DOE/ER/75272--T1

CONVERSION OF THE UNIVERSITY OF MISSOURI-ROLLA REACTOR FROM HIGH-ENRICHED URANIUM TO LOW-ENRICHED URANIUM FUEL

8/25/86 - 9/30/87
Lead Principal Investigator - Dr. Albert E. Bolon
Co-Investigator - Dr. Milan Straka
Award Number - DOE DE FG02 86ER75272 Straka 8/87

10/1/87 - 9/30/94
Lead Principal Investigator - Dr. Milan Straka
Co-Investigator - Dr. Albert E. Bolon
Award Number - DOE DE FG02 86ER75272 Straka 9/88

10/1/95-9/30/96
Lead Principal Investigator - Dr. Albert E. Bolon
Co-Investigator - David W. Freeman
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DISCLAIMER

Summary Report for Conversion of the UMR Reactor from HEU to LEU Fuel

The objectives of this project were to convert the UMR Reactor fuel from high-enriched uranium (HEU) to low-enriched uranium (LEU) fuel and to ship the HEU fuel back to the Department of Energy Savannah River Site. The actual core conversion was completed in the summer of 1992. The HEU fuel was offloaded to an onsite storage pit where it remained until July, 1996. In July, 1996, the HEU fuel was shipped to the DOE Savannah River Site. The objectives of the project have been achieved.

DOE provided the following funding for the project:

Date	Funding
8/86	$77,439
10/87	$78,621
10/95	$65,000
Total	$221,060

The above funding supported analyses performed to support the conversion. The analysis work included neutronics modeling and thermohydraulic studies. The analysis results were used to support licensing documents (e.g. Safety Analysis Report and Technical Specifications) required by the U.S. Nuclear Regulatory Commission for the conversion.

Additionally, the above funding supported the actual conversion and offsite shipping of the irradiated HEU fuel.

Several papers were published regarding the conversion project and are listed in the Attachment.

In retrospect, the conversion project required much more time and effort than originally thought. Several difficulties were encountered including the unavailability of a shipping cask for several years. We are grateful for the generous funding provided by DOE for this project but wish to point out that much of our efforts on the conversion project went unfunded. We are quite pleased that the project has been successfully completed and again wish to express our thanks for the funding received.

ATTACHMENT

Conversion Project Papers

1. Milan Straka, A.E. Bolon, Lorne Covington, "Study of the Reduced Enrichment Fuel Conversion at the University of Missouri-Rolla Reactor", International Annual Meeting on Reduced Enrichment for Research and Test Reactors, Buenos Aires, Argentina, September, 1987.

2. Milan Straka and Lorne Covington, "Study of Neutron Physics: Conversion of the University of Missouri-Rolla Reactor to Low Enriched Fuel", ANS Winter Meeting, Los Angeles, CA, November, 1987.

3. Lorne J. Covington, "Neutronics Study of the Conversion of the University of Missouri-Rolla Reactor to Low Enriched Uranium Fuel", M.S. Thesis, Rolla, MO, 1989.

4. Jeffery Joel Smith, "Determination of Characteristics of the University of Missouri-Rolla Reactor Highly-Enriched Uranium Fuel Using the ORIGIN2 Computer Code", M.S. Thesis, Rolla, MO, 1989.

5. Alice Ann Netzer, "Dose Rate Determination of the Highly-Enriched Uranium Fuel at the University of Missouri-Rolla Reactor in Preparation for Transportation", M.S. Thesis, Rolla, MO, 1991.

6. Ali A. Simpkins and A.E. Bolon, "Dose Rate Determination of UMRR Fuel in Preparation for Transportation", ANS Annual Meeting, Boston, MA, June 9, 1992.

7. David W. Freeman and A.E. Bolon, "Recent Accomplishments at the University of Missouri-Rolla Reactor Facility", (Invited Paper), American Nuclear Society Summer Meeting, New Orleans, LA, June 19-23, 1994.

8. Michelle Lynn Hill, "Dose Rate Measurements of the Highly-Enriched Uranium Fuel at the University of Missouri-Rolla Reactor", M.S. Thesis, Rolla, MO, 1994.

9. Michelle L. Hill and A.E. Bolon, "Dose Rate Measurements of the Highly Enriched Uranium Fuel at the UMR Reactor", (Poster Session), Health Physics Society Annual Meeting, San Francisco, CA, June 29, 1994.

10. David Freeman, Hatem Khouaja, and A.E. Bolon, "Engineering Spent Fuel Shipments at the UMR Reactor Facility", ANS Meeting, Washington, D.C., November, 1996.