan, the Permittee must reevaluate the delineation of the AoR and perform corrective action in the manner specified in the AoR and Corrective Action Plan. Reevaluation of the AoR and Corrective Action Plan must include a new survey of wells within the existing or modified AoR.

Following each AoR reevaluation, the Permittee must submit an amended AoR and Corrective Action Plan or demonstration that no amendment is needed based on monitoring data and modeling results. Any amendments to the AoR and Corrective Action Plan must be approved by the Director, incorporated into the Permit, and are subject to the permit modification requirements. Once approved, the AoR and Corrective Action Plan become an enforceable condition of this Permit. If the Director disapproves the revised AoR and Corrective Action Plan, the Permittee must cease injection operations, or if the well is not currently injecting, the Permittee must not resume injection until a revised AoR and Corrective Action Plan is approved.

F.2 - Requirements for Corrective Action—At least 60 days prior to commencing corrective action, the Permittee must submit proposed procedures for performing corrective action on the identified deficient wells within the AoR. The Permittee must not commence any corrective action until the procedures are approved by the Director. Corrective action on all deficient wells in the AoR must be completed, and approved in writing by the Director, before the Permittee may commence injection, unless the Director has approved a phased corrective action plan.

G. FINANCIAL RESPONSIBILITY

The Permittee must demonstrate and maintain financial responsibility in accordance with 40 CFR 146.85 to cover estimated costs. The approved financial responsibility documents and estimated costs are found in Attachment H of this Permit. No substitution of a demonstration of financial responsibility shall become effective until the Permittee receives notification from the Director that the alternative demonstration of financial responsibility is acceptable.

As specified in 40 CFR 146.84(b), the requirement to maintain adequate financial responsibility and resources is directly enforceable regardless of whether the requirement is a condition of the permit. The Permittee must maintain financial responsibility and resources until the Director receives and approves the completed Post-injection Site Care and Site Closure Plan (Attachment E) and the Director approves site closure. The Permittee may be released from a financial instrument in the following circumstances: the Permittee has completed the phase of the Project for which the financial instrument was required and has fulfilled all its financial obligations as determined by the Director, including obtaining financial responsibility for the next phase of Project, if required; or the Permittee has submitted a replacement financial instrument and received written approval from the Director accepting the new financial instrument and releasing the Permittee from the previous financial instrument.

The Permittee must provide updated information related to their financial responsibility instrument(s) on an annual basis, and if there are any changes, the Director must evaluate the financial responsibility demonstration to confirm that the instrument(s) used remain adequate for use. The Permittee must maintain financial responsibility requirements regardless of the status of the Director's review.

Compliance with the financial responsibility requirements, including the applicable duration, described in this Permit does not relieve the Permittee from complying with any other applicable federal, state, and local financial responsibility requirements.

G.1 - Cost Estimate Updates and Adjustments

During the life of the geological sequestration project the Permittee must maintain a current, detailed written cost estimate to reflect adjustments for inflationary costs and any amendments made to the Project Plans included as attachments of this Permit. The Permittee must submit updates, adjustments, and amendments to the cost estimates as follows:

(a) Annually, within 60 days prior to the anniversary date of the establishment of the financial instrument. The Permittee must also provide written update adjustments to the cost estimate within 60 days of any amendment to the AoR and Corrective Action Plan, the Well Plugging Plan, the Post-Injection Site Care and Site Closure Plan, or the Emergency and Remedial Response Plan.

(b) No later than 60 days after the Director has approved a request to modify the AoR and Corrective Action Plan, the Well Plugging Plan, the Post-Injection Site Care and Site Closure Plan, or the Emergency and Remedial Response Plan, if the change in the plan significantly increases the cost, as determined by the Director.

(c) Within 60 days of notification from the Director that the most recent demonstration is no longer adequate to cover the current estimated costs.

Cost estimates must be based on costs to the regulatory agency of hiring a third party to perform the required activities. A third party is a party who is not within the corporate structure of the Permittee.

G.2 - Changes in Coverage— The Permittee must obtain approval from the Director for any new or updated cost estimate or revised financial instrument(s).

Whenever a cost estimate increases to an amount greater than the face amount of a controlling financial instrument(s), the Permittee, within 60 days after the increase, must either cause the face amount to be increased to an amount at least equal to the current cost estimate and submit evidence of such increase to the Director, or obtain other qualifying financial responsibility instrument(s) to cover the increase. Whenever a current cost estimate decreases to an amount less than the face amount of a controlling financial instrument, the face amount of the financial assurance instrument may be reduced to the amount of the current cost estimate only after the Permittee has received written approval from the Director.

G.3 - Adverse Financial Conditions Notification—The Permittee must notify the Director by certified mail and by email of adverse financial conditions that may affect the ability to cover current cost estimates.

(a) In the event that the Permittee or the third-party provider of a financial responsibility instrument is going through a bankruptcy, the Permittee must notify the Director within 10 days after commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy) of the U.S. Code, naming the Permittee as debtor. A guarantor of a corporate guarantee must make such notification if they are named as debtor, as required under the terms of the guarantee.

(b) In the event of insolvency or bankruptcy of the trustee or issuing institution of the financial mechanism, the suspension or revocation of the authority of the trustee institution to act as trustee, or the issuing institution's losing its authority to issue such an instrument, the Permittee must notify the Director within 10 business days of the Permittee receiving notice of such event. A Permittee who obtains a letter of credit, surety bond, or insurance policy will be deemed to be without the required financial responsibility or liability coverage in the event of bankruptcy, insolvency, or a suspension or revocation of the license or charter of the issuing institution. The owner or operator must establish other financial assurance meeting the requirements in 40 CFR 146.85, within 60 calendar days after such an event.

