



WASHINGTON, D.C. 20460

November 5, 2024

Travis Hurst
Carbon TerraVault 1, LLC
28590 Highway 119
Tupman, CA 93276

Sent by email only

Subject: Underground Injection Control (UIC) Permit Application
Carbon TerraVault 1, LLC (CTV) A1-A2 Project
Class VI Pre-Construction Permit No. R9UIC-CA6-FY21-1.1 and R9UIC-CA6-FY21-1.2
Technical Review of Application – Request for Additional Information

Dear Mr. Hurst,

The United States Environmental Protection Agency, Region 9 (EPA) has conducted a technical evaluation of the Well Construction Plans for the subject permit application. Based on this evaluation, we have identified additional information or clarification needed for continued evaluation of the permit application. These comments are included below.

Corrosion of Well Construction Materials

Factors impacting the corrosivity of an environment containing CO₂ are complex and include pressure, temperature, and impurities (Cl⁻, O₂, SO₂, NO_x, H₂S, etc.) that are frequently found to be present in sequestration injectate and/or formation fluids. Selection of appropriate well construction materials is therefore project-specific and depends, among other things, on the composition of formation fluids and the CO₂ stream.

Due to the acidic conditions generated by the mixing of CO₂ and water, alloys that may come into contact with water should be able to withstand pH values below 2.5. Examples of acceptable alloys may include Cr-25 steel and Hastelloy C-22. Some materials commonly used in less corrosive environments, such as Portland cement and Cr-13, are likely not appropriate for the corrosive conditions that occur where both water and CO₂ are present, either from aqueous formation fluids mixing with CO₂ or water present in the CO₂ stream itself. Also, monitoring wells located in the injection zone that contact the CO₂ plume will need to be adequately corrosion-resistant to tolerate the acidic conditions that can be generated by mixing of CO₂ streams and formation fluids in order to prevent endangerment of underground sources of drinking water.

For the proposed injection and monitoring wells please submit a demonstration of the adequacy of the planned materials including, but not limited to, performing corrosion modeling over the timescale of the project. Any corrosion modeling used to validate well materials should take into account site-specific chemistry, including the CO2 stream and the formation fluids, and consider possible stress cases, in addition to normal operations, among other relevant factors.

Please submit the information requested in the Enclosure by December 6, 2024. If you have any questions about this letter and the Enclosure, please contact me at (415) 972-3971, or Elise Nord at (415) 972-3079.

Sincerely,

David Albright
Manager, Groundwater Protection Section

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