U.S. ENVIRONMENTAL PROTECTION AGENCY

UNDERGROUND INJECTION CONTROL PERMIT

FINAL PERMIT

CLASS VI INJECTION WELL

Permit Number: R9UIC-CA6-FY22-1.1

Well Name: 373-35R

Issued to:

Carbon TerraVault JV Storage Company Sub 1, LLC

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne St.
San Francisco, CA 94105-3901

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT: CLASS VI

Permit Number: R9UIC-CA6-FY22-1.1
Facility Name: CTV 1: Elk Hills 26R

Pursuant to the Safe Drinking Water Act and Underground Injection Control regulations of the U.S. Environmental Protection Agency codified at Title 40 of the Code of Federal Regulations (40 CFR) Parts 124, 144, 146, and 147,

Carbon TerraVault JV Storage Company Sub 1, LLC of Tupman, CA

hereinafter, the permittee, is hereby authorized to construct and operate a Class VI injection well located in the State of California, Kern County, T 30 S, R 23 E of Mount Diablo Base Meridian, Section 35, 35° 16' 34.5276" N, 119° 28' 24.1836" W, as part of the Elk Hills 26R Carbon Dioxide Storage Project. The well will inject a carbon dioxide stream (carbon dioxide is also called CO_2 in the attachments to this permit) sourced initially from pre-combustion gas treatment within the Elk Hills Oil Field (see Attachment B). The permittee may request to inject carbon dioxide from additional emission sources in the future, subject to review and approval by EPA, as described in Section N of this permit. The permittee stated in their application that potential future sources of carbon dioxide may include: post combustion capture from the Elk Hills power plant, renewable fuel plants, post combustion capture from steam generators, other power plants, and industrial sources. The carbon dioxide stream, as characterized in the permit application and the administrative record, shall be a liquid, supercritical fluid, or gas. Injection is authorized into the Monterey Formation at a depth of approximately 6,000 feet below ground surface upon the express condition that the permittee meet the restrictions set forth herein. The designated confining zone for this injection is the Reef Ridge Shale Formation.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs federal agencies, to the greatest extent practical and permitted by law, to identify and address, as appropriate, disproportionate, and adverse human health or environmental impacts on people of color and low-income populations. See Exec. Order No. 12898, 59 Fed. Reg. 7629 (Feb. 11, 1994). Recently, Executive Order 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, supplemented this direction. See Exec. Order No. 14096, 88 Fed. Reg. 25251 (Apr. 21, 2023). As part of the decision-making process for this permit, EPA considered these executive orders and EPA's Environmental Justice Guidance for UIC Class VI Permitting and Primacy (Aug. 17, 2023). EPA's evaluation and consideration of environmental justice for this permit is described in EPA's Fact Sheet.

This permit is for the construction and operation of one Class VI injection well (well name 373-35R); three other wells at the Elk Hills 26R Carbon Dioxide Storage Project are authorized under separate Class VI permits (Permit Nos. R9UIC-CA6-FY22-1.2, R9UIC-CA6-FY22-1.3 and R9UIC-CA6-FY22-1.4). Injection shall not commence until the operator has received written authorization from the Director of the Water Division of EPA Region 9, in accordance with Section S of this permit.

All references to Title 40 of the Code of Federal Regulations are to all regulations that are in effect on the date that this permit is effective. The following attachments are incorporated into this permit as enforceable conditions:

- A: Summary of Operating Requirements;
- B: Area of Review and Corrective Action Plan;
- C: Testing and Monitoring Plan;
- D: Well Plugging Plan;
- E: Post-injection Site Care and Site Closure Plan;
- F: Emergency and Remedial Response Plan;
- G: Construction Details;
- H: Financial Assurance Demonstration; and
- I: Stimulation Program.

This permit shall become effective on February 3, 2025, and shall remain in full force and effect during the operating life of the well and the post-injection site care period until site closure is authorized and completed, unless this permit is revoked and reissued, terminated, or modified pursuant to 40 CFR 144.39, 144.40, or 144.41. This permit shall also remain in effect upon delegation of primary enforcement responsibility of the UIC program for Class VI wells to the State of California until such time as the State issues its own permit to the permittee or the State chooses to adopt this permit as a State permit. At least every five years from the effective date specified above, the permittee must re-evaluate the Area of Review and comply with 40 CFR 146.84(e). If results from the re-evaluated Area of Review are different from what is predicted in Attachment B of this permit, EPA may require the permittee to update the permit and the attachments.

Digitally signed by
TOMAS TORRES
Date: 2024.12.30
15:28:05 -08'00'

Tomás Torres
Director, Water Division

PERMIT CONDITIONS

A. EFFECT OF PERMIT

The permittee is authorized to engage in underground injection in accordance with the conditions of this permit. Notwithstanding any other provisions of this permit, the permittee authorized by this permit shall 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 zones. The objective of this permit is to prevent the movement of fluids into or between USDWs or into any unauthorized zones consistent with the requirements at 40 CFR 146.86(a). 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 to any action brought under Section 1431 of the SDWA or any other common or statutory law other than Part C of the SDWA.

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. Nothing in this permit, nor compliance with its terms, shall be construed to relieve the permittee of any duties under applicable State or local laws or regulations that are not preempted or superseded by the Federal SDWA Underground Injection Control (UIC) program.

B. PERMIT ACTIONS

1. **Modification, Revocation and Reissuance, and Termination –** The Director of the Water Division of Region 9 of the U.S. Environmental Protection Agency (EPA), hereinafter, the Director, may, for cause or upon request from any interested person, including the permittee, modify, revoke and reissue, or terminate this permit in accordance with 40 CFR 124.5, 144.12, 146.86(a), 144.39, and 144.40. The permit is also subject to minor modifications for cause as specified in 40 CFR 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 permit condition.

2. **Minor Modifications –** Upon the consent of the permittee, the Director may modify this permit to make the corrections or allowances for minor changes in the permitted activity as listed in 40 CFR 144.41. Any permit modification not processed as a minor modification under 40 CFR 144.41 must be made for cause, and with part 124 draft permit and public notice as required in 40 CFR 144.39.

3. **Transfer of Permits** – This permit is not transferable to any person except in accordance with 40 CFR 144.38(a) and Section O(6)(b) of this permit.

4. Permit Expiration – The Permit shall 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 to and approved by the Director. The Permittee shall submit such requests prior to the permit expiration or extension deadline, whichever is applicable. Each request shall state delay causality, give an estimated well completion date, include updated financial assurance cost estimates and list any additional wells that penetrate the designated confining zone within the area of review (AOR) which were not included in the initial permit application.

