October 4th, 2023

David Albright
Manager, Groundwater Protection Section
United States Environmental Protection Agency Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Re: Response to Administrative Review – Notice of Incomplete Application
Carbon TerraVault Holdings LLC (CTV) V Project
Underground Injection Control (UIC) Permit Application
Class VI Pre-Construction Permit Application No. R9UIC-CA6-FY23-6.1 to 6.6

Dear Mr. Albright:

Carbon TerraVault Holdings LLC (CTV) has prepared this response to the U.S. Environmental Protection Agency Region IX ("EPA") CTV V Class VI Permit Application Administrative Review request for Additional Information in your letter dated August 30, 2023.

Sincerely,

Faisal Latif

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Technical Manager,
Carbon TerraVault Holdings LLC.

Enclosure: Response to EPA Administrative Review – Notice of Incomplete Application

cc (via email): Chris Jones, CalGEM Central District
Alex Olsen, Central Valley Regional Water Control Board
Janice Zinky, CA State Water Resources Control Board

Response to EPA Administrative Review – Notice of Incomplete Application

General Information

Follow-up Questions/Requests for the Applicant:

40 CFR 144.31 (e)(1)-(6) requires that the application includes a list of the activities conducted by the applicant which requires RCRA, UIC, NPDES, or PSD permits. The application did not include information about RCRA permits. Please confirm these permits are not applicable to this project or update the application to include information about them.

> RESPONSE: Appendix 2 of the application has been updated to discuss the applicability of these permits.

40 CFR 144.31 (e)(6) requires that the application includes a list of all permits or construction approvals received or applied or under the following programs:

- *o Hazardous Waste Management Program under RCRA*
- *o UIC Program*
- *o NPDES*
- *o PSD Program*
- *o CAA Nonattainment Program*
- *o NESHAPS Preconstruction Approval under the CAA*
- *o Ocean Dumping Permits under MPRSA*
- *o Section 404 Dredge and Fill Permits*
- *o Other relevant environmental permits, including State permits*

The application did not mention the Hazardous Waste Management Program, NESHAPS Preconstruction Approval, Ocean Dumping Permits, or Section 404 Dredge and Fill Permits. Please confirm these permits or approvals are not applicable to this project or update the application to include information about them.

> RESPONSE: Appendix 2 of the application has been updated to discuss the applicability of these permits.

40 CFR 146.82(a)(2) requires that the application includes a map showing the injection wells, the Area of Review (AoR), and the below list of items:

- *o Injection wells,*
- *o Producing wells,*
- *o Abandoned wells,*
- *o Plugged wells or dry holes,*
- *o Deep stratigraphic boreholes,*
- *o State- or EPA-approved subsurface cleanup sites,*
- *o Surface bodies of water,*
- *o Springs,*
- *o Mines (surface and subsurface),*

- *Quarries,*
- *Water wells,*
- *Other pertinent surface features,*
- *State, Tribal, and Territory boundaries, and*
- *Roads.*

The injection wells, producing wells, and boreholes are not distinguished from one another in the figures provided. In addition, the figure must also show the number or name of all wells. Please update Figure 2.2-1 in the Narrative document to include this information.

> RESPONSE: The above list of items can be found in Figure 2.2-11. Figure 2.2.11 was updated to include a reference number for all wells in the AoR. Reference Table 2.2-1 and Table 2.2-2 were added to the document to identify water production and oil/gas wells within the AoR.

Geologic Narrative/Site Characterization Information

40 CFR 146.82(a)(3)(iii) requires that the application addresses the following types of data on the injection and confining zone(s):

- *Depth*
- *Areal extent*
- *Thickness*
- *Mineralogy*
- *Porosity*
- *Permeability*
- *Capillary pressure*

The areal extent of the injection and confining zones is not discussed in the Narrative document. Please update the application to include this information.

> RESPONSE: The injection zones, upper confining zone, and internal barrier are laterally continuous throughout the basin.

Section 2.2.2.2 describes the lower injection zone: [redacted]

Section 2.2.2.3 describes the internal barrier: [redacted]

Section 2.2.2.4 describes the upper injection zone: [redacted]

[redacted]

Section 2.2.2.5 describes the upper injection zone: [redacted]

40 CFR 146.82(a)(3)(iv) requires that the application addresses the in-situ fluid pressures in the confining zone(s). This isn't discussed the Narrative document. Please update the application to include this information.

> RESPONSE: As discussed in Section 2.5.2 of Attachment A, *"No data currently exists for the pore pressure of the confining zone. This will be determined as part of the preoperational testing."* Attachment I Pre-Operational Testing provides details of the testing to be performed prior to injections.

Post-Injection Site Care (PISC) and Site Closure Plan

40 CFR 146.93(c) describes EPA's discretionary authority to approve an alternative PISC timeframe other than the 50-year default, if an owner/operator can demonstrate during the permitting process that an alternative timeframe is appropriate and ensures non-endangerment of USDWs. The demonstration must be based on significant, site-specific data and must contain substantial evidence that the geologic sequestration project will no longer pose a risk of endangerment to USDWs at the end of the proposed alternative PISC timeframe. CTV requested an alternative PISC timeframe of 25 years.

40 CFR 146.93(c)(1)(vi) requires that the PISC and Site Closure Plan include the results of laboratory analyses, research studies, and/or field or site-specific studies to verify the information required by 40 CFR 146.93(c)(1)(iv) and (v), as follows:

- *A description of the site-specific processes that will result in carbon dioxide trapping including immobilization by capillary trapping, dissolution, and mineralization at the site (40 CFR 146.93(c)(1)(iv)); and*
- *The predicted rate of carbon dioxide trapping in the immobile capillary phase, dissolved phase, and/or mineral phase (40 CFR 146.93(c)(1)(v)).*

The application did not include verification of this information. Please provide the results of laboratory analyses, research studies, and/or field or site-specific studies to verify the above information.

> RESPONSE: Site specific studies and research studies are cited in Attachment E Section 6; in response to this comment additional detail was added. Geochemical modeling (Appendix B) to assess mineralization is based in part on laboratory studies of geologic core and fluid samples and additional reference to this site-specific modeling was added to Attachment E Section 6. Reference to a research study (Krevor et al., 2015) verifying our findings is included in Attachment E Section 6.