H. WELL CONSTRUCTION

The EPA-approved design and specifications for the injection well and a deep-zone monitoring well that are the subject of this Permit are included in Attachment G of this Permit. Changes to the approved construction plan must be approved through permit modification by the Director, prior to implementation of any changes.

H.1. - Injection Well Construction – The well must be constructed in accordance with this section and Attachment G. The design and construction must allow continuous monitoring of the annulus between the long string casing and the injection tubing and accommodate testing devices and workover tools.

H.2. - Casing and Cementing—Casing, cement, and other materials used in the construction of the well must have sufficient structural strength for the life of the geologic sequestration project. All well materials must be compatible with all fluids with which the materials may be expected to come into contact with and must meet or exceed standards developed for such materials by the American Petroleum Institute (API) or ASTM International, or comparable standards acceptable to the Director. The well must be cased and cemented to prevent the movement of fluids into any unauthorized zones for the duration of the geologic sequestration project in accordance with 40 CFR 146.95(f)(ii).

H.3. - Injection Tubing and Packer— Tubing and packer materials used in the construction of the well must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the API or ASTM International, or comparable standards acceptable to the Director. The tubing-packer system must be set in the long string casing within or below the nearest cemented and impermeable confining system no more than 100 feet above the top of the injection zone.

H.4.- Sampling and Monitoring Devices— The design and construction must allow continuous monitoring of the annulus between the long string casing and the injection tubing and accommodate testing and sampling devices and workover tools.

The Permittee must install and maintain in good condition all devices required to measure, monitor, and record the data and parameters required by Attachment C of this Permit. The Permittee must ensure that the devices installed, and methods used, are sufficient to represent the activity being measured, monitored, or recorded. For required continuous monitoring, the Permittee must use devices capable of monitoring the required activity.

Calculated flow data or periodic monitoring are not acceptable for required continuous monitoring except as a backup system if the primary continuous monitoring devices malfunction or become inoperable. The Permittee must notify the Director of such occurrences, and continuous monitoring devices must be repaired or replaced as soon as practicable. If this length of time is greater than 72 hours, injection activities must cease until such time that continuous monitoring is restored.

The Permittee must ensure all gauges used for monitoring and testing are properly calibrated and maintained as referenced in the Quality Assurance and Surveillance Plan (QASP) in Attachment I.

H.5. - Monitoring Well Construction— Casing, cement, and other materials used in the construction of the monitoring wells, including monitoring wells present in the injection zone, must be compatible with all fluids with which the materials may be expected to come into contact with and must meet or exceed standards developed for such materials by the API or ASTM International, or comparable standards acceptable to the Director. The deep-zone monitoring well must be constructed in the manner depicted in Attachment G of this Permit using materials that are compatible with the injected fluids, formation fluids and a mix of both. All monitoring wells must be constructed in a manner to provide representative samples that can be analyzed for the monitoring parameters required by this Permit.

I. PRE-OPERATIONAL REQUIREMENTS

Before the Director issues written authorization to commence injection, the Permittee must complete and submit documentation of preoperational requirements as required below. The Permittee is prohibited from injection until after the Director reviews and approves these results, along with any required plan updates, and issues written authorization to commence injection.

I.1 Well construction verification (40 CFR 146.86; Attachment G)

(a) Run and submit construction verification logs on the injection well and deep-zone monitoring well to confirm isolation and integrity.
(b) Verify casing, cement, injection tubing, and packer meet approved design and material specifications; document any variances.

I.2. Mechanical integrity demonstration (40 CFR 146.87; Permit Sections L.1–L.5, J)

Conduct a series of tests designed to demonstrate the internal and external mechanical integrity of injection well and deep-zone monitoring well, which may include:

(a) A pressure test with liquid or gas;
(b) A tracer survey such as oxygen-activation logging;
(c) A temperature or noise log;
(d) A casing inspection log; and
(e) Conduct tests with the Director witnessing if required; submit plans/results per permit reporting.

I.3. Injectivity and formation testing; operating limits (40 CFR 146.87; Permit Sections K.3, J)

(a) Perform step rate or equivalent formation tests to establish fracture pressure and validate downhole maximum allowable injection pressure.
(b) Establish baseline reservoir pressure and temperature in the injection zone (and confining zone, if applicable).
(c) Upon completion, but prior to operation, the owner or operator must conduct the following tests to verify hydrogeologic characteristics of the injection zone:
(d) Pressure fall off test, and pump test or injectivity test

I.4. **Emergency Shutdown Readiness** (40 CFR 146.88; Permit Sections K.9, L.6; Attachment C)

(a) Install and calibrate continuous recording devices (pressure, rate, temperature as applicable); retain calibration certificates.
(b) Configure alarm and automatic shutoff/ESD setpoints and logic with sufficient margin to prevent approaching/exceeding downhole MAIP.
(c) Complete the preoperational functional demonstration of alarms, automatic shutoff, and ESD systems per Attachment C; obtain Director approval.

I.5. **Annulus fluid and packer verification** (40 CFR 146.86; Permit Sections K.6–K.8, J)

(a) Fill annulus with approved noncorrosive fluid (add tracer if required); confirm stability.
(b) Verify tubing/packer differential pressure behavior consistent with design.
(c) Pressure test packer set and seal performance.

