



Public Comments Sought on Class VI UIC Injection Well Carbon Storage Draft Permit Denial

CapturePoint Osage Class VI UIC Injection Wells
Osage County, Oklahoma
January 2025

Options for Participating in the Permitting Process

The public may submit written comments online at <https://www.regulations.gov/> under Docket #EPA-R06-OW-2024-0583. Requests for a public hearing may also be submitted via this method. If you are unable to submit comments electronically, or if you have questions or require assistance submitting comments, please contact Mr. Brandon Maples at Maples.Brandon@epa.gov or by phone at (214) 665-7252.

All comments must be received by 11:59 p.m. Eastern Standard Time (EST) on Friday, February 14, 2025.

All comments received prior to the end of the comment period will be considered in the formulation of any final determinations. Comments are given equal consideration regardless of how they are received. Comments **MUST be submitted directly to EPA Region 6** to be considered as part of the permitting decision. Comments submitted to the applicant, the Osage Nation, or any other entities will **NOT** be considered.

The U.S. Environmental Protection Agency (EPA) is accepting comments from the public on its intent to deny a Class VI permit application submitted by CapturePoint Solutions, LLC, (CPS) to construct two carbon dioxide (CO₂) storage injection wells in Osage County, Oklahoma. This process is called “geologic sequestration” or “carbon sequestration.” Carbon sequestration is a means of containing underground CO₂ captured at an emission source or from the atmosphere.

CPS proposed to inject CO₂ captured from industrial emitters in northeastern Oklahoma including fertilizer, ammonia, and natural gas processing plants. The CO₂ would be captured at the industrial facilities and transported via a pipeline to the proposed carbon sequestration site for injection into the subsurface via two injection wells. EPA’s proposal covers underground injection only and does not address the capture or transport of CO₂.

CPS proposed to inject between 11 and 14 million metric tonnes of CO₂ over a period of 20 to 25 years into the Arbuckle Formation, a carbonate (mostly dolomite) rock formation. The proposed injection zone is an 800-1,080-foot interval that is 3,500 to 4,300 feet below ground level.

However, as described below, CPS has not demonstrated that the proposed site possesses the geologic conditions necessary to contain CO₂ and prevent endangerment to underground sources of drinking water (USDWs). Specifically, CPS has failed to demonstrate to the EPA that the proposed injection zone/storage formation is geologically sound to contain CO₂ and that the proposed primary and secondary confining zones are present and of sufficient areal extent and integrity across the project site to serve as adequate confining layers.

Therefore, EPA is issuing this intent to deny the permit application.

How did EPA make its tentative decision?

In reviewing CPS's permit application, EPA evaluated technical information and project-specific data with support from the Department of Energy. The administrative record for this proposed decision includes materials required under 40 CFR 124.9(b), which includes the supporting file for the draft decision to deny the permit application. Key project-specific data reviewed to make this tentative decision to deny the permit application includes:

- The applicant's description of the regional and site geology (rock layers and structures). See the Project Information/Site Characterization Narrative document and its appendices (Version 1.0, October 2023).
- Information on the applicant's planned computational modeling approach to determine the maximum extent of the CO₂ plume and pressure front defining the proposed project area of review and corrective action procedures for all existing non-project wellbores near the project site. See the Project Information/Site Characterization Narrative document and Area of Review (AoR) and Corrective Action Plan document (Version 1.0, September 2023).

The technical summary portion of this fact sheet below provides additional discussion about these data and EPA's review and analysis of this information that led to this tentative decision to deny the permit application. References to the administrative record are also included to allow the public to review the data and EPA's comprehensive analysis.

What happens next in the permit process?

After the close of the public comment period, EPA will review all public comments before making a final decision on whether to deny the permits. EPA will respond to all significant comments on the decision.

Administrative Record

Documents that the EPA reviewed in making this proposed decision are available for public review at <https://www.regulations.gov/> under Docket #EPA-R06-OW-2024-0583. Due to the size and extent of the application materials and full record, the docket includes an administrative records index and instructions for how to access the full administrative record. For additional information or assistance accessing the administrative record, please contact Brandon Maples at 214-665-7252 or maples.brandon@epa.gov.

Additional Project Details

For more information about the CapturePoint Osage project: <https://www.epa.gov/ok/public-notice-intent-deny-uic-class-vi-permits-capturepoint-solutions-llc>.

Legal Notice for Final Permit Decision Appeal

To preserve your right to appeal any final permit decision, you must either submit written comments on the draft permit denial decision by the end of the comment period or submit a comment at a public hearing, if one is scheduled.

The first appeal must be made to the Environmental Appeals Board; only after all agency review procedures have been exhausted may you file an action in the appropriate Circuit Court of Appeals.

Technical Summary of the CapturePoint Osage Project

The information below is a summary of EPA's technical analysis. For more detailed information, including references to the Administrative Record, see the Technical Support Document (TSD) found at <https://www.regulations.gov/>.

EPA conducted a thorough review of CPS's permit application. The data and information provided by CPS as part of the permit application and reviewed by EPA are publicly available as part of the administrative record for this tentative denial decision, along with other information EPA considered in its decision-making. This portion of the fact sheet provides additional technical background and details on the CapturePoint Osage project to help the public better understand how EPA reached the tentative decision to deny the permit application.

EPA's review of CPS's permit application indicates that endangerment to USDWs could result from the proposed injection; therefore, EPA proposes to deny the application to inject. In accordance with [40 CFR 124.8](#), information considered in EPA's decision is presented below.

