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Irradiation of LEU Targets in the BR2 Reactor for Mo-99 Production

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ABSTRACT

The BR2 reactor has currently with 7.800 six-day curies per week the largest installed irradiation capacity worldwide for the production of Mo-99. This production level is currently achieved by the irradiation of highly enriched uranium (HEU) targets in dedicated irradiation devices. In support of non-proliferation objectives and global reliability of supply, two separate projects have been initiated in 2012 with the processors IRE and MALLINCKRODT to develop low enriched uranium (LEU) targets for the production of Mo-99 without the use of HEU. The safety approval for 'test' irradiations has been received after submission and analysis of the safety report including neutronic calculations, thermohydraulic calculations, modification of existing irradiation devices, updated irradiation procedures, Five irradiation campaigns of LEU targets have been successfully performed in the BR2 reactor in 2014 before its refurbishment for a period of 16 months (February 2015 – June 2016) which will enable safe and reliable operation of the reactor for another period of at least 10 years. SCK•CEN is considering upgrading BR2's operating regime and increasing its yearly irradiation capacity for Mo-99 production if compatible with the full-cost recovery principle defined by OECD/NEA's High-Level Group on the Security of Supply of Medical Radioisotopes (HLG-MR).