



INSTITUTE FOR RESEARCH IN  
**ELECTRONICS  
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Document Control Desk  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

SUBJECT: UNIVERSITY OF MARYLAND - REQUEST FOR ADDITIONAL INFORMATION  
REGARDING THE REVIEW OF LICENSE RENEWAL FOR THE MARYLAND  
UNIVERSITY TRAINING REACTOR (TAC NO. ME1592)

Enclosed please find the responses to RAIs dated November 9, 2016 for the University of  
Maryland Training Reactor (MUTR).

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

Sincerely,

A handwritten signature in black ink that reads "Timothy W. Koeth".

Timothy W. Koeth

A 620  
NRR

1. The amendment request dated November 1, 2016 (ADAMS Accession No. ML16312A066), requested an amendment to increase the SNM possession limit.

By letter dated October 10, 2002 (ADAMS Accession No. ML022690533), NRC staff requested additional information in support of the facility operating license renewal:

37. Section 9.5, Possession and Use of Byproduct, Source, and Special Nuclear Material. Please confirm that you want to maintain the current license special nuclear material and byproduct material limits in your renewed license.

In response to RAI No. 37 in letter dated June 7, 2004 (ADAMS Accession No. ML101970211), the MUTR staff response states, "It is the desire of the licensee to maintain the current level of SNM."

It is not clear if this new amendment is intended to be a separate amendment to Facility Operating License R-70, or if this is to be reviewed and evaluated in the license renewal.

Clarify the intended review and evaluation of this amendment.

*We would like this to be evaluated as part of the license renewal.*

2. The amendment request dated November 1, 2016 (ADAMS Accession No. ML16312A066), states in part, that, "Pursuant to the Act and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," to receive and possess, but not use, up to 1,060 grams of contained uranium-235 enriched to less than 20 percent in the form of TRIGA reactor fuel."

It is not clear how these additional elements may be distinguished from the other TRIGA fuel elements currently allowed for use.

Provide an identifier to be used in the license condition for these 19 elements that will distinguish them as possession only fuel.

*We will refer to this shipment as Alternate Reactor Fuel.*

3. The amendment request dated November 1, 2016 (ADAMS Accession No. ML16312A066), states in part, that:

Due to our need for new fuel, and with only slightly irradiated fuel available, we will be receiving a shipment of 19 used stainless steel clad TRIGA fuel elements from Idaho National Laboratory (INL) which will arrive before we have completed the analysis to load the fuel in the reactor.

- a. License condition 2.B.(3) to the amended R-70 license states, "Pursuant to the Act and 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," to possess, but not to separate, such byproduct materials as may be produced by operation of the facility."

It appears the license amendment does not address possession of byproduct material produced in reactors other than the MUTR.

Provide a license condition that would enable Facility Operating License R-70 to receive, possess, but not use, in the form of TRIGA fuel elements, such byproduct materials that may have been produced in other facilities.

*Pursuant to the Act and Title 10, Chapter 1, CFR, Part 30,  
to receive, possess, use, but not separate, in connection with  
operation of the facility, byproduct material contained in fuel produced in the  
MUTR and other facilities.*

- b. It appears the license amendment does not propose a license condition for the possession of SNM produced in other facilities

Provide a license condition that would enable Facility Operating License R-70 to receive, possess, but not use, in the form of TRIGA fuel elements, SNM that may have been produced in other facilities.

*Pursuant to the Act and 10 CFR Part 70, to receive, possess, but not use and not separate, in connection with operation of the facility:*

*such special nuclear material as may be received in TRIGA fuel elements that are transferred to License No. R-70 after utilization in other research reactor facilities.*

4. The regulations in 10 CFR 50.34(b)(3) require the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR Part 20.

In the amendment request dated November 1, 2016 (ADAMS Accession No. ML16312A066), you reviewed the security plan, but not any other plans that may be in place at the facility.

What plans or procedures does the facility have in place to ensure the radiation exposures from fuel receipt and storage are within 10 CFR Part 20 or the facility as low as reasonably achievable program?

*We are preparing procedures that will be in place that ensure the radiation exposures from fuel receipt and storage will be within 10 CFR Part 20.*

5. The regulations in 10 CFR 50.34(b)(6)(v) require that plans for coping with emergencies be included in the safety analysis report (SAR).

In the amendment request dated November 1, 2016 (ADAMS Accession No. ML16312A066), you reviewed the security plan, but not any other plans that may be in place at the facility.

- a. Are there new any new accidents involving fuel receipt and storage that have not been previously evaluated?

*There are no new accidents involving fuel receipt and storage that have not been previously evaluated.*

- b. What plans or procedures does the facility have in place to mitigate the consequences of accidents involving fuel receipt and storage?

*We have an emergency plan in place to mitigate the consequences of accidents involving fuel receipt and storage. We are preparing procedures to deal with the receipt and storage of fuel.*

6. The regulations in 10 CFR 50.34(b)(2) require that a description and analysis of the structures, systems, and components of the facility required in 10 CFR 34(b)(2)(i) be

sufficient to permit understanding of the system designs and their relationship to safety evaluations.

The amendment request dated November 1, 2016 (ADAMS Accession No. ML16312A066), states, in part, that, "Fuel storage at the MUTR is described in the MUTR Safety Analysis Report (February 1, 2000) section 9.2. In summary, the MUTR has a safe and secure storage capacity for 19 TRIGA fuel elements."

SAR Section 9.2, describes an in pool fuel storage rack, and a fuel storage pit.

Guidance in NUREG-1537, Part 1, Section 9.2 states, in part, that:

The applicant should provide analyses and discuss how subcriticality is ensured ( $k_{eff}$  not to exceed 0.90) under all conditions, except during transportation off site...Descriptions of procedures and systems for the

storage and handling of irradiated fuel should include radiation shielding, protection from physical damage, physical control, and sufficient cooling to prevent overheating and surface corrosion...

It appears there are two separate fuel storage locations at the MUTR, and it is not clear if; the prevention of inadvertent criticality, radiation shielding, and cooling of the fuel is acceptable.

Clarify the following fuel storage items:

- a. The geometry the fuel will have in storage,  
*We will fabricate holders that maintain the same geometry as a four-element fuel bundle, as defined in proposed technical specifications 5.4.1.*
- b. Radiation shielding the fuel will have in storage, and  
*The fuel will be stored in the pool, see SAR 9.2.1, using the water as radiation shielding. The radiation levels of the fuel stored in the water are well within the limits of 10 CFR Part 20. The maximum dose at 3 feet in air is approximately 2 R/hr.*
- c. Methods of cooling the fuel while in storage; or  
*The fuel will be stored in the pool, see SAR 9.2.1, which will provide the cooling.*
- d. Confirm additional fuel will be stored in accordance with proposed technical specification 5.4, and provide a basis for that conclusion, or  
*We have evaluated the fuel with TS 3.3 specification 1 and TS 5.4 specifications 1,2 and 3. We have also added an additional SCRAM channel in Table 3.1.*
- e. Justify why additional information is not necessary.