

April 15, 2013

Colonel L. Andrew Huff, Director
Armed Forces Radiobiology
Research Institute
National Naval Medical Center
8901 Wisconsin Avenue
Bethesda, MD 20889-5603

SUBJECT: ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE – NRC ROUTINE
INSPECTION REPORT NO. 50-170/2013-201

Dear Colonel Huff:

From March 18–21, 2013, the U.S. Nuclear Regulatory Commission (NRC or the Commission) conducted an inspection at the Armed Forces Radiobiology Research Institute reactor facility. The inspection included a review of activities authorized for your facility. The enclosed report documents the inspection results, which were discussed on March 21, 2013, with members of your staff.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliances with NRC requirements were identified.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 2.390, "Public inspections, exemptions, request for withholding," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Ossy Font at (301) 415-2490.

Sincerely,

/RA/

Gregory T. Bowman, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-170
License No. R-84

Enclosure: NRC Inspection Report No. 50-170/2013-201
cc w/encl: See next page

Armed Forces Radiobiology Research Institute

Docket No. 50-170

cc:

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

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No: 50-170

License No: R-84

Report No: 50-170/2013-201

Licensee: Armed Forces Radiobiology Research Institute

Facility: AFRRRI Reactor Facility

Location: Bethesda, MD

Dates: March 18–21, 2013

Inspectors: Ossy Font, Trainee
Patrick J. Isaac

Approved by: Gregory Bowman, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Armed Forces Radiobiology Research Institute
Research Reactor Facility
NRC Inspection Report No. 50-170/2013-201

The primary focus of this routine, announced inspection included the onsite review of selected aspects of the Armed Forces Radiobiology Research Institute (AFRRI's or the licensee's) Class II research reactor facility safety programs, including organization and staffing, operations logs and records, requalification training, surveillance and limiting conditions for operation, emergency planning, maintenance logs and records, and fuel handling logs and records. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with U.S. Nuclear Regulatory Commission requirements.

Organization and Staffing

- The licensee's organization and staffing were in compliance with the requirements specified in the Technical Specifications (TS) 6.1.

Operations Logs and Records

- Operational activities were consistent with applicable TS and procedural requirements.

Requalification Training

- Operator requalification was up-to-date and was being performed as required by AFRRI's reactor operator requalification program.

Surveillance and Limiting Conditions for Operation

- All surveillances were completed in accordance with TS Section 4.0 and the licensee was in compliance with limiting conditions for operation requirements in TS Section 3.0.

Emergency Planning

- The emergency preparedness program was conducted in accordance with the Emergency Plan.

Maintenance Logs and Records

- Maintenance activities ensured that equipment remained consistent with the Safety Analysis Report and TS requirements.

Fuel Handling Logs and Records

- Fuel handling and inspection activities were completed and documented as required by TS and facility procedures.

REPORT DETAILS

Summary of Facility Status

The Armed Forces Radiobiology Research Institute (AFRRI's or the licensee's) one megawatt Training Research Isotope Production General Atomics (TRIGA) Mark II research reactor, located on the campus of the National Naval Medical Center, operated in support of the Institute's mission of research, experiments, education, reactor operator training and periodic equipment surveillance immediately prior to the inspection. During the inspection the reactor was maintained in a shutdown status for the annual maintenance outage.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure (IP) 69001)

To verify that the licensee's organization and staffing were in accordance with AFRRI Technical Specification (TS) 6.1, the inspectors reviewed the following:

- Organizational structure
- Management responsibilities
- Staffing requirements for safe operation of the research reactor facility
- Reactor Logbook Number 134, November 2010 to September 2011
- Reactor Logbook Number 135, September 2011 to November 2012
- Reactor Logbook Number 136, November 2012 to present

b. Observations and Findings

The structure and functions of the licensee's organization at the AFRRI facility had not functionally changed since the last U.S. Nuclear Regulatory Commission (NRC) inspection. The licensee's current organizational structure and assignment responsibilities were consistent with those specified in the TS 6.1. There was one change in management – a new individual had been assigned to the position of Director, AFRRI. All positions reviewed were filled with qualified personnel. Review of records verified that management responsibilities were generally administered as required by TS 6.1.2 and applicable procedures. The inspectors determined from the reactor console logbook that minimum staffing and on-call requirements were in compliance with TS 6.1.3.2, "Operations."

c. Conclusion

The licensee's organization and staffing was in compliance with the requirements specified in the TS 6.1.

