

August 11, 2010

Colonel Mark A. Melanson, 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. 50-170/2010-202

Dear Colonel Melanson:

On July 12-15, 2010, 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 July 15, 2010 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. However, one Non-Cited Violation (NCV) from a previous inspection was discussed and closed. No response to this letter is required.

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 Patrick J. Isaac at 301-415-1019.

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. 50-170/2009-202
cc w/encl: See next page

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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***concurrence by e-mail**

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NAME	PIsaac	GLappert	JEads
DATE	8/11/10	8/11/10	8/11/10

OFFICIAL RECORD COPY

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

Docket No: 50-170

License No: R-84

Report No: 50-170/2010-202

Licensee: Armed Forces Radiobiology Research Institute

Facility: AFRRI Research Reactor Facility

Location: Bethesda, MD

Dates: July 12-15, 2010

Inspector: Patrick J. Isaac

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. 50-170/2010-202

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.

Follow-up of Previously Identified Items

- Non-Cited Violation (NCV 50-170/2010-201) issued as a result of a reactor start-up with TS required Gas Stack Monitor not in service is closed.

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 started up, operated, and shutdown as required and in accordance with applicable procedures to support these ongoing activities.

1. Procedures

a. Inspection Scope (IP 69001)

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

- AFRRI Operational Procedure 0, Writing and Modifying Procedures, revised February 11, 1999
- AFRRI Administrative Procedure A3, Facility Modifications, revised February 26, 2001
- AFRRI Administrative Procedure A4, Special Nuclear Material Accountability, revised March 24, 2003
- AFRRI Operational Procedure 1, Conduct of Experiments, revised March 4, 1996
- AFRRI Operational Procedure 4, Reactor As Low As Reasonably Achievable Program, revised October 4, 1994
- AFRRI Operational Procedure 8, Conduct of Experiments, revised March 4, 1996
- AFRRI Operational Procedure 8, TAB B, Daily Operational Startup Checklist, revised September 11, 2009
- AFRRI Operational Procedure 8, TAB E, Steady State Operation, revised November 24, 1997
- AFRRI Operational Procedure 10, Stack Gas Monitor Procedure, revised September 11, 2009

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, 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. The clarity and detail in the procedures was acceptable. 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.

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 Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59, the inspector reviewed selected aspects of:

- Reactor Logbook Number 132, from May 8, 2009 to February 22, 2010
- Reactor Logbook Number 131, from October 22, 2008 to May 8, 2009
- AFRRRI Operational Procedure 1, Conduct of Experiments, revised March 4, 1996
- Reactor Utilization Request # 10-02, dated March 8, 2010
- Reactor Utilization Request # 10-04, dated April 19, 2010
- Reactor Utilization Request # 10-07, dated June 16, 2010
- Reactor Utilization Request # 10-08, dated July 13, 2010

b. Observations and Findings

The Reactor Utilization Request forms noted above 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, the 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 AFRRRI TS, and the applicable facility procedures.

3. Health Physics

a. Inspection Scope (IP 69001)

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

- AFRRI Radiation Protection Program Instruction 60558.F, dated April 20, 2005
- Radiation Exposure Report, dated June 29, 2010
- Calendar Year (CY) 2009, Annual Thermoluminescent Dosimeter (TLD) Report, dated 2 March 2010
- CY 2009 Facility Environmental TLD
- Radiation Exposure Report, dated January 7, 2010
- Health Physics Procedure (HPP) 0-0, dated December 18, 2008
- HPP 1-1.6, Dosimetry Record Management System, dated February 1, 2000
- HPP 2-1.B, Environmental TLD Program, dated Dec 6, 2005
- CY 2009 Reactor Stack Gas Monitor Calibration, dated September 11, 2009
- CY 2009 Continuous Air Monitor Calibration, dated February 9, 2009
- Liquid Effluent Release Report for July 2009 through August 2009
- Memorandum regarding Gaseous Radioeffluents for CY 2009 3rd Quarter, dated October 9, 2009
- Radiation Safety Committee (RSC) Minutes of the Radionuclide and X-ray Safety Subcommittee (RXSS) Meeting for 3rd Quarter CY 2009, dated September 25, 2009
- Radiation Safety Committee (RSC) Minutes of the RXSS Meeting for 1st Quarter CY 2009, dated April 3, 2009
- ALARA Report for 1st Quarter 2009, dated June 15, 2009

b. Observations and Findings

The inspector interviewed licensee personnel regarding the radiation safety protection program at the AFRRI reactor. The interview focused on the use of radiation monitoring equipment, placement of radiological signs and postings, and practices for handling and storing radioactive material or contaminated equipment. Additionally, the inspector accompanied a Health Physics technician conducting a weekly survey of the facility and observed general health physics practices. The radiation survey was performed in accordance with procedures.

