

Title: Analysis of Hot Cell paint

Author: Per Roos¹⁾, Xiaolin Hou¹⁾, Thommy Ingemann Larsen²⁾ and Jens Hassingboe²⁾

1) Radiation Research Department, Risø National Laboratory, NUK-202, Technical University of Denmark, DK-4000 Roskilde, Denmark

2) Danish Decommissioning, Frederiksborgvej 399, DK-4000 Roskilde, Denmark

Abstract:

The decommissioning of the nuclear facilities at Risø, Denmark, involves decontamination of 6 hot cells. During operation from 1964 to 1989 the hot cells were used for examination of spent fuel elements and production of irradiated cobalt pellets. Thus the cells are contaminated with actinides, fission products and some activation products. The interior compartments of the concrete construction are sealed with a steel liner, which is coated with epoxy paint. The paint contains significant levels of PCB's and lead. The decontamination will be done by sandblasting the paint off the steel liner. We expect to get app. 100 barrels, or 10,000 liters, of sandblasting material mixed with contaminated paint particles. A subsample is collected from each barrel, which is going to be analyzed to estimate the total inventory of the radionuclides.

The challenge is to establish a method for analyzing the alpha emitting radionuclides. For this purpose, the material has to be fully dissolved to release the radionuclides to a solution from the matrix. Some preliminary testing has been performed, and it was found that the epoxy paint cannot be decomposed by conventional methods, e.g. acid digestion using aqua regia and ashing at less than 1000 °C. Leaching of the material using boiling aqua regia may however liberate virtually all actinides adsorbed. Due to the relatively high concentrations direct alpha spectrometry and low energy gamma and X-ray spectrometry can be used both to provide approximate concentrations of Pu-isotopes and to verify the amount of Pu and Am removed from the surface during leaching. A detailed analysis of the leaching of the individual samples will be presented.