

February 8, 2016

Mr. Vito Nuccio  
Reactor Administrator  
Department of the Interior  
U.S. Geological Survey  
PO Box 25046, MS 911  
Denver, CO 80225-0046

SUBJECT: U.S. GEOLOGICAL SURVEY – REQUEST FOR ADDITIONAL INFORMATION  
REGARDING THE REVIEW OF THE LICENSE RENEWAL OF THE U.S.  
GEOLOGICAL SURVEY TRIGA RESEARCH REACTOR (TAC NO. ME1593)

Dear Mr. Nuccio:

The U.S. Nuclear Regulatory Commission (NRC) is continuing its review of the U.S. Geological Survey (USGS) application dated January 5, 2009 (a redacted version of the safety analysis report is available on the NRC's public Web site at [www.nrc.gov](http://www.nrc.gov) under Agencywide Documents Access and Management System Accession No. ML092120136), as supplemented, for the renewal of Facility Operating License No. R-113 for the USGS TRIGA Research Reactor.

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 RAI 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 evaluation of your renewal request.

V. Nuccio

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If you have any questions about this review, or if you need additional time to respond to this request, please contact me at (301) 415-0893, or by electronic mail at [Geoffrey.Wertz@nrc.gov](mailto:Geoffrey.Wertz@nrc.gov).

Sincerely,

***/RA Alexander Adams for/***

Geoffrey A. Wertz, Project Manager  
Research and Test Reactors Licensing Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-274  
License No. R-113

Enclosure:  
As stated

cc: See next page

U.S. Geological Survey TRIGA Reactor

Docket No. 50-274

cc:

Environmental Services Manager  
480 S. Allison Pkwy.  
Lakewood, CO 80226

State of Colorado  
Radiation Program  
HMWM-RM-B2  
4300 Cherry Creek Drive South  
Denver, CO 80246

Timothy DeBey  
Reactor Manager  
U.S. Geological Survey  
Box 25046 - Mail Stop 974  
Denver Federal Center  
Denver, CO 80225

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

V. Nuccio

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As stated

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**ADAMS Accession No.: ML16027A134**

\*concurrence via e-mail

NRR-088

OFFICE	NRR/DPR/PRLB*	NRR/DPR/PRLB*	NRR/DPR/PRLB	NRR/DPR/PRLB
NAME	GWertz	NParker	AAdams	GWertz (AAdams for)
DATE	1/27/16	1/28/16	2/8/16	2/8/16

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OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR ADDITIONAL INFORMATION

REGARDING THE RENEWAL OF

THE U.S. GEOLOGICAL SURVEY TRIGA RESEARCH REACTOR

LICENSE NO. R-113; DOCKET NO. 50-274

The U.S. Nuclear Regulatory Commission (NRC) is continuing its review of the U.S. Geological Survey (USGS) TRIGA Reactor (GSTR) license renewal application dated January 5, 2009 (a redacted version of the safety analysis report (SAR) 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. ML092120136), as supplemented. During our review, questions have arisen for which additional information is needed. This request for additional information (RAI) identifies the additional information needed to continue our review. We request that you provide responses to this RAI within 30 days from the date of this letter.

RAIs Associated with the Technical Review:

1. The USGS SAR, Section 7.3.2, "Servo System," provides general information about the servo control system, but does not describe any specific details associated with the potential failure of the servo system. NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors: Format and Content," Section 7.3, "Reactor Control System," provides guidance that the license should analyze the operation and performance of the system, including the bases for any technical specifications (TSs) and surveillance requirements, and provide a description of the evaluation of any accident scenarios that may be created by a malfunction of the system (e.g., a malfunction of the servo bounded by another reactivity insertion event.).
  - a. Provide details of the servo system operation including the normal reactivity control range, regulating rod position, interlocks, and any other significant design information, or justify why no additional information is necessary.
  - b. Explain if additional TSs are needed for the servo system, or justify why no changes are necessary.
2. The USGS SAR does not indicate if chemicals are used in the conduct of experiments, or in the control of contamination for radiation protection of the workers and visitors. NUREG-1537, Part 1, Chapter 10, "Experimental Facilities and Utilization," and Chapter 11, "Radiation Protection Program and Waste Management," provide guidance that chemical hazards should be considered. Provide a description of the chemicals used at the facility that may be considered hazardous to the facility staff, or the environment or public if released, the quantities used, and the controls that mitigate the risks associated with their use, and method of disposal or justify why no additional information is needed.

Enclosure

3. The USGS SAR, Section 9.2.1, "Fuel Storage Racks," provided information concerning the storage of the USGS TRIGA fuel, including a statement that the keff was measured to be below the limit of 0.9. However, it is not clear if this applies to racks located in both the in-tank and the fuel pit locations. NUREG-1537, Part 1, Section 9.2, "Handling and Storage of Reactor Fuel," provides guidance that the licensee should provide an analysis that shows that the keff for fuel storage, under all conditions, is less than 0.9. Provide an analysis or discussion that demonstrates that the fuel storage keff is less than 0.9 under all conditions, or justify why no explanation is needed.
4. By letter dated September 8, 2015 (ADAMS Accession No. ML15261A042), USGS staff provided proposed TSs.
  - a. Proposed TS Table 3.2, "Minimum Reactor Safety Channels," provided safety channels for (1) High Voltage; and (2) Watchdog SCRAMS. However, it does not appear to list the setpoints. NUREG-1537, Part 1, Section 14, Appendix 14.1, Chapter 3.2, "Reactor Control and Safety Systems," item (4), "Scram Channels," provides guidance that scrams and their associated setpoints should be provided. Provide setpoints for the scrams associated with the High Voltage and Watchdog SCRAMS, or justify why no changes are needed.
  - b. The proposed TSs do not appear to contain a limit or specification on reactivity insertion rate. NUREG-1537, Part 1, Section 14, Appendix 14.1, Chapter 3.2, "Reactor Control and Safety Systems," item (2), "Reactivity Insertion Rate," provides guidance that a reactivity insertion rate should be included in the TSs. Provide a reactivity insertion rate, or justify why no change is needed.
  - c. The TSs provided by letter dated September 8, 2015, contained numerous annotations or markups which were useful to the staff to understand the proposed changes. However, in order to help ensure that the NRC staff understands the final format and content, provide a final, clean version of the USGS proposed TSs, or justify why additional information is needed.

