CLASS VI PERMIT APPLICATION NARRATIVE SUMMARY
40 CFR 146.82(a)

YAMS CO_2 Sequestration Project

1.0 Project Background and Contact Information

Facility name: YAMS CO_2 Sequestration Project
YAMS CCS 2 Well

Facility contact: Kelly Watson, Project Manager
5 Greenway Plaza Houston, TX 77046
713-552-8613 kelly_watson@oxy.com

Well location: [redacted], Louisiana

The YAMS CCS 2 well in the YAMS CO2 Sequestration Project is part of the Oxy Low Carbon Ventures, LLC (OLCV), objective to demonstrate technical feasibility of Carbon Capture and Storage (CCS), utilizing CO2 from industrial emitters along the Louisiana Gulf Coast. The advancement of CCS technology is critically important in addressing CO2 emissions and global climate change concerns. The YAMS CO2 Sequestration Project is designed to demonstrate utility-scale integration of transport and permanent storage of captured CO2 into a deep geologic formation (i.e., geologic sequestration). A commercial-scale CCS system will be designed, built, and operated with the capability of storing CO2 gas.

The YAMS CO2 Sequestration Project will display that the geologic sequestration process can be done safely, ensuring that the injected CO2 will be retained within the intended storage reservoir.

GSDT Submission - Project Background and Contact Information
GSDT Module: Project Information Tracking ***Tab(s):*** General Information tab; Facility Information and Owner/Operator Information tab Please use the checkbox(es) to verify the following information was submitted to the GSDT: ☒ Required project and facility details ***[40 CFR 146.82(a)(1)]***

2.0 Site Characterization

The Area of Review (AoR) is defined as the larger of the maximum extent of the a) free-phase CO_2 plume or b) pressure boundary within which brines from the injection zone can migrate into overlying USDW via leaky wells, faults, or breaches of the confining zone. Both AoRs are determined using a multiphase CO_2-brine transport model, which is constructed from a sophisticated geologic model that accounts for site-specific hydrogeology.

3.0 AoR and Corrective Action

The Area of Review and Corrective Action Plan document meets the requirements of Environmental Protection Agency (EPA) document 40 CFR Subpart H - Criteria and Standards Applicable to Class VI Wells. The key challenges are detailed characterization of the injection and confining zones, delineating all underground sources of drinking water, and implementing corrective action on existing wells within the Area of Review. The attachment describes the subsurface characterization, computational modeling, current AoR delineation, corrective action plan and schedule, wells requiring corrective action, and future AoR re-evaluation plan and schedule.

At a fixed frequency specified in the Area of Review and Corrective Action Plan, or more frequently when monitoring and operational conditions warrant, Oxy Low Carbon Ventures, LLC, must reevaluate the AoR and perform corrective action in the manner specified in 40 CFR 146.84. Oxy Low Carbon Ventures, LLC, must also update the Area of Review and Corrective Action Plan or demonstrate to the Director that no update is needed.

Following each Area of Review and Corrective Action Plan reevaluation or demonstration showing that no new evaluation is needed, Oxy Low Carbon Ventures, LLC, shall submit the resultant information in an electronic format to the Director for review and approval of the results. Once approved by the Director, the revised Area of Review and Corrective Action Plan will become an enforceable condition of this permit.

AoR and Corrective Action GSDT Submissions

GSDT Module: AoR and Corrective Action
Tab(s): All applicable tabs

Please use the checkbox(es) to verify the following information was submitted to the GSDT:
☒ Tabulation of all wells within AoR that penetrate confining zone ***[40 CFR 146.82(a)(4)]***
☒ AoR and Corrective Action Plan ***[40 CFR 146.82(a)(13) and 146.84(b)]***
☒ Computational modeling details ***[40 CFR 146.84(c)]***

4.0 Financial Responsibility

Oxy Low Carbon Ventures, LLC, shall maintain financial responsibility and resources to meet the requirements of 40 CFR 146.85 and conditions of this permit. Financial responsibility shall be maintained through all phases of the project. The approved financial assurance mechanisms are found in the Financial Assurance Plan document of this permit. The financial instrument(s) must be sufficient to cover the cost of:

- Corrective action (meeting the requirements of 40 CFR 146.84);
- Injection well plugging (meeting the requirements of 40 CFR 146.92);
- Post-injection site care and site closure (meeting the requirements of 40 CFR 146.93);
- Emergency and remedial response (meeting the requirements of 40 CFR 146.94).

Financial Responsibility GSDT Submissions

GSDT Module: Financial Responsibility Demonstration
Tab(s): Cost Estimate tab and all applicable financial instrument tabs

Please use the checkbox(es) to verify the following information was submitted to the GSDT:
☒ Demonstration of financial responsibility ***[40 CFR 146.82(a)(14) and 146.85]***

5.0 Injection Well Construction

The YAMS CCS 2 injection well is designed with the highest standards and best practices for drilling and well construction. Operational parameters and material selection are aimed to ensure mechanical integrity in the system and to optimize the operation during the life of the project.

6.0 Pre-Operational Logging and Testing

The YAMS CCS 2 well testing program aims to obtain chemical and physical characteristics of the injection and confining zone(s). The program includes logging, sidewall coring, formation hydrogeologic testing, and other activities performed during the drilling and construction of the CO_2 injection well, monitoring well(s), and any stratigraphic characterization well(s).