C. 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.

D. CONFIDENTIALITY

In accordance with 40 CFR part 2 (Public Information) and 40 CFR 144.5, any information submitted to EPA pursuant to this permit may be claimed as confidential business information by the submitter. Any such claim must be asserted at the time of submission by clearly identifying each page with the words "confidential business information" on every page containing such information. If no claim is made at the time of submission, 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.

E. DEFINITION

All terms used in this permit shall have the meaning set forth in the SDWA and Underground Injection Control regulations specified at 40 CFR parts 124, 144, 146, and 147. Unless specifically stated otherwise, all references to "days" in this permit should be interpreted as calendar days.

F. DUTIES AND REQUIREMENTS

1. **Duty to Comply** – The permittee shall 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, modification, or for denial of a permit renewal application.

2. **Duty to Reapply** – If the permittee wishes to continue an activity regulated by this permit after the expiration or termination of this permit, the permittee must apply for and obtain a new permit.

3. **Penalties for Violations of Permit Conditions** – Any person who violates a permit requirement is subject to civil penalties and other enforcement action under the SDWA. Any person who willfully violates permit conditions may be subject to criminal prosecution under the SDWA and other applicable statutes and regulations.

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.

5. **Duty to Mitigate** – The permittee shall take all timely and reasonable steps necessary to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

6. **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, among other things, 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.

7. **Duty to Provide Information** – The permittee shall furnish to the Director in an electronic format, 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 or the UIC regulations. The permittee shall also furnish to the Director, upon request within a time specified, electronic copies of records required to be kept by this permit.

8. **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 electronic or non-electronic records are kept under the conditions of this permit;

   (b) Have access to and copy, at reasonable times, any electronic or non-electronic records that are 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.

9. **Signatory Requirements** – All reports or other information, required to be submitted by this permit or requested by the Director shall be signed and certified in accordance with 40 CFR 144.32.

G. AREA OF REVIEW AND CORRECTIVE ACTION

1. The Area of Review (AoR) is the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The AoR is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and is based on available site characterization, monitoring, and operational data. The permittee shall maintain and comply with the approved Area of Review and Corrective Action Plan (Attachment B of this permit) which is an enforceable condition of this permit and shall meet the requirements of 40 CFR 146.84.

2. Plugging and Abandonment of Wells in the AoR

(a) All wells that penetrate the Reef Ridge Formation within the delineated AoR and are not used for monitoring (341-27R,328-25R, 376-36R) or injection (373-35R, 345C-36R, 353XC-35R, 363C- 27R) are required to be properly plugged and abandoned prior to the authorization of carbon dioxide injection.

(b) Within 30 days of an effective permit, the permittee must submit in an electronic format plugging reports for wells in the AoR that have already been plugged and abandoned. The well reports must document the process and materials used for plugging activities on each well. The report must be certified as accurate by the permittee and by the person who performed the plugging operation (if other than the permittee). If any of the plugged and abandoned wells are found to be deficient by EPA, the permittee shall submit a plan for approval by EPA to re-enter, plug, and abandon the wells, in a way that prevents the migration of fluids into any USDWs.

(c) For wells that require plugging, within 60 days after plugging work is completed, the permittee must submit in an electronic format a plugging report to the Director. The plugging report must document the process and materials used for plugging activities on each well. The report must be certified as accurate by the permittee and by the person who performed the plugging operation (if other than the permittee.)

3. At least sixty (60) days prior to commencing corrective action, the permittee shall submit procedures for performing corrective action on the identified deficient wells within the AoR and not commence any corrective action until the procedures are approved by the Director.

    (a) As corrective action activities are completed, the permittee shall provide periodic updates, including plugging reports, to the Director.

    (b) Corrective action on all deficient wells in the AoR must be complete, and approved in writing by EPA, before the permittee may commence injection pursuant to Section Q(3) of this permit.

4. At a fixed frequency of every five years, or more frequently when monitoring and operational conditions warrant, the permittee must reevaluate the area of review and perform any necessary corrective action in the manner specified in 40 CFR 146.84. The first reevaluation shall be completed no later than 5 years from the effective date of this permit unless the Director requests an earlier reevaluation. After conducting an AoR reevaluation, the permittee shall update the Area of Review and Corrective Action Plan or demonstrate to the Director that no update is needed.

5. Following each AoR reevaluation, the permittee shall submit the resultant information (i.e., the completed reevaluation analysis, along with either a revised AoR and Corrective Action Plan or a demonstration that the reevaluation analysis determined no revised Plan is needed) in an electronic format to the Director for review and approval. If a revised AoR and Corrective Action Plan is submitted and approved by the Director, the revised Plan becomes an enforceable condition of this permit.

6. To ensure permit activities do not increase environmental impacts, resource needs, and public health risks in already overburdened communities, along with the submittal of a revised AoR and Corrective Action Plan, the permittee shall submit an updated EJScreen analysis that incorporates the revised AoR boundary.

H. FINANCIAL RESPONSIBILITY

1. **Financial Responsibility** – The permittee shall maintain financial responsibility and resources to meet the requirements of 40 CFR 146.85 and the conditions of this permit. Financial responsibility shall be maintained through all phases of the project. The permittee must maintain financial responsibility until site closure is authorized from the director as described in Section Q of this permit. Compliance with the financial responsibility requirements, including the applicable duration, described in this permit shall not relieve the permittee from complying with any other applicable Federal, State, and local financial responsibility requirements that are not preempted or superseded by the Federal SDWA UIC program.

    The financial instrument(s) must be sufficient to cover the cost of:

(a) Corrective action (that meets the requirements of 40 CFR 146.84);

(b) Injection well plugging (that meets the requirements of 40 CFR 146.92);

(c) Post injection site care and site closure (that meets the requirements of 40 CFR (146.93) and;

(d) Emergency and remedial response (that meets the requirements of 40 CFR 146.94).

The permittee submitted a letter of credit, with a standby trust agreement, to cover financial assurance for items 1(a), (b), and (c) and submitted a certificate of insurance with details about a third-party insurance policy it will secure to cover financial assurance for 1(d). The EPA-approved financial assurance mechanisms are found in Attachment H and in the administrative record of this permit.

The total initial cost estimates for these activities to be covered by the approved financial assurance mechanisms is $33,672,785. This amount covers all four Class VI injection well permits for the Elk Hills 26R CO_2 Storage Project.

1. **Cost Estimate Updates** – During the active life of the geologic sequestration project, the permittee must adjust the cost estimate for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s) and provide this adjustment to the Director in an electronic format. The permittee must also provide to the Director written updates in an electronic format of adjustments to the cost estimate within 60 days of any amendments to the Project Plans included as Attachments B – F of this permit, which address items (a) through (d) in Section H(1) of this permit.

