

Armed Forces Radiobiology Research Institute  
AFRRI R-84 Annual Report  
October 1982

(Report Period: 1 October 1981 - 30 September 1982)

Part A - Changes to the Facilities and Procedures

This section specifies the actions taken during the report period that reflect changes to the existing Final Safeguards Report (FSR) not previously reported to USNRC.

AFRRI is still currently involved in a contested relicensing proceeding.

During this report period, the NRC Staff issued its Safety Evaluation Report (SER) on the AFRRI Reactor Facility based on AFRRI's submission (during the previous report period) of the AFRRI Reactor Facility Safety Analysis Report (SAR) as part of the relicensing procedure. The NRC staff's SER for the AFRRI Reactor Facility, License R-84, was published in January 1982 as NUREG-0882. Also, the AFRRI Reactor Emergency Plan is currently being rewritten to comply with proposed Revision 1 to USNRC Regulatory Guide 2.6, utilizing the guidance and criteria set forth in Draft 2, American National Standard ANSI/ANS 15.16 and NUREG-0849. The AFRRI Reactor Emergency Plan will be submitted to USNRC for review and subsequent implementation by 3 November 1982.

Several changes to the NRC-approved AFRRI Reactor Facility Physical Security Plan were made during this report period and submitted to USNRC on 10 September 1982. Changes made in the AFRRI Reactor Facility Physical Security Plan do not alter the effectiveness of reactor physical security.

Since the AFRRI Reactor Facility SAR (submitted during the previous report period) has not been approved and, therefore, cannot be implemented; the actions taken during this report period are categorized and presented below on a chapter basis as listed in the existing FSR.

CHAPTER I - SITE

The only major construction underway on the National Naval Medical Center (NNMC) site involves the renovation of the old NNMC Hospital (Bldg. 1) and renovation of the basement of building 23 (CPO Club). During this report period, the NNMC emergency room was relocated to the west end (ground level) of the new NNMC Hospital (Bldg. 9).

CHAPTER II - FACILITY

Completion, acceptance, and occupancy of AFRRI's new animal facility (Bldg. 47) occurred during this report period. As a result, the AFRRI Emergency Evacuation and Fire Plan was appropriately updated and implemented on 30 September 1982. A copy of the existing operable AFRRI Emergency Evacuation and Fire Plan is provided as Attachment 1.

Installation and dedicated use of a new Intrusion Detection Alarm System was accomplished during this report period. This system is described in the changes to the AFRRI Reactor Facility Physical Security Plan submitted by letter 10 September 1982.

Renovation of the AFRRI Radiochemistry Laboratory continues and is expected to be completed early in 1983.

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### CHAPTER III - REACTOR

An annual reactor shutdown maintenance period was performed in December 1981.

The pool water conductivity measuring system was replaced with an upgraded model by the same manufacturer. The monitoring cells and readout display panel remain in the same locations as for the previous system.

A new steady state timer used to measure run times and, in some cases, to scram the reactor at a preset time was installed replacing an older model. The new timer performs the same function as its predecessor. All controls, including start, stop, and reset remain the same.

No other changes to the reactor systems were made during this report period that affected the use or intent of any system and no changes to the Technical Specifications were made.

Malfunctions that occurred during the reporting period are listed below:

1. 5 Nov 81 MALFUNCTION - The conductivity cell in the water monitor box gave erroneous readings. This resulted from wiring to the cell becoming wet due to a water main break.

ACTION TAKEN - Conductivity was measured daily with back-up manual meter. Cell removed, cleaned, wire dried, and the system was placed back in service. Manual measurements discontinued since readings agreed with the repaired cell. Completed action on 24 Nov 81.

2. 1 Dec 81 MALFUNCTION - Cocked fuel element found in core position F-9.

ACTION TAKEN - Photo taken of cocked element; NRC Region I office notified; element measured for length and bow, inspected, and returned to core. No damage sustained.

3. 23 Dec 81 MALFUNCTION - Variations in K-excess measurements were caused by breakage of the bolt holding together two telescoping sections of the transient connecting rod.

ACTION TAKEN - NRC Region I notified; connecting rod bolt replaced and an additional bolt was installed; rod worth curves were verified after the transient rod assembly was returned to core.

4. 5 Jan 82 MALFUNCTION - Main stack fan alarm was caused by maintenance personnel cutting power to fan.

ACTION TAKEN - Reminded Logistics staff that the reactor staff must be informed before any test or maintenance is performed on the stack fan. Logged event as an unplanned scram.

5. 16 Feb 81 MALFUNCTION - During preoperational startup, the emergency ventilation damper in room 3152 closed on command but failed to reopen due to water in compressed air system.

