



Underground Injection Control – Class VI Permit Application for Mockingbird Carbon Storage  
Project Injection Wells No. 01, No. 02, No. 03, and No. 04

SECTION 0 – APPLICATION NARRATIVE

Mockingbird Carbon Storage Project  
Allen Parish, Louisiana  
ExxonMobil Low Carbon Solutions Onshore Storage, LLC  
April 2025

## SECTION 0 – APPLICATION NARRATIVE

### TABLE OF CONTENTS

1. Additional Permits .....	6
2. Project Background.....	7
3. Site Characterization and Summary of Site Suitability .....	9
4. Plume Model.....	9
5. Area of Review and Corrective Action.....	10
6. Injection Well Construction and Operations .....	10
7. Testing and Monitoring .....	11
8. Injection Well Plugging .....	11
9. Post-Injection Site Care and Site Closure.....	11
10. Emergency and Remedial Response.....	11
11. Financial Responsibility.....	12

### Figures

Figure 1 – [REDACTED] .....	8
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### Tables

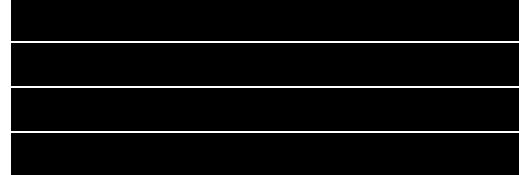
Table 1 – Additional Required Permits .....	6
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## General Application Information

**Project Name:** Mockingbird Carbon Storage Project

**Mailing Address:** 22777 Springwoods Village Parkway  
Spring, Louisiana 77389

**Well Location(s):** Allen Parish, Louisiana  
Mockingbird INJ No. 01:  
Mockingbird INJ No. 02:  
Mockingbird INJ No. 03:  
Mockingbird INJ No. 04:



\*NAD 27 – North American Datum of 1927

**Project Contact:**



**Project Owner:** ExxonMobil Low Carbon Solutions Onshore Storage

**Ownership Status:** Limited Liability Company

**Entity Status:** Public

Standard Industrial Classification (SIC) Codes: 4953 – Refuse Systems (nonhazardous waste disposal sites)

The facility is not located on federal or Indian lands. The surface facilities are not located on state lands; however, state lands are located within the area of review.





## 1. Additional Permits

Table 1 – Additional Required Permits

## 2. Project Background

ExxonMobil Low Carbon Solutions Onshore Storage, LLC (ExxonMobil) is proposing to construct and operate four carbon sequestration and storage (CS) wells in Allen Parish, Louisiana. The goal of the Mockingbird Carbon Storage (Mockingbird) Project is to permanently store anthropogenic CO<sub>2</sub> captured from industrial sources, thereby facilitating the United States' efforts to reduce greenhouse gas emissions. The Mockingbird Project will be a commercial-scale carbon capture system that is designed, constructed, and operated with the capability of storing CO<sub>2</sub> in deep geologic formations. The site was chosen based on the favorable geology—ideal for storage—and proximity to both emitting sources of CO<sub>2</sub> and existing CO<sub>2</sub> pipelines.



This Class VI permit application thoroughly describes and characterizes the geology of the planned well locations, evaluates the formations for the qualities required to permanently contain the sequestered CO<sub>2</sub>, and outlines the engineering design and safety requirements of the constructed wells. The application also describes and details the planned monitoring system that will be used to analyze movement of the actual injectate plume with that predicted by reservoir modeling and simulation.

This permit application has been developed to meet all requirements of the Louisiana Administrative Code, Title 43 (LAC43): XVII **§3601** through **§3633**. Once issued, the permit will be subject to review every 5 years thereafter for the active injection life of the wells and post-injection site care period, per LAC43: XVII **§3609.M.1**. Figure 1 displays the Mockingbird Project.

