

ANNUAL REPORT

for AFRRRI TRIGA Mark-F Reactor

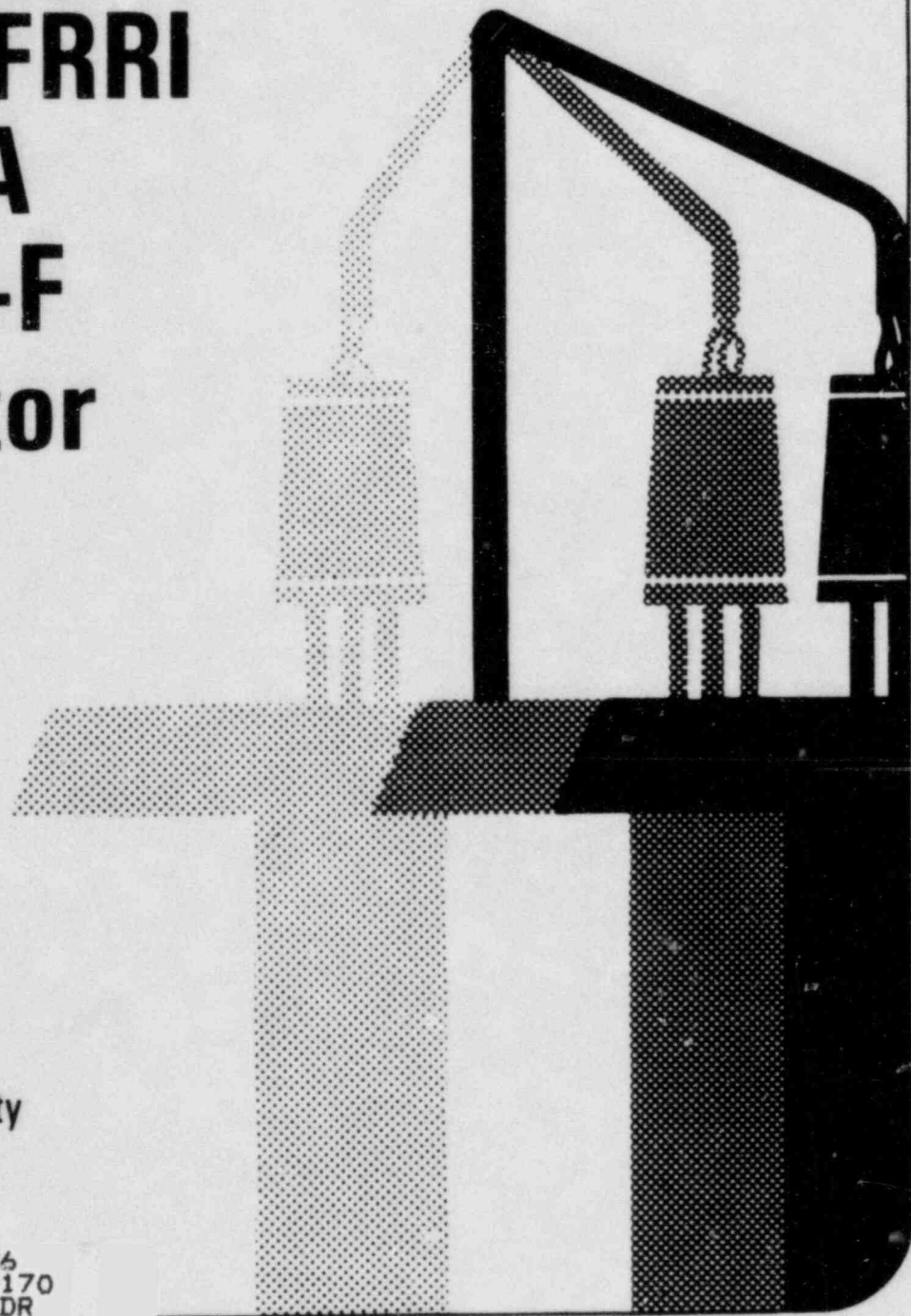
Prepared by

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Armed Forces Radiobiology Research Institute

