

March 8, 2000

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

SUBJECT: NRC ROUTINE, ANNOUNCED INSPECTION REPORT NO. 50-170/00201

Dear Colonel Eng:

This refers to the inspection conducted on February 22 through 25, 2000, at the Armed Forces Radiobiology Research Institute research reactor. 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 placed in the NRC Public Document Room.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at (610) 337-5373.

Sincerely,

**/RA/**

Ledyard B. Marsh, Chief  
Events Assessment, Generic Communications  
and Non-Power Reactors Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report No.50-170/00201

cc w/enclosure: Please see next page

Armed Forces Radiobiology Research  
Institute

Docket No. 50-170

cc:

Director, Maryland Office of Planning  
301 West Preston Street  
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County Executive  
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Mr. Stephen I. Miller  
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U. S. NUCLEAR REGULATORY COMMISSION

Docket No: 50-170

License No: R-84

Report No: 50-170/00201

Licensee: Armed Forces Radiobiology Research Institute

Facility: Armed Forces Radiobiology Research Institute Research Reactor Facility

Location: Bethesda, Maryland

Dates: February 22 through 25, 2000

Inspector: Thomas F. Dragoun

Approved by: Ledyard B. Marsh, Director  
Events Assessment, Generic Communications and  
Non-Power Reactors Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

This routine, announced inspection included onsite review of selected aspects of the radiation protection program, environmental protection program, and emergency preparedness program, since the last NRC inspection of this program.

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

### REACTOR OPERATIONS

Corrective action on previously identified items was complete and acceptable

### RADIATION PROTECTION

The current RSO is transferring a compliant program to his replacement. The Assistant RSO will continue to provide technical depth. The radiation protection program satisfied NRC requirements.

### ENVIRONMENTAL PROTECTION

The environmental protection program satisfied NRC requirements.

### EMERGENCY PREPAREDNESS

Environmental TLDs were reused for an emergency monitoring network. The emergency preparedness program was conducted in accordance with the Emergency Plan.

## Report Details

### Summary of Plant Status

During the inspection the reactor was operated several hours a week to support service work, tours, and digital console testing.

#### 1. OPERATIONS

##### a. Scope

The inspector reviewed action on previously identified items

##### b. Observations and Findings

During an inspection in 1998, the licensee reported that the reactor digital console was not Y2K compliant. Corrective action included replacement of the main computer, peripheral hardware, and the operating system software. All main parameter displays and logging functions were verified and validated. Testing of tertiary features was continuing. Corrective actions for inspector follow-up item 50-170/98201-03 are complete and acceptable.

During the same inspection, the inspector noted that the alarm set points on two area radiation monitors located over the reactor pool were adjusted up scale during reactor pulses. The monitors were relocated to work areas adjacent to the pool and set to alarm at 10 millirem/hr with no adjustment required during pulsed reactor operations. Corrective actions for inspector follow-up item 50-170/98201-02 are complete and timely.

##### c. Conclusions

Corrective action for previously identified items was acceptable.

#### 2. RADIATION PROTECTION

##### a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- organization and staffing
- audits
- policies and procedures
- personnel training
- radiological signs and postings
- routine surveys and monitoring
- analytical laboratory capability
- dosimetry records
- maintenance and calibration of radiation monitoring equipment
- As Low As Reasonably Achievable (ALARA) reviews

b. Observations and Findings

The Radiation Safety Officer was scheduled to be replaced within a few months as part of routine military rotations. A replacement was on site and had acceptable training and experience to assume the RSO position. The AFRR staff, including the Safety and Health Department, had been downsized. Discussions with the RSO indicated that the personnel changes in the SHD department were commensurate with reduced use of radioactive materials in the facility. SHD staffing was acceptable to support the current workload. Contingency planning for potential future projects, such as boron-neutron capture therapy, was acceptable. The licensee reviewed the radiation protection program at least annually in accordance with 10 CFR 20.1101(c). A thorough audit by a contractor of the environmental protection program reviewed control of all hazardous material.

The radiation protection program described in Instruction 6055.8D was as required by 10 CFR 20.1101(a). Health physics procedures were provided as required by TS 6.3.1. Policies and procedures were detailed, clear, and up-to-date.

Personnel training programs satisfied requirements in 10 CFR 19.12. Handout material was changed in anticipation of migrating to computer-based training. Requalification training of operators was as required. The content and periodicity of training were acceptable.

