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RADIATION LABORATORY

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ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: SNM Limit, License No. R-125, Docket No. 50-223

The University of Massachusetts Lowell hereby requests an amendment to its Facility Operating License No. R-125. The requested amendment is for an increase in the Uranium-235 limit specified in paragraph 2.B.(2) of the license from 6 kilograms to 11 kilograms of Uranium-235 at enrichments equal to or less than 20% in the form of material test reactor (MTR) fuel.

A detailed justification for this request is provided in the attached document.

Please direct any requests for additional information regarding this submittal to:

Mr. Leo Bobek, Reactor Supervisor
Radiation Laboratory
University of Massachusetts Lowell
One University Avenue
Lowell, MA 01854

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

A handwritten signature in black ink, appearing to read 'Gunter H. R. Kegel'.

Gunter H. R. Kegel
Director, Radiation Laboratory

Cc: Ms. Cindy Montgomery
NRR/ADRO
USNRC

A020
NRR

Information Related to the Increased SNM Limit Amendment

Facility Operating License No. R-125
University of Massachusetts Lowell
Docket No. 50-223

Overview

The 10 kW research reactor at Worcester Polytechnic Institute (WPI) is in the process of decommissioning. The WPI and the University of Massachusetts Lowell (UML) research reactors were both designed and manufactured by General Electric. Both reactors use low-enriched uranium (<20% U-235) MTR-type flat plate fuel having the same physical dimensions. The fuel elements used in the WPI reactor have a combined negligible burn-up of less than 0.2 gram U-235 resulting from a combined usage of less than 2% of 1 Megawatt Day (MWD).

Currently, the fuel in the UML research reactor has an estimated useful life of approximately 120 MWD. A small number of unused elements stored on site will provide an additional estimated 60 MWD. Given a not unreasonable usage of 20 MWD per year, the current fuel inventory will last approximately 9 years. Usage of the WPI fuel could provide approximately another 150 MWD of operation.

There are slight differences in the material composition and U-235 loading between the WPI and UML fuels. The WPI fuel elements consist of 18 plates having a U-Al_x fuel matrix with approximately 170 grams of U-235 per element. The UML fuel consists of 16 plates having a U₃Si₂-Al fuel matrix with approximately 200 grams of U-235 per element. Thus, the WPI fuel is slightly less reactive than the UML fuel. Nonetheless, usage of the WPI fuel would provide a low-cost solution to the long-term fuel needs of the UML research reactor.

Storage

Fuel storage at the UML research reactor is described in the UMLRR Final Safety Analysis Report (1984) section 6.1 and as evaluated in section 9.1 of NUREG-1139 (SER Related to the Renewal of the Operating License for the Training and Research Reactor at the University of Lowell – November 1985) and as evaluated in section 2.4 of the safety evaluation for facility license R-125, amendment 12. In summary, the UMLRR has a safe and secure storage capacity for 72 MTR-type flat plate fuel elements. This capacity exceeds that required for both the existing on-site fuel and the WPI fuel.

Security

The storage is located within the designated areas of the control access area as described in the Physical Security Plan for Protection of Special Nuclear Material of Moderate Strategic Significance at the University of Massachusetts Lowell Research Reactor (Rev. 5). The security systems, plans and procedures as described in the aforementioned plan meet or exceed the 10CFR 73.67 requirements for SNM quantities of moderate strategic significance.

Usage

The Technical Specifications for Facility License R-125 (Section 5.1) do not permit the use of the WPI fuel in the UML reactor. A supplemental safety analysis will be performed and then submitted along with license amendment request to allow use the WPI fuel in the UML reactor.