Class VI UIC Area of Review and Corrective Action

This submission is for:

Project ID: R06-TX-0009

Project Name: Orchard

Current Project Phase: Pre-Injection Prior to Construction

Overview

Simulator Used for AoR delineation modeling: GEM

Version Used: 2022.10

Simulator Description/Documentation: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/GEM_2022.10.pdf

Total Simulation Time From Start of Injection: -999 days

Additional AoR Delineation Information: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_1.pdf

Model Domain

Coordinate System: State Plane

Horizontal Datum: NAD83

Coordinate System Units: ft

Vertical Datum: Reference Elevation

Describe Vertical Datum: -999

Zone: -999

FIPSZONE: -999 ADSZONE: -999

Mesh Type: Hexahedral Cartesian

Domain Size in Global Units Specified Above

Hexahedral Cartesian

Domain Coordinates File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_2.pdf

Angle of Inclination in X Direction: -999 Dips in the Direction of: increasing x

Angle of Inclination in Y Direction: -999 Dips in the Direction of: increasing y

Grid Size

Number of Nodes in x: -999 y: -999 z: -999

Grid Spacing: Constant

Grid Spacing in x: -999 y: -999 z: -999

Grid File Format: ASCII file containing vertices and elements

Grid File Description: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_4.pdf

Grid Data File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_5.pdf

Faults Modeled: Yes

Fault Coordinates File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_6.pdf

Caprock Modeled: Yes

Image File(s) for Model Domain Grid: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_7.pdf

Processes Modeled by Simulator

Reservoir Conditions:

Supercritical CO2 Conditions

Phases Modeled:

Aqueous Supercritical CO2

Aqueous Phase:

Phase Compressibility: Compressible

Compressibility Value: -999 1/Pa

Phase Composition: Compositional

Aqueous Phase Components:

Supercritical CO2 Phase:

Phase Compressibility: Compressible

Phase Composition: Compositional

Supercritical CO2 Phase Components:

Equation of State Description Including Reference: Peng-Robinson Equation of State

File with EOS Reference or Documentation: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_8.pdf

Multifluid Flow Processes:

Thermal Conditions: Isothermal

Heat Transport Processes:

Geochemistry Modeled: Yes

File Describing Geochemistry Modeling: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_12.pdf

Geomechanical/Structural Deformations Modeled: Yes

File Describing Geomechanical/Structural Modeling: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_13.pdf

Rock Properties and Constitutive Relationships

Porosity/Permeability Model

Porosity Distribution: Heterogeneous

Spatially Variable Porosity File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_9.pdf

File Describing how Porosity was Determined and Assigned to Numerical Model: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_10.pdf

Image Files for Porosity Distributions: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_11.pdf

Permeability Distribution: Heterogeneous

Spatially Variable Permeability File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_14.pdf mD

File Describing how Permeability was Determined and Assigned to Numerical Model: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_15.pdf

Image Files for Permeability Distributions: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_16.pdf

Number of Rock Types Modeled: -999

Description of Rock Type Selection and Assignment: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_17.pdf

Rock Type Distribution Data File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_18.pdf

Image Files for Rock Type Distribution: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_19.pdf

Boundary Conditions

Attach Boundary Conditions Description File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_20.pdf

Initial Conditions

Initial Phases in Domain:

Operational Information

Number of Injection Wells: -999

Model Output/Results

Provide file name and corresponding spatial location for each file: -999

Time-Series File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_21.pdf

Provide file name and corresponding variable and time stamp for each file: -999

Snapshot File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_22.pdf

Provide file name and corresponding description of surface for each file: -999

Surface Flux File: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_25.pdf

AoR Pressure Front Delineation

Lowermost USDW:

Name of Lowermost USDW: -999

Water Density: -999 gm/cm^3 at Elevation: -999 ft

Location of Measurement for Density: -999

Temperature: -999 F at Elevation: -999 ft

Location of Measurement: -999

Pressure: -999 psi at Elevation: -999 ft

Location of Measurement: -999

Salinity: -999 ppm at Elevation: -999 ft

Location of Measurement: -999

Elevation of bottom of USDW: -999 m

Injection Zone:

Name of Injection Zone: -999

Water Density: -999 gm/cm^3 at Elevation: -999 ft

Location of Measurement: -999

Temperature: -999 F at Elevation: -999 ft

Location of Measurement: -999

Pressure: -999 psi at Elevation: -999 ft

Location of Measurement: -999

Salinity: -999 ppm at Elevation: -999 ft

Location of Measurement: -999

Elevation of top of Injection Zone: -999 ft

Method of Estimating Critical Pressure: Static Mass Balance

Assumptions: -999

File Describing Critical Pressure Estimation: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_23.pdf

Estimated Critical Pressure: -999 psi

Delineated AoR:

Shapefile or KML File Showing Delineated AoR: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/CBI_AOR_24.pdf

Corrective Action

Area of Review and Corrective Action Plan [40 CFR 146.82(a)(13) and 146.84(b) or applicable state requirements]

Are you making an Area of Review and Corrective Action Plan submission at this time?: Yes

Reason for Project Plan Submission: Permit application submission

Project Plan Upload

Attach the Area of Review and Corrective Action Plan: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-

PreConstruction/AoRModeling-01-31-2023-1217/Section--3_Area--of--Review-----Corrective--Action_Redacted.pdf

Appendices and Supporting Materials Upload

Attach Any Supporting Documentation for the AoR and Corrective Action Plan: https://gsdt.pnnl.gov/alfresco/service/velo/getFile/no_wiki/shared/Submissions/R06-TX-0009/Phase1-PreConstruction/AoRModeling-01-31-2023-1217/Section--2_Plume--Model_Redacted.pdf

Area of Review Reevaluation [40 CFR 146.84(e) or applicable state requirements]

Minimum fixed frequency of AoR reevaluation: 5 Years

Are you making an Area of Review reevaluation submission at this time?: No

Reevaluation Background

Reevaluation Materials

Please upload your amended AoR and Corrective Action Plan on the previous tab.

Complete Submission

Authorized submission made by: Michael Blincow

For confirmation a read-only copy of your submission will be emailed to: rshah@elysian.cc