Dosimetry results were reviewed by the inspector; AFRRI's associated exposures are in conformance with 10 CFR Part 20 and administrative limits.

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.

The inspector reviewed applicable radioactive effluent monitoring and radioeffluent discharge logs and procedures. The licensee reported the results of several TLDs placed around the AFRRI facility as environmental radiation monitors. In all cases the TLDs indicated no significant difference from background radiation levels.

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 Section 50.59, the inspector reviewed selected aspects of:

- 10 CFR 50.59 Analysis – Replacement of the Stack Gas Monitor with an Equivalent Nuclear Administration Instruction Scintillation Detection System, dated September 9, 2009
- Draft Minutes of the Reactor and Radiation Facilities Safety Subcommittee Meeting, dated December 28, 2009
- Procedure 8, TAB B – Daily Operational Startup Checklist, revised September 11, 2009
- Calibration Procedure 10 – Stack Gas Monitor Procedure, revised January 12, 2009
- Transient Rod Drive Motor Replacement, dated August 19, 2009
- Reactor Logbook Number 133, from February 24, 2010 to present
- Reactor Logbook Number 132, from May 8, 2009 to February 22, 2010

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, the inspector determined that, since the previous inspection, there were two facility modifications and one procedural change that required a 10 CFR Section 50.59 analysis. One of the facility modifications was the replacement of the Stack Gas Monitor and the other was for the replacement of the transient rod drive motor. None of the changes involved a change to the technical specifications or met any of the criteria in 10 CFR Section 50.59(c)(2).

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 September 15, 2009
- Draft Minutes of the RRFSC Meeting of December 8, 2009
- AFRRRI Emergency Drill Final Report for December 3, 2009
- AFRRRI Emergency Drill Final Report for March 27, 2009
- 2009 AFRRRI Reactor Facility Audit Report, dated January 4, 2010

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, 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:

- Fuel Inventory Sheet, dated October 1, 2009
- Department Of Energy/NRC Form 741, Nuclear Material Transaction Report, July 23, 2009
- DOE/NRC Form 742, Material Balance Report for Period of October 02, 2008 to October 01, 2009, dated October 6, 2009
- Reactor Logbook Number 132, from May 8, 2009 to February 22, 2010
- Reactor Logbook Number 133, from February 24, 2010 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. Follow-up

a. Inspection Scope (IP 92701)

On July 29, 2008, contrary to the TS, the reactor was started with the Gaseous Stack Monitor not in service. Based on the inspection conducted on January 11-15, 2010 and the resulting Non-Cited Violation (NCV) 50-170/2010-201-01, the inspector reviewed training records, maintenance and surveillance records to verify implementation of changes by the licensee to prevent a similar occurrence.

b. Observations and Findings

The inspector determined that the changes implemented by the licensee were adequate; the NCV was therefore closed.

c. Conclusion

NCV 50-170/2010-201-01 issued as a result of a reactor start-up with TS required Gas Stack Monitor not in service is closed.

8. Exit Interview

The inspection scope and results were summarized during an exit meeting on July 15, 2010, 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
K. Allen	Assistant Radiation Safety Officer
S. Miller	Reactor Facility Director
H. Spence	Reactor Operations Supervisor

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 86740	Transportation
IP 92701	Follow-up

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-170/2010-201-01 NCV Reactor Start-up with TS required Gas Stack Monitor not in service

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
AFRRI	Armed Forces Radiobiology Research Institute
ALARA	As Low As Reasonably Achievable
CY	Calendar Year
DOE	Department of Energy
HPP	Health Physics Procedure
IP	Inspection Procedure
LCO	Limiting Condition for Operation
NCV	Non-Cited Violation
NNMC	National Naval Medical Center
NRC	U. S. Nuclear Regulatory Commission
RPO	Radiation Protection Officer
RRFSC	Reactor and Radiation Facility Safety Committee
RRFSS	Reactor and Radiation Facility Safety Subcommittee

RSC	Radiation Safety Committee
RTR	Research and Test Reactor
SRO	Senior Reactor Operator
TLD	Thermoluminescent Dosimeter
TS	Technical Specifications
TRIGA	Training Research Isotope Production General Atomics