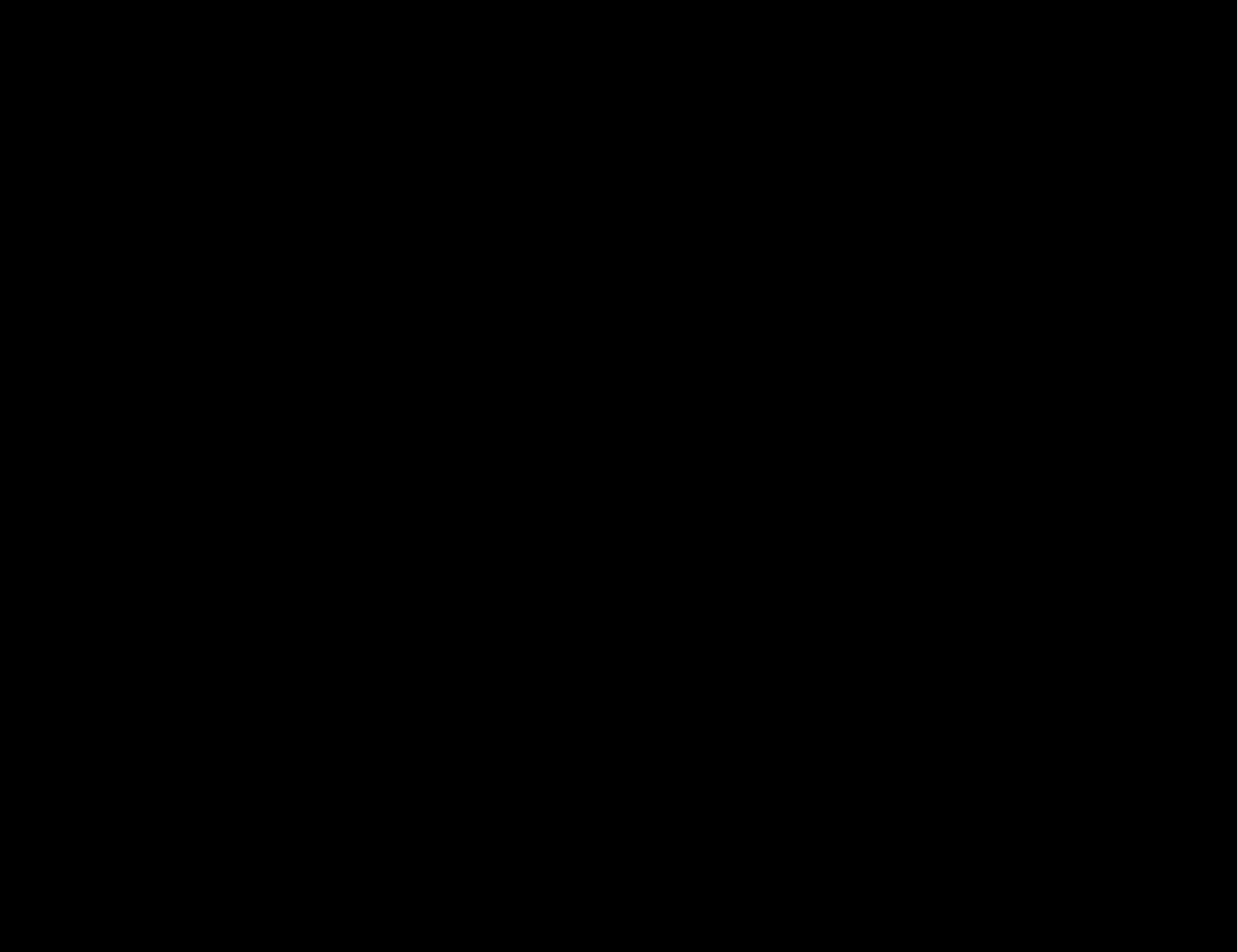


Figure 1 – [REDACTED]

### 3. Site Characterization and Summary of Site Suitability

A regional and local geologic evaluation was conducted (*Section 1 – Site Characterization*) for the Mockingbird Project site using geologic, geophysical, petrophysical, hydrogeological, and well log analysis data obtained from published literature, commercial sources, proximal core data, and publicly available data sets.