2. **Notification** –

   (a) Whenever the current cost estimate increases to an amount greater than the face amount of a financial instrument currently in use, 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 financial responsibility instruments to cover the increase.

   (b) Whenever the current cost estimate decreases, the face amount of the financial assurance instrument may be reduced to the amount of the current cost estimate only after the permittee has submitted a justification for the reduced cost estimate and received written approval from the Director. For requested reductions in the face amount of a financial instrument, the Director may provide notice to the public of the proposed reduction, prior to finalizing approval of the reduction.

   (c) The permittee must notify the Director by certified mail and in an electronic format of adverse financial conditions such as bankruptcy that may affect the ability to carry out

injection well plugging, post-injection site care and site closure, and any applicable ongoing actions under Corrective Action or Emergency and Remedial Response.

(i) If the permittee or the third-party provider of a financial responsibility instrument is going through a bankruptcy, the permittee must notify the Director by certified mail and in an electronic format of the commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code, naming the permittee as debtor, within 10 days after commencement of the proceeding.

(ii) A permittee who fulfills the requirements of paragraph (a) of this section by obtaining a trust fund, surety bond, letter of credit, escrow account, or insurance policy will be deemed to be without the required financial assurance in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution to act as trustee of the institution issuing the trust fund, surety bond, letter of credit, escrow account, or insurance policy.

3. **Establishing Other Coverage** – The permittee must establish other financial assurance or liability coverage acceptable to the Director, within 60 days of the occurrence of the events in Section H(2) or H(3) of this permit.

I. CONSTRUCTION

1. **Siting** – The permittee has demonstrated to the satisfaction of the Director that the well is in an area with suitable geology in accordance with the requirements at 40 CFR 146.83.

2. **Casing and Cementing** – Casing and cement or 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 and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director. The casing and cementing program must prevent the movement of fluids into or between USDWs for the expected life of the well in accordance with 40 CFR 146.86. The casing and cement used in the construction of this well are shown in Attachment G of this permit and in the administrative record for this permit. Any change must be submitted in an electronic format for approval by the Director before installation.

3. **Tubing and Packer Specifications** – 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 American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director. The permittee shall inject only through tubing with a packer set within the long string casing at a point within or below the confining zone immediately above the injection zone. The tubing and packer used in the well are represented in engineering

drawings contained in Attachment G of this permit. Any change must be submitted in an electronic format for approval by the Director before installation.

4. **Compatibility Testing of Injection and In-Zone Monitoring Wells** – Prior to initiating construction, the permittee must submit a final demonstration for approval by the Director that must include, at a minimum, corrosion modeling for well materials that will be in contact with the injection formation, including any chromium 13 components, over the timescale of the project. The corrosion modeling must include the site-specific chemistry, including the carbon dioxide-stream and formation fluids, and include possible stress cases in addition to normal operations and any other relevant factors.

J. PRE-INJECTION TESTING

1. Prior to the Director authorizing injection, the permittee shall perform all pre-injection logging, sampling, and testing specified at 40 CFR 146.87. This testing shall provide data sufficient to address the pre-operational testing objectives identified in Attachment G of this permit, including:

   (a) Logs, surveys, and tests to determine or verify the depth, thickness, porosity, permeability, lithology, and formation fluid salinity in all relevant geologic formations. These tests shall include:

      (i) Deviation checks that meet the requirements of 40 CFR 146.87(a)(1);

      (ii) Logs and tests before and upon installation of the surface casing that meet the requirements of 40 CFR 146.87(a)(2);

      (iii) Logs and tests before and upon installation of the long-string casing that meet the requirements of 40 CFR 146.87(a)(3);

      (iv) Tests to demonstrate internal and external mechanical integrity that meet the requirements of 40 CFR 146.87(a)(4); and

      (v) Any alternative methods that are required by or approved by the Director pursuant to 40 CFR 146.87(a)(5).

   (b) Whole cores or sidewall cores of the injection zone and confining system and formation fluid samples from the injection zone that meet the requirements of 40 CFR 146.87(b);

   (c) Records of the fluid temperature, pH, conductivity, reservoir pressure, and static fluid level of the injection zone that meet the requirements of 40 CFR 146.87(c);

   (d) Tests to provide information about the injection and confining zones, including calculated fracture pressure and the physical and chemical characteristics of the

injection and confining zones and the formation fluids in the injection zone that meet the requirements of 40 CFR 146.87(d); and

(e) Tests to verify hydrogeologic characteristics of the injection zone that meet the requirements of 40 CFR 146.87(e), including:

(i) A pressure fall-off test; and

(ii) A pumping test or injectivity tests.

2. The permittee shall submit to the Director for approval in an electronic format a schedule for logging and testing activities 30 days prior to conducting the first test and submit any changes to the schedule 30 days prior to the next scheduled test. The permittee must provide the Director or their representative with the opportunity to witness all logging, sampling, and testing required under this Section.

K. OPERATIONS

1. **Injection Fluids/Carbon Dioxide Sources –** The permittee will capture carbon dioxide from multiple sources during the life of the permit for injection into the Class VI well. The initial source of carbon dioxide approved for injection is Elk Hill Oil Field pre-combustion gas treatment (see Attachment B). The permittee may propose additional sources of carbon dioxide for injection, subject to review and approval by EPA, as described in Section N of this permit.

2. **Injection Pressure Limitation** – The permittee must ensure that injection pressure does not exceed 90 percent of the fracture pressure of the injection zone(s) to ensure that the injection does not initiate new fractures or propagate existing fractures in the injection zone(s). In no case 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 maximum injection pressure limit is listed in Attachment A.

3. **Stimulation Program** – Pursuant to requirements at 40 CFR 146.82(a)(9), all stimulation programs proposed by the permittee must be approved by the Director as a permit modification and incorporated into Attachment I of this permit.

4. **Additional Injection Limitation** – No injectate other than that which has been analyzed and approved by the Director under this permit in accordance with Section N of this permit shall be injected except fluids used for rework, and well tests as approved by the Director.

5. **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.

6. **Annulus/Tubing Pressure Differential** – Except during workovers or times of annulus maintenance, the permittee must maintain on the annulus a pressure that exceeds the

operating injection pressure as specified in Attachment A of this permit, unless the Director determines that such requirement might harm the integrity of the well or endanger USDWs.

7. **Automatic Alarms and Automatic Shut-off System** –

   (a) The permittee must:

      (i) Install, continuously operate, and maintain an automatic alarm and an automatic shut-off system or, at the discretion of the Director, down-hole shut-off systems, or other mechanical devices that provide equivalent protection; and

      (ii) Successfully demonstrate the alarm system and shut-off system operates according to manufacturer's specifications prior to the Director authorizing injection, and at a minimum of once every twelfth month after the last approved demonstration.