The pre-operational testing program will determine or verify the depth, thickness, mineralogy, lithology, porosity, permeability, and geomechanical information of the injection zone, overlying confining zone, and other relevant geologic formations. In addition, formation fluid characteristics are to be obtained from the injection zone to establish baseline data against which future measurements may be compared after the start of injection operations.

Pre-Operational Logging and Testing GSDT Submissions
GSDT Module: Pre-Operational Testing ***Tab(s):*** Welcome tab Please use the checkbox(es) to verify the following information was submitted to the GSDT: ☒ Proposed pre-operational testing program ***[40 CFR 146.82(a)(8) and 146.87]***

7.0 Well Operation

The well was designed to maximize the rate of injection as well as reduce the surface pressure and friction alongside the tubing, while maintaining the bottomhole pressure below the frac gradient. The selected design provides enough clearance to deploy the pressure and temperature gauges on tubing and to ensure continuous surveillance of external integrity and conformance through the external fiber optic cable.

No injectate other than that identified in this permit shall be injected into the well except fluids used for stimulation, rework, and well tests as approved by the Director.

Electronic reports, submittals, notifications, and records made and maintained by Oxy Low Carbon Ventures, LLC, under this permit must be in an electronic format approved by EPA. The permittee shall electronically submit all required reports to the Director.

8.0 Testing and Monitoring

This Testing and Monitoring Plan describes how Oxy Low Carbon Ventures, LLC, will monitor the YAMS CO_2 Sequestration Project site pursuant to 40 CFR 146.90. In addition to demonstrating that the well is operating as planned, the carbon dioxide 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_2 within the storage zone to support AoR reevaluations and a non-endangerment demonstration.

Other than during periods of well workover or maintenance approved by the Director, in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the injection well must have and maintain mechanical integrity consistent with 40 CFR 146.89.

Testing and Monitoring GSDT Submissions
GSDT Module: Project Plan Submissions ***Tab(s):*** Testing and Monitoring tab Please use the checkbox(es) to verify the following information was submitted to the GSDT: ☒ Testing and Monitoring Plan ***[40 CFR 146.82(a)(15) and 146.90]***

9.0 Injection Well Plugging

Upon end of life for YAMS CCS 2, the injection well will be plugged and abandoned relevant to the requirements of Environmental Protection Agency (EPA) document 40 CFR Subpart H – Criteria and Standards Applicable to Class VI Wells. The plugging procedure and materials will be designed to prevent unwanted fluid movement, resist the corrosive aspects of carbon dioxide (CO2) with water mixtures, and protect any underground sources of drinking water (USDWs).

Injection Well Plugging GSDT Submissions
GSDT Module: Project Plan Submissions ***Tab(s):*** Injection Well Plugging tab Please use the checkbox(es) to verify the following information was submitted to the GSDT: ☒ Injection Well Plugging Plan ***[40 CFR 146.82(a)(16) and 146.92(b)]***

10.0 Post-Injection Site Care (PISC) and Site Closure

The Post-Injection Site Care and Site Closure (PISC) plan describes the activities that Oxy Low Carbon Ventures, LLC, will perform to meet the requirements of 40 CFR 146.93. Oxy Low Carbon Ventures, LLC, will monitor ground water quality and track the position of the carbon dioxide plume and pressure front until site closure. Oxy Low Carbon Ventures, LLC, may not cease post-injection monitoring until a demonstration of non-endangerment of USDWs has been approved by the UIC Program Director pursuant to 40 CFR 146.93(b)(3). Following approval for site closure, Oxy Low Carbon Ventures, LLC, will plug all monitoring wells, restore the site to its original condition, and submit a site closure report and associated documentation.

PISC and Site Closure GSDT Submissions
GSDT Module: Project Plan Submissions ***Tab(s):*** PISC and Site Closure tab Please use the checkbox(es) to verify the following information was submitted to the GSDT: ☒ PISC and Site Closure Plan ***[40 CFR 146.82(a)(17) and 146.93(a)]***

PISC and Site Closure GSDT Submissions
GSDT Module: Alternative PISC Timeframe Demonstration ***Tab(s):*** All tabs (only if an alternative PISC timeframe is requested) Please use the checkbox(es) to verify the following information was submitted to the GSDT: ☐ Alternative PISC timeframe demonstration ***[40 CFR 146.82(a)(18) and 146.93(c)]***

11.0 Emergency and Remedial Response

This Emergency and Remedial Response Plan (ERRP) describes actions Oxy Low Carbon Ventures, LLC, shall take to address movement of the injection fluid or formation fluid in a manner that may endanger an underground source of drinking water (USDW) during the construction, operation, or post-injection site care periods.

Emergency and Remedial Response GSDT Submissions
GSDT Module: Project Plan Submissions ***Tab(s):*** Emergency and Remedial Response tab Please use the checkbox(es) to verify the following information was submitted to the GSDT: ☒ Emergency and Remedial Response Plan ***[40 CFR 146.82(a)(19) and 146.94(a)]***

12.0 Injection Depth Waiver and Aquifer Exemption Expansion

Injection depth waivers are not requested in this permit application.

Injection Depth Waiver and Aquifer Exemption Expansion GSDT Submissions
GSDT Module: Injection Depth Waivers and Aquifer Exemption Expansions ***Tab(s):*** All applicable tabs Please use the checkbox(es) to verify the following information was submitted to the GSDT: ☐ Injection Depth Waiver supplemental report ***[40 CFR 146.82(d) and 146.95(a)]*** ☐ Aquifer exemption expansion request and data ***[40 CFR 146.4(d) and 144.7(d)]***