Statistical Approach for Derivation of
Quantitative Acceptance Criteria for Radioactive Wastes
in Near-Surface Disposal Facility

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Abstract

Statistical analysis by using the Latin Hypercube Sampling(LHS) is conducted to derive the radionuclide concentration limit for low- and intermediate-level radioactive waste disposal facility. In this statistical analysis, Post Drilling and Post Construction scenario are mutually competing scenarios to determine radionuclide concentration in comparing with the previous study of deterministic approach, where Post Construction scenario appeared as a most limiting candidate scenario. As an alternative performance assessment, a new assumption considering the depth of disposal facility is introduced. This assumption resulted in that concentration limit of Nb-94, Tc-99 and I-129 are increased about 4~4.5 orders of magnitude in both Construction and Post Construction scenario. In this case, Post Construction scenario is no longer the limiting scenario to derive the concentration limit of disposal facility. Post Drilling scenario as a limiting case, in this study, shows that most gamma-emitting radionuclides such as H-3, C-14, Co-60, Nb-94 and Cs-137 show elevated values of limit concentration. And non-gamma emitting radionuclides such as Sr-90, Tc-99 I-129, Ni nuclides (gamma-emitting), and alpha-emitting radionuclides show lower values than the case of previous deterministic study.