      (iii) Establish well-specific thresholds for activating the shut-off system and submit a revised Attachment A to the Director prior to the Director authorizing injection.

   (b) Testing under this Section must involve subjecting the system to simulated failure conditions and must be witnessed by the Director or his or her representative unless the Director authorizes an unwitnessed test in advance. The permittee must provide notice in an electronic format 30 days prior to running the test and must provide the Director or their representative the opportunity to attend. The test must be documented using either a mechanical or 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 in an electronic format within the time period specified in Section O(4) of this permit.

8. **Precautions to Prevent Well Blowouts** – At all times, the permittee shall maintain on the well a pressure which will prevent the return of the injection fluid to the surface. The well bore must be filled with a high specific gravity fluid during workovers to maintain a positive (downward) gradient or a plug shall be installed which can resist the pressure differential. A blowout preventer must be installed and kept in proper operational condition whenever the wellhead is removed to work on the well. The permittee shall follow procedures such as those below to assure that a backflow or blowout does not occur:

   (a) Limit the temperature and/or corrosivity of the injectate; and

   (b) Develop procedures necessary to assure that pressure imbalances do not occur.

9. **Circumstances Under Which Injection Must Cease** –

Injection shall cease when any of the following circumstances arise:

(a) Failure of the well to pass a mechanical integrity test;

(b) A loss of mechanical integrity during operation;

(c) The automatic alarm or automatic shut-off system is triggered;

(d) A significant unexpected change in the annulus or injection pressure;

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

(f) The permittee is unable to maintain compliance with any permit condition or regulatory requirement and the Director determines that injection should cease.

10. **Approaches for Ceasing Injection** –

(a) The permittee must shut-in the well by gradual reduction in the injection pressure as outlined in Attachment A of this permit; or

(b) The permittee must immediately cease injection and shut-in the well as outlined in the Emergency and Remedial Response Plan (Attachment F of this permit).

L. MECHANICAL INTEGRITY

1. **Standards** – Other than during periods of well workover (maintenance) approved by the Director in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the injection well must have and maintain mechanical integrity consistent with 40 CFR 146.89. To meet these requirements, mechanical integrity tests/demonstrations 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 un-witnessed test. To conduct testing without an EPA representative, the following procedures must be followed.

(a) The permittee must submit prior notification in an electronic format within the time period specified in Section L(3) of this permit and if EPA informs the permittee that no EPA representative is available this must be documented in the approved plan and testing report. The permittee must receive permission from the Director to proceed;

(b) The test must be performed in accordance with the Testing and Monitoring Plan (Attachment C of this permit) and documented using either a mechanical or digital device that records the value of the parameter of interest; and

(c) A final report including any additional interpretation necessary for evaluation of the testing must be submitted in an electronic format within the time period specified in Section O(4) of this permit.

2. **Mechanical Integrity Testing** – The permittee shall conduct a casing inspection log and mechanical integrity testing as follows:

(a) Prior to receiving authorization to inject, the permittee shall perform the following testing to demonstrate internal mechanical integrity pursuant to 40 CFR 146.87(a)(4):

(i) A pressure test with liquid or gas; and

(ii) A casing inspection log; or

(iii) An alternative approved by the Director that has been approved by the Administrator pursuant to requirements at 40 CFR 146.89(e).

(b) Prior to receiving authorization to inject, the permittee shall perform the following testing to demonstrate external mechanical integrity pursuant to 40 CFR 146.87(a)(4):

(i) A tracer survey such as an oxygen activation log; or

(ii) A temperature or noise log; or

(iii) An alternative approved by the Director that has been approved by the Administrator pursuant to requirements at 40 CFR 146.89(e).

(c) Other than during periods of well workover (maintenance) approved by the Director in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the permittee must continuously monitor injection pressure, injection rate, injection volumes, pressure on the annulus between tubing and long string casing, and annulus fluid volume as specified in 40 CFR 146.88(e) and 146.89(b).

(d) At least once per year, the permittee must perform the following testing to demonstrate external mechanical integrity pursuant to 40 CFR 146.89(c):

(iii) An Administrator-approved tracer survey such as an oxygen-activation log; or

(iv) A temperature or noise log. The Director may require such tests whenever the well is worked over; or

(v) An alternative approved by the Director that has been approved by the Administrator pursuant to requirements at 40 CFR 146.89(e).

(e) After any workover that may compromise the internal mechanical integrity of the well, the well shall be tested by means of a pressure test approved by the Director and the well must pass the test to demonstrate mechanical integrity.

(f) Prior to plugging the well, the permittee shall demonstrate external mechanical integrity as described in the Injection Well Plugging Plan and that meets the requirements of 40 CFR 146.92(a).

(g) The Director may require the use of any other tests to demonstrate mechanical integrity other than those listed above with the written approval of the Administrator pursuant to requirements at 40 CFR 146.89(e).

3. **Prior Notice and Reporting** –

(a) The permittee shall notify the Director in an electronic format of his or her 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) Reports of mechanical integrity demonstrations which include logs must include an interpretation of results by a knowledgeable log analyst. The permittee shall report in an electronic format the results of a mechanical integrity demonstration within the time period specified in Section O(4) of this permit.

4. **Gauge and Meter Calibration** – The permittee shall calibrate all gauges used in mechanical integrity demonstrations and other required monitoring to an accuracy of not less than 0.5 percent of full scale, within one year prior to each required test. The date of the most recent calibration shall be noted on or near the gauge or meter. A copy of the calibration certificate shall be submitted to the Director in an electronic format with the report of the test. Pressure gauge resolution shall be no greater than five psi. Certain mechanical integrity and other testing may require greater accuracy and shall be identified in the procedure submitted to the Director prior to the test.

5. **Loss of Mechanical Integrity** –

(a) If the permittee or the Director finds that the well fails to demonstrate mechanical integrity during a test, or fails to maintain mechanical integrity during operation, or that a loss of mechanical integrity as defined by 40 CFR 146.89(a)(1) or (2) is suspected during operation (such as a significant unexpected change in the annulus or injection pressure), the permittee must:

(i) Cease injection in accordance with Sections K(8) and K(9)(a) or (b), and Attachments A or F of this permit;

(ii) Take all steps reasonably necessary to determine whether there may have been a release of the injected carbon dioxide stream or formation fluids into any

unauthorized zone. If there is evidence of USDW endangerment, implement the Emergency and Remedial Response Plan (Attachment F of this permit);

(iii) Follow the reporting requirements as directed in Section O of this permit;

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

(v) After receiving written approval to resume injection, notify the Director in an electronic format when injection is expected to resume.

