

Deferred Performance Assessment Summary

The U. S. Environmental Protection Agency (EPA) recertification decision documents for the 2014 Compliance Recertification Application (CRA-2014) discussed several technical concerns and recommendations that could be addressed in the CRA-2019. In order to allow time to work with the EPA on resolution of technical concerns and recommendations and produce an updated performance assessment (PA) that is more meaningful, the Department of Energy (DOE) decided, with agreement from the EPA, to submit PA results in late 2019 (U.S. DOE 2017) (U.S. EPA 2017). Consistent with this plan, the deferred PA documentation includes the 2019 PA results and the following appendices necessary to provide updated information related to the requirements in 40 Code of Federal Regulations (CFR) 194.

- Appendix PA: Performance Assessment
- Appendix SCR: Feature, Event, and Process Screening for Performance Assessment
- Appendix MASS: Performance Assessment Modeling Assumptions
- Appendix GEOCHEM: Implementation of Chemistry Conceptual Models
- Appendix SOTERM: Actinide Chemistry Source Term

In addition, the Compliance Recertification Application/Deferred Performance Assessment (DPA)–2019 Crosswalk provides a brief description of commitments and requirements in the sections of the CRA-2019 and where they are addressed in the corresponding DPA document.

Appendix PA presents the mathematical models used to evaluate performance of the Waste Isolation Pilot Plant (WIPP) disposal system and the results of these models for the CRA-2019 DPA. PA is designed to address three primary questions about the WIPP:

- Q1: What processes and events that might affect the disposal system could occur at the WIPP site over the next 10,000 years?
- Q2: How likely are the various processes and events that might affect the disposal system to occur at the WIPP site over the next 10,000 years?
- Q3: What are the consequences of the occurrence of various processes and events that might affect the disposal system at the WIPP site over the next 10,000 years?

The CRA-2019 PA results demonstrate that the WIPP continues to comply with the quantitative containment requirements in 40 CFR 191.13(a). The CRA-2019 PA results also confirm that direct releases from drilling intrusions are the major contributors to radionuclide release to the accessible environment.

Appendix SCR documents the results of the screening process for features, events, and processes (FEPs) that are retained in the conceptual models of repository performance, including those FEPs that have been modified since CRA-2014. The FEP screening process evaluates any new information that may have impacts on or present inconsistencies with those screening arguments and decisions presented since the last certification or recertification. For the CRA-2019, a reassessment of FEPs concluded that of the 245 FEPs considered, 164 have not been changed and 81 have been updated with new information. Of the 81 updated FEPs, 2 have also

had their screening decisions changed: FEP W52 *Radiolysis of Brine* is now screened in, and FEP W114 *Mechanical Degradation of Panel Closures* is now screened out.

Appendix MASS presents supplementary information regarding the assumptions, simplifications, and approximations used in models that underlay the CRA-2019 PA. Appendix MASS discusses relevant issues in the formulation or development of the various types of models (for example, conceptual, mathematical, numerical, or computer code), and provides explanation of relevant historical information and references as appropriate.

Appendix GEOCHEM is a new appendix for CRA-2019. Since the Compliance Certification Application (CCA), the DOE has continued studying processes related to WIPP repository chemistry. Consequently, additional information has become available regarding actinide solubilities, the magnesium oxide engineered barrier, and the roles of lead, iron, corrosion, and colloids in the repository. Appendix GEOCHEM provides extensive documentation of the evolution of the conceptual models, the process models, the process-model parameterization, and the quantification of uncertainty for the geochemistry models.

Appendix SOTERM (Actinide Chemistry Source Term) is a summary of the DOE's understanding of the WIPP chemical and microbial conditions, processes that underlie the actinide chemistry, and the resulting mobile actinide concentrations that were calculated based on this repository chemistry. This appendix focuses on the mobile actinide source term used in the calculation of actinide release from the WIPP for Direct Brine Release and transport through the Salado Formation and Culebra, which is the sum of the soluble and colloidal species in brine. Project-specific and literature actinide data since the CRA-2014 are summarized and reviewed. The historical perspective of the key assumptions that define the current actinide source term model are provided.

Based on the information provided in the CRA-2019 and in the DPA, the DOE believes it has demonstrated that the WIPP remains in compliance with EPA requirements.

References

(*Indicates a reference that was previously submitted with the CRA-2019)

U.S. Department of Energy (DOE). 2017. Letter from Shrader, T., DOE, to Edwards, J.D., EPA. Compliance Recertification Application (CRA) 2019. October 5, 2017. U.S. DOE, Carlsbad, NM: Carlsbad Field Office.*

U.S. Department of Energy (DOE). 2019. Title 40 CFR Part 191 Compliance Recertification Application (March 26, 2019). Carlsbad, NM: Carlsbad Field Office. DOE/WIPP-19-3609.

U.S. Environmental Protection Agency (EPA). 2017. Letter from Veal, L., EPA, to Shrader, T., DOE. December 4, 2017. U.S. EPA, Washington D.C.*