2. Operations Logs and Records

a. Inspection Scope (IP 69001)

The inspectors reviewed selected aspects of the following to verify compliance with TS Sections 2.0, 3.0, and 6.0 and applicable procedure requirements for operation:

- AFRRRI Reactor Monthly Usage Summary, 2011 to present
- Reactor Logbook Numbers 134, 135, and 136
- AFRRRI Malfunction Log from 2011 to present
- AFRRRI Operational Procedure 8, "Reactor Operations," Rev. dated May 1, 1998
- AFRRRI Operational Procedure 8, Tab A, "Logbook Entry Checklist," Rev. dated February 26, 2001
- AFRRRI Operational Procedure 8, Tab B, "Daily Operational Startup Checklist," Rev. dated September 11, 2009
- AFRRRI Operational Procedure 8, Tab G1, "Pulse Operation (Critical)," Rev. dated March 16, 1998
- AFRRRI Operational Procedure 8, Tab H, "Weekly Operational Instrument Checklist"
- AFRRRI Operational Procedure 8, Tab I, "Daily Operational Shutdown Checklist"
- Daily Operational Startup and Shutdown Checklists, 2011 to present
- Weekly Operational Instrument Checklist, 2011 to present
- AFRRRI 2011 Annual Report, dated March 30, 2012

b. Observations and Findings

The operating logs and records were well maintained and provided a clear indication of operational activities, changes in reactivity, and maintenance actions or malfunctions that had occurred.

Logs and records also showed that operational conditions and parameters were consistent with license and TS requirements. Information on the operational status of the facility was recorded in logbooks and on checklists as required by procedure.

Operational problems and events noted in the logs were reported, reviewed, and resolved as required. Operations logs and records also documented that shift staffing met the minimum requirements.

c. Conclusion

Operational activities were consistent with applicable TS and procedural requirements.

3. Requalification Training

a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the requirements of the operator requalification program, the inspectors reviewed selected aspects of:

- "Reactor Operator Requalification Program for the Armed Forces Radiobiology Research Institute TRIGA Reactor Facility," revised

June 27, 2001

- Effective dates of current operator licenses
- Operator training records maintained on "Requalification Program Checklist" forms in individual folders for each operator
- Medical examination records for the past 2 years
- License termination letter, dated July 31, 2012
- Operator requalification training lectures for 2011–2013
- Facility written exam, administered December 2011

b. Observations and Findings

As of the date of the inspection, all the NRC-licensed senior reactor operators (SROs) on staff maintained current licenses. All operators were enrolled in the licensee's NRC-approved requalification and training program and had completed a minimum of 4 hours of shift functions per quarter. The inspectors noted that operators were receiving the required biennial medical examinations.

A review of the logs and records showed that training was being conducted in accordance with the program. Requalification program data, such as attendance at training sessions and completion of written examinations and operation tests, was documented as required. As of the date of this inspection, the required biennial written examination for this training cycle was not yet administered. The inspectors noted that the last written examination was administered in December 2011. Records of quarterly reactor operations, reactivity manipulations, and other operations activities were being maintained.

c. Conclusion

Operator requalification was up-to-date and was being performed as required by the AFRRRI reactor operator requalification program.

4. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001)

To determine that LCOs were met and surveillances were completed as required by TS Sections 3.0 and 4.0, the inspectors reviewed:

- TS for the AFRRRI reactor facility, dated June 27, 2001
- 2011 Annual Operating Report for the AFRRRI
- AFRRRI Malfunction Log from 2011 to present
- Reactor Logbook Numbers 134, 135, and 136
- Daily Operational Startup/Shutdown Checklist, 2011 to present
- Calibration procedures for the AFRRRI reactor facility
- Maintenance procedures for the AFRRRI reactor facility
- TRIGA Tracker Report

b. Observations and Findings

Daily, weekly, monthly, quarterly, semi-annual, and other periodic checks, tests, and verifications for TS required LCOs were being completed as required. The inspectors performed a random sampling of the AFRRRI surveillance and verified that the control rods' reactivity worth and shutdown margin were performed in accordance with TS 4.1.a; the scram function of the high-flux safety channels verification was performed in accordance with TS 4.2.2.a; the reactor fuel elements inspection was performed in accordance with TS 4.2.5; that the ventilation system check was performed in accordance with TS 4.4; and the area radiation monitoring system check was performed in accordance with TS 4.5.

The inspectors reviewed a random sampling of operational logs and records and determined that they met the required LCOs.

The AFRRRI uses a computer database, the TRIGA Tracker Report, to track completion of the various required surveillance and LCO verifications. The inspectors performed a random sampling of the database to ensure that there were no overdue requirements and cross-referenced the applicable TS to ensure all required surveillances were accounted for in the TRIGA Tracker Report; there were no issues noted.

c. Conclusion

All surveillances were completed in accordance with TS Section 4.0 and the licensee was in compliance with LCO requirements in TS Section 3.0.

