

February 19, 2003

Colonel Robert R. Eng, Director
Armed Forces Radiobiology
Research Institute
National Naval Medical Center
8901 Wisconsin Avenue
Bethesda, MD 20889-5603

SUBJECT: NRC ROUTINE, ANNOUNCED INSPECTION REPORT NO. 50-170/2003-201

Dear Colonel Eng:

This letter refers to the inspection conducted on February 3-6, 2003, at the Armed Forces Radiobiology Research Institute research reactor facility. The enclosed report presents the results of that inspection.

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 to NRC requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Craig Bassett at 404-562-4712.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report No.50-170/2003-201

cc w/enclosure: Please see next page

Armed Forces Radiobiology Research

Docket No. 50-170

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Test, Research, and Training
Reactor Newsletter
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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: 50-170/2003-201

Licensee: Armed Forces Radiobiology Research Institute (AFRRI)

Facility: AFRRI Reactor Facility

Location: Bethesda, Maryland

Dates: February 3-6, 2003

Inspector: Craig Bassett

Approved by: Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This routine, announced inspection included onsite review of selected aspects of programs and activities since the last NRC inspection including: organizational structure and functions, reactor operations, design control, review and audit, operator requalification, maintenance and surveillance, fuel handling, experiments, procedural control, radiation protection, environmental protection, emergency preparedness, transportation of radioactive materials, material control and accountability, and security.

The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

Organizational Structure and Functions

- The organizational structure and functions were consistent with Technical Specification (TS) Section 6.1 requirements.

Operations

- The operations program was well documented and satisfied TS Section 6.1 requirements.

Design Control

- The design control program satisfied NRC requirements specified in 10 CFR 50.59.

Review and Audit

- The review and audit program satisfied TS Section 6.2 requirements and the Reactor and Radiation Facility Safety Committee was acceptably fulfilling its responsibilities.

Operator Requalification

- Operator requalification was being conducted in accordance with the AFRRRI Reactor Operator Requalification Program.

Maintenance and Surveillance

- Maintenance records, performance, and reviews satisfied TS and procedure requirements.
- The program for tracking and completing surveillance checks and Limiting Conditions for Operation verifications satisfied TS requirements.

Fuel Handling

- Fuel handling activities and documentation were as required by TS and facility procedures.

Experiments

- Conduct and control of experiments and irradiations met the requirements specified in the TSs Sections 3.6 and 6.4 and the applicable experiment authorizations and procedures.

Procedures

- Procedural review, revision, control, and implementation satisfied TS Section 6.3 requirements.

Radiation Protection

- Surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present.
- Postings met the regulatory requirements specified in 10 CFR Parts 19 and 20.
- Personnel dosimetry was being worn as required and doses were well within the NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- The Radiation Protection Program implemented by the licensee satisfied regulatory requirements.

Environmental Protection

- The environmental protection program satisfied NRC requirements.

Emergency Preparedness

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

Transportation of Radioactive Materials

- Radioactive material was routinely transferred to the licensee's Broad Scope license and shipped under that license.

Material Control and Accountability

- Special Nuclear Materials were acceptably controlled and inventoried.

Security

- The NRC-approved security program was acceptably implemented.

REPORT DETAILS

Summary of Plant Status

The licensee's one point one megawatt (1.1 MW) research and test reactor is typically operated in support of service work, tours, training, and digital console testing. During the inspection, the reactor was not operated because of on-going reactor console upgrades being completed by a vendor (General Atomics) representative.

1. Organizational Structure and Functions

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

The inspector reviewed the following regarding the licensee's organizational structure and functions to ensure that the requirements of Section 6.1 of TSs, Amendment No. 24, dated June 27, 2001, were being met:

- AFRRRI Reactor Facility organization and staffing
- staff qualifications
- management responsibilities
- selected portions of the operations log for the past two years
- AFRRRI TRIGA Reactor Facility Annual Reports for 2000 and 2001

b. Observations and Findings

The organizational structure had not changed since the last inspection. Although routine rotation of military personnel occurred, replacement personnel with the appropriate qualifications or training were selected to fill any vacancies. The organizational structure and staffing at the facility were as required by TS. Qualifications of the staff met TS requirements. Review of records verified that management responsibilities were administered as required by TS and applicable procedures.

c. Conclusions

The organizational structure and functions were consistent with TS Section 6.1 requirements.

