NE-26-39283 Domestic Uranium Conversion by a Zero-F2 Process

Raven-Flint Nuclear Corporation, located in Idaho Falls, ID, is developing a novel uranium conversion process that eliminates the need for elemental F_2 and F_2-derived fluorinating agents, but the remaining technical challenge is establishing pilot-scale mass balance, material control and accountancy (MC&A), and stream characterization methods suitable for NRC licensing. The United States currently relies on a single commercial uranium hexafluoride (UF_6) conversion facility, and all Western-aligned conversion plants depend on elemental fluorine (F_2) chemistry, which creates significant cost, safety, permitting, and supply-chain vulnerabilities. The company requires specialized analytical chemistry capabilities and subject-matter expertise to generate licensing-grade operational and material-balance data for its pilot plant and future commercial facility.

Raven-Flint will work with Idaho National Laboratory (INL) to develop an integrated mass-balance, MC&A, and supporting stream-characterization for the Raven-Flint pilot plant. This will utilize INLs operating-scale UF_6 conversion expertise and advanced radiochemistry and analytical capabilities. INL's combination of subject-matter expertise, radiological authority, and analytical instrumentation enables the development of NRC-credible MC&A and stream-characterization methodologies essential for commercial licensing.

The project will establish a new domestic UF_6 conversion pathway that eliminates reliance on elemental fluorine, reducing capital costs, operating costs, hazardous-material inventories, and permitting complexity for future conversion facilities. The work would also strengthen the resiliency and competitiveness of the U.S. nuclear fuel supply chain by reducing common-mode fluorine handling risks while supporting HALEU production, advanced reactor deployment, and continued LWR operations.