Detailed discussions of the geologic features, seismic history, injection and confining zone details, and area of review (AOR) site suitability are presented in *Section 1 – Site Characterization* and *Section 2 – Plume Model*; below are some highlights from those discussions. The Mockingbird Project site is a geologically ideal location for CO<sub>2</sub> injection and storage operations. The injection zone is composed of thick, porous, and permeable sandstones that will support the proposed injection operations. The upper confining zone (UCZ) is characterized by low porosity and permeability, modeled to impede the upward migration of fluids.

Consistent with the requirements of LAC43: XVII **§3615.A**, the Mockingbird Project area's geological system is suitable for CO<sub>2</sub> injection and containment in the proposed injection

The upper and lower confining zones show sufficient porosity and permeability along with lateral extent to ensure that the movement of the CO<sub>2</sub> plume and formation fluids is prevented—while the porosity, permeability, and lateral extent of the injection zone are sufficient to ensure the safe and permanent storage of anthropogenic CO<sub>2</sub>.

### 4. Plume Model

A compositional model delineated the AOR for the Mockingbird Project consistent with the requirements of LAC43: XVII **§3615.B.3**. Advanced modeling workflows within Schlumberger's (SLB) industry-standard software were employed to construct geological and dynamic models. An extensive literature and public data search was conducted to help generate model inputs. Additional site-specific data will be acquired during the upcoming evaluation and development phase to enhance the model and validate storage capacity and containment integrity.

Intersect™ was chosen to build the dynamic model for its ability to handle large data sets and multiple grids, offering various tools for data management, visualization, and uncertainty analysis. This software is a widely recognized tool used for modeling both compositional and unconventional reservoirs. Intersect employs cutting-edge computational techniques and equation of state (EOS) algorithms to simulate compositional processes with high fidelity, making it well-suited for CS applications. The dynamic model accounts for the various trapping mechanisms that may occur in the subsurface. Structural, residual gas, and solubility trapping are all included to predict the migration of CO<sub>2</sub> and delineate the AOR.

the project aims to maximize storage capacity while mitigating potential impacts on subsurface integrity and preventing the movement of fluid into USDWs. After injection operations cease, the reservoir model shows that the pressure will stabilize to near in situ conditions. *Section 2 – Plume Model* presents a complete discussion on the generation of the model.

## 5. Area of Review and Corrective Action

*Section 2 – Plume Model* lays the foundation for *Section 3 – Area of Review and Corrective Action Plan* by detailing the methodology behind the determination of the AOR. *Section 3* focuses on the subsequent assessment of all of the artificial penetrations in the AOR. Two distinct evaluations comprise the final AOR: (1) the determination of the CO<sub>2</sub> plume; and (2) the determination of the extent of the critical pressure front. *Section 3* outlines in detail how both of those were determined.

A complete discussion on each of those wells and the proposed schedule of corrective actions are also presented in that section per LAC43: XVII §3615.C.

## 6. Injection Well Construction and Operations

As discussed in *Section 4 – Well Construction Plan and Operating Conditions*, ExxonMobil plans to construct four CO<sub>2</sub> injection wells in Allen Parish, Louisiana. The wells will be constructed in compliance with the Underground Injection Control (UIC) Class VI injection-well construction requirements of LAC43: XVII §3617. The goal of the operating parameters and material selection is to guarantee the system's mechanical integrity—ensuring protection of the underground source of drinking water (USDW)—and to maximize performance during the life of the Mockingbird Project. The casing and cementing, and tubing and packer materials to be used in the construction of the wells will be of sufficient strength and design to last the life of the CS project—and to be compatible with the fluids with which those materials will be expected to come into contact. Information about those materials is included in *Section 4*, along with wellbore schematics and a more in-depth discussion of the injection well construction procedures.

