ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE
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March 23, 2006

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
ATTN: Pat Isaac, NRR/ADRA/DPR/PRT
Mail Stop 12-G13
Washington, DC 20555-0001

Dear Mr. Isaac:

Enclosed is the 2005 Annual Operating Report required by the technical specifications for the Armed Forces Radiobiology Research Institute reactor (license R-84, docket 50-170). The material is also being sent to you as an e-mail file in WordPerfect format.

Should you need any further information, please contact me at (301) 295-9245.

Enclosure:
as stated

STEPHEN I. MILLER
Reactor Facility Director

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Armed Forces Radiobiology Research Institute
AFRRI TRIGA Reactor Facility

1 January 2005 - 31 December 2005

To satisfy the requirements of
U.S. Nuclear Regulatory Commission License No. R-84 (Docket No. 50-170),
Technical Specification 6.6.b.

Prepared by
Harry H. Spence
Reactor Operations Supervisor

Submitted by
Stephen I. Miller
Reactor Facility Director

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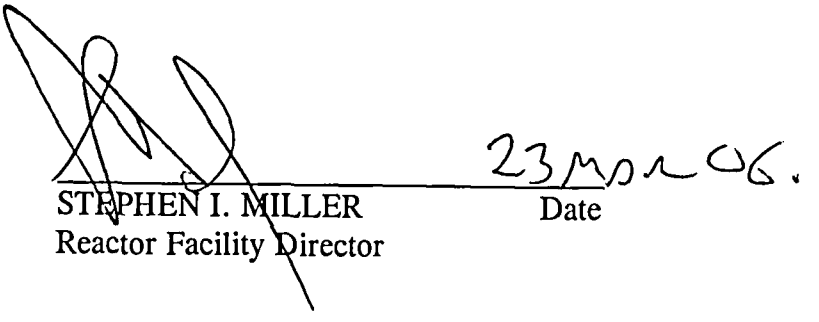
Submission of 2005 Annual Report

I declare under penalty of perjury that this report is true and correct.



23 Mar 06.

STEPHEN I. MILLER Date
Reactor Facility Director

2005 ANNUAL REPORT

TABLE OF CONTENTS

2005 ANNUAL REPORT

INTRODUCTION

The Armed Forces Radiobiology Research Institute (AFRRI) reactor facility was available for irradiation services throughout the year except for one nonoperational period of approximately two months during the annual reactor maintenance shutdown.

There were no major reactor modifications or projects during the year. No minor facility modifications were made during 2005 in accordance with the provisions of 10 CFR 50.59. There was one unplanned shutdown during 2005. Reports required by the reactor technical specifications were submitted, and the details are found in Section IV.

The 2005 annual reactor audit required by the reactor technical specifications was conducted by Mr. Frank Sage and Mr. Francisco Giner in November 2005. Mr. Sage is a senior reactor operator and Mr. Giner is a reactor operator, both at the U.S. Army White Sands Missile Range, NM fast burst reactor facility. During the audit they verbally indicated that they had not found any major discrepancies in reactor operations and those conclusions are reflected in their written report.

A comprehensive NRC inspection of reactor facility operations was conducted by Mr. Craig Bassett during March 2005. No safety concerns or noncompliance with NRC requirements were identified.

There were several RRFSC membership changes during the year. These are detailed in the following section. Also, one reactor operator candidate was removed from the training program during the year.

The remainder of this report is written in the format designated in the Technical Specifications for the AFRRI TRIGA Reactor Facility. Items not specifically required are presented in the General Information section. The following sections correspond to the required items listed in Section 6.6.b. of the specifications.

GENERAL INFORMATION

All personnel held the listed positions throughout the year unless otherwise specified.

Key AFRRI personnel (as of 31 December 2005) are as follows:

1. AFRRI Director - David Jarrett, COL, MC, USA

   Radiation Sciences Department (RSD) Head - Stephen I. Miller

   Radiation Safety Officer - Daniel Simpson, LCDR, USN (Position formerly called Radiation Protection Officer)

2 Reactor Facility Director and Facility Radiation Manager - Stephen I. Miller (SRO)

3. Reactor operations personnel:

   Reactor Operations Supervisor - Harry H. Spence (SRO)

   SRO Training Coordinator - John T. Nguyen (SRO)

   ERT Training Coordinator - Stephanie Vaughn, MAJ, CM USA (SRO)

   Maintenance Specialist - John T. Nguyen (SRO)

   Records Administration Specialist - Harry H. Spence (SRO)

   Senior Staff Engineer - Stephanie Vaughn, MAJ, CM, USA (SRO)

4. Senior Reactor Operator - Christopher Whicker, SSG, USA (SRO)

5. Operator candidates:
   Walter D. Tomlinson (through 23 May)
   Joneil Ribaya, SFC, USA

6. Newly licensed operators:
   None

7. Additions to staff during 2005:
   None

8. Departures during 2005:
   None. Mr. Walter Tomlinson remains a member of the reactor staff but his duties no longer require him to possess a reactor operator license.