(b) If a shutdown (*i.e.,* down-hole or at the surface) is triggered, the permittee must immediately investigate and identify as expeditiously as possible the cause of the shutdown. If, upon such investigation, the well appears to be lacking mechanical integrity, or if monitoring required indicates that the well may be lacking mechanical integrity, the permittee must take the actions listed above in Section L(5)(a)(i) through (v).

(c) If the well loses mechanical integrity prior to the next scheduled test date, then the well must either be plugged or repaired and retested within 30 days of losing mechanical integrity. The permittee shall not resume injection until mechanical integrity is demonstrated and the Director gives written approval to recommence injection in cases where the well has lost mechanical integrity.

6. **Mechanical Integrity Testing on Request From Director** – The permittee shall demonstrate mechanical integrity at any time upon written notice from the Director.

M. TESTING AND MONITORING

1. **Testing and Monitoring Plan** –

(a) The permittee shall maintain and comply with the approved Testing and Monitoring Plan (Attachment C of this permit) and with the requirements at 40 CFR 144.51(j), 146.88(e), and 146.90. The Testing and Monitoring Plan is an enforceable condition of this permit. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Procedures for all testing and monitoring under this permit must be submitted to the Director in an electronic format for approval at least 30 days prior to the test. In performing all testing and monitoring under this permit, the permittee must follow the procedures approved by the Director. If the permittee is unable to follow the EPA-approved procedures, then, the permittee must contact the Director at least 30 days prior to testing to discuss options, if any are feasible. When the test report is submitted, a full explanation must be provided as to why any approved procedures were not followed. If the approved procedures were not followed, EPA may take an appropriate action, including but not limited to, requiring the permittee to re-run the test.

(b) The permittee must update the Testing and Monitoring Plan as required at 40 CFR 146.90 (j) to incorporate monitoring and operational data and in response to AoR reevaluations required under Section G(2) of this permit or demonstrate to the Director that no update is needed. The amended Testing and Monitoring Plan or demonstration shall be submitted to the Director in an electronic format 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.

(c) Following each update of the Testing and Monitoring Plan or a demonstration that no update is needed, the permittee shall submit the resultant information in an electronic format to the Director for review and approval of the results. Once approved by the Director, the revised Testing and Monitoring Plan will become an enforceable condition of this permit.

2. **Carbon Dioxide Stream Analysis** – The permittee shall analyze the carbon dioxide stream with sufficient frequency to yield data representative of its chemical and physical characteristics, as described in the Testing and Monitoring Plan and to meet the requirements of 40 CFR 146.90(a).

3. **Continuous Monitoring** – The permittee shall maintain continuous monitoring devices and use them to monitor injection pressure, flow rate, volume, the pressure on the annulus between the tubing and the long string of casing, annulus fluid level, and temperature. This monitoring shall be performed as described in the Testing and Monitoring Plan to meet the requirements of 40 CFR 146.90(b). The permittee shall maintain for EPA's inspection at the facility an appropriately scaled, continuous record of these monitoring results as well as original files of any digitally recorded information pertaining to these operations.

4. **Corrosion Monitoring** – The permittee shall perform corrosion monitoring of the well materials for loss of mass, thickness, cracking, pitting, and other signs of corrosion on a quarterly basis using the procedures described in the Testing and Monitoring Plan and in accordance with 40 CFR 146.90(c) to ensure that the well components meet the minimum standards for material strength and performance set forth in 40 CFR 146.86(b).

5. **Ground Water Quality Monitoring** – The permittee shall monitor ground water quality and geochemical changes above the confining zone(s) that may be a result of carbon dioxide movement through the confining zone(s) or additional identified zones. This monitoring shall be performed for the parameters identified in the Testing and Monitoring Plan at the locations and depths, and at frequencies described in the Testing and Monitoring Plan to meet the requirements of 40 CFR 146.90(d).

6. **External Mechanical Integrity Testing** – The permittee shall demonstrate external mechanical integrity as described in the Testing and Monitoring Plan and Section L of this permit to meet the requirements of 40 CFR 146.90(e).

7. **Pressure Fall-Off Test** – The permittee shall conduct a pressure fall-off test at least once every five years unless more frequent testing is required by the Director based on site-specific information. The test shall be performed as described in the Testing and Monitoring Plan to meet the requirements of 40 CFR 146.90(f).

8. **Plume and Pressure Front Tracking** –The permittee shall track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) as described in the Testing and Monitoring Plan.

   (a) The permittee shall use direct methods to track the position of the carbon dioxide plume and the pressure front in the injection zone as described in the Testing and Monitoring Plan and to meet the requirements of 40 CFR 146.90(g)(1).

   (b) The permittee shall use indirect methods to track the position of the carbon dioxide plume and pressure front as described in the Testing and Monitoring Plan and to meet the requirements of 40 CFR 146.90(g)(2).

   (c) If any indirect monitoring performed under Section M(8)(b) of this Permit detects increased pressure above the confining zone or other unanticipated results, the permittee shall increase the frequency of geochemical sampling under Section M(8)(a) to monthly sampling.

   (d) If data collection performed under Section M(8)(a) and M(8)(b) of this permit detects increased pressure above the confining zone or other unanticipated results the Director may require installation of additional monitoring wells.

9. **Surface Air and/or Soil Gas Monitoring** –

   (a) The permittee shall conduct any surface air monitoring or soil gas monitoring required by the Director to detect movement of carbon dioxide that could endanger a USDW or public health at the frequency and locations described in the Testing and Monitoring Plan to meet the requirements of 40 CFR 146.90(h).

   (b) Any surface air monitoring or soil gas monitoring described in the Testing and Monitoring Plan of this Permit must not conflict with air monitoring requirements set forth by other Federal, State, or local agencies for the project, including monitoring to comply with the approved Monitoring, Reporting, and Verification (MRV) plan under 40 CFR part 98, Subpart RR, monitoring required for California's Low-Carbon Fuel Standard program compliance, and monitoring required by Kern County pursuant to a Conditional Use Permit (CUP) and environmental impact report (EIR) for the project.

10. **Leak Detection Monitoring -**

(a) The permittee shall conduct any leak detection monitoring at the wellhead required by the Director to ensure injection well integrity and detect movement of carbon dioxide that could endanger a USDW or public health at the frequency and locations described in the Testing and Monitoring Plan.

(b) Any leak detection monitoring described in the Testing and Monitoring Plan of this Permit should be consistent with EPA's document "Leak Detection and Repair – A Best Practices Guide" (October 2007), and must not conflict with leak detection monitoring requirements set forth by other Federal, State, or local agencies for the project, including monitoring to comply with the approved Monitoring, Reporting and Verification (MRV) plan under 40 CFR part 98, subpart RR, monitoring required for California's Low-Carbon Fuel Standard program compliance, and monitoring required by Kern County pursuant to a Conditional Use Permit (CUP) and environmental impact report (EIR) for the project.