RAIs Associated with the Financial Review:

As required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.33(f)(2), "[a]pplicants to renew or extend the term of an operating license for a nonpower reactor shall include the financial information that is required in an application for an initial license." To comply with this requirement, you provided financial information by letter dated August, 12, 2010 (ADAMS Accession No. ML102300385). During the course of our review, some of this information has become outdated and needs to reflect the current financial status at your facility. Provide responses to the following RAIs. If, in some cases, the responses provided in the August 12, 2010, letter remain current, indicate in your RAI response "no change, no additional information is necessary," and the NRC staff will consider the information provided by the August 12, 2010, letter to remain current.

1. Pursuant to 10 CFR 50.33, "Contents of applications; general information," certain information is required by the applicant, USGS. The application indicates that USGS is a Federal bureau within the U.S. Department of the Interior. To comply with 10 CFR 50.33(d), the staff requests that the applicant state whether USGS is owned, controlled, or dominated by an alien, foreign corporation, or foreign government, and if so, give details.

2. The NRC staff will analyze USGS' annual financial statements for the current year, which are required by 10 CFR 50.71(b), to determine if USGS is financially qualified to operate the GSTR. Since USGS' financial statements are not included in the application, please provide a copy of the latest annual financial statements for the staff's review.
3. Pursuant to 10 CFR 50.33(f)(2), "[t]he applicant shall submit estimates for total annual operating costs for each of the first five years of operation of the facility." For the NRC staff to complete its review, the following additional information must be submitted:
  - a. The estimated operating costs for the GSTR for each of the fiscal years (FYs) 2016 through FY2020 (the first five years after projected license renewal).
  - b. USGS' source(s) of funds to cover the operating costs for the above FYs.
4. NUREG-1537, Part 1, Section 15.3, "Financial Ability to Decommission the Facility," states that the cost to decommission the GSTR was \$3.7 million in 2006 dollars. In order for the NRC staff to complete its review of the decommissioning cost estimate, please provide the following additional information:
  - a. A current cost estimate in 2016 dollars to meet the NRC's radiological release criteria for decommissioning the facility for unrestricted use, the basis for the decommissioning cost estimate, and show costs specifically broken down into the categories of labor, waste disposal, other items (such as energy, equipment, supplies), and a contingency factor of at least 25 percent.
  - b. A description of the means of adjusting the cost estimate and associated funding level periodically over the life of the facility to comply with 10 CFR 50.75(d)(2)(iii). Also, provide a detailed numerical example showing how the 2016 cost estimate will be updated periodically in the future.
5. The USGS SAR, Section 15.3, "Financial Ability to Decommission the Facility," states that "...the funds needed for decommissioning will be requested through appropriate federal funding channels and will be obtained sufficiently in advance of decommissioning to prevent delay of required activities." Where the applicant intends to use a statement of intent (SOI) as the method to provide decommissioning funding assurance, as provided for by 10 CFR 50.75(e)(1)(iv), the staff must find that the applicant "...is a Federal, State, or local government licensee..."

To make this finding, the applicant must state that it is a Federal government organization and that the decommissioning funding obligations of the applicant are backed by the Federal government, and also provide corroborating documentation. Further, the applicant must provide documentation verifying that the signator of the statement of intent is authorized to execute said document that binds the applicant. This document may be a governing body resolution, management directives, or other form that provides an equivalent level of assurance. As the application does not include all of the above information, please submit the following:

- a. The current (2016 dollars) cost estimate for decommissioning (for which decommissioning funding assurance is being provided) and the signator's oath or affirmation attesting to the information.

- b. Documentation that corroborates the statement in the application that USGS is a Federal institution and a Federal government licensee under 10 CFR 50.75(e)(2)(iv).
- c. A statement as to whether the decommissioning funding obligations for the GSTR are backed by the Federal government. The application must also present information that corroborates this statement. For example, the documentation may be a copy of or complete citation to a Federal statute that expressly provides that the obligations, or at least the decommissioning funding obligations, of the applicant are obligations backed or supported by the full faith and credit of the Federal government, or an opinion of the applicant's General Counsel with citations to statutes, regulations, and/or case law that the obligations, or at least with respect to the decommissioning funding obligations, of the applicant are obligations backed or supported by the full faith and credit of the Federal government.
- d. Documentation verifying that the signator of the SOI is authorized to execute such a document that binds the applicant financially. For example, provide a copy of an official USGS delegation of authority showing that the signator of the SOI is authorized to bind USGS financially, at least with respect to funding the decommissioning of the GSTR.