



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 5, 2018

Captain John Gilstad, Director
Armed Forces Radiobiology
Research Institute
National Naval Medical Center
8901 Wisconsin Avenue
Bethesda, MD 20889-5603

SUBJECT: ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE – NUCLEAR
REGULATORY COMMISSION ROUTINE ANNOUNCED INSPECTION
REPORT NO. 05000170/2018201 AND NOTICE OF VIOLATION

Dear Captain Gilstad:

From June 5-7, 2018, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the Armed Forces Radiobiology Research Institute reactor facility. The purpose of this inspection was to conduct a review of activities authorized for your facility. The enclosed report documents the results of this inspection, which were discussed on June 7, 2018, with you and members of your staff.

The inspection examined activities conducted under your license as they relate to public health and safety, and to confirm compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at <https://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it constitutes a failure to meet regulatory requirements that has more than minor safety significance and the licensee failed to identify the violation.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response will be made available electronically for public inspection in the NRC Public Document Room or from the

NRC's Agencywide Documents Access and Management System, accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

If you have any questions concerning this inspection, please contact Michael Takacs at 301-415-2042, or by electronic mail at Michael.Takacs@nrc.gov.

Sincerely,

/RA/

Anthony J. Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

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

Enclosures:

1. Notice of Violation
2. NRC Inspection Report
No. 05000170/2018201

cc: w/enclosures: See next page

Armed Forces Radiobiology Research Institute

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

Environmental Program Manager III
Radiological Health Program
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1800 Washington Blvd., Suite 750
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Director
Air & Radiation Management Adm.
Maryland Dept of the Environment
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Test, Research and Training
Reactor Newsletter
P.O. Box 118300
University of Florida
Gainesville, FL 32611

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

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

SUBJECT: ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE – NUCLEAR REGULATORY COMMISSION ROUTINE ANNOUNCED INSPECTION REPORT NO. 05000170/2018201 AND NOTICE OF VIOLATION DATED JULY 5, 2018

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OFFICE	NRR/DLP/PROB/SS*	NRR/DLP/PROB/LA*	NRR/DLP/PROB/BC
NAME	MTakacs	NParker	AMendiola
DATE	6/27/2018	6/27/2018	7/5/2018

OFFICIAL RECORD COPY

NOTICE OF VIOLATION

Armed Forces Radiobiology
Research Institute

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

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted June 5-7, 2018, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

As specified in the Armed Forces Radiobiology Research Institute (AFRRI) Facility Operating License No. R-84 for the TRIGA-type nuclear reactor, Section 2.C.2, "Technical Specifications," states the following: "The Technical Specifications contained in Appendix A are hereby incorporated in their entirety in the license. The licensee shall operate the facility in accordance with the Technical Specifications."

The AFRRI technical specification (TS), Section 6.2.5., "Audit Function," states that audits shall be performed annually, not to exceed 15 months and shall encompass the following:

- a. Conformance of facility operation to the Technical Specifications and the license;
- b. Performance, training, and qualifications of the reactor facility staff;
- c. Results of all actions taken to correct deficiencies occurring in facility equipment, structures, systems, or methods of operation that affect safety;
- d. Facility emergency plan and implementing procedures;
- e. Facility Physical Security Plan;
- f. Any other area of facility operations considered appropriate by the RRFSS or the AFRRI Licensee; and
- g. Reactor Facility ALARA Program. This program may be a section of the total AFRRI program.

Contrary to the TS requirements referenced above, on June 7, 2018, the NRC inspector found that more than 15 months had lapsed since the last audit for the facility emergency plan (EP) and implementing procedures (IPs), and the facility physical security plan (PSP). Although an annual audit was performed in February 2018, it did not include the EP, IPs, or PSP as required by TS. The last time these plans and procedures were audited was in January 2017.

This has been determined to be a Severity Level IV violation (Section 6.1).

Pursuant to the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 2.201, "Notice of violation," AFRRI is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the

corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

In accordance with 10 CFR 19.11, "Posting of notices to workers," you may be required to post this Notice within two working days of receipt.

Dated this 5th day of July 2018

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

Docket No: 50-170

License No: R-84

Report No: 05000170/2018201

Licensee: Armed Forces Radiobiology Research Institute

Facility: AFRRRI Research Reactor Facility

Location: Bethesda, MD

Dates: June 5 - 7, 2018

Inspector: Michael Takacs

Accompanied by: Michael Balazik
Elizabeth Reed

Approved by: Anthony J. Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Armed Forces Radiobiology Research Institute
AFRRI Research Reactor Facility
NRC Inspection Report No. 05000170/2018201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the Armed Forces Radiobiology Research Institute (AFRRI or the licensee's) Class II research reactor facility safety programs including: (1) procedures; (2) experiments; (3) health physics; (4) design changes; (5) committees, audits and reviews; and (6) transportation. The licensee's programs were acceptably directed toward the protection of public health and safety and in compliance with U.S. Nuclear Regulatory Commission (NRC) requirements.

Procedures

- The inspector found that appropriate procedures were in effect and being followed, and were updated as necessary.

