

# FACT SHEET

## Intent to Issue Class VI Underground Injection Control Permit Milestone Carbon Midland CCS Hub, LLC South Midland Facility Upton County, Texas CO2 Storage Project

Milestone Carbon Midland CCS Hub, LLC has applied to the Railroad Commission of Texas (RRC) for a Class VI Underground Injection Control (UIC) permit to construct and operate injection well for their South Midland Facility. The proposed injection well will be in Survey - T&P RR CO; Abstract - 427; Block – 39; Township – 5S; Section – 9, in Upton County near Midkiff, Texas. The location of the well is shown in Table 1 below.

Table 1: Well Identification

Well Name	Location (Lat/Long) (NAD83)
Midland CCS #2	31.615788/-101.990004

Milestone Carbon plans to inject approximately 1 million metric tons (1 MMT) of carbon dioxide into the Milestone Carbon Midland CCS # 2 injector well per year (MMTPA) for 12 years. Milestone Carbon plans to inject a cumulative total of 11.9 million metric tons (MMT) into the proposed well over the 12-year injection period of the South Midland CCS Project.

Carbon dioxide will come from nearby oil and gas processing sources, Direct Air Capture Facilities, power plants and/or cement plants, within a radius of 50 miles of the Midland CCS facility.

Milestone Carbon selected the location of the proposed well based on its research and used site-specific data to ensure that the carbon dioxide would be safely stored in the proposed injection formation. The proposed injection formations are the Siluro-Devonian and Ellenburger, perforated in an injection interval ranging between approximately 12,200 – 13,849 feet in depth below ground surface. These injection reservoirs are top-sealed and geologically isolated by an approximately 270 -feet thick layer of combined Devonian Woodford Shale (primary top seal) and Devonian Barnett Shale (secondary top seal). The injection reservoirs lie approximately 10,950 feet (more than 2 miles) below the deepest underground source of drinking water (USDW) which at this location occurs at 1,250 feet below the surface.

### ***Technical background and details of Milestone Carbon’s carbon storage project***

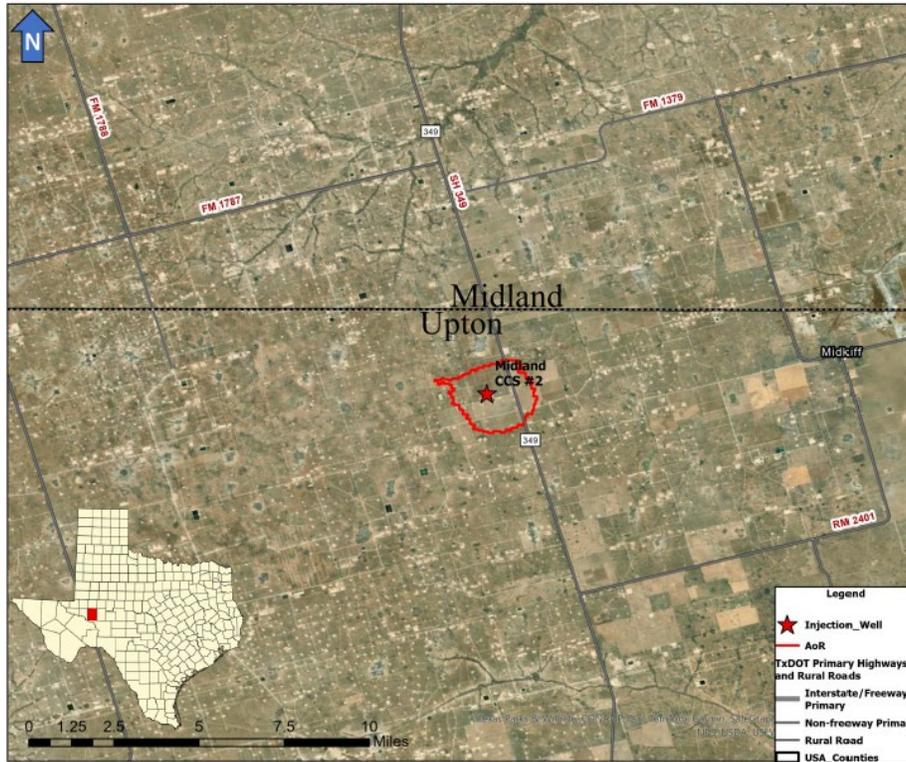
The RRC’s review of the permit application determined that the proposed injection would comply with the Class VI UIC regulations. Therefore, the RRC proposes to issue permits for the proposed injection well. RRC regulations require that the RRC Class VI UIC permits for carbon dioxide storage specify conditions for the construction, operation, monitoring, reporting, plugging, post-injection site care, and site closure of Class VI injection well. These conditions are designed to prevent the movement of fluids into any underground source of drinking water. Refer to Chapter 5, Subchapters A and B for the general provisions of Class VI UIC permits.

