May 24, 2012

Colonel L. Andrew Huff, Acting 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, ANNOUNCED INSPECTION REPORT NO. 50-170/2012-201

Dear Colonel Huff:

On May 1-4, 2012, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at the Armed Forces Radiobiology Research Institute. The inspection included a review of activities authorized for your facility. The enclosed report documents the inspection results, which were discussed on May 4, 2012 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 concern or noncompliance with NRC requirements was 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 Gregory M. Schoenebeck at 301-415-6345.

Sincerely,

/RA/
Johnny H. Eads, Jr., 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. 50-170/2012-201
cc w/encl: See next page

cc:

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

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ADAMS ACCESSION NO.: ML121360656 ***concurrence by e-mail** **TEMPLATE #: NRC-002**

OFFICE	PROB:RI	PROB:LA*	PROB:BC
NAME	GSchoenebeck	GLappert	JEads
DATE	5/14/2012	5/17/2012	5/24/2012

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

Docket No:	50-170
License No:	R-84
Report No:	50-170/2012-201
Licensee:	Armed Forces Radiobiology Research Institute
Facility:	AFRRI Research Reactor Facility
Location:	Bethesda, MD
Dates:	May 1-4, 2012
Inspectors:	Greg Schoenebeck Ossy Font (In Training)
Approved by:	Johnny H. Eads, Jr., Chief Research and Test Reactors Oversight Branch Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Armed Forces Radiobiology Research Institute
AFRRI Research Reactor Facility
NRC Inspection Report No. 50-170/2012-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the Armed Forces Radiobiology Research Institute (AFRRI, the licensee's) Class II research reactor facility safety programs including procedures; experiments; Health physics; design changes; committees, audits and reviews; 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 requirements.

Procedures

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

Experiments

- Conduct and control of experiments met the requirements of regulations, the AFRRI Technical Specifications (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 per the TS and facility procedures.

Committees, Audits and Reviews

- The Reactor and Radiation Facilities Safety Subcommittee provided the oversight required by the TS.

Transportation

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

REPORT DETAILS

Summary of Facility Status

The Armed Forces Radiobiology Research Institute (AFRRI, the licensee) one megawatt Training Research Isotope Production General Atomics (TRIGA) Mark II research reactor located on the campus of the National Naval Medical Center (NNMC) is operated in support of the Institute's mission of research, experiments, education, reactor operator training and periodic equipment surveillance. During the inspection, the Research Test Reactor was shut down and secured for maintenance.

1. Procedures

a. Inspection Scope (IP 69001)

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

- AFRRI Operational Procedure 0, Writing and Modifying Procedures, revised February 11, 1999
- Title 10 of the Code of Federal Regulations (10 CFR) Section 50.59 Analysis – Replacement of Safety Channel Ion Chamber with Fission Chamber, dated July 21, 2011
- AFRRI Operational Procedure 8, Reactor Operations Tab B-Daily Operational Startup Checklist, revised April 10, 2012

b. Observations and Findings

One 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, Procedures.

The inspector determined that written procedures were available for the activities delineated in TS Section 6.3 and were approved by the Reactor and Radiation Facility Safety Subcommittee (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.

The inspector reviewed the startup procedures to determine if there was the need for a change to coincide with a recent design change at the facility. No change was made to the startup procedure which required RRFSC approval.

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 Sections 3.6, Limitations on Experiments, TS Section 6.4, Review and Approval of Experiments, and 10 CFR 50.59, one inspector reviewed selected aspects of:

- Reactor Logbook Number 135, from September 7, 2011 to present
- Reactor Utilization Request, various 2011
- Operational Procedure 8, Tab A, Logbook Entry Checklist, dated February 26, 2001

b. Observations and Findings

The Reactor Utilization Requests reviewed had been completed and contained the appropriate information, hazards analyses as applicable, and had been reviewed and approved as required by TS and procedure.

Through review of the experiment procedure and the Reactor Logbook, one inspector verified that the experiments were conducted as outlined in the experiment authorizations and as required by the TS.

c. Conclusion

Conduct and control of experiments met the requirements of regulations, the AFRRI TS, and the applicable facility procedures.