Experiments

- The program for conduct and control of experiments met the requirements of regulations, the AFRRI technical specification (TS), and the applicable facility procedures.

Health Physics

- The radiation protection program was effective in minimizing radiation doses to individuals. Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory limits.

Design Changes

- The design change program was being implemented as required by the TS and facility procedures. One unresolved item initiated regarding the reactor console replacement.

Committees, Audits and Reviews

- The Reactor and Radiation Facilities Safety Subcommittee (RRFSS) provided the oversight required by the TS. One Level IV violation was identified.

Transportation

- The program for transportation of radioactive materials satisfied NRC requirements.

REPORT DETAILS

Summary of Facility Status

The AFRRRI's 1 megawatt Training Research Isotope General Atomics Mark II research reactor, located on the campus of the Walter Reed National Military Medical Center, is operated in support of the Institute's mission of research, experiments, education, reactor operator training, and periodic equipment surveillance testing. During the inspection, the reactor was shut down and secured for maintenance and testing.

1. Procedures

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

The inspector reviewed the following to ensure that the requirements of TS Section 6.3, "Procedures," were being met concerning written procedures:

- AFRRRI Surveillance Procedure S010, "Measurement of Fuel Elements/Inspection," revised June 12, 2017
- AFRRRI Operational Procedure 8, "Reactor Operations," Tab H, "Weekly Operational Instrument Checklist," revised April 9, 2017

b. Observations and Findings

The inspector reviewed the licensee's written procedures and revisions to procedures. The Procedures Manual was organized to address the specific categories of procedures identified in TS Section 6.3.

The inspector determined that written procedures were available for the activities delineated in TS Section 6.3, and were approved by the RRFSS before they were implemented. A cover sheet on each procedure documented review by the Reactor Facility Director, the Reactor and Radiation Facility Safety Committee (RRFSC) or RRFSS, and each licensed reactor operator on the staff at the time the procedure modification was implemented.

Through observation of various activities at the facility, including reactor operation, the inspector determined that licensee personnel conducted activities in accordance with applicable procedures.

c. Conclusion

The inspector found that appropriate procedures were in effect, being followed, and being updated as necessary.

2. Experiments

a. Inspection Scope (IP 69001)

To verify compliance with the licensee's procedures; TS Section 3.6, "Limitations on Experiments;" TS Section 6.4, "Review and Approval of Experiments;" and

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59, “Changes, test and experiments,” the inspector reviewed selected aspects of:

- Reactor Logbook from January 2017 to present
- Reactor Utilization Requests 2017 to present (none)

b. Observations and Findings

No experiments have been conducted since the last inspection.

c. Conclusion

The program in place for facility experiments satisfied NRC requirements.

3. Health Physics

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20, “Standards for Protection against Radiation,” requirements:

- AFRRRI Facility and Environmental Thermoluminescent Dosimeter Report for the third quarter 2017
- Liquid Effluent Release Reports for first quarter of 2018
- Gaseous Radioeffluents Reports for first quarter of 2018
- Radiation Exposure Report (Extremity), various for 2018
- Radiation Exposure Report (Whole Body), various for 2018
- Reactor Controlled Area Radiation Level/Contamination Survey, various for 2018

b. Observations and Findings

The inspector reviewed the facility and environmental dosimetry program and determined that radiation doses were being monitored and reviewed as appropriate to evaluate the impact to the public.

Personnel dosimetry results were reviewed by the inspector. Occupational radiation exposures were in conformance with 10 CFR Part 20 and administrative limits. During the review of the records for 2018, the inspector identified that doses were low due to the limited time the reactor was operated.

The inspector reviewed radiation and contamination surveys for the reactor. All surveys reviewed indicated that radiation levels and contamination swipe results were less than the threshold action levels at the facility.

The calibration records of selected devices were reviewed. Calibration tags on devices located throughout the facility were verified to be current and in accordance with the calibration records that were reviewed. The inspector observed a technician performing the calibration of a Ludlam 375 radiation area

monitor. The technician performing the calibration followed the manufacturer's calibration instructions and successfully completed the calibration.

c. Conclusion

The radiation protection program was effective in minimizing radiation doses to individuals. Effluent monitoring satisfied licensee and regulatory requirements and releases were within the specified regulatory limits.