I.6. **Baseline sampling and CO_2 stream characterization** (40 CFR 146.87; Permit Sections N, O,; Attachment C). The owner or operator must record the fluid temperature, pH, conductivity, reservoir pressure, and static fluid level of the injection zone(s).

(a) Characterize the CO_2 stream (composition/impurities) and submit documentation to the Director.
(b) Confirmation that monitoring wells (deep-zone, shallow, soil/gas) are in place.
(c) Acquire baseline groundwater quality of USDWs in all monitoring wells.
(d) Acquire baseline geochemical and pressure data of the injection zone.
(e) Submit list of laboratories to the director for approval.
(f) Acquire baseline vertical seismic profile

I.7 Area of Review (AoR) and corrective action completion (40 CFR 146.84; Permit Section F, , Attachment B)

(a) Complete corrective actions for wells in the AoR and submit verification.
(b) Update AoR delineation and submit to the Director according to Attachment B.

I.8. **Emergency and remedial response readiness** (40 CFR 146.92; Permit Section Q; Attachment F)

(a) Confirm the Emergency and Remedial Response Plan is current and ready for implementation.
(b) Verify Emergency Shutdown (ESD) triggers and procedures are integrated into emergency response.
(c) Ensure personnel training and documentation are in place.

I.9. **Reporting, recordkeeping, and notices** (40 CFR 146.85; Permit Sections O.2–O.4, O.7, L.7)
(a) Provide advance notices of testing to the Director and submit test plans/results per O.5.
(b) Report any testing results to the Director within timelines defined in Section O.
(c) Retain all records for at least ten years, consistent with 40 CFR 146.85(c)(4) and O.7.

J. COMMENCING INITIAL INJECTION

The Permittee cannot commence initial injection until all of the following requirements have been met:

J.1 – Review and Approval of Results of Pre-Operational Requirements - The Permittee has submitted the results of the Pre-Operational Requirements as specified in Section I of this Permit to the Director for review and approval;

J.2 – Notice of Completed Construction - Construction is complete and the Permittee has submitted to the Director a notice of completion of construction and a completed EPA Form 7520-18 and required attachments or its equivalent. If the well construction is different than the approved construction found in Attachment G, the Permittee must also provide a revised well diagram and a description of the previously approved modification to the well construction;

J.3– Determination of Compliance with Permit Conditions - The Director has inspected the injection well and reviewed all submitted information in J.1 and J.2 and finds it complies with the conditions of the Permit. The inspection is waived if the Permittee has not received notice from the Director of intent to inspect the injection well within 13 days of the date of the notice provided in paragraph J.2 above; and

J.4 – Written Authorization to Commence Initial Injection - The Director has provided the Permittee written authorization to commence injection.

K. INJECTION WELL OPERATION

K.1 - Outermost Casing Injection Prohibition—The Permittee must only inject the CO_2 stream into the injection zone through the injection tubing. Injection between the outermost casing protecting USDWs and the wellbore is prohibited.

K.2 - Injection Zone and Fluid Movement

Injection zone means "a geological formation, group of formations, or part of a formation receiving fluids through a well." Injection must only occur within the authorized injection zone specified in Attachment A, Section 1, and injected fluids must remain within the injection zone.

If monitoring or test results indicate the movement of fluids from the injection zone, the Permittee must notify the Director within twenty-four (24) hours (Permit Sections E.1 or O.3(a))

and submit a written report that documents circumstances that resulted in movement of fluids beyond the injection zone.

For perforated casing completions, additional injection perforations may be added if: (1) they are made within the approved injection zone, (2) fracture gradient data is submitted and representative of the portion of the injection zone to be perforated, and (3) the Permittee provides notice and reports to the Director in accordance with Sections O.4 & O.5. The Permittee must also follow the requirements found in Section I.3 that may result in a change to the permitted downhole MAIP.

K.3 - Injection Fluids Limitation— Approved Injection fluids are limited to those fluids described in Attachment A, Section 1. The Permittee may propose additional sources of carbon dioxide for injection, subject to review and approval by the Director. An analysis of any proposed new injection fluid, including the chemical and physical characteristics, must be submitted to the Director for review and written approval prior to commencing injection of proposed injection fluid. This may require corrosion modeling, modifications to well design, and if approved, will result in a permit modification (either a "minor modification" pursuant 40 CFR 144.41 or a major modification pursuant to 40 CFR 144.39).

K.4 - Injection Pressure Limitation— Except during stimulation at specific times as approved by the Director, the Permittee must ensure that injection pressure does not exceed 90% of the fracture pressure of the injection zone(s) and does not initiate new fractures or propagate existing fractures in the injection zone(s). Under no circumstance shall injection pressure initiate fractures or propagate existing fractures in the confining zone or cause the movement of injection or formation fluids into a USDW. The downhole MAIP at the depth of the injection zone is listed in Attachment A, Section 1 of this Permit.

K.5 - Stimulation Program—The Permittee must obtain prior approval from the Director to conduct stimulation activities, at least 30 days in advance, and may be subject to the permit modification requirement. In no case may injection pressure initiate fractures in the confining zones or cause the movement of formation fluids that endanger a USDW.

K.6 - Annulus Fluid—The Permittee must fill the annulus between the tubing and the long string casing with a non-corrosive fluid approved by the Director.

K.7 - Annulus/Tubing Pressure Differential— Except during workovers, the Permittee must maintain a pressure on the tubing-casing annulus as specified in Attachment A, Section 1, unless the Director determines that such requirement might harm the integrity of the well or endanger USDWs.

