Denbury Carbon Solutions, LLC

Geologic Site Characterization

Draco Storage Facility: Allen, Beauregard, and Vernon Parishes, Louisiana

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
AoR	Area of Review
API	American Petroleum Institute
BCZ	Basal Confining Zone
bgs	Below Ground Surface
Ca	Calcium
CI	Contour Interval
CO_2	Carbon Dioxide
DEM	Digital Elevation Models
DN	Density Neutron
E	East
FeToT	Total Iron
FM	Formation
FMI HD	High-Definition Formation Micro Imager
FS	Flooding Surface
Ft	Feet
GAPI	API Gamma Ray Unit
g/cm^3	Grams per Cubic Centimeter
gpd	Gallons Per Day
HCO_3	Bicarbonate
HPMI	High Pressure Mercury Injection Capillary Pressure
In	Inch
K	Potassium
km	Kilometer
LA	Louisiana
LIDAR	Light Detection and Ranging
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LGS	Louisiana Geological Survey
LLC	Limited Liability Company

MICP	Mercury Injection Capillary Pressure
MD	Measured Depth
mD	Millidarcies
MDL	Method Detection Limit
Mg	Magnesium
mV	Millivolts
Mgal/d	Million gallons per day
µg/L	Micrograms per liter
mg/L	Milligrams per liter
N	North
Na	Sodium
NAD27	North American Datum of 1927
nd	Neutron Density
NPHI	Neutron Porosity
PCZ	Primary Confining Zone
pH	Potential of Hydrogen
ppt	Parts per Thousand
RCAL	Routine Core Analysis
RES	Resistivity
RHOB	Bulk Density
RT	Resistivity
RW	Water Resistivity
S	South
SB	Sequence Boundary
SCAL	Special Core Analysis
SCZ	Secondary Confining Zone
SMCL	Secondary Maximum Contaminant Levels
SN	Serial Number
SO_4	Sulfate
SONRIS	Strategic Online Natural Resources Information System
SP	Spontaneous Potential
sq	Square
TD	Total Depth
TS	Transgressive Surface
TVD	True Vertical Depth
TVDSS	True Vertical Depth Subsea
TX	Texas

US	United States
USDW	Underground Source of Drinking Water
USGS	United States Geological Survey
USIT	Ultrasonic Imager Tool
v/v	Neutron Porosity
W	West
XRD	X-ray Diffraction
XRF	X-ray Fluorescence
3D	Three Dimensional
4D	Four Dimensional

1.0 FACILITY INFORMATION

Facility Name: Draco Storage Facility

Facility Location: [redacted]

Mailing Address: 5851 Legacy Circle, Suite 1200
Plano, Texas 75024

Well Location(s): [redacted]

2.0 GEOLOGY, GEOLOGIC STRUCTURE, AND HYDROGEOLOGY

2.1 GEOLOGY

[redacted]

[redacted]

2.1.1 Data Sources

The existing data within the AoR consists of three-dimensional (3D) seismic [redacted]

2.1.1.1 Existing Data

Well Data

Data from existing wells in [redacted] published literature, and publicly available datasets from the Louisiana Department of Natural Resources (LDNR) and the Louisiana Geological Survey (LGS) were used to characterize the subsurface at the Draco Storage Facility. A more detailed subsurface evaluation was conducted across the Draco Storage Facility 3D geologic model area, which contains [redacted]

Within the geomodel area, [redacted]

[redacted]

Seismic Data

The seismic data coverage in the vicinity of the Draco Storage Facility comprises [redacted]

2.1.1.2 Site-Specific Data

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

The Wilcox Group, Eocene and Paleocene age [redacted] unconformably overlies the Midway Group, consisting of siliciclastic strata and ranging in thickness from 1,000 feet up to 7,000 feet across the Gulf of Mexico. Regionally, the Wilcox Group has been interpreted as an amalgamation of deltaic systems distributed across the Gulf of Mexico Basin by up to five fluvial axes that initially delivered a sediment supply of 150,000 km^3 per million years [redacted]

2.1.3 Geology of Major Stratigraphic Units

A stratigraphic column showing the key units for the Draco Storage Facility is provided in [redacted]

[redacted]

[redacted]

[redacted]

2.1.4 Site-Specific Geology

The following discusses the geology in the vicinity of the Draco Storage Facility to demonstrate the continuity and physical properties of critical geological units (Table 3). The site-specific geology has subdivided the injection interval (Section 2.1.4.1) and confining system (Section 2.1.4.2). The petrophysical model is included in Appendix A and outlines the shale correction, porosity, and permeability methodologies facilitating characterization.