Information on the proposed activity and proposed permit conditions is provided below.

***Area of Review and Corrective Action:***

The Area of Review, or AoR, is the region surrounding the geologic storage project where underground sources of drinking water may be endangered by the injection activity (e.g., if there are any improperly sealed, completed, or abandoned wells that penetrate the confining zone that could provide a conduit for fluid migration). The Area of Review for the proposed well is approximately 5 square miles and was delineated using a model that predicts the movement of the carbon dioxide plume and pressure front based on available information about planned injection operations and the subsurface rock formations. The AoR is shown in Figure 1 below.

**Figure 1. South Midland CCS - Area of Review (AoR)**



Based on Milestone Carbon’s search of well records and aeromagnetic (well locator) survey, there are no pre-existing legacy wellbores penetrating the top seal or injection interval within the Area of Review that require corrective action by Milestone Carbon.

Milestone Carbon will re-evaluate the Area of Review by assessing monitoring and operational data every five (5) years over the duration of the project to verify that the carbon dioxide plume and pressure front are moving as predicted. If any significant changes from the modeled predictions are detected, Milestone Carbon will revise the project-specific plans described here, and RRC will modify the permit per 16 TAC §5.202(d)(2).

***Underground Sources of Drinking Water:***

The lowest geologic unit in the Area of Review that has the potential to be an underground source of drinking water is the Dockum Group Aquifer. The top of the Dockum Group Aquifer rock layer occurs at an average depth of approximately 300 feet below the ground surface. The Groundwater Advisory Unit has determined that the deepest (base of) underground source of

drinking water (having 10,000 mg/liter or less of total dissolved solids) occurs at a depth 1,250 feet below ground surface in the Area of Review.

***Well Construction Requirements:***

Milestone Carbon proposes to drill the Midland CCS #2 Class VI injection well for their South Midland CCS Facility. Statewide Rule §5.203 (e)(1)(B)(v) requires that: *‘At least one long string casing, using a sufficient number of centralizers, must extend from the surface to the injection zone and must be cemented by circulating cement to the surface in one or more stages. The long string casing must isolate the injection zone and other intervals as necessary for the protection of USDWs and to ensure confinement of the injected and formation fluids to the permitted injection zone using cement and/or other isolation techniques. If the long string casing does not extend through the injection zone, another well string or liner must be cemented through the injection zone (for example, a chrome liner).’*

Due to the extensively fractured nature of the proposed Siluro-Devonian and Ellenburger formations injection interval in their project area, Milestone Carbon has requested and has been granted a well construction variance to Statewide Rule §5.203 (e)(1)(B)(v) by the RRC, which allows construction of the Midland CCS #2 Class VI injection well using an open-hole completion (that is, with no perforated casing or liner across the injection interval). This construction variance was granted on the basis of the following considerations:

1. Although extensively fractured, the combined Siluro-Devonian and Ellenburger formations injection reservoir consists of well-indurated (strongly lithified) Paleozoic rocks, so a casing or liner is not necessary as a structural component of the well to maintain wellbore stability.
2. Injection into the combined Siluro-Devonian and Ellenburger formations injection reservoir interval below the Devonian Woodford Shale top-seal using an open-hole completion is an optimal engineering approach. An open-hole completion is a recognized production engineering best practice for heavily fractured reservoirs, that allows maximum hydraulic connectivity to be established between an injection well and a fractured injection reservoir.
3. Given the fact that the combined Siluro-Devonian and Ellenburger formations injection interval consists of upper and lower zones of stratigraphically massive and extensively fractured rock separated by a thin 100-foot interval of Simpson Shale, there is little to no zonal isolation capability provided or to be gained by using a “regular” perforated casing or perforated liner completion to vertically isolate and “cement squeeze” (i.e. shut-off) specific layers / discreet strata within the injection interval.
4. The Midland CCS #2 Class VI injection well construction will be designed to allow a long-string casing or liner to be set and cemented through the entire injection interval, if future conditions indicate such control is necessary.

All other aspects of the proposed design of the Midland CCS #2 injection well, meet the regulatory criteria stipulated by 16 TAC §5.203(e). All Class VI wells must be constructed with materials and cements that can withstand exposure to carbon dioxide and carbon dioxide/water mixtures over the life of the project. Class VI wells also must be cased and cemented to prevent the movement of fluids into or between underground sources of drinking water.

The Midland CCS #2 injection well will be equipped with an automatic surface shut-off system that will shut off the well if any permitted operating parameters—such as injection pressure—diverge from permit limitations. Milestone Carbon may not commence construction, including drilling, of any new well until a final W-1 permit has been issued and is effective.

***Injection Fluid:***

The RRC will review whether the chemical and physical characteristics of the carbon dioxide stream from any additional proposed source meet the permit requirements. The RRC will also review whether injecting carbon dioxide from any additional source(s) in the future would alter the project or permit requirements and result in the need for a major permit modification, including public notice.

***Maximum Injection Pressure:***

The injector well has a maximum allowable bottomhole injection pressure (BHP) 7,875 pounds per square inch (4,000 psig. surface injection pressure).

This maximum allowable (not-to-exceed) bottomhole injection pressure ensures that the pressure during injection does not initiate fractures in the injection or confining zones and ensures that the injection pressure will not cause movement of injected fluids or formation fluids vertically upward into an underground source of drinking water (USDW).

***Monitoring and Reporting Requirements:***

The draft permit will implement an RRC-approved Testing and Monitoring Plan. The permittee is required to analyze the carbon dioxide stream quarterly to provide information about its chemical and physical characteristics. Milestone Carbon is also required to demonstrate well integrity before injection begins and periodically throughout the duration of injection operations. Milestone Carbon is required to conduct and pass a two-part mechanical integrity test, in accordance with 16 TAC §5.203(h) and §5.206(f), before the RRC will authorize Milestone Carbon to start injecting.

After injection begins, Milestone Carbon is required to:

- Continuously observe and record injection pressure, flow rate and volume, and the pressure on the annulus (the space between casing and tubing) to detect leaks in the casing, tubing, or packer.
- Annually demonstrate external mechanical integrity using a temperature or noise log or another approved method to detect any fluid movement behind the casing.
- Test the injection wells for signs of corrosion every quarter to provide early indication of any well material corrosion due to contact with carbon dioxide in the presence of water that could compromise the well.
- Monitor the environment near the wells to verify that the project and the injected carbon dioxide plume are behaving as predicted and that carbon dioxide is not migrating outside the injection formation. Milestone Carbon will perform groundwater quality monitoring in shallow and deep wells quarterly to detect geochemical changes that may be a result of injection - such as leaching or mobilization of heavy metals and organic compounds or fluid displacement that could impact Underground sources of drinking water.
- Perform pressure fall-off testing at least every five years to verify that the injection zone is responding to injection as predicted.
- Track the movement of the carbon dioxide plume and pressure front using direct methods such as fluid monitoring of the injection zone and Underground sources of drinking water and pressure monitoring of the injection zone, and indirect methods such as seismicity

monitoring and pulse neutron logging of well bores to verify that the carbon dioxide plume and pressure front are moving as predicted or to provide early indication if they are not.