K.8 - Maintenance of Mechanical Integrity—Other than during periods of well workover or annulus maintenance, approved by the Director in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the Permittee must always maintain mechanical integrity.

K.9 - Continuous Recording Devices, Automatic Alarms, and Automatic Shutoff System

The Permittee must:

(a) Install and use continuous recording devices to monitor the injection pressure; the rate, volume and/or mass, and temperature of the carbon dioxide stream; and the pressure on the annulus between the tubing and the long string casing and annulus fluid volume;

(b) Install, continuously operate, and maintain an automatic alarm and automatic shutoff system or downhole shutoff systems; and

(c) Successfully demonstrate to the Director the functionality of the alarm system and shutoff system prior to the Director authorizing injection, and at a minimum of once every twelve months after the last approved demonstration.

Well-specific thresholds for activating the shutoff system are identified in Attachment A.1. Shutoff thresholds must be below the maximum limits established in the Permit and manufacturer-recommended operating conditions.

Testing under this section must involve subjecting the system to simulated failure conditions and must be witnessed by the Director or their representative unless the Director authorizes an unwitnessed test in advance. The Permittee must provide notice 30 days prior to running the test and must provide the Director or their representative with the opportunity to attend. The test must be documented using either a mechanical or a digital device which records the value of the parameter of interest, or by a service company job record. A final report including any additional interpretation necessary for evaluation of the testing must be submitted to the Director within the time period specified in Section O of this Permit.

K.10 - Precautions to Prevent Well Blowouts—Except at specific times as approved by the Director, the Permittee must maintain on the injection well, a pressure which will prevent the return of the injected carbon dioxide stream to the surface. The wellbore must be filled with a fluid of sufficient specific gravity during workovers to maintain a positive (downward) pressure gradient and/or a plug must be installed which can resist the pressure differential. A blowout preventer must be installed and kept in proper operational condition.

K.11 - Circumstances Under Which Injection Must Cease—Injection must cease immediately when any of the following circumstances occur:

(a) The injection well fails to pass a mechanical integrity test;

(b) A deep-zone monitoring well fails to pass a mechanical integrity test;

(c) There is a loss of mechanical integrity during operation;

(d) The automatic alarm or automatic shutoff system is triggered;

(e) There is a change in the annulus or injection pressure that may indicate the potential endangerment of a USDW;

(f) The Director determines that the well lacks mechanical integrity;

(g) Movement of injection or formation fluids into a USDW or other unauthorized formation is detected;

(h) Circumstances in Attachment F Emergency Remedial and Response Plan that require Permittee to “initiate shutdown plan”; or

(i) The Director determines that continued injection may result in endangerment of USDWs based on new data or information.

In all instances where injection is required to cease, the Permittee must immediately cease injection and initiate the shutdown plan as outlined in Attachment F and Section I of this Permit. The Permittee must obtain written approval from the Director to resume injection.

If an automatic shutdown is triggered, the Permittee must immediately investigate and, as expeditiously as possible, identify the cause of the shutdown. If, upon investigation, the well appears to lack mechanical integrity, or if the required monitoring of data from continuous recording devices or automatic shutoff systems indicates that the well may lack mechanical integrity, the Permittee must take the actions listed below in Section L.7 Loss of Mechanical Integrity and in Attachment F Emergency and Remedial Response Plan.

L. MECHANICAL INTEGRITY

The Permittee must ensure that the Front Range 1-1 injection well and Front Range 2-1 deep-zone monitoring well that penetrate the upper confining zone have both internal and external mechanical integrity for the operational life of the well. The approved tests, test procedures and schedule for mechanical integrity demonstration are found in Attachment C of this Permit. The Permittee may propose alternative tests and/or procedures not listed in Attachment C to be considered by the Director for approval and incorporated into Attachment C of this Permit as part of a permit modification. Any alternative tests and/or procedures must receive prior approval before they can be implemented.

L.1 – Requirement to Maintain Mechanical Integrity—The Permittee is required to ensure that mechanical integrity is always maintained in the wells. Injection into a well that lacks mechanical integrity is prohibited and must satisfy both internal and external mechanical integrity:

Internal Mechanical Integrity - There is no significant leak in the casing, tubing, or packer; and

External Mechanical Integrity - There is no significant fluid movement into any unauthorized zone through vertical channels adjacent to the injection well bore.

Other than during periods of well workover approved by the Director in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the injection well or deep-zone monitoring well must have and maintain mechanical integrity.

L.2 - Mechanical Integrity Demonstration Requirements and Schedule

The Permittee must demonstrate mechanical integrity of the injection well or deep-zone monitoring well as follows:

(a) Any time upon written request from the Director.

(b) Continuously monitor injection pressure, rate, injected volumes; pressure on the annulus between tubing and long-string casing; and annulus fluid volume, as specified in 40 CFR 146.89(b).

(c) Annually for external mechanical integrity using a method listed in 40 CFR 146.89(c).

(d) After any loss or suspected loss of mechanical integrity.

(e) For internal mechanical integrity, after removal of tubing or packer assembly.

(f) For external mechanical integrity, prior to plugging the well pursuant to 40 CFR 146.92(b)(2) and as listed in Attachment D of this Permit.

(g) After a seismic event as outlined in Attachment F Section 4.6 of this Permit.

(h) Prior to authorization to inject.