11. **Third-Party Audit Expert Review**

(a) No later than 90 days prior to commencing injection the permittee shall submit to the Director for review and approval in an electronic format a third-party audit protocol. The third-party audit protocol shall include:

(i) A description of the Third-Party Auditor Expert retained by the permittee, in accordance with Section 1.b, including the Expert's qualifications;

(ii) The surface air monitoring and leak detection monitoring equipment calibration and verification that will be included in the audit;

(iii) A description of the narrative and data that will be included in the Third-Party Audit Report

(iv) A description of how the Third-Party Auditor Expert will act independently to provide an objective and fair assessment of the facility's actions to meet the surface air and leak detection monitoring and reporting requirements of the Permit;

(v) The date of the first Third-Party Audit which shall be no later than 6- months after the commencement of injection;

(vi) The frequency of the Third-Party Audit which shall occur, at a minimum, on an annual basis; and

(vii) Any testing and monitoring results collected from the permittee's required monitoring that would trigger an immediate, additional Third-Party Audit.

(b) The permittee shall retain a Third-Party Auditor Expert that meets the following:

(i) Holds credentials and certifications necessary to install, operate, and maintain monitoring equipment that is being used for surface air monitoring and leak detection systems;

(ii) Has not been involved in any manner with the planning, installation, operation, or maintenance of CTV's surface air and leak detection monitoring systems/equipment; and

(iii) Whose credentials and certifications have been reviewed and approved by EPA for the purpose of conducting the required Third-Party Audit.

(c) Within 90 days of completion of each Audit, the Third-Party Auditor Expert shall submit a Third-Party Audit Report to EPA for review and approval. The Report shall be delivered electronically to EPA via email to: Albright.david@epa.gov

(d) Subsequent to EPA review and approval of each annual Audit Report, EPA will send the permittee a list of deficiencies, if any. All deficiencies shall be corrected within 60 days of receipt of the approved Audit Report from EPA, unless the EPA provides an alternate timeline for the corrective action.

12. **Additional Monitoring** – If required by the Director as provided in 40 CFR 146.90(i), the permittee shall 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 40 CFR 146.86(a). This monitoring shall be performed as described in a modification to the Testing and Monitoring Plan.

N. INJECTION OF CARBON DIOXIDE FROM ADDITIONAL SOURCES

1. The permittee must receive written approval from the Director before injecting carbon dioxide from a source that is not fully described in Attachment B of this permit. Carbon dioxide from additional sources will not be approved if the Director determines that the carbon dioxide stream from the proposed additional source is incompatible, or will adversely interact, with the injection well material, injection formation, or confining zone.

2. Proposed additional sources of carbon dioxide will be evaluated by EPA to determine if the additional source is approvable, and if so, whether its addition requires a major permit modification or a minor permit modification.

(a) Conditions that will result in a major permit modification include, but are not limited to, if the proposed additional source of carbon dioxide meets any of the following:

(i) The addition of the proposed carbon dioxide source would increase the injection volume or injection pressure above the amount authorized in this

permit; or

(ii) The proposed additional carbon dioxide source is determined to have a chemical composition outside of the range of injectate compositions listed in Attachment B of this permit, or

(iii) The addition of the proposed carbon dioxide source would interfere with the operation of the facility or its ability to meet conditions described in the permit; or

(iv) The addition of the proposed carbon dioxide source would result in a material and substantial alteration or addition to the permitted Class VI injection activity which justifies the application of permit conditions that are different or absent in the existing permit; or

(v) The Director determines that addition of the proposed carbon dioxide source does not meet criteria for a minor permit modification.

3. In proposing an additional source of carbon dioxide for the Director's approval, the permittee shall provide the Director with the following information:

(a) The analytical parameters of the proposed additional carbon dioxide stream from the proposed source as described in the Testing and Monitoring Plan of this permit;

(b) A description of the industry in which the proposed additional carbon dioxide stream will be produced from;

(c) The name and address of the proposed additional carbon dioxide source; and

(d) An assessment of the compatibility of the carbon dioxide stream with subsurface fluids and minerals.

(e) An assurance that the construction materials of the injection wells and other wells that may encounter the injected plume are still compatible, (e.g., will not corrode over time due to the chemical interactions).

4. The public shall be notified within 30 days when a proposed additional carbon dioxide source is submitted to EPA for review.

5. The public shall be notified 30 days before the injection of an EPA-approved additional carbon dioxide stream is injected.

O. REPORTING AND RECORDKEEPING

1. **Electronic Reporting** – Electronic reports, submittals, notifications, and records made and maintained by the permittee under this permit must be in an electronic format approved by EPA. The permittee shall electronically submit all required reports to the Director at:

   https://epa.velo.pnnl.gov/operators

2. **Semi-Annual Reports** – The permittee shall submit semi-annual reports containing:
   (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 the permit;

   (d) A description of any event which triggers the shut-off systems required in Section K(6) of this permit pursuant to 40 CFR 146.88(e), and the response taken;

   (e) The monthly volume or mass of the carbon dioxide stream injected over the reporting period and the volume or 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 M(3), 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 volume; (5) daily maximum flow rate; and (6) average annulus tank fluid level; and

      (ii) Graph(s) of the continuous monitoring as required in Section M(3) of this permit, or of daily average values of these parameters. The injection pressure, injection volume and flow rate, annulus fluid level, annulus pressure, and temperature shall be submitted on one or more graphs, using contrasting symbols or colors, or in another manner approved by the Director; and

   (h) Results of any additional monitoring identified in the Testing and Monitoring Plan and described in Section M of this permit.

3. **24-Hour Reporting** –

(a) The permittee shall report to the Director any permit noncompliance which may endanger human health or the environment or any events that require implementation of actions in the Emergency and Remedial Response Plan (Attachment F of this permit). Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. Such verbal reports shall include, but not be limited to, the following information:

(i) Any evidence that the injected carbon dioxide stream or associated pressure front may cause an 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 shut-off system required in Section K(6) of this permit (i.e., down-hole or at the surface);

(iv) Any failure to maintain mechanical integrity;

(v) Pursuant to compliance with the requirement at 40 CFR 146.90(h) for surface air/soil gas monitoring or other monitoring technologies, if required by the Director, any release of carbon dioxide to the atmosphere or biosphere; and

(vi) Actions taken to implement appropriate protocols outlined in the Emergency and Remedial Response Plan (Attachment F of this permit).

(vii) A written submission shall be provided to the Director in an electronic format within five days of the time the permittee becomes aware of the circumstances described in Section O(3)(a) of this permit. The 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 as well as actions taken to implement appropriate protocols outlined in the Emergency and Remedial Response Plan (Attachment F of this permit); and steps taken or planned to reduce, eliminate and prevent recurrence of the noncompliance.