2. Operations

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify compliance with TS Section 6.1 and applicable procedure requirements for operation:

- staffing for reactor operations
- AFRRRI Reactor Logbook Number (No.) 124 (opened February 27, 2002, and closed January 13, 2003)

- AFRRRI Malfunction Log, pages 104-108
- AFRRRI Operational Procedure 8, "Reactor Operations," Revised (Rev) May 1, 1998
- AFRRRI Operational Procedure 8, TAB A, "Logbook Entry Checklist," Rev February 26, 2001
- AFRRRI Operational Procedure 8, TAB B, "Daily Operational Startup Checklist," AFRRRI Form 61a (R), Rev October 7, 2002
- AFRRRI Operational Procedure 8, TAB B1, "Daily Safety Checklist," AFRRRI Form 61b (R), Rev October 7, 2002
- AFRRRI Operational Procedure 8, TAB D, "K-Excess," Rev January 16, 2002
- AFRRRI Operational Procedure 8, TAB E, "Steady State Operations," Rev November 24, 1997
- AFRRRI Operational Procedure 8, TAB H, "Weekly Operational Instrument Checklist," AFRRRI Form 66 (R) Rev August 18, 1999
- AFRRRI Operational Procedure 8, TAB I, "Daily Operational Shutdown Checklist," Rev January 11, 2002
- AFRRRI Operational Procedure 9, "Reactor Room Safety," Rev May 15, 1991

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. The logs and records indicated that shift staffing, including on-call personnel, was as required by TS 6.1.3.2. Logs and records also showed that operational conditions and parameters were consistent with license and TS requirements.

Although no reactor operations were carried out during the inspection, the inspector could infer that licensee personnel were following written procedures through the records and logs that were being maintained. Information on the operational status of the facility was recorded in log books and on checklists as required by procedure. Use of maintenance and malfunction logs satisfied procedural requirements. Significant problems and events noted in the operations log were reported, reviewed, and resolved as needed. Scrams were identified in the logs and records, reported, and their cause(s) resolved before the resumption of operations under the authorization of the Reactor Facility Director (RFD).

The inspector verified that TS and procedure required items were logged and cross referenced with other logs and checklists as required, and that TS operational limits had not been exceeded.

c. Conclusions

The operations program was well documented and satisfied TS Section 6.1 requirements.

3. Design Control

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- facility design changes and reviews for 2002
- facility configuration and updated drawings
- RRFSC meeting minutes and approvals
- AFRRRI Administrative Procedure A3, "Facility Modification," Rev February 26, 2001
- AFRRRI Administrative Procedure A3, "Facility Modification Worksheet 1 - No. 10 CFR 50.59 Analysis" Rev February 26, 2001
- AFRRRI Administrative Procedure A3, "Facility Modification Worksheet 2 - No. 10 CFR 50.59 Analysis Required," Rev February 26, 2001

b. Observations and Findings

Records and observations showed that the changes made during 2002 at the facility were acceptably reviewed in accordance with 10 CFR 50.59 and applicable administrative controls. The changes completed by the licensee were then reviewed by the Reactor and Radiation Facility Safety Committee, determined to be acceptable, and approved as required. None of the changes constituted a safety question or required a change to the TS.

c. Conclusions

The design control program satisfied NRC requirements specified in 10 CFR 50.59.

4. Review and Audit

a. Inspection Scope (IP 69001)

In order to verify that the licensee had established and conducted reviews and audits as required in TS Section 6.5, the inspector reviewed selected aspects of:

- Reactor and Radiation Facility Safety Committee (RRFSC) meeting minutes from 2001 to the present
- safety review and audit records for 2000 and 2001
- responses to the safety reviews and audits
- schedule for completing the 2002 audit

b. Observations and Findings

The RRFSC membership satisfied TS requirements and the Committee's procedural rules. The RRFSC had semiannual meetings as required and a quorum was present. Review of the committee meeting minutes indicated the RRFSC provided appropriate

guidance and direction for reactor operations, and ensured suitable use and oversight of the reactor.

