

2018 Mo-99 TOPICAL MEETING ON MOLYBDENUM-99 PRODUCTION TECHNOLOGY DEVELOPMENT

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Medical Isotope Production in Liquid-Fluoride Reactors

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Liquid-fluoride reactors use a mixture of fluoride salts held above their melting point as the medium for fission reactions as well as primary thermal transport. While the primary mission of these reactors is electrical power generation, near-term demonstration systems will produce substantial amounts of medical isotopes. Noble metal and noble gas fission products, including molybdenum and xenon, are readily removed from the molten salt during normal reactor operation. Obtaining medical-grade radioisotopes from the bulk extraction stream can require large, complex, and costly chemical processing systems. Flibe Energy has partnered with the Pacific Northwest Nuclear Laboratory (PNNL) to propose a novel chemical separations technique for processing molten salts used in liquid-fluoride reactors which has the potential to efficiently isolate pure streams of noble metal fission products. The U.S. Department of Energy has awarded \$2.6M to our team to develop this technology over the next two years. If successful, the near-term deployment of demonstration reactors and long-term deployment of utility-class reactors will make large quantities of medical isotopes available at low costs for the indefinite future.