Reactor Facility Annual Report

1 Oct 1984 to 31 Dec 1984

Prepared by

M. L. Moore, Facility Director

H. H. Spence, Senior Operator

Armed Forces Radiobiology Research Institute

Reactor Facility Annual Report

1 Oct 1984 to 30 Dec 1984

Introduction

This is a supplemental report issued to cover the time period 1 Oct 1984 to 30 Dec 1984. The shortened period reflects the change necessary to comply with a change in reporting period required of the new AFRRI technical specifications issued 1 Aug 1984. This report when attached to the report submitted 30 Sept 1984, becomes the CY 1984 Annual report in its entirety.

This report is written in a format to include notification items required by the technical specifications. Items not specifically required but of a general information value will be given in the General Information section. Each section following the general information corresponds to the required section as listed in Section 6.6.1a of the AFRRI technical specifications.

General Information

1. Current key AFRRI personnel are as follows

Director - COL Bobby R. Adcock, MS, USA

Deputy Director - CDR Richard L. Walker, MSC, USN

Chairman, Radiation Sciences Dept. - CDR Vincent L. McManaman,
MSC, USN

Chief, Radiations Sources Division - CPT Leonard A. Alt, EN, USA

2. Current key reactor facility personnel

Reactor Facility Director - Mark Moore (SRO)

Reactor Operations Supervisor - CPT Charles Williamson (SRO)

Reactor Staff Engineer - Maureen Dougherty (SRO)

Senior Reactor Operator - CPT Leonard A. Alt (SRO)

Senior Reactor Operator - MSG Harry Spence (SRO)

Senior Reactor Operator - SFC Steven Holmes (SRO)

Senior Reactor Operator - Stacy Brasfield (SRO)

Nuclear Research Officer - CPT Kenneth Hodgdon (trainee)

Trainee Operator - SP6 Wayne Reed (Trainee)

Trainee Operator - Alexine Holmes (Trainee)

3. There were no personnel departures during this period.

4. There were no changes in the RRFSC this period.

Section I CHANGES TO DESIGN, CHARACTERISTICS, PROCEDURES, AND THE RESULTS OF SURVEILLANCE TESTING

a. There were no changes to design, characteristics, or procedures as given in the SAR this period. A current startup and shutdown checklist are enclosed for information.

b. All surveillance items were accomplished on time. Malfunctions discovered are included in Section IV.

Section II ENERGY GENERATED ON CURRENT CORE

<u>Month</u>	<u>Kwh</u>
Oct	8810.4
Nov	5998.0
Dec	6502.6

Total power - 486348.3 Kwh

Total pulses greater than \$2.00 - 3556

Section III UNSCHEDULED SHUTDOWNS

There were no unscheduled shutdowns in this reporting period. Unscheduled maintenance is listed in Section IV.

Section IV SAFETY CORRECTIVE MAINTENANCE

The following are malfunctions that occurred to reactor equipment during this reporting period. The reason for the corrective action taken, in all cases, was to return the failed unit to its proper operational status.

03 Nov 84 During a startup checklist the linear count rate section of the linear channel failed to respond on serial ranges. The linear count rate board was replaced with a calibrated, fully functional board. The old board was checked, repaired and found functional.

26 Nov 84 Gas stack monitor found to be inoperative due to loss of counting gas. Gas tank replaced with full tank, lines purged, system operational.

10 Dec 84 Loss of signal on linear count rate section .003w to 300w. Replaced amplifier on board XH211. Channel recalibrated, system returned to service.

12 Dec 84 Magnet "on" light bulb not making good contact, causing safe rod to drop. Bulb contacts cleaned, bulb replaced, system tested found fully operational.

Section V FACILITY CHANGES

There were no changes to the facility this period.