Since the last inspection the required audits of reactor facility activities and reviews of programs, procedures, equipment changes, and proposed tests or experiments, had generally been completed and documented. Additionally, the annual reviews of the emergency and security plans had been conducted and acceptably documented except for the year 2002. The reviews that have been completed were appropriate and were reviewed by the RRFSC as required.

The inspector noted that the facility safety audit for 2002 was originally scheduled to be completed in January 2003. Because the person selected to conduct the audit was recently deployed to the Middle East, a second person had to be selected. That person will not be available to conduct an audit until the third week in February. The licensee was informed that the completion of the audit for 2002 would be identified as an Inspector Follow-up Item (IFI) and will be reviewed during a future NRC inspection (IFI 50-170/2003-201-01).

c. Conclusions

The review and audit program satisfied TS Section 6.2 requirements and the RRFSC was acceptably fulfilling its responsibilities.

5. Operator Requalification

a. Inspection Scope (IP 69001)

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

- Reactor Operator Requalification Program for the Armed Forces Radiobiology Research Institute Reactor Facility revised June 27, 2001
- the effective dates of current operator licenses
- operator training records maintained in individual folders for each operator
- operator physical examination records for the past two years
- operator competence evaluation and written examination records
- operator active duty status noted in the training folders

b. Observations and Findings

The Requalification Program was maintained up-to-date. All currently licensed Senior Reactor Operators were successfully completing the training, reactivity manipulations, and supervisory responsibilities as required by the NRC-approved requalification plan. Folders containing individual training records provided the documentation required by the program. Review of records indicated that operator annual performance evaluations and biennial written examinations had been given as required. Biennial medical examinations had been completed as well.

c. Conclusions

Operator requalification was conducted as required by the AFRRRI Reactor Operator Requalification Program.

6. Maintenance and Surveillance

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- surveillance, calibration, and test data sheets and records
- surveillance activities and equipment maintenance documented in the TRIGA Tracker System including Monthly Reports and Annual Maintenance Reports for 2000 through 2002
- AFRRRI Reactor Logbook Number (No.) 124 (opened February 27, 2002, and closed January 13, 2003)
- AFRRRI Malfunction Log, pages 104-108
- AFRRRI Operational Procedure 3, "Maintenance Procedures," Rev December 1, 1994

b. Observations and Findings

Daily, weekly, monthly, quarterly, semiannual, and other periodic checks, tests, and verifications for TS required Limiting Conditions for Operation (LCOs) were being completed as required. All surveillance and LCO verifications reviewed were completed on schedule as required by TS and in accordance with licensee procedures. A computer-based system, the TRIGA Tracker system, was used to track completion of the various required surveillances and LCO verifications. Checklists and/or associated forms were completed to document the date an activity was completed and by whom. These checklists and forms provided acceptable documentation of the results and proper control of reactor operational tests and surveillances. Some of the daily and periodic checks of equipment operability included recording system parameters such as temperature, pressure, and flow. All recorded results observed by the inspector were within prescribed TS and procedure parameters and in close agreement with the previous surveillance results.

Routine and preventive maintenance was also controlled and documented in the TRIGA Tracking system through the Monthly TRIGA Tracker Report consistent with the TS and licensee procedures. Unscheduled maintenance or repairs were reviewed to determine if they required a 50.59 evaluation. Verifications and operational systems checks were performed to ensure system operability before return to service.

During facility tours, the inspector noted that Control Room and Reactor Room equipment was operational. However, as noted previously, the licensee and a vendor representative were updating the reactor console software.

c. Conclusions

Maintenance records, performance, and reviews satisfied TS and procedure requirements. The program for tracking and completing surveillance checks and LCO verifications satisfied TS requirements.