The Class VI Rule, at [40 CFR 146.83\(a\)](#) requires applicants seeking Class VI permits to demonstrate to the satisfaction of the Director that the wells will be sited in areas with a suitable geologic system that comprises:

- An injection zone of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the CO₂ stream; and
- A confining zone that is free of transmissive faults or fractures and is of sufficient areal extent and integrity to contain the injected CO₂ stream and displaced formation fluids and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zone.

Applicants must demonstrate this suitability by providing site-specific information about the injection and confining zones, including their lithology, geomechanical properties, and geochemistry, and other information described at [40 CFR 146.82\(a\)](#).

CPS's site characterization narrative was based on trial field test data from wells in the Wellington Field in Sumner County, Kansas, which is approximately 55 miles from the proposed project site. CPS failed to provide evidence that the data from the Wellington Field would be representative of the proposed injection site. As such, EPA found the permit application to be deficient and not based on the site-specific data (e.g., cores and density, caliber, and porosity logs) that are required to inform a complete evaluation of the site.

EPA reviewed the site characterization narrative submitted in the permit application along with other supporting materials found in the record and has determined that the proposed project site lacks suitable geology as discussed below.

Injection zone: Based on information provided, EPA has determined that the Arbuckle Formation at the proposed project site is karstic and fractured. Karst rock (such as limestone) can dissolve in the presence of acidic fluids, such as the carbonic acid that forms when injected CO₂ combines with the water that naturally exists within the pore spaces of subsurface rock. Core data shows the Arbuckle is fractured and vuggy (vugs are small cavities or pores in the rock). These characteristics can provide potential conduits for the CO₂ or formation fluids to migrate upward and potentially endanger USDWs. The application does not provide data and calculations to indicate that the Arbuckle Formation has sufficient storage capacity to contain the total volume of CO₂. CPS proposes to inject without excessive pressure increases that could initiate fractures in the injection or confining zones.

Confining zone: The Woodford Shale (the proposed primary upper confining zone) is deficient or absent in the area of the project site, and EPA has determined that there would not be an adequate confining layer at the project site. Shale typically forms an effective confining layer because it is of low permeability which limits the potential for fluids to migrate upward. Structure and isopach (i.e., thickness) maps and cross sections of the project site submitted with the site characterization narrative indicate that, near the proposed injection wells, the Woodford Shale is about 8-11 feet thick. The formation also contains

a relatively low shale content (based on gamma ray readings as shown on a composite type log in Figure 2-2 submitted in the site characterization narrative).

Secondary confinement: Per [40 CFR 146.83\(b\)](#), EPA may require Class VI permit applicants to identify and characterize additional zones that will impede vertical fluid movement, are free of faults and fractures that may interfere with containment, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation. CPS proposed the Lower Mississippi Formation as a secondary confining zone. High resistivity divergence shown in well logs indicates the Lower Mississippi Formation is a fractured limestone with potential pathways for injectate migration and would not serve as an adequate secondary confining unit at the project site.

Induced seismicity: The Reagan Sandstone lies between the proposed injection zone (Arbuckle) and the basement rock (the Washington Volcanic Group) but is potentially absent at the project site. When injection occurs directly on or near the granitic basement rock, the potential for induced seismic events (earthquakes) may be greater. Induced seismicity can compromise the integrity of injection or monitoring wells which can provide conduits for fluid movement to USDWs. While not relevant to EPA's proposed permit denial, which is based on risks to the USDWs, EPA notes that seismic activity can also damage surface structures or local infrastructure. The lack of vertical separation between the injection zone and the basement rock at the proposed site indicates an unacceptable potential for injection-induced seismicity.

Faults and fractures: EPA also has concerns that faults or fractures may penetrate the confining and injection zones at the project site [and may serve as conduits for injectate or injection zone fluids to migrate to USDWs]. The applicant provided insufficient information to support its claim that the proposed site is not impacted by faults. EPA reviewed existing sources of data on faults in Oklahoma (e.g., the Oklahoma Fault Database and the Comprehensive Fault Database) and identified faults as close as 5 miles to the proposed site (Holloway, Holland, and Keller, 2016; Luza and Lawson, 1983).

While the failure of the permit applicant to demonstrate suitable geology, which cannot be addressed via permit conditions or other mitigation measures, is the sole reason for EPA's proposed decision to deny the permit application, the Agency also identified other concerns with the application, including:

- ***CO₂ compatibility concerns:*** The lack of site-specific data or geochemical studies limits EPA's ability to review the behavior of the CO₂ geochemistry of the Arbuckle and its ability to evaluate compatibility with subsurface fluids at the proposed site. This evaluation is necessary to support a determination that there would be no adverse geochemical reactions that could mobilize contaminants that could adversely affect project operations, influence the movement of the CO₂ plume and pressure front, or otherwise endanger a nearby USDW.
- ***Inadequate modeling.*** The computational modeling described in CPS's AoR and Corrective Action Plan does not address the concerns related to geologic suitability identified at the site. These concerns include: the characteristics of the Arbuckle (e.g., the presence of karst, and effects of potential fractures and faults); formation geochemistry and potential geochemical reactions; localized heterogeneities and preferential leakage pathways; representation of vertical permeability of the confining zone; and the effects of active wells near the injection wells (e.g., possible pressure interference).
- ***Incomplete information on wells in the AoR:*** The applicant identified 1,346 wells within the project's AoR. Many of these were constructed in the 1920s, 1930s, and 1960s, and historical well records were not provided for 61 of these wells. It is also unclear if the list of wells is exhaustive, given that well records are not digitized. In addition, there appear to be inconsistencies in the information provided (e.g., between well schematics and driller's logs). Without this information, it cannot be determined whether these wells penetrate the injection or confining zones and would be potential CO₂ leakage pathways.

Figure 1. Map of the Area of Review (AoR)

