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subject: Drilling Rate and Plugging Pattern Probabilities for the CRA-2026 PA Calculations

The purpose of this memo is to provide drilling rate and plugging pattern probability parameters for use in the 2026 Compliance Recertification Application (CRA-2026) Performance Assessment (PA) calculations. Drilling parameters are updated for the CRA-2026 PA calculations to include information through August 31, 2024, as reported in the 2024 Waste Isolation Pilot Plant Delaware Basin Monitoring Annual Report (DBMAR) (U.S. DOE 2025).

The frequency of drilling events, known as the drilling rate, used in the PA calculations is the rate of drilling events over the past 100 years in the Delaware basin. The DBMAR calculates an updated number of drilling events as 153.4 boreholes per square kilometer over 10,000 years. Converting this value to a rate of drilling events gives 0.01534 boreholes per square kilometer per year (km^{-2} yr^{-1}), for the WIPP PA parameter GLOBAL:LAMBDAD.

Borehole plugging pattern probability parameters are also updated based on data contained in the DBMAR. Table 8 of the DBMAR summarizes six types of plugging patterns. These six plugging patterns are grouped into three unique plugging patterns for PA purposes based on the translation scheme defined in Thompson et al. (1996). In this translation, the type VI plug corresponds to the parameter GLOBAL:ONEPLG, type I, III, and V plugs correspond to the parameter GLOBAL:TWOPLG, and type II and IV plugs correspond to the parameter GLOBAL:THREEPLG. This same translation scheme is used to define the parameterization in Table 1.

Table 1. Drilling Rate and Plugging Pattern Probabilities for the CRA-2026.

Material	Property	Description	Units	RPPCR Value	CRA-2026 Value
GLOBAL	LAMBDAD	Drilling rate per unit area	km^{-2} yr^{-1}	0.01389	0.01534
GLOBAL	ONEPLG	Probability of having Plug Pattern 1 (full plug)	(-)	0.366	0.359
GLOBAL	TWOPLG	Probability of having Plug Pattern 2	(-)	0.430	0.464
GLOBAL	THREEPLG	Probability of having Plug Pattern 3	(-)	0.204	0.177

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References

Thompson, T.W., W.E. Coons, J.L. Krumhansl, and F.D. Hansen. 1996. Inadvertent Intrusion Borehole Permeability. Title 40 CFR Part 191 Compliance Certification Application for the Waste Isolation Pilot Plant, MASS Attachment 16-3. Carlsbad, NM: United States Department of Energy, Carlsbad Area Office.

U.S. Department of Energy (DOE). 2025. Waste Isolation Pilot Plant Delaware Basin Monitoring Annual Report. DOE/WIPP-24-2308. Rev. 0. Carlsbad, NM: U.S. Department of Energy, Carlsbad Field Office.

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