Section VI SUMMARY OF SAFETY EVALUATION CHANGES NOT SUBMITTED TO NRC PURSUANT TO 10 CFR 50.59

There were no changes, new tests, or experiments this period.

Section VII SUMMARY OF RADIOACTIVE EFFLUENTS RELEASED

- a. Liquid waste - The estimated average release on a quarterly basis is for the quarter less than 25% of the allowable release.
- b. Gaseous Waste - There was no particulate discharge in the last quarter CY 1984. The total Argon 41 discharged 1 Oct - 31 Dec is 8.3 Ci.
- c. Solid Waste - All solid material was transferred to the AFRRI byproduct license, none was disposed of under R-84.

Section VIII ENVIRONMENTAL RADIOLOGICAL SURVEYS

- a. The results of environmental sampling of soil, water and plant growth were not demonstrably above the normal range of background levels. The radionuclides found were those normally expected in natural background radioactivity and from longterm fallout.
- b. Results of the environmental dosimetry program showed the following for the calendar year 1984:
 - 1. The average background was determined to be 81.9 +/- 5.5 mrem.
 - 2. The average reading above background was determined to be 7.0 +/- 2.5 mrem.
 - 3. The highest station reading was determined to be 34.1 +/-20.5 mrem.
 - 4. The results above are expressed at a 95% confidence level.
- c. In plant surveys, including effluent filters analysis, showed no measurable activity (unless specified in VII above).
- d. There were no special environmental studies.

Section IX EXPOSURES GREATER THAN 25% OF 10CFR20

There were no visitors to, or staff members of, the reactor facility that received greater than 25% of the allowable dose given in 10CFR20 this reporting period.

DAILY OPERATIONAL START-UP CHECKLIST

CHECKLIST No. _____
 SENIOR SRO PRESENT/ON CALL _____
 OPERATORS _____

DATE _____
 PERFORMED BY _____
 TIME COMPLETED _____

I. EQUIPMENT ROOM (Rm-3152)

1. Gas stack monitor pump and cooling air blower "ON"
2. Air compressor pressure (psi)
3. Air compressor water traps DRAINED
4. Air dryer operating
5. Doors 231, 231A, 3152 and roof hatch SECURED

II. LOBBY AREA

Lobby audio alarm turned "OFF"

III. EQUIPMENT ROOM (Rm-2158)

1. Prefilter differential pressure
2. Primary discharge pressure (psi)
3. Demineralizer flow rates set to 6 gpm
4. Stack roughing filter D.P. (inches of water)
5. Stack absolute filter D.P. (inches of water)
6. Visual inspection of area
7. Door 2158 SECURED

IV. PREPARATION AREA

Visual inspection of area

V. REACTOR ROOM (Rm-3161)

1. Transient rod air pressure (psi)
2. Shielding doors bearing air pressure (psi)
3. Tank water level below full mark (inches)
4. Visual inspection of core and tank
5. Number of fuel elements and control rods in tank storage
6. Air particulate monitor
 - (a) Operating and tracing
 - (b) Alarm test completed
7. Door 3162 SECURED

VI. REACTOR CONTROL ROOM

1. Emergency air system RESET
2. Console recorder DATED
3. Stack gas recorder & fuel temp. recorder DATED
4. Logbook DATED and REVIEWED
5. Water monitor box
 - (a) Background activity (ma)
 - (b) Alarm test completed and alarm reset to 0.5 ma
 - (c) Water monitor box conductivity. List resistivity in $M\Omega$ -cm (must be $> 0.5 M\Omega$ -cm)
 - (d) DM1 conductivity. List resistivity in $M\Omega$ -cm (must be $> 0.5 M\Omega$ -cm)
 - (e) DM2 conductivity. List resistivity in $M\Omega$ -cm (must be $> 0.5 M\Omega$ -cm)
6. Stack gas flow rate (Kcfm)
7. Gas stack monitor
 - (a) Background (cpm)
 - (b) Alarm check
 - (c) High alarm set to 10^5 cpm
8. Stack particulate monitor
 - (a) Background (cpm)
 - (b) Alarm check
 - (c) High alarm set to 2×10^3 cpm