4. **Reports on Well Tests and Workovers** – The permittee shall report, within 30 days, the results of:

(a) Periodic tests of mechanical integrity;

(b) Any well workover, including stimulation;

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

(d) Any test of any monitoring well required by this permit.

5. **Advance Notice Reporting** –

(a) **Well Tests** – The permittee shall give at least 30 days advance written notice to the Director in an electronic format of any planned workover, stimulation, or other well test.

(b) **Planned Changes** – The permittee shall give written notice to the Director in an electronic format, as soon as possible, of any planned physical alterations or additions to the permitted injection facility other than minor repair/replacement or maintenance activities. An analysis of any new injection fluid and, as specified in Section N of this Permit, an analysis of any additional source of carbon dioxide, shall be submitted to the Director for review and written approval at least 60 days prior to injection; this approval may result in a permit modification.

(c) **Anticipated Noncompliance** – The permittee shall give at least 30 days advance written notice to the Director in an electronic format of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

6. **Additional Reports** –

(a) **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 in an electronic format by the permittee no later than 30 days following each schedule date.

(b) **Transfer of Permits** – This permit is not transferable to any person except after notice is sent to the Director in an electronic format at least 30 days prior to transfer and the requirements of 40 CFR 144.38(a) have been met. Pursuant to requirements at 40 CFR 144.38(a), the Director will 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 SDWA.

(c) **Other Noncompliance** – The permittee shall report in an electronic format all other instances of noncompliance not otherwise reported with the next monitoring report. The reports shall contain the information listed in Section O(3)(b) of this permit.

(d) **Other Information** – When the permittee becomes aware of failure to submit any relevant facts in the permit application or that incorrect information was submitted in a permit application or in any report to the Director, the permittee shall submit such

facts or corrected information in an electronic format within 10 days in accordance with 40 CFR 144.51(l)(8).

(e) **Report on Permit Review** – Within 30 days from the effective date of this permit, the permittee shall certify to the Director in an electronic format that he or she has read and is personally familiar with all terms and conditions of this permit.

7. Records –

(a) The permittee shall 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 shall 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 for a period of at least 10 years after site closure.

(c) The permittee shall retain records concerning the nature and composition of all injected fluids until 10 years after site closure.

(d) The retention periods specified in Section O(7)(a) through (c) of this permit may be extended by request of the Director at any time. The permittee shall continue to retain records after the retention period specified in Section O(7)(a) through (c) of this permit or any requested extension thereof expires unless the permittee delivers the records to the Director or obtains written approval from the Director to discard the records.

(e) Records of monitoring information shall 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. PUBLIC AVAILABILITY OF MONITORING AND COMPLIANCE DATA

1. The permittee shall develop and maintain a publicly accessible website with information and monitoring data collected under this Permit. The website must be accessible to persons with disabilities and shall include:

   (a) Semi-annual monitoring reports and data;

   (b) Annual third-party audit report as described in part M(11)(c) of this permit;

   (c) An executive summary (in both English and Spanish) that interprets the Semi-annual monitoring reports and data;

   (d) Real-time display of data collected for any Surface Air/Soil Gas Monitoring required under Section M(9) and Leak Detection Monitoring required under Section M(10) of this Permit; and

   (e) Notification of any permit non-compliance on a quarterly basis, including the steps taken to resolve the non-compliance, and any actions taken to prevent a re-occurrence of the non-compliance.

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

1. **Well Plugging Plan** – The permittee shall maintain and comply with the approved Well Plugging Plan (Attachment D of this permit) which is an enforceable condition of this permit and shall meet the requirements of 40 CFR 146.92.

2. **Revision of Well Plugging Plan** – If the permittee finds it necessary to change the Well Plugging Plan (Attachment D of this permit), a revised plan shall be submitted in an electronic format to the Director for written approval. Any amendments to the Well Plugging 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.

3. **Notice of Plugging and Abandonment** – The permittee must notify the Director in writing in an electronic format pursuant to 40 CFR 146.92(c), at least 60 days before plugging, conversion or abandonment of a well. At the discretion of the Director, a shorter notice period may be allowed.

4. **Plugging and Abandonment Approval and Report** –

   (a) The permittee must receive written approval of the Director before plugging the well and shall plug and abandon the well in accordance with 40 CFR 146.92, as provided in the Well Plugging Plan (Attachment D of this permit).

(b) Within 60 days after plugging, the permittee must submit in an electronic format a plugging report to the Director. The report must be certified as accurate by the permittee and by the person who performed the plugging operation (if other than the permittee.) The permittee shall retain the well plugging report in an electronic format for 10 years following site closure. The report must include:

(i) A statement that the well was plugged in accordance with the Well Plugging Plan previously approved by the Director (Attachment D of this permit); or

(ii) If the actual plugging differed from the approved plan, a statement describing the actual plugging and an updated plan specifying the differences from the plan previously submitted and explaining why the Director should approve such deviation. If the Director determines that a deviation from the plan incorporated in this permit may endanger USDWs, the permittee shall re-plug the well as required by the Director.

5. **Temporary Abandonment** – If the permittee ceases injection into the well for more than 24 consecutive months, the well is considered to be in a temporarily abandoned status, and the permittee shall plug and abandon the well in accordance with the approved Well Plugging Plan, 40 CFR 144.52 (a)(6), and 40 CFR 146.92, or make a demonstration of non-endangerment of this well while it is in temporary abandonment status. During any periods of temporary abandonment or disuse, the well will be tested to ensure that it maintains mechanical integrity, according to the requirements and frequency specified in Section L(2) of this permit. The permittee shall continue to comply with the conditions of this permit, including all monitoring and reporting requirements according to the frequencies outlined in the permit.

6. **Post-Injection Site Care and Site Closure Plan** –

(a) The permittee shall maintain and comply with the Post-Injection Site Care and Site Closure Plan (Attachment E of this permit), which meets the requirements of 40 CFR 146.93 and is an enforceable condition of this permit. The permittee shall:

(i) Upon cessation of injection, either submit in an electronic format for the Director's approval an amended Post-Injection Site Care and Site Closure Plan or demonstrate through monitoring data and modeling results that no amendment to the plan is needed.

(ii) At any time during the life of the project, the permittee may modify and resubmit in an electronic format the Post-Injection Site Care and Site Closure Plan for the Director's approval. The permittee may, as part of such modifications to the Plan, request a modification to the post-injection site care timeframe that includes documentation of the information at 40 CFR 146.93(c)(1).

