2019 Performance Assessment Calculations for the Recertification of the Waste Isolation Pilot Plant

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The Waste Isolation Pilot Plant (WIPP), located in southeastern New Mexico, has been developed by the U.S. Department of Energy (DOE) for the geologic (deep underground) disposal of transuranic (TRU) waste. Containment of TRU waste at the WIPP is regulated by the U.S. Environmental Protection Agency (EPA) according to the regulations set forth in Title 40 of the Code of Federal Regulations (CFR), Part 191. The DOE demonstrates compliance with the containment requirements according to the Certification Criteria in Title 40 CFR Part 194 by means of performance assessment (PA) calculations performed by Sandia National Laboratories (SNL). WIPP PA calculations estimate the probability and consequence of potential radionuclide releases from the repository to the accessible environment for a regulatory period of 10,000 years after facility closure.

The models used in PA are maintained and updated with new information as part of an ongoing process. Improved information regarding important WIPP features, events, and processes typically results in refinements and modifications to PA models and the parameters used in them. Planned changes to the repository and/or the components therein also result in updates to WIPP PA models. WIPP PA models are used to support the repository recertification process that occurs at five-year intervals following the receipt of the first waste shipment at the site in 1999.

The 2019 Compliance Recertification Application (CRA-2019) is the fourth WIPP recertification application submitted for approval by the EPA. A PA has been executed by SNL in support of the DOE submittal of the CRA-2019. Results found in the CRA-2019 PA are compared to those obtained in the 2014 Compliance Recertification Application (CRA-2014) PA in order to assess repository performance in terms of the current regulatory baseline. This presentation includes a summary of the changes modeled in the CRA-2019 PA, as well as the estimated releases over the assumed 10,000-year regulatory period. Changes incorporated into the CRA-2019 PA included repository planned changes, parameter updates, and refinements to PA implementation.

Overall, the total normalized releases for the CRA-2019 PA have increased at all probabilities compared to those from the CRA-2014 PA. Releases from each of the four potential release mechanisms tracked in WIPP PA (cuttings and cavings, spallings, releases from the Culebra formation, and direct brine releases) have also increased at all probability levels. Cuttings and
cavings releases continue to dominate total releases at high probabilities and direct brine releases continue to dominate total releases at low probabilities. Although the calculated releases have increased, the total normalized releases continue to remain below regulatory limits. As a result, the CRA-2019 PA demonstrates that the WIPP remains in compliance with the containment requirements of 40 CFR Part 191.

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