3. Health Physics

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20 requirements:

- AFRRI Facility and Environmental TLDs Report for June 28, 2011, through February 28, 2011
- Environmental Sample Analysis Report, dated April 12, 2012
- Reactor Primary Water Analysis Results, various for 2011 and 2012
- Reactor Secondary Water Analysis Results, various for 2011 and 2012
- Reactor Stack Gas Monitor (SGM) Ar-41 Calibration, dated October 4, 2011
- Health Physics Procedure 7-5 “Calibration of SGM”, dated 2005
- Radiation Exposure Report (Extremity), various for 2011 and 2012
- Radiation Exposure Report (Whole Body), various for 2011 and 2012
- Reactor Controlled Area Radiation Level/Contamination Survey, various for 2011 and 2012

b. Observations and Findings

One inspector took the radiation safety orientation training for Unescorted Access and found to be acceptable for basic awareness and safety of radiation hazards at the reactor. A key highlight was the mention of 10 CFR 19 and provisions for Radiation Worker rights (e.g., NRC Form 3).

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. The highest dose was 0.230 R (Rem), which was located at a rad waste compactor (TLD #41); this is not an area accessible to the general public.

The inspector reviewed reactor primary water and secondary water analyses results and soil sample results and determined that the samples did not exceed action level thresholds and were reviewed and approved in accordance with procedure and protocol. All water samples reviewed indicated no presence of fission products.

Dosimetry results were reviewed by the inspector; AFRRI’s associated exposures were in conformance with 10 CFR Part 20 and administrative limits. During the review of the records since October 2011, were fairly low (in most cases zero) due to the reactor being out of service for maintenance.

The inspector reviewed radiation and contamination surveys for the reactor. All surveys reviewed indicated 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 found throughout the facility were verified to be current and in accordance with the calibration records that were reviewed.

No unmarked radioactive material was found in the facility. A copy of the current NRC Form 3 notice to radiation workers required by 10 CFR Part 19 was posted at the entrance to the Control Room and Reactor Bay and other conspicuously placed areas near laboratory work stations.

c. Conclusion

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.

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, one inspector reviewed selected aspects of:

- Annual Report for AFRRI, dated March 30, 2012
- 10 CFR 50.59 Analysis – Replacement of Safety Channel Ion Chamber with Fission Chamber, dated July 21, 2011
- Reactor Logbook Number 135, from September 7, 2011 to present

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, one inspector determined that, since the previous inspection, there was one facility modification that required a 10 CFR 50.59 analysis. The facility modification was the replacement of a failed ion chamber which was replaced with a fission chamber that had similar response characteristics. None of the changes involved a change to the technical specifications or met any of the criteria in 10 CFR 50.59(c)(2). An update had been noted by the licensee to change the wording of AFRRI's Final Safety Analysis Report, specifically Section 4.11.3 to denote the use of "fission chambers" as a method for the high flux safety channels (one and two) to report reactor power level.

c. Conclusion

The design change program was being implemented as required per the TS and facility procedures.

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 - The Reactor and Radiation Facility Safety Committee:

- Minutes of the RRFSC Meeting of December 14, 2011

b. Observations and Findings

One inspector verified that the RRFSC composition, meeting quorums, and meeting frequency were all in accordance with TS Section 6.2, Review and Audit. 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, Review Function, were all reviewed by the committee. The inspector also verified that the audit function required by TS Section 6.2.5, Audit Function, was conducted and that the audit reports were reviewed by the RRFSC.

c. Conclusion

The RRFSC provided the oversight required by the TS.

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 licensed radioactive material:

- Annual Report for AFRRI, dated March 30, 2012
- Reactor Logbook Number 135, from September 7, 2011 to present

b. Observations and Find

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

c. Conclusion

The program for transportation of radioactive materials satisfied NRC requirements.

7. Exit Interview

The inspection scope and results were summarized during an exit meeting on May 4, 2012, with members of licensee management. The inspector described the areas inspected and discussed significant inspection observations. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during the routine inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

A. J. Teachout	Radiation Protection Officer
S. Miller	Reactor Facility Director
H. Spence	Reactor Operations Supervisor
I. Gifford	Assistant Reactor Operations Supervisor

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 86740	Transportation

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ADAMS	Agencywide Document Access and Management System
AFRRI	Armed Forces Radiobiology Research Institute
ALARA	As Low As Reasonably Achievable
HPP	Health Physics Procedure
IP	Inspection Procedure
NNMC	National Naval Medical Center
NRC	U. S. Nuclear Regulatory Commission
RRFSC	Reactor and Radiation Facility Safety Committee
RRFSS	Reactor and Radiation Facility Safety Subcommittee
RSC	Radiation Safety Committee
SGM	Stack Gas Monitor
SRO	Senior Reactor Operator
TLD	Thermoluminescent Dosimeter
TS	Technical Specifications
TRIGA	Training Research Isotope Production General Atomics