[redacted]

2.1.4.1 Injection Interval Characteristics

The injection interval is a stacked reservoir system that has thick, laterally extensive sands with suitable physical properties to allow the injected CO_2 to be distributed through a large volume of rock, minimizing pressure increase. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

2.1.4.2 Confining System

[redacted]

2.1.4.2a Basal Confining Zone

[redacted]

2.1.4.2b Above Injection Zone Confining System

[redacted]

[redacted]

[redacted]

2.1.4.3 Cross-Sections of the AOR

[redacted] show north-south and west-east structural cross-sections through the proposed AoR, respectively. These cross-sections illustrate that project-critical injection and confining zones [redacted]

2.1.4.4 Geomechanical and Petrophysical Information on Injection and Confining Zones

[redacted]

Petrophysical analysis of the injection and confining zones was conducted [redacted] A detailed description of this process can be found in Appendix A.

2.1.4.5 Geophysical Model for 3D Volume

[redacted]

[redacted]

[redacted]

[redacted]

2.2 GEOLOGIC STRUCTURE

2.2.1 Faults, Fractures, and Seismic History

2.2.1.1 Regional Faulting and Fracturing

The regional geologic structure is summarized in Section 2.1.2. The Draco Storage Facility sits in [redacted]

[redacted]

[redacted]

[redacted]

2.2.1.2 Local Faulting and Fracturing

Based on integrated 3D seismic and well analyses, [redacted]

2.2.2 3D Seismic Interpretation

A 3D seismic volume [redacted] was interpreted to generate subsurface structural and thickness maps covering key stratigraphic intervals for the geomodel area. The 3D was interpreted in time and converted to depth; the time-depth model conversion process is outlined in Section 2.1.4.4. [redacted]

2.2.3 Seismic Event History

[redacted]

[redacted]

[redacted]

[redacted]

2.3 HYDROGEOLOGY

The primary hydrogeologic aquifer units for [redacted]

2.3.1 Primary Aquifer Formations

The primary hydrogeologic units for [redacted] The aquifer units consist of discontinuous beds of clay, silt, and sand that extend across central and southern Louisiana.

2.3.1.1 [redacted]

[redacted]

2.3.2 Groundwater Flow

Aquifer recharge is primarily from precipitation, which generally moves downward into the aquifer, then groundwater flow is either toward the coast within the aquifer or discharges to small streams at the surface. Recharge and groundwater flow of each aquifer unit is outlined below (LDEQ, 2021).

[redacted]

2.3.3 Groundwater Quality

[redacted]

[redacted]

2.3.4 USDW

The base of the lowest USDW [redacted] was determined from public data, review of offset wells and literature review. The lowest USDW base was determined using a resistivity log-based method outlined by the Louisiana Department of Natural Resources. This method uses the deep induction curve of the electric log along with depth and resistivity cutoffs to determine the lowermost USDW [redacted]. The USDW base is then established at the base of the sand unit containing the lowermost USDW, if at least 100 feet of net shale exists between the USDW base and the next zone [redacted]

In the vicinity of the Draco Storage Facility, the base USDW is interpreted using electric logs and integrated [redacted]

[redacted]

2.4 GEOCHEMISTRY

[redacted]

2.5 SITE SUITABILITY

The Draco Storage Facility has favorable geologic controlling factors related to injectivity, capacity, and containment. Critical favorable factors include:

[redacted]

[redacted]

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APPENDIX A: PETROPHYSICAL ANALYSIS OF DRACO STORAGE FACILITY AREA WELLS

1.1 INTRODUCTION

As part of the geologic site characterization at the Draco Storage Facility, open-hole wireline well logs in digital and raster form were acquired from several exploration wells in the area of the Draco Storage Facility [redacted]

The objective of shale volume and porosity analyses was to establish key lithofacies distributions and porosity ranges for use in the geologic model.

1.2 WORKFLOW

[redacted]

[redacted]

Vsh = Final shale volume

[redacted]

[redacted]

[redacted]

[redacted]

APPENDIX B: EXISTING WELL DATA USED FOR SITE CHARACTERIZATION

[redacted]

[redacted]