7. Fuel Handling

a. Inspection Scope (IP 69001)

To verify compliance with TS Sections 4.2.5 and 5.2.2, the inspector reviewed selected aspects of:

- fuel handling equipment, instrumentation, and storage locations
- fuel handling and examination records contained in the Reactor Logbook No. 124, pages 153 - 161
- fuel movement and location records contained in the AFRRRI Records for Stainless Steel Fuel Elements binder and on the fuel element board located in the Control Room
- AFRRRI Administrative Procedure A4, "Special Nuclear Material Accountability," Rev June 7, 1994
- AFRRRI Administrative Procedure A4, Appendix B "Fuel Inventory Sheet," Rev September 30, 1999
- AFRRRI Operational Procedure 7, "Reactor Core Loading and Unloading," Rev May 15, 1991

b. Observations and Findings

Fuel movement, inspection, log keeping, and data recording was being completed as required by procedure and met TS Sections 4.2.5 and 5.2.2 requirements. Data recorded for fuel movement was clear and cross referenced on fuel inventory sheets and in operations logs. The inspector verified that half of the fuel elements present in the core were being inspected for damage or deterioration and measured for length and bow annually as required by TS 4.2.5.

During the inspection, the serial numbers of two fuel elements in the reactor pool were verified.

c. Conclusions

Fuel handling activities and the documentation thereof were acceptable and in accordance with procedural and TS requirements.

8. Experiments

a. Inspection Scope (IP 69001)

To verify compliance with the licensee's program for conducting experiments and irradiations as outlined in TS Sections 3.6 and 6.4, the inspector reviewed selected aspects of:

- Routine Reactor Authorizations No. 1 - 5, dated July 2000
- Special Reactor Authorization No. 1, dated July 2000
- Reactor Logbook No. 124 and irradiation records

- Reactor Use Request (RUR) forms (AFRRI Form 2, dated July 1, 1994) Nos. 01-01 through 01-08 and Nos. 02-01 through 02-07
- annual reviews documented in RRFSC meeting minutes
- experiment approvals documented on Irradiation Request Form, AFRRI Form No. 1, form dated October 1992
- AFRRI Operational Procedure 1, "Conduct of Experiments," Rev March 4, 1998
- AFRRI Operational Procedure 1, TAB A, "Reactor Exposure Room Entry," Rev June 29, 2000
- AFRRI Operational Procedure 1, TAB E, "In-Pool/In-Core Experiments," Rev May 15, 1991

b. Observations and Findings

The Routine and Special Authorization forms noted above had been approved by the RFD, the Chairman, Safety and Health Department (SHD), and the Chairman and members of the RRFSC as required by TS Section 6.4. The RUR forms that had been completed for conducting experiments during 2001 and 2002 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, the Reactor Logbook, and interviews with staff, the inspector verified that the experiments and irradiations that were completed were installed, constrained, conducted, and removed as outlined in the experiment authorizations and as required by the TS. The radioactive material produced was handled and controlled as required.

c. Conclusions

Conduct and control of experiments and irradiations met the requirements specified in the TS and the applicable experiment authorizations and procedures.

9. Procedures

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify that the licensee was complying with the requirements of TS Section 6.3:

- selected administrative and operational procedures
- records for procedure changes and temporary changes
- observation of procedure implementation
- related logs and records documenting procedure implementation
- AFRRI Operational Procedure 0, "Procedure Changes," Rev February 11, 1999

b. Observations and Findings

Operations procedures were available for those tasks and items required by the TS. Written changes were approved by the RFD and reviewed by the RRFSC as required.

Temporary changes that did not change the original intent of the procedure were made by the Reactor Operations Supervisor (ROS), documented, and subsequently reviewed and approved by the RFD as required by the TS.

Review of procedure changes by staff members was documented on a standard AFRRRI form for each procedure. Training of personnel on procedures and changes was acceptable. Through records review, the inspector verified that personnel conducted TS activities in accordance with applicable procedures.

c. Conclusions

Procedural review, revision, control, and implementation satisfied TS requirements.