9. There were several changes to the Reactor and Radiation Facility Safety Committee (RRFSC) during 2005. Dr. Richard Lofts replaced Mr. Mark Gee as the Chairman and Director's Representative on 06 July. In September, two formerly separate committees (the Reactor and Radiation Facility Safety Committee and the Radioisotope and X-ray Safety Committee) were changed to become subcommittees of a new overall AFRRI Radiation Safety Committee. The membership, authority, and oversight responsibilities of the former RRFSC are now vested in the renamed Reactor and Radiation Facilities Safety Subcommittee (RRFSS) under the reactor Technical Specifications. As part of that reorganization, the Radiation Protection Officer was renamed the Radiation Safety Officer. A new position titled Facility Radiation Manager (FRM) was created and staffed to provide day-to-day oversight of all radiation-related matters within the Institute for the AFRRI Director. The FRM is now a regular member of the RRFSS.

In accordance with the requirements set forth in Section 6.2.1.1. of the Technical Specifications for the AFRRI TRIGA Reactor Facility, the RRFSS consisted of the following members as of 31 December 2005.

Regular members are:
Radiation Safety Officer - Daniel Simpson, LCDR, USN
Reactor Facility Director and Facility Radiation Manager - Stephen I. Miller
Reactor Operations Specialist - Seymour Weiss
Health Physics Specialist - Joe Pawlovich

Chairman and Director's Representative - Dr. Richard Lofts

Special nonvoting member - David Lake, Montgomery County Government (Department of Environmental Protection)

Recorder - Harry H. Spence

Two meetings were held in 2005:

19 May

01 November

SECTION I

Changes in the Facility Design, Performance Characteristics, Administrative Procedures, Operational Procedures, Results of Surveillance Tests and Inspections

A summary of changes to the facility design, performance characteristics, administrative procedures, and operational procedures as well as the results of surveillance testing are provided in this section.

A. DESIGN CHANGES

There were no design changes to the facility during 2005.

B. PERFORMANCE CHARACTERISTICS

There were no changes to the performance characteristics of the core during 2005. All fuel, chambers, and the core experiment tube (CET) remained in place for operations throughout the year.

C. ADMINISTRATIVE PROCEDURES

There were no changes to Administrative Procedures during the year.

D. OPERATIONAL PROCEDURES

There were no changes to Operational Procedures during the year.

E. RESULTS OF SURVEILLANCE TESTS AND INSPECTIONS

All maintenance and surveillance tasks during 2005 were accomplished as normally scheduled with three exceptions. Determinations of the reactivity worth of each control rod, the shutdown margin, and the power coefficient of reactivity (Technical Specifications Section 4.1) were postponed until early 2006 due to ongoing reactor maintenance and repairs. These tasks will be completed before the reactor is returned to normal operations.

Malfunctions are detailed in Section IV, Safety-Related Corrective Maintenance.

The 2005 annual reactor audit required by the reactor technical specifications was conducted

by Mr. Frank Sage and Mr. Francisco Giner in November 2005. Mr. Sage is a senior reactor operator and Mr. Giner is a reactor operator, both at the U.S. Army White Sands Missile Range, NM fast burst reactor facility. During the audit they verbally indicated that they had not found any major discrepancies in reactor operations and those conclusions are reflected in their written report.

A comprehensive NRC inspection of reactor facility operations was conducted by Mr. Craig Bassett during March 2005. No safety concerns or noncompliance with NRC requirements were identified.

