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Challenges in Bulk Nuclear Forensics Sample Analysis

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Analytical chemistry operations at Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL) support technical nuclear forensics by providing chemical and physical measurements of bulk special nuclear material for a consortium of key US government agencies. Capabilities to support the nuclear forensic mission continue to evolve from the basic analytical method set developed half a century ago to support reactor operations and U. S. defense programs. Evolution of analytical chemistry capability includes new certified reference materials for quality assurance and quality control to maintain historical measurement surety but with improved fidelity and defensibility. A lack of traceable, matrix-matched standards with certified uncertainties representative of modern analytical techniques has been recognized as impacting confidence in the measurement results on important nuclear materials. Drawing guidance from the National Institutes of Standards and Technology (NIST) and New Brunswick Laboratory (NBL), the U.S. nuclear forensic community is working to define and develop the well characterized reference materials necessary to ensure the integrity of critical forensic measurements. In this presentation, we will present a case for using available pedigreed materials that are commonly used to provide quality assurance on relevant nuclear materials for nuclear forensic certified reference materials. A discussion of challenges associated with transitioning from a regular analytical laboratory to an ISO 17025 accredited laboratory entity will also be presented.

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