L.4 - Notification Prior to Testing and Reporting

(a) The Permittee must notify the Director of intent to demonstrate mechanical integrity at least 30 days prior to such demonstration. At the discretion of the Director, a shorter time period may be allowed.

(b) The mechanical integrity tests and procedures are listed in Attachment C of this Permit. If the Permittee wishes to use tests and procedures not listed, such tests and procedures must be approved by the Director in advance of the testing.

(c) The Permittee must report the results of a mechanical integrity demonstration no later than 30 days after the demonstration is complete. Testing reports on a mechanical integrity demonstration must include a description of the test and the methods used. Any demonstration which includes logs, must include an interpretation of results by a knowledgeable log analyst.

L.5 - EPA Witnessing of Mechanical Integrity Tests—Mechanical integrity tests for the wells must be witnessed by the Director or an authorized representative of the Director unless prior approval has been granted by the Director to run an unwitnessed test. If approval has been granted, to conduct testing without an EPA witness, the Permittee must adhere to the following procedures:

(a) Submit prior notice within the time period specified within this section and Section O.5 of this Permit, and receive written permission from the Director to proceed;

(b) Perform the test in accordance with the Testing and Monitoring Plan found in Attachment C of this Permit; and

(c) Submit a final report including any additional interpretation necessary for evaluation of the testing, including a test record and gauge certification to the Director within the time period specified in Section O.4 of this Permit.

L.6 - Gauge and Meter Calibration—Prior to testing, the Permittee must ensure proper calibration of all gauges used in mechanical integrity demonstrations and other monitoring required by this Permit. All equipment must be calibrated in the manner and frequency recommended by the

manufacturer and within one year prior to each required test. The date of the most recent calibration must be noted on or near the gauge or meter. A copy of the calibration certificate must be submitted to the Director with the report on the test. All recordings must read to an accuracy of no more than 0.5% of full scale for mechanical gauges. Pressure gauge resolution is not to exceed five pounds per square inch. When the Director determines that mechanical integrity or other testing requires greater accuracy, the Permittee must identify the alternative procedure and submit it to the Director prior to the test.

L.7 - Loss of Mechanical Integrity

(a) If the Permittee or the Director finds that: 1) the injection well or deep-zone monitoring well fails to demonstrate mechanical integrity during a test, 2) the injection well or deep-zone monitoring well fails to maintain mechanical integrity during operation, or 3) a loss of mechanical integrity during operation has likely occurred, the Permittee must:

(i) Cease injection immediately;

(ii) Take all reasonable measures necessary to determine whether there may have been a release or is evidence of a potential leak of the injected carbon dioxide stream or formation fluids into any unauthorized zone;

(iii) Implement the steps in the Emergency and Remedial Response Plan (Attachment F);

(iv) Within 24 hours of the event, notify the Director of the circumstances surrounding the event in accordance with Section O.3;

(v) Follow any other applicable reporting requirements as directed in Section O of this Permit;

(vi) Notify the Director when injection can be expected to resume and submit a projected plan for reestablishing mechanical integrity or plugging the well; and

(vii) Restore and demonstrate mechanical integrity to the satisfaction of the Director and receive written approval from the Director prior to resuming injection.

(b) If an automatic shutdown (i.e., downhole or at the surface) is triggered, the Permittee must immediately investigate and identify as expeditiously as possible the cause of the shutdown. If, upon investigation, the injection well or deep-zone monitoring well appears to be lacking mechanical integrity, or if the required monitoring indicates that the injection well or deep-zone monitoring well may be lacking mechanical integrity, the Permittee must take the actions listed above in this Section.

(c) The injection well or deep-zone monitoring well must remain shut in until the Permittee receives written approval from the Director to commence/resume injection.

L.8 - Alternative Mechanical Integrity Tests and Procedures — The Permittee must submit any proposed alternative tests and/or procedures not listed in the Testing and Monitoring Plan to the Director for approval prior to using them to demonstrate mechanical integrity per 40 CFR 146.89(e). Any such approval must be in accordance with the UIC regulations at 40 CFR 146.89(e); if any proposed alternatives are not listed in 40 CFR 146.89, they will require approval by the EPA Administrator.

M. SEISMIC EVENT REQUIREMENTS

M.1 – Seismic Event Notification Service – The Permittee must subscribe to the U.S. Geological Survey Earthquake Notification Service or similar seismic monitoring network to receive notification of seismic events (both natural and induced) within 50 miles from the injection well.

M.2 – Notice of Seismic Monitoring Network – The Permittee must provide the Director with specific details of any seismic monitoring network reasonably available to the Permittee prior to injection and must make available the collected data and information to the Director.

M.3 – Seismic Activity Response –The Permittee must perform response actions in accordance with Section 4.6, Table 2 in Attachment F Emergency Remedial and Response Plan.

N. TESTING AND MONITORING REQUIREMENTS

The Permittee must maintain and comply with the approved Testing and Monitoring Plan included as Attachment C of this Permit. Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity. If an alternative test is proposed that deviates from the procedures outlined in the Testing and Monitoring Plan in Attachment C of this Permit, the Permittee must submit it to the Director and obtain approval prior to conducting the test.

