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United States Nuclear Regulatory Commission  
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Docket Number 50-27  
Facility License Number R-76

The Washington State University Nuclear Radiation Center (WSU/NRC) operates a TRIGA-conversion reactor which utilizes a mixed HEU/LEU core. In accordance with Federal requirements, the WSU/NRC is cooperating with the United States Department of Energy (DOE), DOE contractors at the Argonne National Laboratory (ANL) and Idaho National Laboratory (INL), General Atomics (GA), and the United States Nuclear Regulatory Commission (NRC) to remove HEU fuel from the WSU/NRC, and to replace HEU fuel with LEU fuel in the WSU/NRC nuclear reactor.

This letter is being transmitted by Washington State University (WSU) to the NRC as part of the conversion process, and as an application by WSU to the NRC to amend Facility License Number R-76. Washington State University requests that the NRC issue two orders, one for increasing possession limits for uranium-235 (Possession Order), and a second order for conversion of the WSU reactor from HEU to LEU fuel (Conversion Order), in accordance with the following two requested modifications:

1. Application for amendment to License Number R-76, (Docket Number 50-27), to increase possession limits for uranium-235
2. Submittal of Safety Analysis Report for amendment to License R-76 authorizing changes to Technical Specifications for the conversion of the TRIGA nuclear reactor at the Washington State University Nuclear Radiation Center from HEU to LEU fuel.

**Application for amendment to License R-76, (Docket Number 50-27), to increase possession limits for uranium-235**

Washington State University is currently licensed to possess and use quantities of uranium-235 which are described in Amendment Number 10 to License Number R-76. Amendment Number 10 to License Number R-76 stipulates a possession limit of 25 kg of uranium-235 at various enrichments with the following specific categories of maximum limits:

A020

NRR

Inventory Limits of Uranium-235; Amendment 10 to License Number R-76

Maximum U-235 (kg)	% enrichment	Exempt status
10.0	< 20	Exempt 10 CFR 73.6 (a)
15.0	> 20	Exempt 10 CFR 73.6 (b)
4.90	> 20	Not exempt

The nuclear reactor facility at the WSU/NRC provided 11,521.45 user-hours of services for the reporting period of July 1, 2006 to June 30, 2007. Extensive use of the reactor was accomplished by providing irradiation services to multiple users and irradiating multiple samples simultaneously. As is evident by extensive use of the reactor, it is of great importance to the academic community at WSU and at other institutions to minimize the shut-down time that must necessarily result from refueling activities. Minimization of down-time may be accomplished by modification of the uranium-235 possession limits specified in Amendment 10 to License R-76. WSU requests an amendment to increase inventory limits of uranium-235 to permit receipt of fresh, unirradiated TRIGA fuel before shipment of spent HEU fuel from the WSU/NRC, and to accommodate the increased inventory of LEU that will necessarily result from the conversion process.

The WSU TRIGA Reactor Uranium Inventory Report for Period Ending March 31, 2007 describes the inventory of U-235 at the WSU/NRC. As part of refueling, the WSU/NRC is scheduled to receive additional U-235. Specific quantities describing fuel burnup status, enrichment, and storage location are available to the NRC on request.

Washington State University is currently authorized to possess twenty five (25) kilograms of uranium-235, at various enrichments. After the spent HEU fuel is shipped from the WSU/NRC, only LEU fuel with enrichment less than 20% will remain. The neutron (fission) detectors in the WSU reactor employ a small quantity of uranium enriched to greater than 20%; Washington State University requests that a small quantity (500 grams) of uranium-235 at enrichment greater than 20% be permitted for possession for use in nuclear detectors and for experimental research.

Washington State University requests the NRC to order the following inventory limit modification: that the inventory limit for uranium of enrichment less than 20% be amended to allow possession of 24.5 kilograms of uranium-235.

Washington State University requests that, after shipment of HEU fuel the inventory limit for uranium of enrichment greater than 20% be set at not less than 500 grams of uranium-235 for use in nuclear detectors and for experimental use.

Washington State University also requests that assembly of fresh, unirradiated, individual fuel elements into 3-element or 4-element fuel assemblies (also referred to as fuel bundles) be permitted under the Possession Order.

**Submittal of Safety Analysis Report for License amendment authorizing changes to Technical Specifications for the conversion of the TRIGA nuclear reactor at the Washington State University Nuclear Radiation Center from HEU to LEU fuel.**

Washington State University proposes changes to the Technical Specifications that are applicable to License Number R-76, as part of the process requirements for removal of HEU fuel from the reactor, and replacing the HEU with LEU fuel. The Safety Analysis Report (SAR) describing the proposed changes is attached to this letter. General Atomics provided the technical analysis for the SAR.

The attached SAR includes an appendix that describes the fuel storage facilities which will be employed to store the fresh, unirradiated fuel until such time that the NRC orders conversion of the WSU reactor. The description of the fuel storage facilities includes a criticality safety analysis.

I declare under penalty of perjury that the foregoing is true to the best of my knowledge.

Respectfully Submitted



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