Contribution ID: **189** Type: **Verbal**

Treatment of washing solution of uranium-contaminate wastes

Friday, 16 May 2014 09:45 (15 minutes)

A large quantity of acidic waste solution containing uranium is generated when U-contaminated soil and concrete are decontaminated using nitric or sulfuric acid in the electrokinetic equipment. If the uranium in the solution selectively sorbed on an ion exchange resin or extracted by a proper reagent, the acid would be recycled, and a very small amount of sludge would be generated. Two strong anion exchangers, IRA 910 and Ag1x8, were examined to capture uranyl sulfate anion complexes such as UO2(SO4)22- and UO2(SO4)34- from sulfuric waste solution. Tri-n-butyl phosphate was used to extract uranyl ions from the nitric waste solution, and the interference of iron ions in the waste solution was also considered. When pH of the solution was adjusted to around 9.0 by adding CaO to precipitate uranium ions in an acidic washing solution, high concentration of calcium created several problems in the electrokinetic equipment. The addition of sulfuric acid reduced the concentration of calcium from 3.8% to 0.08% by precipitation of CaSO4.

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Session Classification: Radionuclides in the Environment, Radioecology 4

Track Classification: Radionuclides in the Environment, Radioecology