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Investigation of the manifold sensitivities of a final repository model with two distinct peaks in the output distribution

Sabine M. Spiessl and Dirk-Alexander Becker
Gesellschaft fuer Anlagen und Reaktorsicherheit (GRS) mbH, Braunschweig, Germany

The sensitivities of a performance assessment (PA) model for a final repository for low- and intermediate-level radioactive waste in rock salt are examined. The output frequency distribution of this PA model shows two peaks, which become increasingly distinct with time. This is a result of the dissolution and nearly sudden failure of a seal in the near field, which happens at some point in time depending on certain parameters. When this barrier fails, the release of radionuclides increases considerably within a short time. The presented investigations of the various sensitivities are based upon separation of the output of a probabilistic set of model runs at selected points in time into “low” and “high” values. In this way, the sensitivities of the two distinct subsets of the model output can be studied separately. For evaluation, a variance-based and a non-parametric method are applied.