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Methodology for deriving criteria for the acceptance of cellulose-containing waste throughout a low-level radioactive waste repository

The Republic of Korea has been operating a low- and intermediate-level radioactive waste disposal site since 2015. Recently, the issue of the impact of isosaccharinic acid (ISA), a type of complexing agent, on the migration of radionuclides has emerged as a factor for the safety of the repository. ISA is a cellulose-derived material that is highly adsorptive to radionuclides, which can be an important consideration for the long-term safety of a repository. This study analyzed the current status of cellulose-related regulatory requirements and acceptance criteria in Korea. In particular, an advanced case (Sweden) was analyzed. To analyze the phenomenon of nuclide migration by cellulose, we designed experiments on the solubility and adsorption of radionuclides depending on the concentration of cellulose, and elaborated an experimental design for the degradation rate of ISA caused by cellulose, which will be directly affected as a complexing agent. The total amount of ISA available for disposal in the derived disposal facility was then finalized.

Primary author: Mr HA, Jaechul (Korea radioactive waste agency)

Presenter: Mr HA, Jaechul (Korea radioactive waste agency)

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