(b) The permittee 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, as specified in the Post-Injection Site Care and Site Closure Plan and in 40 CFR 146.90, and 40 CFR 146.93, including:

(i) Ground water quality monitoring;

(ii) Tracking the position of the carbon dioxide plume and pressure front including direct pressure monitoring and geochemical plume monitoring and the use of indirect methods;

(iii) Any other required monitoring, e.g., soil gas and/or surface air monitoring described in the Post-Injection Site Care and Site Closure Plan;

(iv) The permittee shall submit in an electronic format the results of all monitoring performed according to the schedule identified in the Post-Injection Site Care and Site Closure Plan; and

(v) The permittee shall continue to conduct post-injection site monitoring for at least 50 years or for the duration of any alternative timeframe approved pursuant to 40 CFR 146.93(c) and the Post-Injection Site Care and Site Closure Plan.

(c) The post-injection monitoring must continue until the project no longer poses an endangerment to USDWs and the demonstration pursuant to 40 CFR 146.93(b)(2) and as described in Section Q(6)(d) of this permit is approved by the Director.

(d) Prior to authorization for site closure, the permittee shall submit to the Director for review and approval, in an electronic format, a demonstration, based on information collected pursuant to Section Q(5)(b) 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). The Director reserves the right to amend the post-injection site monitoring requirements (including extending the monitoring period) if the carbon dioxide plume and the associated pressure front have not stabilized or there is a concern that USDWs are being endangered.

(e) The permittee shall notify the Director in an electronic format 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 shall submit a revised plan.

(f) After the Director has authorized site closure, the permittee shall plug all monitoring wells as specified in Attachment E of this permit – the Post-Injection Site Care and Site Closure Plan – in a manner which will not allow movement of injection or formation

fluids that endangers a USDW. The permittee shall also restore the site to its pre-injection condition.

(g) The permittee shall submit a site closure report in an electronic format to the Director within 90 days of site closure. The report must include the information specified at 40 CFR 146.93(f).

(h) The permittee shall 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 the following information:

(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 shall retain for 10 years following site closure an electronic copy of the site closure report, records collected during the post-injection site care period, and any other records required under 40 CFR 146.91(f)(4). The permittee shall deliver the records in an electronic format to the Director at the conclusion of the retention period.

R. EMERGENCY AND REMEDIAL RESPONSE

1. The Emergency and Remedial Response Plan describes actions the permittee must take to address movement of the injection or formation fluids, including surface leaks of carbon dioxide or other contaminants, that may cause an endangerment to a USDW or public health during construction, operation, and post-injection site care periods. The permittee shall maintain and comply with the approved Emergency and Remedial Response Plan (Attachment F of this permit), which is an enforceable condition of this permit, and with 40 CFR 146.94.

   Prior to the Director authorizing injection, the permittee shall revise the Emergency and Remedial Response Plan to include a description and documentation of the contracts the permittee holds with service providers, including any contracts or access agreements with local emergency response authorities, to perform the actions outlined in the Emergency and Remedial Response Plan, and shall confirm that any required payments were made to Kern County Planning and Natural Resources Department, as required by the approved Conditional Use Permits, for transfer to the Kern County Fire Department for equipment and training specific to the detection and control of emergency situations caused by the release of carbon dioxide.

2. If the permittee obtains evidence that the injected carbon dioxide or associated pressure front may cause endangerment to a USDW or public health, the permittee must:

   (a) Cease injection in accordance with Sections K(8) and K(9)(a) or (b), and Attachments A or F of this permit;

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

   (c) Notify the Director within 24 hours; and

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

3. At least every five years, or more frequently when monitoring and operational conditions warrant, the permittee shall review and update the Emergency and Remedial Response Plan as required at 40 CFR 146.94(d) or demonstrate to the Director that no update is needed. The amended Emergency and Remedial Response Plan or demonstration shall be submitted to the Director in an electronic format within one year of an AoR reevaluation, following any significant changes to the facility such as addition of injection wells, or when required by the Director.

4. Following each update of the Emergency and Remedial Response Plan or a demonstration that no update is needed, the permittee shall submit the resultant information in an electronic format to the Director for review and confirmation of the results. Once approved by the Director, the revised Emergency and Remedial Response Plan will become an enforceable condition of this permit.

S. COMMENCING INJECTION

The permittee may not commence injection until:

1. Results of the formation testing and logging program and a demonstration that all pre-operational testing objectives have been met as specified in Section J of this permit and in 40 CFR 146.87 are submitted to the Director in an electronic format and subsequently reviewed and approved by the Director;

2. Mechanical integrity of the well has been demonstrated in accordance with 40 CFR 146.89(a)(1) and (2), and in accordance with Section L(1) through (3) of this permit;

3. The completion of corrective action required by the Area of Review and Corrective Action Plan found in Attachment B of this permit in accordance with 40 CFR 146.84;

4. All requirements at 40 CFR 146.82(c) have been met, including but not limited to reviewing and updating of the Area of Review and Corrective Action, Testing and Monitoring, Well

Plugging, Post-Injection Site Care and Site Closure, and Emergency and Remedial Response plans to incorporate final site characterization information, final delineation of the AoR, and the results of pre-injection testing, and information has been submitted in an electronic format, reviewed and approved by the Director;

5. The permittee has submitted the results of an analysis of the physical and chemical characteristic of the carbon dioxide stream for all analytical parameters identified in the Testing and Monitoring Plan (Attachment C of this Permit).

6. Construction is complete and the permittee has submitted to the Director in an electronic format a notice that completed construction is in compliance with 40 CFR 146.86 and Section I of this permit;

7. The Director has inspected or otherwise reviewed the injection well and all submitted information and finds it is in compliance with the conditions of this permit;

8. The Director has approved demonstration of the alarm system and shut-off system under Section K(6) of this permit;

9. The Permittee has revised the Emergency and Remedial Response Plan to include a description and documentation of the contracts the permittee holds with service providers in order to perform the actions outlined in the Emergency and Remedial Response Plan;

10. The Director has approved the publicly accessible website required under Section P of this permit; and

11. The Director has given written authorization to commence injection.

ATTACHMENTS

These attachments include, but are not limited to, permit conditions and plans concerning operating procedures, monitoring and reporting, as required by 40 CFR parts 144 and 146. The permittee shall comply with these conditions and adhere to these plans as approved by the Director, as follows:

A. SUMMARY OF OPERATING REQUIREMENTS

B. AREA OF REVIEW AND CORRECTIVE ACTION PLAN

C. TESTING AND MONITORING PLAN

D. WELL PLUGGING PLAN

E. POST-INJECTION SITE CARE AND SITE CLOSURE PLAN

F. EMERGENCY AND REMEDIAL RESPONSE PLAN

G. CONSTRUCTION DETAILS

H. FINANCIAL ASSURANCE DEMONSTRATION

I. STIMULATION PROGRAM