5. **Emergency Preparedness**

a. Inspection Scope (IP 69001)

The inspectors reviewed the implementation of selected portions of the emergency preparedness program, including:

- AFRRRI Emergency Plan, dated July 2004
- AFRRRI emergency drill conducted on December 1, 2011
- AFRRRI emergency drill conducted on December 20, 2012
- AFRRRI emergency supplies
- Security guard radiation safety procedures

b. Observations and Findings

The inspectors reviewed the current Emergency Plan (EP). The inspectors noted that the notification rosters in the control room and at the guard's desk were up to date and reviewed periodically in accordance with procedures. The inspectors verified that the four emergency supply boxes were inventoried and their radiation monitoring devices were within their calibration period.

The inspectors reviewed the last two annual drills, one of which was a large exercise with external participants, as required in the EP to be held biennially.

The large exercise included participants from the Naval Support Activity Bethesda, police, and fire departments. The second drill involved only facility staff. The drills were successfully completed, followed by discussion and feedback. Action items were being tracked and closed out, as appropriate.

The inspectors verified that key emergency response personnel and individuals authorized access (e.g., guards) completed initial and periodic retraining of the emergency preparedness program as required by the EP.

The inspectors interviewed the police chief and the fire department's chief and captain. They were knowledgeable of their roles and responsibilities in case of an emergency. Additionally, the inspectors interviewed one of the on-duty guards. He was knowledgeable of the EP and walked the inspector through one of their emergency procedures, which would be used activate the Emergency Response Team.

The inspectors observed radiation monitoring alarm tests, one of which resulted in a response by security as expected.

c. Conclusion

The emergency preparedness program was conducted in accordance with the Emergency Plan.

6. Maintenance Logs and Records

a. Inspection Scope (IP 69001)

To determine that maintenance was being completed as required by the TS and applicable procedures, the inspectors reviewed:

- AFRRRI Malfunction Log from 2011 to present
- Reactor Logbook Numbers 134, 135, and 136
- Daily Operational Startup Checklist, various
- Maintenance procedures for the AFRRRI reactor facility
- TRIGA Tracker Report
- Annual Maintenance Report
- Annual Shutdown Maintenance Checklist

b. Observations and Findings

The inspectors verified through records that annual, semi-annual, quarterly, and monthly maintenance requirements were performed on their respective frequency. Routine and preventive maintenance were well controlled and documented in the TRIGA tracking system. Use of maintenance and malfunction logs satisfied procedural requirements.

The inspectors reviewed Inspector Follow-up Item (IFI) 50-170/2011-201-01 (NRC Report No. 50-170/2010-201) to track maintenance activities regarding the transient rod mechanical failure. The inspectors verified that the new transient

rod was inspected with no issues and continues to be operational. This IFI is now closed.

c. Conclusion

Maintenance activities ensured that equipment remained consistent with the Safety Analysis Report and TS requirements.

7. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001)

The inspectors reviewed the following to verify compliance with the procedural requirements in TS 6.3.f, "Reactor core loading and unloading":

- AFRRRI current stainless steel clad fuel element records
- AFRRRI Operational Procedure 7, "Reactor Core Loading and Unloading," May 15, 1991
- Control room reactor fuel inventory map
- Reactor Logbook Numbers 134, 135, and 136

b. Observations and Findings

The AFRRRI maintains a fuel element record of all their elements. Information such as serial number, core position, and power history are maintained and tracked. The inspectors reviewed selected records for fuel movements and inspection of the reactor fuel. The inspectors verified that fuel moves and measurements were accurately recorded in each of the various records. A written and properly approved procedure was used in the conduct of the fuel moves.

c. Conclusion

Fuel handling and inspection activities were completed and documented as required by TS and facility procedures.

8. Exit Interview

The inspectors presented the inspection results to licensee management at the conclusion of the inspection on March 21, 2013. The inspectors described the areas inspected and discussed in detail the inspection observations. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspectors during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

L. Andrew Huff, Colonel	Director, AFRRRI
S. Miller	Reactor Facility Director
H. Spence	Reactor Operations Supervisor
I. Gifford	Senior Reactor Operator
G. Wilhelm	Captain, Fire Marshall Office
J. Grey III	Chief, Fire Marshall Office
J. Bieger	Chief, Police Department
A. Lancaster	Guard, AFRRRI

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
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ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None.

Closed

50-170/2011-201-01	IFI	Track maintenance activities regarding the transient rod mechanical failure.
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Discussed

None.

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Document Access and Management System
AFRRRI	Armed Forces Radiobiology Research Institute
ERC	Emergency Response Center
IFI	Inspector Follow-up Item
IP	Inspection Procedure
LCO	Limiting Condition for Operation
NRC	U.S. Nuclear Regulatory Commission
SRO	Senior Reactor Operator
TS	Technical Specifications
TRIGA	Training Research Isotope Production General Atomics