9. Radiation Monitors

MONITOR	ALARM POINTS FUNCTIONAL	READING (mR/hr)	ALARM SETTING (mR/hr)
(a) R-1	_____	_____	500
(b) R-2	_____	_____	10
(c) R-3	_____	_____	10
(d) E-3	_____	_____	10
(e) E-6	_____	_____	10
(f) R-5 (criticality)	_____	_____	50

10. Timer "ON"
11. TV monitors "ON"
12. Source level on log channel ≥ 0.5 cps
13. Check 0.5 cps source RWP
14. Time delay OPERATIVE

15. OPERATIONAL CHANNELS

Cal Log Switch Pos No.	Range Switch	% Linear	% Log
1	0.3 watt	_____	_____
2	30 watt	_____	_____
3	300 watt	_____	_____
4	1 kw	_____	_____
5	10 kw	_____	_____
6	3 MW	_____	_____

16. Rod raising interlock for Mode I
17. Rod raising interlock for Mode III
18. Zero power pulse (obtain signal w/trip test before pulse)
19. SCRAM CHECKS (insure each rod is checked with at least one scram)

(a) Carriage movement <input type="checkbox"/>	(f) Fuel temp 2 <input type="checkbox"/>	(k) HV loss safety 1 <input type="checkbox"/>
(b) Fuel temp 1 <input type="checkbox"/>	(g) Safety flux 2 <input type="checkbox"/>	(l) HV loss safety 2 <input type="checkbox"/>
(c) Safety flux 1 <input type="checkbox"/>	(h) Timer <input type="checkbox"/>	
(d) Manual <input type="checkbox"/>	(i) Emergency stop <input type="checkbox"/>	
(e) Pool H ₂ O level <input type="checkbox"/>	(j) Reactor key <input type="checkbox"/>	

20. Water temperature (INLET)
21. Period trip test for 1 KW interlock
22. APM high level audible alarm check

DAILY OPERATIONAL SHUT-DOWN CHECKLIST

CHECKLIST No. _____ DATE _____

TIME COMPLETED _____ PERFORMED BY _____

I. REACTOR ROOM (RM-3161)

1. All rod drives DOWN
2. Carriage lights OFF
3. Door 3162 SECURED
4. Door 3161 locked with key

II. EQUIPMENT ROOM (RM-3152)

1. Distillation unit discharge valves CLOSED
2. Air dryer OPERATIONAL
3. Doors 231, 231A, 3152 and Roof Hatch SECURED

III. EQUIPMENT ROOM (RM-2158)

1. Primary discharge pressure (PSI)
2. Demineralizer flow rates set to 6 gpm
3. Visual inspection for leaks
4. Door 2158 SECURED

IV. PREPARATION AREA

1. ER 2 plug door CONTROL LOCKED; door CLOSED and handwheel PADLOCKED
2. ER 2 lights ON and rheostat at 10%
3. ER 1 plug door CONTROL LOCKED; door CLOSED and handwheel PADLOCKED
4. ER 1 lights ON and rheostat at 10%
5. Visual inspection of area

V. LOBBY AREA

Lobby alarm audio ON

VI. REACTOR CONTROL ROOM (RM-3160)

1. Reactor tank lights OFF
2. Timer OFF
3. TV monitors OFF
4. Console LOCKED
5. Diffuser and secondary pumps OFF
6. Purification and primary pumps ON
7. Radiation monitors:

MONITOR	READING	HIGH-LEVEL ALARM SETTING (mR/hr)
(a) R-1	_____	20
(b) R-2	_____	N/A
(c) R-3	_____	N/A
(d) E-3	_____	N/A
(e) E-6	_____	N/A
(f) R-6 (stack)	_____	N/A
(g) R-5 (criticality)	_____	20