10. Radiation Protection

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- radiation and contamination survey records documented on the appropriate forms in accordance with the guidance contained in AFRRRI Health Physics Procedure (HPP) 3-2.B, "Reactor Facility Health Physics," dated April 10, 2000, and in AFRRRI HPP 4-6.C, "Facility In-Plant Monitoring," dated January 14, 2000
- audits of the Radiation Protection Program
- calibration and periodic check records for radiation monitoring instruments documented on the applicable forms
- AFRRRI personnel radiation protection training
- radiological signs and postings in the controlled areas of the facility
- AFRRRI personnel dosimetry records for 2001 and 2002
- As Low As Reasonably Achievable (ALARA) Program
- AFRRRI Instruction 6055.8E, "Radiation Protection Program," dated March 12, 2001
- AFRRRI HPP 0-1.E, "Radiological Safety Training," dated February 1, 2000
- AFRRRI HPP 1-2.C, "Personnel Monitoring Program," dated February 1, 2000
- AFRRRI HPP 3-1.C, "Reactor Irradiation Facilities," dated February 1, 2000
- AFRRRI HPP 7-1.C, "Survey Instruments," dated March 14, 2000
- AFRRRI HPP 7-2.C, "Radiation Monitors," dated January 14, 2000
- AFRRRI HPP 7-3.C, "Airborne Radioactivity Instruments," dated January 14, 2000
- AFRRRI HPP 8-1.A, "Radiological Survey Techniques," dated March 14, 2000
- AFRRRI Operational Procedure 4, "Reactor ALARA Program," Rev October 4, 1994
- AFRRRI Operational Procedure 11, "Air Particulate Monitor (CAM) Procedure," Rev May 1, 1998

The inspector also toured the facility, conducted a radiation survey in selected areas, and observed the use of dosimetry and radiation monitoring equipment. Licensee personnel were interviewed and radiological signs and postings were observed as well.

b. Observations and Findings

(1) Surveys

The inspector reviewed weekly radiation and contamination surveys of licensee controlled areas conducted by SHD personnel. The inspector also reviewed biweekly general area contamination surveys of the AFRRRI building from 2002 to date. These latter surveys had also been completed by SHD personnel as stipulated by AFRRRI HPP 4-6.C. The results were documented on the appropriate forms, were evaluated as required, and corrective actions taken when readings or results exceeded set action levels.

During the inspection, the inspector accompanied an HP Technician during a weekly survey. The inspector also conducted a radiation survey of the Reactor Room and the Reactor Prep Area and compared the readings detected with those found by the HP Technician. The results were comparable and no anomalies were noted. The inspector noted that the weekly survey was conducted in accordance with HPP procedures and records were properly maintained. As part of the area survey, the HP Technician operationally checked the portable meters stationed for use by experimenters and reactor operations personnel. Radioactivity on smear samples was determined by a gas flow proportional counter and by liquid scintillation detection.

(2) Postings and Notices

The inspector reviewed the postings at the entrances to the controlled areas and in the SHD area of AFRRRI. The postings were acceptable and indicated the radiation and contamination hazards present. Other postings also showed the industrial hygiene hazards present in the areas. The facility's radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was detected in the facility.

Copies of current notices to workers required by 10 CFR Part 19 were posted on various bulletin boards in the facility. NRC Form 3, "Notice to Employees," Revision September 1999, was posted in accordance with 10 CFR 19.11. Caution signs, postings and controls to radiation areas were as required in 10 CFR 20, Subpart J.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program accredited organization, the Naval Dosimetry Center, to process the whole body and extremity thermoluminescent dosimeters (TLDs) supplied to AFRRRI personnel. Through direct observation, the inspector determined that dosimetry was acceptably used by facility personnel and exit frisking practices were in accordance with radiation protection requirements.

An examination of the records for the past two years, through December of 2002, showed that all exposures were well within NRC limits and within licensee action levels. Extremity monitoring, accomplished through the use of finger rings, also showed low doses to the hands of staff members. The highest annual whole body exposure received by a single individual for the past two years was less than 50 millirem. The highest annual extremity exposure for the past two years was less than 110 millirem.