ACTION TAKEN - NRC Region I notified. Power operations discontinued until system was repaired and returned to fully operational status. System was fully functional on 17 Feb 82.

6. 17 Feb 82 MALFUNCTION - Cocked fuel elements were found in positions F-9, F-21, and F-27 following a pulse (core checked before and after pulse).

ACTION TAKEN - NRC Region I notified; elements visually inspected and checked for length and bow and returned to core. No damage sustained.

7. 24 Feb 82 MALFUNCTION - Core dolly drive motor did not function due to failure of a cold solder joint in wiring.

ACTION TAKEN - Wiring repaired; core dolly checked for correct travel; indicator set to correct reading.

8. 12 Apr 82 MALFUNCTION - Electric motor on Exposure Room #1 (ER1) plug door failed to open door due to bad wiring connection.

ACTION TAKEN - Motor removed and taken to repair shop for complete check; wiring connection repaired and motor reinstalled. ER1 plug door operated manually until system returned to fully operational status.

9. 18 Jun 82 MALFUNCTION - Reg rod failed to drive in the manual mode because of a loose capacitor lead. Rod drop mechanism not affected.

ACTION TAKEN - Capacitor lead repaired.

10. 30 Jun 82 MALFUNCTION - HV power supply and NV/NVT circuit board damaged by heat in control room. Heat failures resulted from failure in the building air conditioning system causing high heat on the base of the control console drawers.

ACTION TAKEN - Replaced power supply; set voltage and trip levels; repaired and calibrated NV/NVT circuit. Checked all channels for operability during standard checkout procedures.

For the above listed events, all safety systems performed their intended functions.

#### CHAPTER IV - EXPERIMENTAL FACILITIES

The old momentary-type emergency stop pushbuttons in both exposure rooms were replaced by maintained-type buttons. This provides an increase in system safety since the buttons must now be manually reset from within the exposure room before the emergency stop circuit can be reset from the console.

CHAPTER V - NUCLEAR ANALYSIS

No changes have been made that affect the nuclear analysis.

CHAPTER VI - HAZARD ANALYSIS

No changes have been made that would affect the hazard analysis.

CHAPTER VII - ORGANIZATION

Current key AFRRRI personnel are:

Director - COL Bobby R. Adcock, MSC, USA

Deputy Director - Lt Col James J. Conklin, MC, USAF

Chairman, Radiation Sciences Department - CDR Robert T. Devine, MSC, USN

Chief, Radiation Sources Division - MAJ Ronald R. Smoker, EN, USA

The current Reactor Staff is:

Physicist-in-Charge - Capt Joseph A. Sholtis, Jr, SRO

Chief Supervisory Operator - Mr. Marcus L. Moore, SRO

Reactor Operator - MAJ Ronald R. Smoker, SRO

Reactor Operator - SFC Harry H. Spence, SRO

Reactor Operator - SFC Lorne H. Vernon, RO

Reactor Operator Trainee - HMC Jack Ritz

Reactor Operator Trainee - CPT Charles Williamson

Reactor Operator Trainee - SP6 William Menzel

The current membership of the Reactor and Radiation Facility Safety Committee is:

Lt Col James J. Conklin - AFRRRI - Chairman

Dr. L.S. Myers, Jr. - AFRRRI

CDR C. B. Galley - NNMC

MAJ Ronald R. Smoker - AFRRRI

LTC Z.N. Church - AFRRRI

Capt Joseph A. Sholtis - AFRRRI

Mr. T.G. Hobbs - National Bureau of Standards

Dr. Frank J. Munno - University of Maryland

Dr. N.K. Chawla - AFRRRI

Mr. J.N. Stone - Naval Research Laboratory

CDR R. T. Devine - AFRRRI

LT K. P. Ferlic - AFRRRI

Mrs. B.S. Markovich - Recorder

### CHAPTER VIII - PROCEDURES

Minor procedural changes have been made to AFRRRI's internal Radiation Sources Division Instructions, RSD 5-1 through RSD 5-9, which pertain to the AFRRRI reactor. A copy of the current RSD Instructions pertaining to the reactor are provided as Attachment 2.

#### Part B - Tests and Experiments

No tests or experiments were performed during this reporting period that exceeded the limits stated in the Technical Specifications.

All experiments performed during the reporting period were in accordance with the Technical Specifications and were authorized as either "Routine" or "Special".

The reactor was utilized at the various experimental facilities such that the total power production was 11508.2 kW-hr, broken down as follows:

In Steady State: 11006.4 kW-hr.

In Pulse: 501.8 kW-hr.

Experimental workload for FY 83 is anticipated to be in the range of 25 MW-hr to 50 MW-hr of total burn-up.