



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

August 24, 2022

Mr. Andrew Cook
Interim Reactor Facility Director
Radiation Sciences Department
Armed Forces Radiobiology Research Institute
4301 Jones Bridge Road, Building 42
Bethesda, MD 20889-5648

SUBJECT: ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE – U.S. NUCLEAR
REGULATORY COMMISSION SAFETY INSPECTION REPORT
NO. 05000170/2022201

Dear Mr. Cook:

From July 25-28, 2022, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Armed Forces Radiobiology Research Institute (AFRRI) reactor facility. The enclosed report presents the results of that inspection, which were discussed on July 28, 2022, with you and AFRRI staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed various activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified. No response to this letter is required.

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

If you have any questions concerning this inspection, please contact Andrew Waugh at (301) 415-0230, or by email at Andrew.Waugh@nrc.gov.

Sincerely,



Roche, Kevin signing on behalf
of Tate, Travis
on 08/24/22

Travis L. Tate, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

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

Enclosure:
As stated

cc w/enclosure: See next page

Armed Forces Radiobiology Research

Docket No. 50-170

cc:

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Test, Research and Training
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Attention: Ms. Amber Johnson
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Colonel Mohammad Naeem, Director
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SUBJECT: ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE – U.S. NUCLEAR
REGULATORY COMMISSION SAFETY INSPECTION REPORT
NO. 05000170/2022201 DATED: AUGUST 24, XX, 2022

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OFFICE	NRR/DANU/UNPO	NRR/DANU/UNPO/LA	NRR/DANU/UNPO/BC
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DATE	8/19/2022	8/22/2022	8/24/2022

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

Docket No.: 50-170

License No.: R-84

Report No: 05000170/2022201

Licensee: Armed Forces Radiobiology Research Institute

Facility: Armed Forces Radiobiology Research Institute TRIGA Reactor

Location: Bethesda, MD

Dates: July 25-28, 2022

Inspectors: Andrew Waugh
Juan Arellano

Approved by: Travis L. Tate, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

Armed Forces Radiobiology Research Institute
Research Reactor Facility
Inspection Report No. 05000170/2022201

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) research reactor facility safety programs, including: (1) procedures; (2) surveillance and limiting conditions for operation (LCO); (3) experiments; (4) health physics (HP); (5) design changes; (6) committees, audits and review; (7) fuel handling logs and records; and (8) transportation of radioactive materials. The U.S. Nuclear Regulatory Commission (NRC) staff determined that the licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

Procedures

- The inspector determined that the licensee's procedures were controlled, maintained current, implemented, and followed in compliance with technical specifications (TS) requirements.

Surveillance and Limiting Conditions for Operation

- The inspector determined that surveillances were conducted and LCO were maintained in accordance with TS requirements.

Experiments

- The inspector determined that experiments were reviewed, approved, and conducted in accordance TS, procedural, and regulatory requirements.

Health Physics

- The inspector determined that the licensee's HP program was conducted in accordance with TS, procedural, and regulatory requirements.

Design Changes

- The inspector determined that design changes were conducted in accordance with TS, procedural, and regulatory requirements.

Committees, Audits and Reviews

- The inspector determined that the licensee's oversight programs were conducted in accordance with TS and procedural requirements.

Fuel Handling Logs and Records

- The inspector determined that fuel movements and inspections were conducted in accordance with TS and procedural requirements.

Transportation Activities

- The inspector determined that the licensee's radioactive material transportation program was in accordance with regulatory and procedural requirements.

REPORT DETAILS

Summary of Facility Status

The AFRR1 1.1 megawatt Training, Research, Isotopes, General Atomics (TRIGA) Mark F research reactor, located on the campus of the National Naval Medical Center, normally operates in support of the licensee's mission of research, experiments, education, reactor operator training, and periodic equipment surveillance. During this inspection, the AFRR1 research reactor was started up and operated for the first time since March 2018.

