1 November 2010

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US Nuclear Regulatory Commission
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Re: License R-88, Docket 50-188

To Whom it May Concern:

This letter provides additional information pertaining to a request for an upgrade to the allowed ^{235}U inventory at the Kansas State University TRIGA Mk-II nuclear reactor facility. Specifically, this letter documents the storage geometry for the new fuel elements to be accepted under the amended license, and demonstrates the safety of this geometry.

On 29 July 2010, a letter was sent to the NRC requesting an increase in the allowable ^{235}U inventory at the KSU TRIGA reactor, in order to accept shipment of six new fuel elements. In that letter, it was made clear that the fuel would not be installed in the core until additional safety analysis work has been performed. However, no safety analysis was given for holding the fuel on site prior to installation in the core.

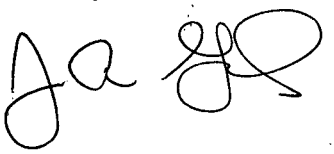
The new fuel elements will be 12% uranium-loaded, 19.5%-enriched TRIGA elements from CERCA. They will be loaded into aluminum in-pool fuel racks on the inside of the reactor tank. These racks are designed to store spent nuclear fuel. The storage racks consist of 30.5 cm-wide, 6.7 cm-deep aluminum plates with six holes, to accommodate six fuel elements. Most of the fuel storage space is in sets of two racks, which arrange the fuel in two rows of six elements, but keep the fuel at different axial elevations to reduce neutronic coupling. In order to test the criticality safety of these racks when holding fresh 12% fuel, fourteen fuel elements were modeled in two rows of seven elements each, with no difference in elevation. The model was conservative, because it used fourteen fuel elements instead of twelve, and because the fuel racks were modeled at the same elevation (for maximum neutronic coupling). The model was also conservative since it assumed that the racks would hold fourteen adjacent, fresh 12%-loaded elements, while only six new elements are being procured, and these will be stored next to spent fuel or vacant rack positions in addition to other fresh elements. The final multiplication factor was calculated to be 0.66907 +/- 0.00025. (The reported uncertainty is from Monte Carlo statistics only). This is far below the critical multiplication factor of 1.0, as expected, and shows that the fuel racks can safely accommodate the fresh fuel until it is approved for insertion into the core.

The MCNP model and output were checked by a senior member of the Reactor Safeguards Committee with expertise in MCNP modeling prior to the issuance of this letter.

A020
NRR

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

Sincerely,



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cc: Cindy Montgomery, Project Manager