NRC Form 3, "Notice to Employees," 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.

Radiation surveys were conducted in accordance with licensee procedures. Records were properly maintained. As part of the area survey, the Assistant RSO 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 liquid scintillation detection. The inspector noticed an apparently unused wall-mounted detector in the "prep area." The staff is investigating this equipment.

Analytical laboratory equipment was calibrated and maintained as required. Equipment quality control checks were accomplished using charts rather than graphs. The inspector determined that the accuracy of this methodology was acceptable. New software for gamma spectroscopy and a high efficiency detector have improved the gamma emitter analysis capability.

Use of dosimeters and exit frisking practices were in accordance with radiation protection requirements. The licensee used whole body and extremity TLDs supplied and processed by the Navy under a National Voluntary Laboratory Accreditation Program (NVLAP) accredited program. The number of TLDs has been reduced and issued only to persons expected to receive an occupational

exposure in accordance with 10 CFR 20.1502. Records indicated all exposures were within prescribed limits.

Since the last inspection, the annual calibration of portable survey meters was shifted to a commercial vendor (RSO, Inc.) Calibration records were well maintained. The number and type of operable instruments on hand were acceptable.

ALARA reviews were performed as required.

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

c. Conclusions

The radiation protection program satisfied NRC requirements.

3. ENVIRONMENTAL PROTECTION

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- annual report
- release records
- counting and analysis program

b. Observations and Findings

The annual report indicated that argon 41 emissions through the exhaust stack met constraint criteria of 10 CFR 20.1101(d).

Samples of liquid waste were properly taken, prepared, and analyzed prior to discharge of waste to the sanitary sewer. Approximately 88,000 gallons of liquid were discharged in 1999. Records indicated that the activity was well below limits specified in 10 CFR 20.

c. Conclusions

The environmental protection program satisfied NRC requirements.

4. EMERGENCY PREPAREDNESS

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- the Emergency Plan
- implementing procedures
- emergency response facilities, supplies, equipment and instrumentation



- training records
- offsite support
- emergency drills and exercises

b. Observations and Findings

The Emergency Plan (E-Plan) in use at the reactor was revised in 1994 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. One emergency kit was unsealed by the inspector, the contents inventoried and instrument calibrations were checked. Results were acceptable.

Agreement for emergency response support from the military base had been signed in 1996 with NNMC for an indefinite period. This agreement included fire, hazmat, and medical response. Communications capabilities were acceptable with these support groups. The inspector verified selected emergency communications capabilities. During an inspection in 1995, the inspector noted that the phone number for the NRC Operations Center was incorrect in the licensee's procedure. This was corrected.

Emergency drills had been conducted 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 as required. Training for NNMC fire department and reactor staff personnel was conducted and documented as stipulated by the E-Plan.

Environmental TLD stations, no longer used, were repositioned in a 100 meter arc around the facility. The Assistant RSO stated that this reuse of equipment was done to enhance the capability to monitor ground level releases in the event of a radiological accident.

c. Conclusions

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

5. EXIT INTERVIEW

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on February 25, 2000. The licensee acknowledged the findings presented.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

CAPT J. Kraimer, Health Physicist  
COL R. Lofts, Deputy Director for Science  
CAPT J. Malinoski, Head, Radiation Sources Department  
R. Marté, Reactor Operations Supervisor  
D. McKown, Assistant RSO  
S. Miller, Reactor Facility Director  
J. Nguyen, Senior Reactor Operator  
SFC S. Osborne, Senior Reactor Operator  
LTC R. Palmer, Deputy Director for Administration  
CAPT S. Torrey, Head, Safety and Health Department  
MAJ B. White, RSO  
MAJ K. Wrisley, Nuclear Engineer

## INSPECTION PROCEDURES USED

IP 69001 CLASS II NON-POWER REACTORS

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

None

### Closed

50-170/98201-02 Relocate area radiation monitor.  
50-170/98201-03 Upgrade reactor console for Y2K compliance

## LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
E-Plan	Emergency Plan
IP	Inspection Procedure
NNMC	National Naval Medical Center
NRC	Nuclear Regulatory Commission
RSO	Radiation Safety Officer
SHD	Safety and Health Department
TLD	ThermoLuminescent Dosimeter
TS	Technical Specifications
Y2K	Year 2000