

FACT SHEET

Intent to Issue Class VI Underground Injection Control Permits for ExxonMobil Low Carbon Solutions Onshore Storage, LLC, Spring, TX

Sunflower Carbon Capture and Storage Project Jefferson & Liberty Counties, Texas

ExxonMobil Low Carbon Solutions Onshore Storage LLC (ExxonMobil) has applied to the Railroad Commission of Texas (RRC) for a Class VI Underground Injection Control (UIC) permit to construct and operate three (3) injection wells for their Sunflower Carbon Capture and Storage (CCS) Project. The proposed injection wells will be located at a project site situated on the north-south county line between Liberty and Jefferson Counties, north of Highway 90 approximately 1 mile west of Nome, Texas. The locations of the injection wells are shown in Table 1 below.

Table 1 – Location of Injection Wells

Well Name & No.	Latitude (NAD83)	Longitude (NAD83)
Sunflower Well No. 1	30.0204249	-94.4656525
Sunflower Well No. 2	30.0485414	-94.4219994
Sunflower Well No. 3	30.0487361	-94.4054694

ExxonMobil plans to inject a cumulative total of 25.3 million metric tons (MMT) of carbon dioxide (CO₂) into the proposed wells over the 11-year injection period of the Sunflower CCS Project.

The CO₂ that ExxonMobil plans to inject will come from industrial emitters in the Beaumont-Port Arthur area (ExxonMobil Green Line) near the Sunflower CCS facility. The CO₂ captured at the nearby industrial emitters will be compressed into a supercritical nearly pure carbon dioxide fluid which will then be injected deep underground through the three injection wells.

ExxonMobil selected the locations of the proposed wells 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 zones are comprised of an approximately 1,700-foot-thick Miocene-age (Fleming Formation) and 2,200-foot-thick Oligocene-age (Frio Formation) sequence of stacked sandstone rock layers which have excellent permeability and porosity, ranging in depth between approximately 4,000 – 8,000 feet below ground surface. The Fleming and Frio formations are separated by an approximately 300-foot-thick Anahuac Shale, a regionally extensive and well-defined sealing unit across the US Gulf Coast. The upper confining zone (UCZ) is characterized by a low porosity and low-permeability top-sealing containment layer that is capable of preventing the upward migration of fluids. ExxonMobil will monitor the wells of the geologic storage facility during the 11-year injection period, and for 50 years after injection ceases, or until a demonstration of non-endangerment to underground sources of drinking water has been approved by the RRC.

Technical background and details of ExxonMobil's Sunflower carbon storage project:

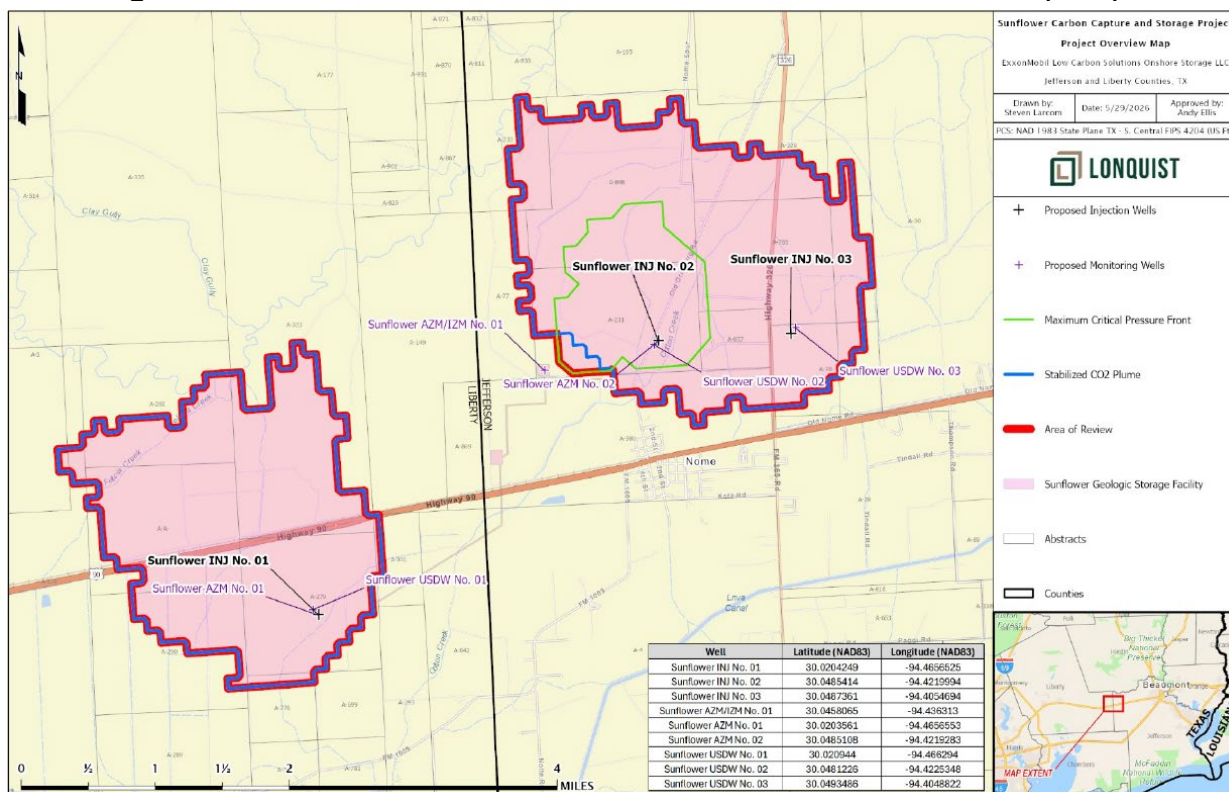
The RRC's review of the permit application has determined that the proposed injection will comply with the Class VI UIC regulations. Therefore, the RRC proposes to issue a permit for the ExxonMobil Sunflower injection facility. RRC regulations require that the RRC Class VI UIC permits for carbon dioxide storage specify conditions for the construction, operation, monitoring, reporting, plugging, post-injection site care, and site closure of Class VI injection wells. 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 are provided below.

