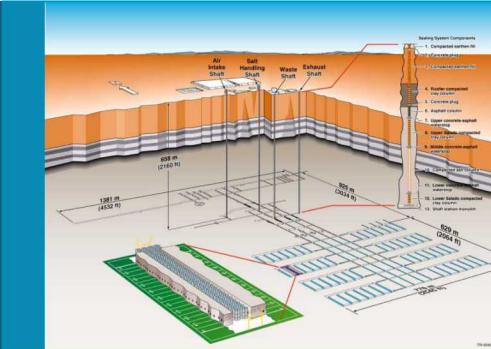


Additional Panels PA-2D & CRA-2024 PA-3D

Peer Reviews - CRA-2024 Plan



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2 Peer Review Scope

2D Conceptual Models Peer Review

- Regulatory requirement for a compliance submittal using current 2D PA approach in support of the Additional Panels Planned Change Request

3D Conceptual Models Peer Review

- Regulatory requirement for a compliance submittal using PFLOTRAN

Background

Conceptual Models Peer Review Requirements

Peer Review is a Requirement of 40 CFR 194.27

- (a) Any compliance application shall include documentation of peer review that has been conducted, in a manner required by this section, for:
 - (1) **Conceptual models** selected and developed by the Department;
- (b) Peer review processes required in paragraph (a) of this section, and conducted subsequent to the promulgation of this part, shall be conducted in a manner that is compatible with **NUREG-1297**, “Peer Review for High-Level Nuclear Waste Repositories,” published February 1988. (Incorporation by reference as specified in §194.5.)

Scope of Peer Review



NUREG 1297

“Peer reviews may be used as part of the QA actions necessary to provide adequate confidence in the work being reviewed. Because of several unique conditions inherent to the geologic repository program, expert judgement will need to be utilized in addressing the adequacy of work. Peer reviews are a mechanism by which these judgements may be made.”

The peer review process shall consist of an in-depth analysis and evaluation of:

- (a) validity of assumptions
- (b) alternate interpretations
- (c) uncertainty of results and consequences if wrong
- (d) appropriateness and limitations of methodology and procedures
- (f) adequacy of application
- (f) accuracy of calculations
- (g) validity of conclusions and
- (h) adequacy of requirements and criteria

In accordance with approved technical and quality assurance requirements and the applicable peer review plan(s).



Current Implementation Document - CBFO Management Procedure MP
10.5 *Peer Review* Rev 9

DOE Initiates Peer Review through a contractor which uses a service provider to plan, select reviewers, implement and document the peer review.

- SNL supports steps in the process:
 - Peer Review Panel Orientation
 - Subject Matter Presentations
 - Panel Meetings

6 | 2D Peer Review Plan

Peer Review needed to support the Additional Panels Planned Change Request Performance Assessment (APPA PCR) - 7/2022 Submittal to EPA

- APPA Changes made to the current baseline 2D approach may challenge the implementation of several of the current conceptual models (AP-185)
- Peer Review is needed to confirm the adequacy of the conceptual models implemented in the new PA approach – Initiated 10/20
- Peer Review Final Report - Scheduled - 12/21
 - Since peer review results may require changes to PA approach – Plan must allow for an additional PA for the APPA PCR
 - Incorporate changes to address Peer Review results
 - Include latest PAIR – 2/22

7 | 2D Subjects Under Peer Reviews

Changes are proposed to the current PA baseline to account for DOE's plan for additional waste panels (APPA). These changes will challenge the current implementation of the PA conceptual models such that

The APPA represents potential changes to the following conceptual models:

- **Disposal System Geometry** – The Disposal System Geometry conceptual model expresses the dimensionality of the engineered system and surrounding geologic/hydrogeologic formations.
 - The addition of repository areas to the BRAGFLO grid is a change in this conceptual model. This conceptual model probably has the largest change of all the conceptual models with the APPA approach.
- **Repository Fluid Flow** - Fluid flow modeling within the repository is concerned with (1) fluid flow and distribution in the waste, (2) fluid flow to and from the Salado and shafts, and (3) fluid flow between the repository and intrusion boreholes.
 - This conceptual model is strongly tied to the changes in Disposal System Geometry. Also, the “unbending” of the repository is an addition to this conceptual model that fluid will preferentially flow through the disturbed regions, rather than in a straight line across undisturbed zones.
- **Direct Brine Release** - Direct brine release refers to the possibility that brine containing actinides may flow from the waste panels up a borehole to the surface during drilling.
 - In general the important features of the DBR grid are retained in the APPA DBR grid, however the change to modeling only a subsection of the waste area is a shift in the conceptual model.
- **Culebra Hydrogeology(?)** - The Culebra is identified as a principal potential pathway for radionuclide release to the environment.
 - If changes are needed and the extent of those changes is dependent on the investigation into Culebra release points

2D Peer Review – AP PCR Schedule

SNL Formally Request CBFO Initiate 2D Peer Review – 10/20

2D APPA Results for PR - 12/20

PFLOTRAN Flow Solutions – 9/20 – 12/20

Panel Orientation and Subject Matter Documents 5/21

Peer Panel Meetings - 7/21

2D Final Report - 12/21

AP PAIR – 2/22

Post-Peer Review AP – 4/22 (RES Completes Draft AP PCR Text 4/22)

AP PCR PA – 5/22 (with updated PBRINE)

APPA Analysis Report - 6/22

AP PCR Submittal - 7/22



Driver

- CRA-2024 Submitted by March 26, 2024 – Document ready for DOE review
8/23

SNL Goals and Assumptions

- EPA approved AP PCR prior to submittal of the CRA-2024
 - CRA baseline PA will be the APPA
 - Updated to include New PAIR, CRA 2019 TSD/EPA Negotiated Elements, Porosity Surface update and Chemistry Updates
- Plan A - PFLOTRAN With Comparison for Flow and Transport with Validated Codes
- Plan B – Updated Current Baseline used for CRA-2024

CRA-2024 Major Tasks

2D PR

AP PCR Submitted

PFLOTRAN Flow & Transport

- 3D Peer Review

PFLOTRAN Integration

PFLOTRAN QA - Transport

AP PCR EPA Approval

CRA-2024 PA(s)

CRA-2024 Submittal

3D/CRA-2024 Schedule

SNL Formally Request CBFO Initiate 3D Peer Review – 10/21

PFLOTRAN Demo Flow and Transport – 12/21

Panel Orientation and Subject Matter - 5/22

3D Peer Panel Meetings - 7/22

3D Final Report - 12/22

CRA-2024 Analysis Plan 2D & 3D 1/23

CRA-2024 PAIR – 2/23

CRA PFLOTRAN PA & CRA 2D PA – 4/23

CRA Analysis Report(s) - 6/23

CRA-2024 Submittal - 3/24



Questions?

References

- U.S. Department of Energy (DOE). 2016a. CBFO Management Procedure: Peer Review (Revision 9). MP No. 10.5. Carlsbad, NM: Carlsbad Field Office.
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1. Conceptual Models Supplementary Peer Review Report (December 1996)
 2. Conceptual Models Second Supplementary Peer Review Report (January 1997)
 3. Conceptual Models Third Supplementary Peer Review Report (April 1997)