(4) Radiation Monitoring Equipment

The calibration of portable survey meters and friskers was typically completed by Calibration Laboratory personnel. The calibration of fixed Radiation Area Monitors and Constant Air Monitors was typically completed by SHD personnel. The calibration records of selected portable survey meters, friskers, fixed radiation detectors, and air monitoring equipment in use at the facility were reviewed. Calibration frequency met the requirements established in the applicable procedures and TS and records were being maintained as required.

Analytical laboratory equipment was calibrated and maintained by SHD personnel as required. Equipment quality control checks were accomplished using charts rather than graphs.

(5) Radiation Protection Program

The licensee's Radiation Protection Program was established in AFRR I Instruction 6055.8E dated March 12, 2001. The program was further outlined in various AFRR I procedures. The program required that all personnel who had unescorted access to work in a radiation area or with radioactive material receive training in radiation protection, policies, procedures, requirements, and facilities prior to entry. The licensee reviewed the radiation protection program at least annually in accordance with 10 CFR 20.1101(c).

The licensee did not require a respiratory protection program or planned special exposure program.

(6) ALARA Policy

The ALARA Policy was also outlined and established in AFRR I Instruction 6055.8E. The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR Part 20.

(7) Radiation Protection Training

The personnel training program satisfied requirements in 10 CFR 19.12. Handout material was very useful in helping people understand the various concepts better. The content and periodicity of training were acceptable.

(8) Facility Tours

The inspector toured the Control Room, Pool Room, Reactor Prep Area, and selected support laboratories and offices. Control of radioactive material and control of access to radiation and high radiation areas were acceptable. As noted earlier, the postings and signs for these areas were appropriate.

c. Conclusions

The inspector determined that, because: 1) surveys were being completed and documented acceptably; 2) postings met regulatory requirements; 3) personnel dosimetry was being worn as required and doses were well within the NRC's regulatory limits; and, 4) radiation monitoring equipment was being maintained and calibrated as required, the Radiation Protection Program being implemented by the licensee satisfied regulatory requirements.

11. Environmental Protection

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- airborne release records documented in the Quarterly Gaseous Radioeffluents Report submitted by the SHD to the RRFSC for the period from 2001 through 2002
- liquid release records documented in the Liquid Radioeffluent Summary Report for the period from 2001 through 2002
- AFRRRI TRIGA Reactor Facility Annual Reports for 2000 and 2001
AFRRRI HPP 2-1.B, "Environmental TLD Program," Rev February 1, 2000
AFRRRI HPP 2-2.B, "Environmental Sampling," Rev February 1, 2000
AFRRRI HPP 2-5.D, "Environmental Radioactivity Releases," Rev February 1, 2000
- AFRRRI Operational Procedure 10, "Stack Gas Monitor Procedure," Rev May 17, 1996

b. Observations and Findings

The inspector reviewed the calibration records of the area and stack monitoring systems. These systems had been calibrated annually according to procedure.

The inspector also reviewed the records documenting liquid and airborne releases to the environment for the past two years. The inspector determined that gaseous releases continued to be calculated as required by procedure and were adequately documented. The releases were determined to be within the annual dose constraints of 10 CFR 20.1101 (d), 10 CFR Part 20, Appendix B concentrations, and TS limits. Liquid releases were approved as required after analyses indicated that the releases would meet regulatory requirements for discharge into the sanitary sewer.

c. Conclusions

The environmental protection program satisfied NRC requirements.

12. Emergency Preparedness

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- Armed Forces Radiobiology Research Institute and AFRRRI Reactor Facility Emergency Plan dated May 1994
- Armed Forces Radiobiology Research Institute and AFRRRI Reactor Facility Emergency Response Guidebook dated April 1996
- emergency response facilities, supplies, equipment and instrumentation
- training records, including the ERT Training Log, for licensee staff and support personnel
- offsite support as documented in the Memorandum of Agreement between AFRRRI and the National Naval Medical Center
- emergency drills and exercises for the past two years
- AFRRRI Operational Procedure 6, "Emergency Procedures," Rev June 4, 1998

b. Observations and Findings

The Emergency Plan (E-Plan) in use at the reactor was in accordance with 10 CFR 50.54(q). Proposed updates to the plan were discussed by the Reactor Facility Director and appeared reasonable. Implementing procedures in the Emergency Response Guidebook were reviewed and revised as needed to implement the E-Plan effectively. Facilities, supplies, instrumentation, and equipment were being maintained, controlled, and inventoried as required in the E-Plan.

