Contribution ID: **139** Type: **Poster**

The Effect of Cellulose Degradation Products on the Migration of 90Sr in Cementitious Backfill using Radial Diffusion.

Monday 17 September 2012 17:30 (1h 30m)

Many concepts for the geological disposal of intermediate level (ILW) and low level radioactive waste (LLW) include backfill materials based on admixtures of Ordinary Portland Cement (OPC). It is expected that these backfill materials will generate high pH conditions and further, the eventual corrosion of the metal canisters used for disposal will promote a low Eh environment. It has been generally assumed that the safety functions of the cement within the near field of a Geological Disposal Facility (GDF) will include reduction of the solubility of many radionuclides and retardation of migration by sorption and incorporation.
Diffusion will remain the dominant migration mechanism for radioisotopes throughout the post closure period. The radioisotope 90Sr will be a significant component of the disposed waste and its half-life of 28.8 years means that escape and migration from the GDF could be of significance if it occurs within the operational phase or first few hundred years, post closure. Cellulosic materials will also be disposed and previous studies have shown that cellulose degradation products (CDP) produced at high pH can enhance the migration of metal ions.
The radial diffusion experimental technique uses small pre-cast cylinders of the matrix under investigation. An appropriate concentration of 90Sr is introduced into a cavity in the centre of the cylinder, which is then sealed and placed in a solution previously equilibrated with the matrix. The increase in concentration of the isotope in the external solution is then determined at defined time intervals.
Diffusion experiments on NRVB (Nirex Reference Vault Backfill) have been undertaken using 90Sr in the presence and absence of CDP or gluconate (a surrogate for the CDP mixture). The effect on the migration of 90Sr caused by addition of CDP is seen to be significant and work is currently underway to understand the mechanisms responsible.

Author: Mr HINCHLIFF, John

Co-authors: Prof. READ, David (Loughborough University); FELIPE-SOTELO, Monica (L); EVANS, Nick (Loughborough University)

Presenter: Mr HINCHLIFF, John

Session Classification: Poster Session

Track Classification: Applications of radioactive tracers and nanoparticles