The Permittee must review the Testing and Monitoring Plan periodically to incorporate monitoring data collected under this subpart, operational data collected under 40 CFR 146.88, and the most recent area of review reevaluation performed under Section F of this Permit and 40 CFR 146.84(e). In no case shall the Permittee review the testing and monitoring plan less often than every five years. Based on this review, the Permittee must submit an amended Testing and Monitoring Plan or demonstrate to the Director that no amendment to the testing and monitoring plan is needed. The amended Testing and Monitoring Plan or demonstration must be submitted to the Director for review and approval within one year of an AoR reevaluation; following any significant changes to the facility such as addition of monitoring wells or newly permitted injection wells within the AoR; or when required by the Director. Any amendments to the Testing and Monitoring plan must be approved by the Director and incorporated into this Permit and are subject to the permit modification requirements at 40 CFR 144.39 or 144.41, if applicable.

If required by the Director as provided in 40 CFR § 146.90(i), the Permittee must perform any additional monitoring determined to be necessary to support, upgrade, and improve computational modeling of the AoR evaluation required under 40 CFR 146.84(c) and to determine compliance with standards under 40 CFR 144.12 or 146.86(a). This monitoring must be performed as described in a modification to Attachments B and C of this Permit.

O. REPORTING AND RECORDKEEPING

The Permittee must submit reports at frequencies described in the approved Testing and Monitoring Plan in Attachment C, and as otherwise required by this Permit. Reports must contain all the data and information required to be monitored, gathered and reported by this Permit, in accordance with 40 CFR 144.51(l) and 146.91.

O.1 - Electronic Reporting - All reports, submittals, notifications, correspondence to the Director, and records made and maintained by the Permittee under this Permit must be in an electronic format. The Permittee must electronically submit all required reports to an address or location as determined by the Director.

O.2 - Semiannual Reports—The Permittee must submit reports on a semi-annual basis. The reporting period for semi-annual reports will be from January 1 through June 30 and from July 1 through December 31. Reports must be submitted within 30 days of the end of each reporting period. Semi-annual reports must include all data collected as described in the approved Testing and Monitoring Plan. The second semi-annual report for each year must include all data that is required to be collected on an annual basis as described in the approved Testing and Monitoring Plan in Attachment C. Reports must contain the following information and data, as well as all other information and data collected not listed below, but as described in the approved Testing and Monitoring Plan in Attachment C:

(a) Any changes to the physical, chemical, and other relevant characteristics of the carbon dioxide stream from the proposed operating data;

(b) Monthly average, maximum, and minimum values for injection pressure, flow rate and daily volume, temperature, and annular pressure;

(c) A description of any event that exceeds operating parameters for annulus pressure or injection pressure specified in this Permit;

(d) A description of any event which triggers the shut-off systems required in Section K of this Permit, and the response taken;

(e) The monthly mass of the carbon dioxide stream injected over the reporting period and the mass injected cumulatively over the life of the project;

(f) Monthly annulus fluid volume added or produced; and

(g) Results of the continuous monitoring required in Section O including:

(i) A tabulation of: (1) daily maximum injection pressure, (2) daily minimum annulus pressure, (3) daily minimum value of the difference between simultaneous measurements of annulus and injection pressure, (4) daily mass of injectate, (5) daily maximum flow rate, and (6) average annulus tank fluid level; and

(ii) Graph(s) of the continuous monitoring or daily average values of these parameters. The injection pressure, injection mass and flow rate, annulus fluid level, annulus pressure, and temperature must be submitted on one or more graphs, using contrasting symbols or colors, or in another manner approved by the Director.

Results of any additional monitoring identified in the Testing and Monitoring Plan in Attachment C and described in Section O of this Permit

O.3 - 24-Hour Reporting Requirements

(a) Within 24 hours from the time the Permittee becomes aware of any of the circumstances listed below, Section E.13(e), or any events that require implementation of actions in the Emergency and Remedial Response Plan (Attachment F) including the release of the injected carbon dioxide stream or formation fluids into any unauthorized zone, the Permittee must notify the Director when there is:

(i) Any evidence that the injected carbon dioxide stream or associated pressure front may cause endangerment to a USDW, or any monitoring or other information which indicates that any contaminant may cause endangerment to a USDW;

(ii) Any noncompliance with a permit condition, or malfunction of the injection system, which may cause fluid migration into or between USDWs;

(iii) Any triggering of the shutoff system required in Section K.9. (i.e., downhole or at the surface);

(iv) Any failure to maintain mechanical integrity in the injection well or deep-zone monitoring wells;

(v) Any release of carbon dioxide to the atmosphere or subsurface, including results from surface air/soil gas monitoring pursuant to 40 CFR 146.90(h);

(vi) Any action taken to implement appropriate protocols outlined in the Emergency and Remedial Response Plan (Attachment F).

(b) Information must be provided, either directly or by leaving a message, within twenty-four (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 SDWA Enforcement Supervisor, or by contacting EPA Region 8 Emergency Operations Center at (303) 293-1788.

(c) A written submission must be provided to the Director within five days of the time the Permittee becomes aware of the circumstances described in Section O.3 (a) above. The submission must contain a description of the noncompliance, emergency, or remedial response and its cause; the period of noncompliance, emergency, or remedial response, including exact dates and times and, if the noncompliance has not been corrected, the anticipated time it is expected to continue as well as actions taken to implement appropriate protocols outlined in the Emergency and Remedial Response Plan (Attachment F); and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance or emergency or condition requiring remedial response.

O.4 - Reports on Well Tests and Workovers—The Permittee must report, within 30 days, the results of:

(d) Any mechanical integrity test required by this Permit;

(e) Any well workover, including stimulation;

(f) Any other test of the injection well conducted by the Permittee if required by the Director; and

(g) Any test of any monitoring well required by this Permit.