1. Procedures

a. Inspection Scope (Inspection Procedure [IP] 69001, Section 02.03)

The inspector reviewed various procedures and observed their implementation. The inspector also reviewed the following regarding the licensee's procedures to ensure that the requirements of the licensee's administrative procedures and TS 6.3 were met:

- procedure 1, "Reactor Startup Checklist," dated July 21, 2022
- procedure 2, "Reactor Operations," dated July 24, 2022
- procedure 3, "Reactor Shutdown Checklist," dated July 24, 2022
- procedure 5, "Reactor Logbook," dated June 30, 2022
- procedure 7, "Reactor Room Safety," dated June 30, 2022
- procedure 200, "Fuel Element Movement and Inspection," dated June 30, 2022
- procedure 202, "Control Rod Calibration/Drop Time," dated July 21, 2022
- select reactor logbook entries, 2020-present

b. Observations and Findings

The inspector observed that the licensee maintained written procedures covering the areas specified in TS 6.3. The inspector found that the procedures in use by the licensee were current, reviewed and approved as required by TS 6.3, able to be implemented as intended, and adhered to by reactor personnel.

Inspection follow-up item (IFI) 05000170/2020201-1 was opened during the previous inspection because a discrepancy in procedures made it unclear if the addition of make-up water would be logged as required by the NRC safety evaluation report. The inspector determined that the licensee's procedures were updated to ensure that make-up water additions are logged as required by the NRC safety evaluation report; this item is closed with no further action required.

c. Conclusion

The inspector determined the licensee's procedures were controlled, maintained current, implemented, and followed in compliance with TS requirements.

2. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001, Section 02.05)

The inspector observed the performance of control rod calibrations and reviewed the following to ensure that the licensee's LCO and surveillances were maintained as required by TS 3.0 and 4.0:

- "Restart Plan for the Armed Forces Radiobiology Research Institute TRIGA Reactor," dated June 29, 2022
- "Armed Forces Radiobiology Research Institute TRIGA Reactor Instrumentation and Control Console Replacement Site Acceptance Test Procedure, Part 1," Revision A
- "Site Acceptance Test Part 2: Replacement of the Instrumentation and Control Console for the AFFRI TRIGA Reactor," Revision A
- control rod drop time datasheet, dated July 23, 2022
- low source interlock datasheet, dated July 15, 2022
- primary water resistance temperature detector calibration datasheet, dated July 15, 2022
- primary water conductivity test and calibration datasheet, dated July 21, 2022
- pool water level calibration datasheet, dated July 15, 2022
- facility interlock system checklist, dated July 22, 2022
- alternating current power loss SCRAM datasheet, dated July 15, 2022
- watchdog SCRAMs datasheet, dated July 15, 2022
- quarterly continuous air monitor (CAM) and radiation area monitor (RAM) channel tests, 2021 - present

b. Observations and Findings

The inspector found that surveillance tests were completed as required by the TS and LCO verifications were completed on schedule and in accordance with the licensee's procedures.

c. Conclusion

The inspector determined that surveillances were conducted and LCO were maintained in accordance with TS requirements.

3. Experiments

a. Inspection Scope (IP 69001, Section 02.06)

The inspector reviewed the following to ensure that experiments were reviewed and conducted as required by TS 3.6 and 6.4:

- routine reactor authorizations
- procedure 10, "Conduct of Experiments," dated July 12, 2022
- procedure 11, "Reactor Exposure Room Entry," dated July 12, 2022

b. Observations and Findings

The inspector found that experiments were reviewed and approved as required by TS 6.2 and Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, "Changes, tests and experiments." The inspector also found that experiments were conducted in accordance with the licensee's procedures and TS 3.6.

c. Conclusion

The inspector determined that experiments were reviewed, approved, and conducted in accordance TS, procedural, and regulatory requirements.

4. Health Physics

a. Inspection Scope (IP 69001, Section 02.07)

The inspector toured the facility, observed radiation surveys, and observed radiological signs and postings. The inspector also reviewed the following to ensure the licensee's HP program adheres to the requirements of 10 CFR Part 19, "Notices, Instructions, and Reports to Workers: Inspection and Investigations," 10 CFR Part 20, "Standards for Protection Against Radiation," and TS 3.5 and 4.5:

