Am-241 Oxide Production at Los Alamos National Laboratory

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Abstract. The European Space Agency has identified americium-241 (Am-241) as the isotope of choice for radioisotope heating units (RHUs) and radioisotope thermoelectric generators (RTGs) for long-duration missions when plutonium-238 (Pu-238) is not available. Am-241 produces less heat per gram than Pu-238 (0.114 W/g for Am-241 versus 0.568 W/g for Pu-238), but its longer half-life (432.2 years for Am-241 versus 87.7 years for Pu-238) slows the degradation of its heat output and makes it a promising candidate for long-duration deep-space missions. Los Alamos National Laboratory (LANL) has a significant inventory of Am-241 in aged plutonium, where the Am-241 has grown in as result of beta decay of plutonium-241. Additionally, chemical processing of plutonium for weapons purposes generates residues that are chemically concentrated in Am-241, creating an attractive feed-source for americium recovery. To this end, the United States Department of Energy (USDOE) Isotope Program, managed by the Office of Science for Nuclear Physics, recently reestablished an Am-241 oxide production line at LANL. The production line has produced ~60 grams of purified Am-241 oxide to date. All produced Am-241 is sold and distributed through the USDOE Isotope Program National Isotope Development Center (NIDC); the primary customer for this Am-241 is currently the oil and gas well-logging industry. Production ramp-up efforts are underway with the goal of increasing availability of Am-241 for research and applications.

Keywords: americium-241, radioisotope, heater, power, LANL.