The inspector reviewed the Memorandum of Agreement between AFRRRI and the National Naval Medical Center (NNMC) dated February 17, 2000, concerning emergency response support. This agreement included NNMC support in case of fire, hazmat, and medical emergencies. Communications capabilities were acceptable with these NNMC support groups.

Emergency drills had been conducted every year as required by the E-Plan. NNMC participation was also as required by the E-Plan. Critiques were held following the drills to discuss the strengths and weaknesses identified during the exercise and to develop possible solutions to any problems identified. The results of these critiques were documented and filed. Emergency preparedness and response training was being completed by reactor staff personnel and the Emergency Response Team (ERT) as required. Training for NNMC fire department, as well as for the security guards, was conducted and documented as stipulated by the E-Plan.

c. Conclusions

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

13. Transportation

a. Inspection Scope (IP 86740)

The inspector reviewed the following to verify compliance with procedural requirements for transferring licensed material:

- AFRRRI SOP No. 35, "Standard Procedure for Receiving and Opening Packages Containing Licensed Materials," dated October 6, 1993
- selected records of radioactive material transfers from the reactor license to the licensee's Broad Scope license

The inspector also interviewed licensee personnel.

b. Observations and Findings

Through records review and discussions with licensee personnel, the inspector determined that the licensee had transferred radioactive material and solid waste produced by reactor operations to the licensee's Broad Scope license for possession, shipment, or disposal. Transfers were recorded on the applicable forms and transfer documentation was kept on file as required.

c. Conclusions

Radioactive material was transferred to the licensee's Broad Scope license and shipped under that license.

14. Safeguards - Material Control and Accountability

a. Inspection Scope (IP 85102)

To verify compliance with 10 CFR Part 70, the inspector reviewed:

- control of Special Nuclear Material (SNM) storage areas
- annual fuel inventory results documented on Fuel Inventory sheets as specified in AFRRRI Administrative Procedure A4
- Nuclear Material Transaction Reports for the time period from October 2000 through October 2002
- AFRRRI Administrative Procedure A4, "Special Nuclear Material Accountability," Rev June 7, 1994

b. Observations and Findings

Records indicated that the licensee accurately accounted for all nuclear material. The licensee had no receipts and made no shipments during the past two years. Nuclear Material Transaction Reports (DOE/NRC Form 741) and Material Status Reports (DOE/NRC Form 742) had been completed semiannually and submitted by the licensee to the appropriate regulatory agencies in a timely manner and as required by 10 CFR 74.13(1).

All SNM was stored and used in designated areas. The Inventory Officer, the person who prepared and kept track of the facility SNM, was documented to have been trained in fuel records, accountability procedures, and inventory procedures by the RFD.

Physical inventories were conducted annually as required by 10 CFR 70.51(d).

c. Conclusions

Special Nuclear Materials were acceptably controlled and inventoried.

15. Security

a. Inspection Scope (IPs 81402 and 81431)

To verify compliance with the licensee's NRC-approved Physical Security Plan (PSP) and to assure that changes, if any, to the plan had not reduced its overall effectiveness, the inspector reviewed:

- security systems, equipment and instruments
- records, and reports concerning security
- access, combination, and key control
- AFRRRI Administrative Procedure A2, "Personnel Passage Through the Prep Area," Rev May 25, 1995
- AFRRRI Operational Procedure 5, "Physical Security," Rev May 15, 1991

b. Observations and Findings

The licensee's PSP, Physical Security Plan for the AFRRRI TRIGA Reactor Facility, was the same as the latest revision approved by the NRC dated June 27, 2001. Military and civilian personnel provided security at AFRRRI as required by the plan. NNMC Security Division personnel, the Civil Guard Force, provided back-up security support. Physical protection systems (barriers and alarms), equipment, and instrumentation were as required by the PSP. Security tests were performed and tracked as required. Access control was implemented as required by the PSP and licensee procedures. Periodic training was provided to both the AFRRRI staff and security personnel. Facility access, combinations, and keys were properly controlled and keys were inventoried periodically as required.

c. Conclusions

The licensee's physical protection program was found to conform to NRC requirements and the licensee's implementing procedures.

