

<sup>226</sup>RA ANALYSIS ON SAVANNAH RIVER SITE  
HIGH ACTIVITY WASTE TANK RESIDUES

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Waste cleanup at the Savannah River Site, as well as other DOE nuclear sites, has created an ongoing need to characterize the radiological inventories of various waste tank heels prior to tank closure. Each tank heel has unique chemical and radiological distributions, rendering the use of routine analyses inadequate. Since each tank is a completely new matrix with often-unforeseen interferences, method development must be performed for each tank's residue material.

While currently representing only a small fraction of the activity in the various sites' radioactive waste inventories, Ra-226 and its progeny will eventually represent a more significant portion of the inventories due to its relatively long half-life. As a result, detection limit requirements for Ra-226 are often quite low. Ra-226 is an alpha emitter with weak gamma emissions. The required Ra-226 detection limit requirement can be 8 or more orders of magnitude lower than the activities of shorter-lived radioisotopes commonly present in various SRS sample matrices. Therefore, a very efficient separation of Ra-226 from high levels of interfering radionuclides is required. High sample radiological doses require initial radiochemistry to be conducted in SRNL's remote handled shielded cells facility. The separations are then completed in radiological hoods. A series of delayed gamma analyses are conducted for Ra-226 and for the Ra-224 tracer's progeny. Details of the Ra-226 analysis method development and implementation in these high activity matrices will be discussed.