O.5 - Advance Notice Reporting

(a) *Well Tests*—The Permittee must give at least 30 days advance written notice to the Director of any planned workover, stimulation, or other well test.

(b) *Planned Changes*— See Section E.13(b). In addition, an analysis of any fluid proposed for injection that is not authorized under this Permit must be submitted to the Director for review and written approval at least 30 days prior to injection; any such approval, if given, may result in a permit modification.

(c) *Anticipated Noncompliance*—See Section E.13(c).

O.6 - Additional Reports

(a) *Compliance Schedules*— See Section E.13(d)

(b) *Other Noncompliance*—See Section E.13(f). The reports must include any monitoring or other information which indicates that any injected carbon dioxide stream or injection zone fluid has moved into any unauthorized zone, or that any contaminant may cause an endangerment to a USDW, or any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into any unauthorized zone or into or between USDWs.

(c) *Other Information*—See Section E.13(g)

(d) *Report on Permit Review*—Within 30 days of receipt of this Permit, the Permittee must certify to the Director that they have read and are personally familiar with all terms and conditions of this Permit.

O.7 - Records and Record Retention

(a) The Permittee must retain records and all monitoring information, including all calibration and maintenance records and all original chart recordings for continuous monitoring instrumentation and copies of all reports required by this Permit (including records from pre-injection, active injection, and post-injection phases) for a period of at least 10 years from collection.

(b) The Permittee must maintain records of all data required to complete the permit application form for this Permit and any supplemental information (e.g., modeling

inputs for AoR delineations and reevaluations, Plan modifications) submitted under 40 CFR 144.27, 144.31, 144.39, and 144.41 until at least 10 years after site closure.

(c) The Permittee must retain records concerning the nature and composition of all injected fluids until 10 years after site closure. The Director may require the Permittee to deliver the records to the Director at the conclusion of the retention period.

(d) The Permittee must retain all records of well plugging reports, post-injection site care data, including, if appropriate, data and information used to develop the demonstration of the alternative post-injection site care timeframe, and the site closure report collected pursuant to requirements at 40 CFR 146.93(f) and (h) shall be retained for 10 years following site closure.

(e) The retention periods may be extended by the Director at any time. In these cases, the Permittee must continue to retain records after the retention period specified in this section of the Permit or any Director extension thereof unless the Permittee delivers the records to the Director or obtains written approval from the Director to discard the records.

(f) Records of monitoring information must include:

(i) The date, exact place, and time of sampling or measurements;

(ii) The name(s) of the individual(s) who performed the sampling or measurements;

(iii) A precise description of both sampling methodology and the handling of samples;

(iv) The date(s) analyses were performed;

(v) The name(s) of the individual(s) who performed the analyses;

(vi) The analytical techniques or methods used; and

(vii) The results of such analyses.

P. WELL PLUGGING, POST-INJECTION SITE CARE, AND SITE CLOSURE

The Permittee must maintain and comply with the approved Well Plugging Plan (Attachment D) and the approved Post Injection Site Care and Site Closure Plan (Attachment E). The Well Plugging Plan and the Post-Injection Site Care and Site Closure Plan are enforceable conditions of this Permit.

P.1 - Well Plugging Plan Revisions—Any amendments to the Well Plugging Plan (Attachment D) or the Post-Injection Site Care and Site Closure Plan (Attachment E) must be approved by the Director and must be incorporated into the Permit and are subject to the permit modification requirements.

P.2 - Required Activities Prior to Plugging—Prior to the well plugging, the Permittee must flush each Class VI well with a buffer fluid, determine bottomhole reservoir pressure, and perform a final external mechanical integrity test. The Permittee must follow all required activities prior to plugging in accordance with Attachment D of this permit.

P.3 - Notice of Plugging and Abandonment—The Permittee must notify the Director in writing at least 60 days before plugging, conversion, or abandonment of the injection well, and must provide the Director or their representative the opportunity to attend. A shorter notice period may be allowed at the discretion of the Director.

P.4 - Plugging and Abandonment Approval and Report

(a) The Permittee must receive written approval from the Director before plugging the well(s) and must plug and abandon the well(s) as described in the approved Well Plugging Plan (Attachment D).

(b) Within 60 days after plugging, the Permittee must submit a plugging report to the Director. The report must be signed and certified as accurate by the Permittee in accordance with 40 CFR 144.32 and by the person who performed the plugging operation (if other than the Permittee). The Permittee must retain the well plugging report for 10 years following site closure. The report must include:

(i) A statement that the well was plugged in accordance with the approved Well Plugging Plan (Attachment D);

P.5 - Temporary Abandonment—After any 24-consecutive-month period of no injection, the injection well is considered to be in a temporarily abandoned status, and the Permittee must plug and abandon the injection well in accordance with the approved Well Plugging Plan (Attachment D) or make a demonstration of non-endangerment of this injection well that is satisfactory to the Director while it is in temporary abandonment status. In no case shall Permittee keep the injection well in temporary abandonment for more than ten consecutive years. To make such a demonstration, the Permittee must notify the Director within 30 days of temporary abandonment and submit a request that describes actions or procedures that the Permittee will take to ensure that the well will not endanger USDWs during the period of temporary abandonment. These actions and procedures shall include compliance with the technical requirements applicable to active injection wells. This demonstration must be approved by the Director. Temporary abandonment status includes instances where well construction/conversion has begun or been completed but no authorization to commence injection has been approved by the Director. During any periods of temporary abandonment, the Permittee must continue to comply with the conditions of this Permit, including all monitoring and reporting requirements and all applicable regulations. The Permittee of an injection well that has been temporarily abandoned must notify the Director prior to resuming operation of the injection well.

