THE CHARACTERIZATION OF LOW-LEVEL WASTE FOR RADIONUCLIDES
Analytical Reality vs. Regulatory Perception

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ABSTRACT

Low-level waste (LLW) must be characterized for a broad range of radionuclides to limits that challenge and sometime exceed modern analytical detection capabilities. Contamination levels are often so low that characterization of individual waste packages by direct measurement is impossible. Instead, accepted practice and regulatory guidance has been to rely on detailed analyses of appropriate samples or contamination smears to infer the level and distribution to be expected in such wastes.

But limitations in even the best available analytical detection capabilities reduce the usefulness of laboratory results. Comparisons of some of these results from samples of two large waste stream at the Savannah River Site with traditional process information show that reliance on analytical detection limits for characterization can seriously distort the actual radionuclide distributions by grossly overestimating minor, but restrictive, isotopes. Manifesting wastes on this basis would falsely limit or restrict placement of waste in the site's new disposal facility.

This paper presents these comparisons and discusses their implications in the light of analytical reality, which sometimes differ from how regulators may perceive them, and it clearly shows that strict reliance on radiochemical analyses alone may not properly characterize waste. This problem, however, can be avoided by use of process knowledge, which is generally detailed and well known from the genesis of most radioactive materials, to formulate an inferred radionuclide distribution. Evidence is presented that shows these inferred distributions better predict trace radionuclide levels likely to occur in real wastes.

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