16. Follow-up on Previously Identified Items

a. Inspection Scope (IP 69001)

The inspector reviewed the licensee's actions taken following identification of an Inspector Follow-up Item noted in NRC Inspection Report No. 50-170/2001-201:

- 50-170/2001-201-01 - IFI - Ensure that security guards are aware of reactor operations responsibilities.

b. Observations and Findings

During the inspection in 2001, the inspector noted that the operating logs and records indicated that shift staffing including on-call personnel was as required by TS 6.1.3.2. However, console log entries for another person required by TS 6.1.3.2(a)(4) listed the building access security guard. Interviews with two on-duty guards indicated a good understanding of emergency responsibilities but mixed understanding of additional responsibilities related to reactor operations. A review of annual training material provided to security guards confirmed this emphasis on emergency response, but did not have information on fulfilling the requirements of TS 6.1.3.2(a)(4).

As part on the current inspection, the inspector reviewed the actions taken by the licensee to provide the appropriate instructions to the guards to allow them to function as the third person during reactor operations. The inspector also interviewed various guards and found them to be knowledgeable of their responsibilities.

c. Conclusions

This issue is considered closed.

17. Exit

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on February 6, 2003. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection except for the Physical Security Plan.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Carter, MAJ, USA, Senior Reactor Operator
R. Eng, COL, MS, USA, Director, AFRRRI
P. Liotta, CDR, MSC, USN, Chairman, Radiation Sciences Department, AFRRRI, and Chairman of the RRFSC
S. Miller, Reactor Facility Director
J. Nguyen, Senior Reactor Operator
H. Spence, Reactor Operations Supervisor

Other Personnel

C. Cummings, CAPT, MC, USN, Department Head, SHD
J. Ganz, HM1 (SW), Radiation Health Technician, SHD
I. Kornegay, Radiation Safety Supervisor, NNMC
R. LeBlanc, SFC, MPC, USA, Security Operations, Sargent
D. McKown, Assistant Radiation Safety Officer, SHD
T. Tylka, HM1, Radiation Health Technician, NNMC
B. Wampler, Health Physicist, SHD
D. White, Security Guard, TW & Company, Inc. (Security Contractor for AFRRRI)
T. Wilson, Captain, Security, TW & Company, Inc. (Security Contractor for AFRRRI)

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 81402	Report of Safeguards Events
IP 81431	Fixed Site Protection of Special Nuclear Material of Low Strategic Significance
IP 85102	Material Control and Accounting - Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-170/2003-201-01	IFI	Follow-up on completion of the facility safety audit for 2002, including review of the Emergency Plan and review of the Security Plan, scheduled for the third week of February 2003.
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Closed

50-170/2001-201-01	IFI	Ensure that security guards are aware of reactor operations responsibilities.
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LIST OF ACRONYMS USED

AFRRI	Armed Forces Radiobiology Research Institute
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
ERT	Emergency Response Team
HPP	Health Physics Procedure
IFI	Inspector Follow up Item
IP	Inspection Procedure
LCO	Limiting Conditions for Operation
NNMC	National Naval Medical Center
NRC	Nuclear Regulatory Commission
PSP	Physical Security Plan
Rev	Revision/Revised
RFD	Reactor Facility Director
ROS	Reactor Operations Supervisor
RRFSC	Reactor and Radiation Facility Safety Committee
RUR	Reactor Utilization Request
SHD	Safety and Health Department
SNM	Special Nuclear Material
TLD	Thermoluminescent dosimeter
TS	Technical Specifications