

May 3, 2013

Colonel L. Andrew Huff, Director
Armed Forces Radiobiology Research Institute
8901 Wisconsin Avenue
Bethesda, Maryland 20889-5603

SUBJECT: ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE – REQUEST FOR
ADDITIONAL INFORMATION ON FINANCIAL QUALIFICATIONS AND
TECHNICAL SPECIFICATIONS FOR THE LICENSE RENEWAL REVIEW
(TAC NO. ME1587)

Dear Colonel Huff:

The staff of the U.S. Nuclear Regulatory Commission (NRC) is continuing its review of your application for the renewal of Facility Operating License No. R-84 for the Armed Forces Radiobiology Research Institute TRIGA reactor, dated June 24, 2004, as supplemented. During the course of its review, the NRC staff has identified responses in your letters dated August 13, 2010, and November 28, 2011, requiring additional information and clarification. Please provide responses to the enclosed request for additional information within 60 days of the date of this letter.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.30(b), 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 security, 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."

Should you have any questions about this review or if you anticipate a delay in timely responses, please contact me by telephone at 301-415-3398 or by electronic mail at Cindy.Montgomery@nrc.gov.

Sincerely,

/RA/

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

Docket No. 50-170

Enclosure:
As stated

cc w/encl: See next page

Armed Forces Radiobiology Research

Docket No. 50-170

cc:

Director, Maryland Office of Planning
301 West Preston Street
Baltimore, MD 21201

Montgomery County Executive
101 Monroe Street, 2nd Floor
Rockville, MD 20850

Mr. Stephen I. Miller
Reactor Facility Director
Armed Force Radiobiology
Research Institute
8901 Wisconsin Avenue
Bethesda, MD 20889-5603

Environmental Program Manager III
Radiological Health Program
Air & Radiation Management Adm.
Maryland Dept of the Environment
1800 Washington Blvd., Suite 750
Baltimore, MD 21230-1724

Manager
Nuclear Programs
Maryland Department of Natural Resources
Tawes B-3
Annapolis, MD 21401

Director
Air & Radiation Management Adm.
Maryland Dept of the Environment
1800 Washington Blvd., Suite 710
Baltimore, MD 21230

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

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As stated

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OFFICE OF NUCLEAR REACTOR REGULATION
REQUEST FOR ADDITIONAL INFORMATION
REGARDING THE RENEWED LICENSE FOR
THE ARMED FORCES RADIOBIOLOGICAL RESEARCH INSTITUTE
TRIGA REACTOR FACILITY
LICENSE NO. R-84; DOCKET NO. 50-170

The staff of the U.S. Nuclear Regulatory Commission (NRC) is continuing its review of your application for the renewal of Facility Operating License No. R-84 for the Armed Forces Radiobiology Research Institute (AFRRI) TRIGA reactor, dated June 24, 2004, as supplemented. During the course of its review, the NRC staff has identified responses in your letters dated August 13, 2010, and November 28, 2011, requiring additional information and clarification. Please provide responses to the enclosed request for additional information within 60 days of the date of this letter.

Financial Qualifications

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, please provide an update as needed to the information provided by your letter dated August 13, 2010, for a renewed facility operating license for the Armed Forces Radiobiology Research Institute Facility. In some cases, the responses provided in the August 13, 2010, letter may not have changed. In that case, please indicate in your response “no change,” no additional information is necessary, and the NRC staff will consider your response provided in the August 13, 2010, submittal to remain current.

1. 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 operations of the facility.” Since the information included in the previous correspondence was for the period of fiscal years (FYs) 2012 through 2016, please provide the following additional information:
 - (a) Projected operating costs of the AFRRI facility for each of the FY2013 thru FY2018 (the first five year period after the projected license renewal). If the cost estimates have not changed since the previous submittal for the period of FY2013 through FY2016, please so state.
 - (b) Has the source(s) of funding to cover the operating costs for the above FYs changed since the August 13, 2010, submittal?

ENCLOSURE

2. By letter dated August 13, 2010, you provided an updated decommissioning cost estimate for the facility that was developed using NUREG/CR-1756, "Technology, Safety and Costs of Decommissioning Reference Nuclear Research and Test Reactors." The decommissioning cost estimate was \$14.831 million in 2011 dollars. The cost estimate summarized costs by labor, radioactive wastes disposal, energy, and a 25-percent contingency factor.
 - (a) Please indicate if the basis for how the cost estimate was developed has changed. If NUREG/CR-1756 is still the basis, please so state.
 - (b) Please indicate if there are any changes to the means of adjusting the cost estimate and associated funding level periodically over the life of the facility.
3. AFRRRI provided a Statement of Intent (SOI), dated August 11, 2010, stating that "[f]unding will be sought from the [U.S.] Department of Defense in accordance with established programming and budgeting procedures," per 10 CFR 50.75(e)(1)(iv).
 - (a) Please indicate if there have been any changes to the SOI and if decommissioning funding obligations of the AFRRRI facility continue to be backed by the full faith and credit of the U.S. Government.

