Process Developments in Fabricating U-10Mo Plate Fuel

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Abstract. Pacific Northwest National Laboratory is leading an effort on behalf of the National Nuclear Security Administration (NNSA) to develop, qualify and commercialize a low-enriched, monolithic U-10Mo fuel to support the conversion of U.S. high performance research reactors. This effort involves the partnership of various national laboratories, the Y-12 complex and a commercial fuel manufacturer. Successful fabrication of U-10Mo alloy consists of multiple manufacturing process steps which includes: casting, homogenization, hot-rolling, cold-rolling, and hot-isostatic-pressing processes. An overview of PNNL’s modeling, experimentation, and characterization efforts to arrive at a microstructure needed to achieve the desired fuel performance will be presented.

Keywords: Uranium molybdenum alloy fuel, U-10Mo manufacturing, U-10Mo microstructure