- gaseous radio effluents, 2020-present
- 2020 and 2021 annual operating reports
- AFFRI Instruction 6055.8I, "Radiation Protection Program"
- HP procedure 3-2.c, "Reactor Facility Health Physics," dated January 25, 2022
- HP procedure 3-1.d, "Reactor Irradiation Facilities," dated March 12, 2014
- HP procedure 2-1.d, "Environmental Dosimetry Program," dated March 22, 2022
- HP procedure 2-2,e, "Environmental Monitoring Program," dated March 22, 2022
- select environmental dosimetry reports, 2021-present
- select personnel dosimetry reports, 2020-present
- select CAM and RAM calibration records, 2021-present

b. Observations and Findings

The inspector found that practices regarding the use of dosimetry, radiation monitoring equipment, placement of radiological postings, posting of notices, use of protective clothing, and the handling and storing of radioactive material or contaminated equipment was in accordance with regulations and the licensee's radiation protection program. The inspector found that the licensee met the regulatory requirements concerning radiological effluent releases and radiation survey, sampling, and monitoring. The inspector also found that training was conducted for radiation workers and as low as reasonably achievable principles were implemented as required by licensee procedures.

c. Conclusion

The inspector determined that the licensee's HP program was conducted in accordance with TS, procedural, and regulatory requirements.

5. Design Changes

a. Inspection Scope (IP 69001, Section 02.08)

The inspector reviewed the following to ensure that modifications to the facility were made in accordance with the requirements of 10 CFR 50.59 and TS:

- 2020 and 2021 annual operating reports
- select reactor logbook entries, 2019-present

b. Observations and Findings

The inspector found that design changes were reviewed and approved as required by 10 CFR 50.59. The inspector also found that the performance of modified equipment and the procedures and drawings related to that equipment met regulatory, TS, and procedural requirements.

c. Conclusion

The inspector determined that design changes were conducted in accordance with TS, procedural, and regulatory requirements.

6. Committees, Audits and Reviews

a. Inspection Scope (IP 69001, Section 02.09)

The inspector reviewed the following to ensure that committees, audits, and reviews were conducted as required by the licensee's procedures and TS 6.2:

- "Annual TS Audit AFFRI Reactor conducted January 5-6, 2022"
- "Annual TS Audit AFFRI Reactor conducted March 15, 2021"
- reactor facility security plan audit conducted May 9-11, 2022
- minutes of the reactor and radiation facilities safety committee meeting 2021-present

b. Observations and Findings

The inspector found that the licensee's Reactor and Radiation Facilities Safety Subcommittee met and provided reviews and that audits were performed as required by the licensee's procedures and TS. The inspector also found that problems identified from the licensee's required reviews were resolved in accordance with the licensee's procedures and TS.

c. Conclusion

The inspector determined that the licensee's oversight programs were conducted in accordance with TS and procedural requirements.

7. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001, Section 02.12)

The inspector observed fuel handling operations and reviewed the following fuel handling logs and records to verify compliance with TS requirements:

- AFRRRI fuel element records, 2020-present
- procedure 200, "Fuel Element Movement and Inspection," dated June 30, 2022
- control room reactor fuel inventory map
- select reactor logbook entries, 2020-present

b. Observations and Findings

The inspector found that fuel handling activities were conducted and documented in accordance with TS requirements and the licensee's procedural requirements.

c. Conclusion

The inspector determined that fuel movements and inspections were conducted in accordance with TS and procedural requirements.

8. Transportation Activities

a. Inspection Scope (IP 86740)

The inspector reviewed the following to ensure the licensee's program for transporting radioactive materials met NRC and Department of Transportation (DOT) requirements:

- 2020 and 2021 annual operating reports

b. Observations and Findings

The inspector found that the licensee's procedures and records concerning the transportation of radioactive material were in accordance with NRC and DOT requirements.

c. Conclusion

The inspector determined that the licensee's radioactive material transportation program was in accordance with regulatory and procedural requirements.

9. Exit Interview

The inspection scope and results were summarized on July 28, 2022, with members of licensee management and staff. The inspector described the areas inspected and discussed the inspection results. The licensee acknowledged the results of the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

A. Cook	Reactor Facility Director
M. Brener	Reactor Operations Supervisor
T. Ayers	Senior Reactor Operator
A. Guynn	Reactor Operator
J. Sumlin	Radiation Safety Officer
J. Gunn	HP Tech
H. Spence	Compliance Officer
LTC O. Makinde	Department Head, Radiation Sciences Department
J. Gormley	Contractor with General Atomics

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

None

Closed:

05000170/2020201-1 IFI	The inspector determined that the licensee's procedures were updated to ensure that make-up water additions are logged as required.
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Discussed:

None