SECTION II

Energy Generated by the Reactor Core and the Number of Pulses $2.00 or Larger

Month	Kilowatt Hours
JAN	42.8
FEB	100.1
MAR	91.6
APR	290.4
MAY	87.5
JUN	26.7
JUL	89.5
AUG	23.1
SEP	14.8
OCT	1679.8
NOV	401.5
DEC	0.0
TOTAL	2847.8

Total energy generated in 2005: 2,847.8 kWh

Total energy on fuel elements: 1,000,673.7 kWh

Total energy on FFCRs*: 267,876.0 kWh

Total pulses this year $\geq$ $2.00: 0

Total pulses on fuel elements $\geq$ $2.00: 4,216

Total pulses on FFCRs* $\geq$ $2.00: 104

Total pulses this year: 49

Total pulses on fuel elements: 11,945

Total pulses on FFCRs*: 2,180

*Fuel-follower control rods

SECTION III

Unscheduled Shutdowns

There was one unscheduled shutdown on 12 October. Due to the limited capacity of the new uninterruptible power supply (UPS) in the air particulate monitor (CAM) circuit, power to the reactor console was momentarily lost when the secondary CAM pump was turned on. The same UPS powered both CAMs and the console. Pending installation of a larger-capacity UPS, the CAM circuit was rerouted. During the incident, all reactor safety systems functioned as designed and there was no reactor damage or personnel exposure.

SECTION IV

Safety-Related Corrective Maintenance

Following is an excerpt from the malfunction logbook during the reporting period. The reason for the corrective action taken, as in all cases, was to return the failed equipment to its proper operational status.

14 January 2005 - The indicator for one of the probes measuring conductivity at the output of the water purification system read significantly lower than expected immediately after replacement of the ion-exchange resins. The reading was also much lower than that of an identical conductivity probe at the output of a parallel ion-exchange resin bed. The RFD was notified and, with his approval, operations were allowed to continue. The conductivity probes and indicators at the second ion-exchange resin bed and at the bulk water monitor box fulfilled all requirements of the reactor Technical Specifications, Section 3.3. Both the probe and indicator module were removed and returned to the manufacturer for repairs. The items were returned from the manufacturer, tested, and reinstalled on 28 February. The system operated normally thereafter.

SECTION V

Facility and Procedure Changes as Described in the Final Safety Analysis Report (FSAR), New Experiments or Tests Performed During the Year

A. FACILITY CHANGES AS DESCRIBED IN THE FSAR

There were no design changes to the facility during 2005.

B. PROCEDURE CHANGES AS DESCRIBED IN THE FSAR

There were no changes to procedures as described in the FSAR. Changes to the administrative and operational procedures are covered in Section I.

C. NEW EXPERIMENTS OR TESTS

No new experiments or tests were performed during the reporting period that were not encompassed by the FSAR.

There were no safety evaluations for changes not submitted to the NRC, pursuant to the provisions of 10 CFR 50.59. Had there been any during the year, each modification would be described and qualified using Administrative Procedure A3 - Facility Modification. This procedure uses a step-by-step process to document that the criteria in 10 CFR 50.59(c)(2) were not met and that technical specification changes were not required prior to implementation. Such safety evaluations would then be included as attachments to this report.

SECTION VI

Summary of Radioactive Effluent Released

A. Liquid Waste: The reactor produced no liquid waste during 2005.

B. Gaseous Waste: There were no particulate discharges in 2005.

The total activity of Argon-41 discharged in 2005 was 0.96 curies. The estimated effluent concentration from the release of Argon-41 was below the constraint limit for unrestricted areas (Table 2 of Appendix B of 10 CFR 20).

Quarterly:	Jan - Mar 2005	0.037 Ci
	Apr - Jun 2005	0.439 Ci
	Jul - Sep 2005	0.009 Ci
	Oct - Dec 2005	0.474 Ci

C. Solid Waste: All solid radioactive waste material was transferred to the AFRRI byproduct license; none was disposed of under the R-84 reactor license.

SECTION VII

Environmental Radiological Surveys

All environmental sampling of soil and vegetation reported radionuclide levels within the background range. The radionuclides that were detected were those expected from natural background and from long-term fallout from nuclear weapons testing.

The calculated annual dose, due to Argon-41 release to the environment for 2005, was 0.03 mRem at the location of maximum public exposure. The maximum exposure is calculated at a location 91 meters from the release point. Exposure to the general population at the boundary of the National Naval Medical Center is significantly less due to the diffusion of Argon-41 in the atmosphere. The constraint limit for exposure to the public established under 10 CFR 20.1101(d) is 10 millirem per year. The exposure dose was calculated using COMPLY code, level 2, which is the most conservative level of COMPLY. Emissions due to reactor operations were 0.3% of the 10 millirem constraint limit, or 0.03 millirem for the entire year.

The reactor in-plant surveys, specified in Health Physics Procedure (HPP) 3-2, all resulted in readings that were less than the action levels specified in HPP 0-2.

SECTION VIII

Exposures Greater than 25% of 10 CFR 20 Limits

There were no doses to reactor staff personnel or reactor visitors greater than 25% of 10 CFR 20 occupational and public radiation dose limits.