

## Oregon State University

### Supplement to Application for Renewal of Special Nuclear Material License (Docket No. 70-7019)

#### Request for Exemption For a Criticality Monitory System

Per the process described in 10 CFR 70.17, we hereby request a specific exemption. We respectfully request that we be granted an exemption from the requirements of 10 CFR 70.24(a) which requires a criticality monitoring system when a licensee possesses a specified amount of SNM. While it is clear that we are asking for a possession limit higher than that which requires a criticality monitoring system, we feel that the form and use of the material does not necessitate such a system. Furthermore, not having such a system will not endanger life or property or the common defense and security of the United States and are otherwise in the public interest.

The fuel will be an aluminum clad U-Mo alloy that will not be in a soluble or readily dispersible form. In the license application, we provide a series of scenarios and analyzed the criticality of the given fuel configuration. In summary, for expected storage of the fuel elements the estimated  $k_{eff}$  of the full storage rack is  $0.18868 \pm 0.00048$ , the highest  $k_{eff}$  for a single element in an infinite pool of water is  $0.75160 \pm 0.00150$ , with the  $k_{eff}$  for the other elements individually in an infinite pool of water significantly below that number. For the unexpected situations where, (1) the room in which the storage rack sits is flooded and, (2) then the fuel elements are put together in a close configuration in the same water filled room, the  $k_{eff}$  was estimated to be  $0.75161 \pm 0.00136$  and  $0.86335 \pm 0.00126$ , respectively.

For a worst case accident scenario, we assumed that all five fuel elements were involved in a fire and subsequently completely melt and pool at the bottom of the storage rack without the cladding material. In this circumstance, the  $k_{eff}$  was estimated to be  $0.65465 \pm 0.00134$ .

In the license application, we will only be allowed to possess one each of the five unique elements. While the license assumes that we will have all five elements on-site, the reality is that this is not to be the case because of the time it takes to manufacture each unique fuel element. Regardless, we are requesting a license which allows us to receive, possess and use in the manner described (i.e., the hydro-mechanical test loop), but not separate or otherwise process the material. The only administrative procedure that we shall initiate is to require that only one element can be removed from the storage rack at a time.

Given that we can't alter the physical form of the material, the storage rack will only handle one each of the individual elements for a total of five (all that is allowed by the license), we will only be allowed to removed one element at a time, and that all criticality calculations show that  $k_{eff} < 0.9$  at the 95% confidence interval, we feel that a criticality accident is not a credible scenario. Therefore, a criticality monitoring system should not be required.