

November 9, 2016

Dr. Timothy W. Koeth, Director  
Nuclear Reactor and Radiation Facilities  
Chemical and Nuclear Engineering Building 090  
University of Maryland  
College Park, MD 20742

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

Dear Dr. Koeth:

The U.S. Nuclear Regulatory Commission (NRC) is continuing its review of your application for the renewal of Facility Operating License No. R-70, for the Maryland University Training Reactor, dated May 12, 2000 (a redacted version of the application is available on the NRC's public Web site at [www.nrc.gov](http://www.nrc.gov) under Agencywide Documents Access and Management System (ADAMS) Accession No. ML052910399), as supplemented.

During our review, questions have arisen for which additional information is needed. The enclosed request for additional information (RAI) identifies the additional information needed to continue our review. We request that you provide responses to the enclosed RAIs within 30 days from the date of this letter.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.30(b), "Oath or affirmation," you must execute your response in a signed original document under oath or affirmation. Your response must be submitted in accordance with 10 CFR 50.4, "Written communications." Information included in your response that is considered sensitive or proprietary, that you seek to have withheld from the public, must be marked in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding." Any information related to security should be submitted in accordance with 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements." Following receipt of the additional information, we will continue our review of your renewal request.

T. Koeth

- 2 -

If you have any questions, or need additional time to respond to this request, please contact me at 301-415-4246, or by electronic mail at [Eben.Allen@nrc.gov](mailto:Eben.Allen@nrc.gov).

Sincerely,

***/RA/***

Eben Allen, Project Manager  
Research and Test Reactors Licensing Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-166  
License No. R-70

Enclosure:  
As stated

cc: See next page

University of Maryland

Docket No. 50-166

cc:

Director, Dept. of Natural Resources  
Power Plant Siting Program  
Energy & Coastal Zone Administration  
Tawes State Office Building  
Annapolis, MD 21401

Roland G. Fletcher, Program Manager IV  
Radiological Health Program  
Maryland Department of Environment  
1800 Washington Blvd., Suite 750  
Baltimore, MD 21230-1718

Vincent G. Adams  
Facility Coordinator  
Chemical and Nuclear Engineering Building 090  
University of Maryland  
College Park, MD 20742

Mary J. Dorman  
Radiation Safety Officer  
Department of Environmental Safety  
3115 Chesapeake Building 338  
University of Maryland  
College Park, MD 20742

Professor Ray Phaneuf  
Department of Materials Science and Engineering  
Chemical and Nuclear Engineering Building 090  
University of Maryland  
College Park, MD 20742-2115

Test, Research, and Training  
Reactor Newsletter  
University of Florida  
202 Nuclear Sciences Center  
Gainesville, FL 32611

T. Koeth

- 2 -

If you have any questions, or need additional time to respond to this request, please contact me at 301-415-4246, or by electronic mail at [Eben.Allen@nrc.gov](mailto:Eben.Allen@nrc.gov).

Sincerely,

**/RA/**

Eben Allen, Project Manager  
Research and Test Reactors Licensing Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-166  
License No. R-70

Enclosure:  
As stated

cc: See next page

**DISTRIBUTION:**

PUBLIC	JEads, NRR	AAdams, NRR	CMontgomery, NRR,
NParker, NRR	RidsNrrDpr	EAllen, NRR	PRLB R/F
RidsNrrDprPrta			

**ADAMS Accession No.: ML16309A512; \*concurrence via e-mail**

**NRR-088**

OFFICE	NRR/DPR/PRLB	NRR/DPR/PRLB*	NRR/DPR/PRLB	NRR/DPR/PRLB
NAME	EAllen	NParker (ABaxter for)	AAdams	EAllen
DATE	11/02/16	11/08/16	11/09/16	11/09/16

**OFFICIAL RECORD COPY**

OFFICE OF NUCLEAR REACTOR REGULATION  
REQUEST FOR ADDITIONAL INFORMATION  
REGARDING THE RENEWAL OF  
THE MARYLAND UNIVERSITY TRAINING REACTOR  
LICENSE NO. R-70, DOCKET NO. 50-166

The U.S. Nuclear Regulatory Commission (NRC) is continuing its review of your application for renewal of Facility Operating License No. R-70 for the Maryland University Training Reactor (MUTR) dated May 12, 2000 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML052910399), as supplemented. By letter dated November 1, 2016 (ADAMS Accession No. ML16312A066), a license amendment to receive and possess additional TRIGA fuel was requested.

In the course of reviewing of the license amendment, the NRC staff has determined that additional information or clarification is required to complete the review in support of the development of a Safety Evaluation Report. This licensing request was primarily evaluated using the appropriate regulations in Title 10 of the *Code of Federal Regulations* (10 CFR), and the following guidance:

- NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content," issued February 1996 (ADAMS Accession No. ML042430055)
- NUREG-1537, Part 2, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Standard Review Plan and Acceptance Criteria," issued February 1996 (ADAMS Accession No. ML042430048)
- "Interim Staff Guidance on the Streamlined Review Process for License Renewal for Research and Test Reactors," dated October 2009 (ADAMS Accession No. ML092240244)

The regulations in 10 CFR 70.32 "Conditions of licenses," require license conditions for the possession of special nuclear material (SNM). The regulations in 10 CFR 70.32(b) states, in part, that the "Commission may incorporate in any license such additional conditions and requirements with respect to the licensee's ownership, receipt, possession, use, and transfer of special nuclear material as it deems appropriate or necessary."

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

Enclosure

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.

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.

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.

- 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.

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?

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?
  - b. What plans or procedures does the facility have in place to mitigate the consequences of accidents involving fuel receipt and storage?
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 ( $k_{\text{eff}}$  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,
- b. Radiation shielding the fuel will have in storage, and
- c. Methods of cooling the fuel while in storage; or
- d. Confirm additional fuel will be stored in accordance with proposed technical specification 5.4, and provide a basis for that conclusion, or
- e. Justify why additional information is not necessary.