Area of Review (AoR) and Corrective Action (CA):

The 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). There are two separate AoRs for the proposed wells which together encompass approximately 10 square miles. These were 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.

Figure 1. ExxonMobil Sunflower CCS Class VI UIC - Area of Review (AoR)



Based on ExxonMobil's search of well records and aeromagnetic survey, there are eleven (11) pre-existing legacy wellbores within the AoRs that will require re-entry and proper plugging and abandonment by ExxonMobil because the wellbores penetrate the injection zone or confining layer and will not be used for injection or monitoring for the proposed injection project. RRC reviewed the plugging and abandonment plans for the wells and will require ExxonMobil to properly plug and abandon the wells in a phased schedule before these specific well locations are encroached upon by the advancing CO2 injectate plumes or pressure fronts.

ExxonMobil will re-evaluate the AoR by assessing monitoring and operational data every five (5) years over the duration of the project to verify that the carbon dioxide plumes and pressure fronts are moving as predicted. If any significant changes from the modeled predictions are detected, ExxonMobil 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 (USDW):

The lowest geologic unit in the AoR that has the potential to be an underground source of drinking water is the Evangeline Aquifer. The base of the Evangeline Aquifer USDW (defined as having 10,000 mg/liter or less of total dissolved solids) within the Sunflower CCS facility site ranges in depth between approximately 2,000 and 2,500 feet below the ground surface. The Groundwater Advisory Unit has determined that the deepest (base of) USDW occurs at a depth 2,700 feet below the ground surface in the Sunflower CCS Facility AoR.

Well Construction Requirements:

ExxonMobil proposes to drill three (3) Class VI injection wells for the Sunflower CCS facility. All aspects of the proposed design of the Sunflower CCS injection-wells 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 USDW.

The Sunflower CCS facility injection wells 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. ExxonMobil 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 injected fluid will be greater than 97% pure carbon dioxide. The Sunflower CCS Facility will collect concentrated carbon dioxide streams from atmospheric emission points in the area surrounding their project site. 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 Sunflower CCS Project injector wells have maximum allowable bottomhole and surface injection pressures as shown in Table 2 below. These maximum allowable bottomhole injection pressures ensure 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 injection or formation fluids into an USDW.

Table 2: Maximum Permitted Injection Pressures

Well Name & No.	Maximum Surface Injection Pressure (psig)	Maximum Bottomhole Injection Pressure at 90% Fracture Gradient (0.643 psi/ft) at Bottomhole Gauge (psig)
Sunflower Well No. 1	2,000	4,658
Sunflower Well No. 2		
Sunflower Well No. 3		

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. ExxonMobil is also required to demonstrate well integrity before injection begins and periodically throughout the duration of injection operations.

ExxonMobil 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 ExxonMobil to start injecting.

After injection begins, ExxonMobil 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. ExxonMobil 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 USDW.
- 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 USDW 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.

ExxonMobil 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 (ERR):

As required by 16 TAC §5.203(n), ExxonMobil has prepared and submitted to the RRC for approval, a site-specific ERR Plan that identifies key resources/infrastructure in the AoR that must be protected.

The ERR 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 ERR 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 ERR Plan will be an enforceable part of the permit.

Financial Responsibility:

ExxonMobil has demonstrated, and will maintain, adequate financial responsibility to perform all needed corrective action on wells in the AoR, to plug the injection wells, to perform all required post-injection site care, to close the site, and to conduct any needed emergency and remedial response measures. The total initial cost estimates for these activities to be covered by the approved financial assurance mechanisms is \$31,488,275 in 2026 dollars. ExxonMobil 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 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 (PISCC):

ExxonMobil will be required to implement the RRC-approved PISCC) 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 ExxonMobil in support of its permit application, is available for public review at the RRC's District 3 Office at the following address:

Railroad Commission of Texas
District 03 Office
1919 N Loop West, Suite 620
Houston, TX 77008
houston@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 District Director at phone: 713-869-5001, fax: 713-869-9621.

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-notice>