The permittee will be required to submit results of this monitoring to the RRC semiannually or within 30 days of the completion of a mechanical integrity test or other required testing.

***Emergency and Remedial Response:***

As required by 16 TAC §5.203(n), Milestone Carbon has prepared and submitted to the RRC for approval, a site-specific Emergency and Remedial Response Plan (ERRP) that identifies key resources / infrastructure in the Area of Review that must be protected.

The Emergency and Remedial Response Plan describes the responses that would be taken to address adverse events, and identifies the staff, equipment, and other resources available to support emergency and remedial response events. The emergency and remedial response provisions of the permit would facilitate expeditious responses and prevent or mitigate harm to public health and the environment, including underground sources of drinking water. The Emergency and Remedial Response Plan will be an enforceable part of the permit.

***Financial Responsibility:***

Milestone Carbon has demonstrated, and will maintain, adequate financial responsibility to perform all needed corrective action on wells in the Area of Review, to plug the injection well , to perform all required post-injection site care, to close the site, and to conduct any needed emergency and remedial response measures. The total cost estimates for these activities to be covered by the approved financial assurance mechanisms is \$20,957,610 in 2025 dollars. Milestone Carbon will use a surety bond to cover costs and demonstrate financial responsibility.

The draft permits require the permittee to annually update cost estimates for the covered activities. These provisions ensure that resources are available to perform the required activities without using public funds.

***Plugging and Abandonment:***

The draft permits include an Injection Well Plugging Plan for environmentally protective well plugging at the cessation of injection operations. The wells (injector well and surrounding monitoring wells) will be plugged using approved materials that are compatible with carbon dioxide/water mixtures to ensure that the wells will not serve as conduits for fluid movement into underground sources of drinking water.

***Post-Injection Site Care and Site Closure:***

The permittee will be required to implement an RRC-approved Post-Injection Site Care and Site Closure Plan. Following the cessation of injection, the permittee will be required to continue to monitor groundwater quality and track the position of the carbon dioxide plume and pressure front in a similar manner to what is described under “Monitoring and Reporting Requirements” above. This monitoring will help confirm predictions about the behavior of the carbon dioxide plume and pressure front (e.g., that pressures are subsiding after injection ceases) and provide early indication of any potential endangerment of underground sources of drinking water. The permittee will continue this post-injection site monitoring for a period of 50 years following the cessation of injection. At the end of the Post-Injection Site Care period, if site data support it, the RRC may authorize the permittee to close the site.

Following authorization to proceed with site-closure activities, the permittee will plug all monitoring wells with carbon dioxide-compatible materials to ensure they cannot serve as conduits for fluid movement and will restore the site to its original condition.

***Administrative Record***

The full administrative record, including all data submitted by Milestone Carbon in support of its permit application, is available for public review at the RRC's District 7C Office at the following address:

Railroad Commission of Texas  
District 7C Office  
622 South Oakes St, Suite J  
San Angelo, TX 76903  
[san\\_angelo@rrc.texas.gov](mailto:san_angelo@rrc.texas.gov)

The office is open 8:00 a.m. – 5:00 p.m., weekdays. To review the administrative record or for additional information please contact Robert Bertelson (Director of RRC Oil and Gas Division – District 7C) at phone: 325-657-7450 and fax: 325-657-7455.

**On the Web**

For more information about the project and draft Class VI UIC Permits:

<https://www.rrc.texas.gov/oil-and-gas/applications-and-permits/injection-storage-permits/co2-storage/co2-notices>