The injection wells are designed to allow maximum injection volume while ensuring that the bottomhole pressure does not exceed 90% of the formation's fracture gradient. The well design maintains enough clearance for the continuous monitoring of bottomhole pressure and temperature (P/T), using a P/T gauge deployed on the tubing.

A description of the physical and chemical characteristics along with the corrosiveness of the CO<sub>2</sub>

stream will, once prepared, be provided to the Louisiana Department of Energy and Natural Resources (LDENR).

## **7. Testing and Monitoring**

*Section 5 – Testing and Monitoring Plan* describes how ExxonMobil will monitor the Mockingbird Project pursuant to LAC43: XVII **§3625**. As detailed in that section, ExxonMobil has conducted, or will conduct, required testing and monitoring activities—including analysis of the CO<sub>2</sub> stream, use of continuous recording devices, corrosion monitoring, groundwater quality monitoring, mechanical integrity, pressure falloff testing, and plume tracking. In addition to demonstrating that the wells are operating as planned, that the CO<sub>2</sub> plume and pressure front are moving as predicted, and that there is no endangerment to USDWs, the monitoring data will be used to validate and adjust the geological models used to predict the distribution of the CO<sub>2</sub> within the storage zone and to support AOR reevaluations. Results of the testing and monitoring activities described in the Testing and Monitoring Plan may trigger action according to the Emergency and Remedial Response Plan (*Section 8*).

## **8. Injection Well Plugging**

After the cessation of injection, ExxonMobil plans to plug and abandon the injection wells pursuant to LAC43: XVII **§3631**. *Section 6 – Injection Well Plugging Plan* details the procedures and plans for the plugging of the injection and monitoring wells of the Mockingbird Project.

## **9. Post-Injection Site Care and Site Closure**

*Section 7 – Post-Injection Site Care and Site Closure Plan* describes the activities that ExxonMobil will perform during those phases of the project pursuant to LAC43: XVII **§3633**. ExxonMobil will monitor groundwater quality and track the position of the CO<sub>2</sub> plume and pressure for 50 years; however, ExxonMobil may petition the Commissioner of Conservation (Commissioner) to establish an alternate post-injection site care (PISC) time frame in accordance with LAC43: XVII **§3633.A.3**. ExxonMobil may not cease post-injection monitoring until a demonstration of non-endangerment of the USDW has been approved by the Commissioner. Following approval for site closure, ExxonMobil will plug all monitoring wells, restore the site to its original condition, and submit a site closure report and associated documentation.

## **10. Emergency and Remedial Response**

In the event of an emergency that could endanger public health and safety or any USDW during the construction, operation, or PISC periods, *Section 8 – Emergency and Remedial Response Plan* describes the actions that ExxonMobil will perform if needed at the Mockingbird Project pursuant to LAC43: XVII **§3623**. If evidence is verified that the injected CO<sub>2</sub> stream and/or associated pressure front may cause endangerment to a USDW, ExxonMobil will initiate the shutdown plan for the injection wells, take all steps reasonably necessary to identify and characterize the

release, notify the permitting agency (the Commissioner) of the emergency event within 24 hours, and implement the approved Emergency and Remedial Response Plan. Key contact information related to the project is also outlined in *Section 8* (Table 8-4) for local, state, and federal agencies.

## **11. Financial Responsibility**

Pursuant to LAC43: XVII **§3609.C**, ExxonMobil will maintain financial responsibility throughout all phases of the Mockingbird Project, as detailed in *Section 9 – Financial Assurance*. The instruments will be sufficient to cover the costs of corrective action, injection well plugging, PISC, site closure, and emergency and remedial response. Adjustments to the cost estimates, including adjustments for inflation, cost estimate increases, or an event that may adversely affect financial conditions, will be provided in writing to the Commissioner.

**Appendix A – Project Maps**