Technical Specifications

1. Technical Specification (TS) 4.1(a) states, "the reactivity worth of each control rod and the shutdown margin shall be determined annually but at intervals not to exceed 15 months or following any significant core configuration changes". The term "significant core configuration changes" is not defined in your submissions. Please submit a definition for significant core configuration changes or justify why it is not necessary.
2. TS 4.1(e) states, "The core excess reactivity shall be measured at the beginning of each day of operation involving the movement of control rods, or prior to each continuous operation extending more than a day. During extended shutdown periods, the core excess reactivity shall be measured at least annually, not to exceed 15 months." This TS conforms to the recommendation in American Nuclear Society/American National Standards Institute, Inc. (ANS/ANSI) 15.1 except that ANS/ANSI 15.1 states "and following significant core configuration and/or control rod changes". Please justify why it is not necessary to measure core excess reactivity following significant core configuration changes and/or control rod changes or submit a change to your TSs.
3. A description of measurements of the fuel elements and fuel follower control rods is included in TS 4.2.5 and 5.2.2(e).
 - (a) TS 4.2.5 states, in part, "Fuel elements and Fuel follower control rods indicating an elongation greater than 0.100 inch, a lateral bending greater than 0.0625 inch, or significant visible damage shall be considered damaged, and shall not be used in the reactor core." This statement appears to be a limiting condition for

operation (LCO). Please justify why this TS is a surveillance and not an LCO or submit a change to the TSs.

- (b) TS 5.2.2(e), Reactor Core, states that “fuel elements indicating an elongation greater than 0.100 inch, a lateral bending greater than 0.0625 inch, or significant visible damage shall be considered damaged, and shall not be used in the reactor core.” Please justify why this is a design feature and not an LCO.
- 4. The safety analysis report states that the calculation of the maximum temperature during the loss of coolant accident (LOCA) vs. fuel rod power density during operation was based on decay heating after operation at 72 hours per week for 40 years. What is the basis for this assumption—is there a limit which caps the number of operating hours per week? Please explain why a Technical Specifications constraint of 72 hours is not necessary or propose a Technical Specification.
- 5. TS 1.10, the definition of Initial Reactor Startup is, “The first reactor startup following fuel element relocation within the core.” This definition does not conform to the recommendations of NUREG-1537 which suggests that initial reactor startup is defined as “the first startup after the reactor is secured.” Please justify why your definition is acceptable or submit a change to the TSs.
- 6. TS 1.24, the definition of Reactor Secured is, “Either sufficient fuel is removed to ensure a \$1.00 (or greater) shutdown margin...” does not conform to the recommendations of ANSI/ANS 15.1 which state “Either there is insufficient moderator available in the reactor to attain criticality...” Please justify why this is acceptable or submit a change to the TSs.
- 7. TS 3.1.3(b), Reactivity Limitations states, “The shutdown margin provided by the remaining control rods with the most reactive control rod fully withdrawn shall be \$3.50...” However, the definition for shutdown margin uses the term “the most reactive position.” Is the term “the control rod fully withdrawn” equivalent to “the most reactive position” and do the two terms refer to the same position? Please justify why different terms were used, and why this is acceptable or submit a change to the TSs.
- 8. TS 3.5.2, Effluents, Argon-41 Discharge Limit, and TS 6.6(b), Operating Reports, Gaseous Waste, indicate that Argon-41 is the only effluent measured. Please justify why other effluents are not measured and indicate how samples are obtained as well as the method used to determine that the samples are statistically representative.
- 9. TS 3.6(b), Limitations on Experiments states, “Each fueled experiment shall be limited so that the total inventory of iodine isotopes 131 through 135 in the experiment is not greater than 1.0 curie and the maximum strontium-90 inventory is not greater than 5 millicuries.” The basis states that these limits assure that the dose to members of the public will not exceed the limits of 10 CFR Part 20. Please explain why this does not apply to workers or submit a change to the TS bases.
- 10. TS 3.4, Ventilation states, “The reactor shall not been operated unless the facility ventilation system fan is operating, except for periods of time during which the dampers shall be closed. In the event of a release of airborne radioactivity in the reactor room above both routine reactor operation and normal background values, the ventilation

system to the reactor room shall be secured via closure dampers automatically by a signal from the reactor deck air particulate monitor.” Please explain what is meant by “except for periods of time during which the dampers shall be closed.” Please describe analyses that have been completed with regard to releases/exposures under both open and closed positions of the dampers.