

Maximum Hypothetical Accident Analysis for HEU to LEU Fuel Conversion at the University of Missouri Research Reactor

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Abstract

As a part of the Global Threat Reduction Initiative (GTRI) and the Reduced Enrichment for Research and Test Reactors (RERTR) programs, the University of Missouri Research Reactor (MURR) intends to convert from 93% highly-enriched uranium (HEU) aluminide dispersion fuel to 19.75% low-enrichment uranium (LEU) U-Mo monolithic fuel. Under chapter 13 of NUREG-1573, MURR must perform several safety analyses, one of which was the maximum hypothetical accident (MHA) analysis.

For the 10-minute dose to workers in containment, a committed effective dose equivalent (CEDE) to the thyroid from the radioiodines was 0.889 mrem. To calculate the total effective dose equivalent (TEDE), two different sets of derived air concentrations (DACs) were used. Using the 10 CFR 20 default DAC for four nuclides with unlisted DACs, the TEDE was 1403 mrem. Using the pre-2007 version of 10 CFR 835 DACs for three of the unlisted radionuclides, the TEDE was 403 mrem. For the 16.5-hour dose to a member of the public beyond the exclusionary boundary area (EBA) of MURR, the CEDE to the thyroid was 0 mrem, the TEDE using the 10 CFR 20 default DAC was 8.58 mrem, and the TEDE using the pre-2007 version of 10 CFR 835 DACs was 2.45 mrem.