P.6 - Post-Injection Site Care and Site Closure Plan

(a) Upon cessation of injection, he Permittee must either submit an amended Post-Injection Site Care and Site Closure Plan (Attachment E of this Permit) for the Director's approval or demonstrate through monitoring data and modeling results that no amendment to the Plan is needed. Any amendments to the post-injection site case and site closure plan must be approved by the Director, be incorporated into the Permit, and are subject to the permit modification requirements.

(b) At any time during the life of the geologic sequestration project, the owner or operator may modify and resubmit the post-injection site care and site closure plan for the Director's approval within 30 days of such change.

(c) The owner or operator shall monitor the site following the cessation of injection to show the position of the carbon dioxide plume and pressure front and demonstrate that USDWs are not being endangered.

(d) Prior to authorization for site closure, the Permittee must submit to the Director for review and approval, a demonstration, based on information collected pursuant to Section O of this Permit, that the carbon dioxide plume and the associated pressure front do not pose an endangerment to USDWs and that no additional monitoring is needed to ensure that the project does not pose an endangerment to USDWs, as required under 40 CFR 146.93(b)(3). If this demonstration cannot be made or if the Director does not approve the demonstration, the Permittee must submit to the Director an amended Post-Injection Site Care and Site Closure Plan (subject to Director approval) to continue post-injection site care until a demonstration by the Permittee can be made and approved by the Director. Consistent with 40 CFR 144.12(b) and 146.90(i), he Director has the authority to modify the post-injection site monitoring requirements--including an extension of the monitoring period--if there is a concern that USDWs are at risk of endangerment.

(e) The Permittee must notify the Director at least 120 days before site closure. At this time, if any changes to the approved Post-Injection Site Care and Site Closure Plan in Attachment E of this Permit are proposed, the Permittee must submit a revised Plan for Director approval.

(f) After the Director has authorized site closure, the Permittee must plug all monitoring wells and any injection wells that remain unplugged as specified in Attachments D and E of this Permit in a manner, which will prevent movement of injection or formation fluids that endangers a USDW. The Permittee must also restore the site to its pre-injection condition.

(g) The Permittee must submit a site closure report to the Director within 90 days of site closure. The report must include the information specified at Attachment E.

(h) The Permittee must record a notation on the deed to the facility property or any other document that is normally examined during a title search that will in perpetuity provide any potential purchaser of the property with the following information consistent with 40 CFR 146.93(g):

  (i) The fact that land has been used to sequester carbon dioxide;

  (ii) The name of the State agency, local authority, and/or Tribe with which the survey plat was filed, as well as the address of the Environmental Protection Agency Regional Office to which it was submitted; and

  (iii) The volume of fluid injected, the injection zone or zones into which it was injected, and the period over which injection occurred.

(i) The Permittee must retain, for 10 years following site closure, an electronic copy of the site closure report and records collected during the post-injection site care period, including well plugging reports, post-injection site care data, including, if appropriate, data and information used to develop the demonstration of the alternative post-injection site care timeframe, The Permittee must deliver the records to the Director at the conclusion of the retention period.

Q. EMERGENCY AND REMEDIAL RESPONSE

The Permittee must maintain and comply with the approved Emergency and Remedial Response Plan (Attachment F), which is an enforceable condition of this Permit. The Emergency and Remedial Response Plan describes actions the Permittee must take to address movement of the injection, annulus, or formation fluids that may cause an endangerment to a USDW during construction, operation, and post-injection site care periods.

Q.1 Emergency and Remedial Response Plan Requirements

If the Permittee obtains evidence that the injected carbon dioxide stream and associated pressure front may cause endangerment to a USDW, the Permittee must:

(a) Immediately cease injection in accordance with Section L and Attachment F of this Permit;

(b) Take all reasonable steps necessary to identify and characterize any release;

(c) Notify the Director within 24 hours; and

(d) Implement the approved Emergency and Remedial Response Plan in (Attachment F) approved by the Director.

Q.2 – Frequency of Emergency and Remedial Response Plan Amendments

The Permittee must periodically review the Emergency and Remedial Response Plan. The Permittee must review the Emergency and Remedial Response Plan no less often than once every five years. Based on this review, the Permittee must submit an amended emergency and remedial response plan or demonstrate to the Director that no amendment to the emergency and remedial response plan is needed. Any amendments to the Emergency and Remedial Response Plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at 40 CFR 144.39 or 144.41, as appropriate. Amended plans or demonstrations must be submitted to the Director as follows:

(a) Within one year of an AoR reevaluation;

(b) Following any significant changes to the facility, such as addition of injection or monitoring wells, on a schedule determined by the Director; or

(c) When required by the Director.

If the amendments to the Emergency and Remedial Response Plan cause the cost estimates to change, then a new financial responsibility demonstration must be submitted for review and approval by the Director in accordance with Section G.1. of this Permit.

Ten

years following the cessation of injection operations, the Permittee must annually collect and analyze the geochemistry of fluids and dissolved gasses from the FR 2-1 well for the Entrada and Ingleside Formation. These data will confirm the integrity of the Upper and Lower Confining Zone. Measurements will be event-driven thereafter (changes in temperature and/or pressure. If geochemistry data of fluids and dissolved gasses in the adjacent USDW are consistent with the absence of introduced Injection Zone brine or CO_2 injectate into the USDW, this monitoring method will be discontinued after 10 years.