4. Design Changes

a. Inspection Scope (IP 69001)

To verify compliance with the licensee's procedures, TS Section 6.2.4, "Review Function," and 10 CFR 50.59, the inspector reviewed selected aspects of:

- Annual Report for AFRRI, covering the period from January 1, 2017, through December 31, 2017
- Selected 10 CFR 50.59 analysis completed in 2017 and 2018
- Reactor Logbook from December 2016 to present

b. Observations and Findings

The licensee performed a 10 CFR 50.59 analysis, dated March 2, 2018, titled: "Replacement of the 1990 vintage console with 2016 era console," regarding the replacement of the existing control system console (CSC) and digital acquisition console (DAC) with an updated "like for like feature" control system. The licensee concluded in its analysis that no amendment was needed prior to implementation of the design change. However, the inspector informed the licensee that due to the complexity of the design change, the inspector did not have the expertise nor resources to review this particular design change, and therefore, needed to involve NRC technical staff for further review. The inspector explained that this issue will be tracked by the NRC staff as an unresolved item (URI) and will remain on future inspection reports as **URI 05000170/2018201-01** until NRC completes its review and concludes as to whether or not a license amendment should have been required to make these design changes. The inspector explained that the NRC will either come to the same conclusion as the analysis performed by AFRRI and that no amendment was needed for the replacement of the electronic components, or that an amendment should have been requested by the licensee and approved by NRC prior to implementing this design change. The inspector also stated that if the NRC determines that an amendment was required, then this issue has the potential to become a violation. The licensee stated that they will need to discuss this "potential violation" with their upper management.

c. Conclusion

The design change program was being implemented as required according to the TS and facility procedures. Further review is needed by NRC staff in order to close out **URI 05000170/2018201-01**

5. Committees, Audits, and Reviews

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with the requirements of TS Section 6.2, "Review and Audit":

- Minutes of the RRFSC meeting for the meeting held on November 30, 2017
- Minutes of the RRFSC meeting for the meeting held on June 20, 2017
- Charter for the AFRRRI Radiation Safety Committee, dated September 9, 2005
- Independent Audit of Technical Specifications, performed February 12-13, 2018

b. Observations and Findings

The inspector verified that the RRFSC composition, meeting quorums, and meeting frequency were all in accordance with TS Section 6.2. Records of meeting proceedings were well organized and included complete sets of materials distributed at meetings. The inspector verified that review functions prescribed in TS Section 6.2.4 were all reviewed by the committee. The inspector also reviewed the audit function required by TS Section 6.2.5, "Audit Function," and found that for the recent annual audit performed in February 2018, all of the programs specified under TS Section 6.2.5 had been audited with the exception of the facility emergency plan (EP) and implementing procedures (IPs), and the facility physical security plan (PSP). The last audit for the EP, IPs, and PSP was conducted in January 2017, which by the date of this inspection, June 7, 2018, had now exceeded the 15 month maximum time allowed by TS between the completion of successive annual audits. The licensee stated that language within the EP and PSP states a review of these plans can be performed every 2 years. The inspector explained that there is a difference between the requirements to perform the annual audit as specified in TS as opposed to the biennial review requirements for the EP, IPs, and PSP. In addition, the licensee had been performing the audit of the EP, IPs and PSP every year prior to January 2017 as required by TS Section 6.2.5. The licensee was informed that the failure to perform the annual audit within 15 months of the previous year's audit is a violation (VIO) of TS 6.2.5.

This has been determined to be a Severity Level IV violation (Section 6.1) (**VIO 05000170/2018201-01**).

c. Conclusion

The RRFSC provided the oversight required by the TS with the exception of the identified violation.

6. **Transportation**

a. Inspection Scope (IP 86740)

The inspector interviewed licensee personnel and reviewed the following records to verify whether the licensee has established and is maintaining an effective management-controlled program to ensure radiological and nuclear safety for shipping of licensed radioactive material:

- Annual Report for AFRRRI, covering the period from January 1, 2017, through December 31, 2017
- Reactor Logbook from December 2016 to present

b. Observations and Find

Through review of applicable records and interviews with licensee personnel, the inspector determined that the licensee had not performed any radioactive material shipments since the last inspection.

c. Conclusion

The program in place for transportation of radioactive materials satisfied NRC requirements.

7. **Exit Interview**

The inspection scope and results were summarized during an exit meeting on June 7, 2018, with members of licensee management. The inspector described the areas inspected and discussed significant inspection observations. The licensee acknowledged the findings presented and identified the documents reviewed by the inspector supporting the reactor console upgrade analysis as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Gilstad	Director, AFRRRI
G. Burke	Deputy Director, AFRRRI
K. Opoku	Administrative Support
D. Planter	Security Operations Manager
C. Mottler	Director of Security/Reviewing Official
C. Remache	Personnel Security
S. Miller	Reactor Facility Director/Reviewing Official
D. Tomlinson	Reactor Facility Director (acting)/Senior Reactor Operator
H. Spence	Contractor
D. Shaw	Radiation Safety Officer

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 86740	Transportation

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

VIO 05000170/2018201-01	Violation for failure to perform the annual audit of EP, IPs, and PSP as required by TS.
URI 05000170/2018201-01	Unresolved item pertaining to the need for NRC staff to review the reactor console replacement project.

Closed

None

Discussed

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
AFRRRI	Armed Forces Radiobiology Research Institute
CSC	Control System Console
DAC	Digital Acquisition Console
EP	Emergency Plan
IP	Inspection Procedure
IP	Implementing Procedures

NRC	U.S. Nuclear Regulatory Commission
PSP	Physical Security Plan
RRFSC	Reactor and Radiation Facility Safety Committee
RRFSS	Reactor and Radiation Facility Safety Subcommittee
TS	Technical Specification