

BNL ALARA Center Data Base

U.K.

R-367

INORGANIC SEED MATERIALS FOR THE DECONTAMINATION OF PWR AQUEOUS WASTES

Keywords: CONTAMINATION REMOVAL; WASTE FILTRATION;
INORGANIC SEED MATERIAL

Principal Investigator:

E. Hooper
AEA Technology
B465 Harwell
Didcot, Oxfordshire OX11 0RA
U.K.
Phone: +44 235 435555

Project Manager:

R. Sellers
Nuclear Electric plc
Timpson Road
Wythenshawe, Manchester M23 9LL
U.K.
Phone: +44 61 946 4202

Objectives: Study the use of several inorganic sorbents, used in combination with crossflow membrane filtration, for the reduction of Cr-51 and Sb-125 levels in a PWR waste stream.

Comments: By adding to the waste effluent small quantities of solid "seed" materials onto which dissolved radionuclides can become absorbed, soluble contaminants can be removed to produce a clean effluent. Seeds specific to a number of different radionuclides have been identified (e.g. nickel hexacyanoferrate (II) for Cs-137). By employing a mixture of different seed materials, a wide spectrum of radionuclides can be dealt with. A mixture of titanium oxide, zirconium phosphate, and sodium nickel hexacyanoferrate (II) gave an overall decontamination factor of 20 at a solution pH of 4.5.

Remarks/Potential for dose limitation: Ultrafiltration is a filtration process that enables particles as small as 2nm in size to be removed from liquid suspension. Some aqueous waste streams arising at nuclear power plants are contaminated with very low levels of radioactive nuclides typically in the sub- $\mu\text{g}\cdot\text{kg}^{-1}$ range. Many of the radionuclides in the wastes are present as colloidal or insoluble material and can therefore be potentially removed using ultrafiltration. Soluble species cannot be filtered directly, and inorganic seed materials must be used.

References: Hooper, E.W., Kavanagh, P. and Sellers, R.M., "Inorganic Seed Materials for the Decontamination of PWR Aqueous Wastes," *Water Chemistry of Nuclear Reactor Systems 6*, Vol. 1, pp. 214-215, British Nuclear Energy Society, London, 1992.

Duration: from: 1991 to: 1992

Funding: N/A

Status: Completed

Last Update: June 14, 1993