

**REACTOR OPERATIONS**  
**BROOKHAVEN MEDICAL RESEARCH REACTOR**  
**BROOKHAVEN HIGH FLUX BEAM REACTOR**

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**APRIL 1995**  
**INFORMAL REPORT**

**BROOKHAVEN NATIONAL LABORATORY**  
**ASSOCIATED UNIVERSITIES, INC.**  
**UPTON, NEW YORK 11973-5000**

under contract No. DE-AC02-76CH00016 with the  
United States Department of Energy

## **Part I**

### **Brookhaven Medical Research Reactor**

#### **1. Reactor**

The reactor ran for 16 days with 24 startups during the month of April. A total of 87.46 Mwhrs of thermal energy were produced bringing the total to date to 21,835.90 Mwhrs.

#### **2. Instrumentation**

There were no reportable instrumentation events during the month of April.

#### **3. Mechanical Maintenance**

All scheduled tickler card maintenance was completed.

#### **4. Occurrence Reports**

There were no reportable occurrences for the month of April, 1995.

#### **5. Safety**

There were no reportable first aid or lost time due to accidents reported for the month of April 1995.

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BMRR TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENTS RECORD

MONTH April YEAR 1995

<u>Requirement</u>	<u>Period</u>	<u>Previous Completion Date</u>	<u>Scheduled Date</u>	<u>Completion Date</u>	<u>Deadline if Not Completed</u>
<b>Operations</b>					
<b>Confinement System</b>					
a. Nuclear Incident System (M-4.2.4)	M	03/15/95	04/95	04/17/95	
b. Bldg. Relief Valves (M-4.2.2)	2/M	04/06/95	04/95	04/17/95	
c. Control Rod Seating	M	03/01/95	04/95	04/06/95	
d. Exhaust Efficiency Iodine	Y	12/13/94	04/95		12/95
<b>Instrumentation</b>					
a. Exhaust Flow (A-4.6.2)	Y	04/28/94	04/95	05/01/95	

[tssrr/aprtechs]

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M = Monthly  
 Q = Quarterly  
 ( ) = Date of the month in which card is issued

A/2 = Semi-Annually  
 A = Annually

SUMMARY OF BMRR IRRADIATIONS  
04/01/95 TO 04/30/95

DATE	PROJECT	HOURS	FACILITY	DESCRIPTION OF SAMPLE
04/04/95	YALE UNIVERSITY	0.250	Pn-TUBE	Li SALT IN C-60/C-70 (BUCKY BALLS)
04/04/95	REACTOR	0.333	TREATMENT ROOM #2	HOSPITAL CLOTH
04/04/95	MEDICAL	2.500	TREATMENT ROOM #2	Au FOILS
04/05/95	DAT	2.500	Pn-TUBE	SiO2 SLIDES
04/06/95	MEDICAL	0.167	Pn-TUBE	Gd-158 STANDARDS
04/06/95	MEDICAL	0.500	TREATMENT ROOM #1	Gd-B CELLS
04/06/95	MEDICAL	1.667	TREATMENT ROOM #1	RATS
04/07/95	DAT	2.500	Pn-TUBE	SiO2 SLIDES
04/07/95	MEDICAL	2.500	RADIAL	CELLS W/B-10
04/07/95	MEDICAL	1.500	WIDE BEAM	Au WIRES/ ION CHAMBER
04/10/95	MEDICAL	3.833	TREATMENT ROOM #1	RATS
04/11/95	MEDICAL	2.217	TREATMENT ROOM #1	RATS
04/12/95	MEDICAL	0.250	TREATMENT ROOM #2	PATIENT CLOTHING MTL.
04/12/95	MEDICAL	0.900	RADIAL	CELLS W/B-10
04/12/95	MEDICAL	0.125	Pn-TUBE	In-115
04/13/95	MEDICAL	0.833	TREATMENT ROOM #2	BNCT PATIENT
04/18/95	MEDICAL	5.383	RADIAL	CELLS W/B-10
04/18/95	DAT	3.750	Pn-TUBE	SiO2 SLIDES
04/19/95	MEDICAL	5.833	TREATMENT ROOM #1	RATS
04/20/95	MEDICAL	1.000	TREATMENT ROOM #1	CELLS
04/20/95	S&EP	0.250	WIDE BEAM	TLD's (NEUTRON/GAMMA)
04/20/95	MEDICAL	2.167	RADIAL	CELLS W/B-10
04/20/95	DAT	2.500	Pn-TUBE	SiO2 SLIDES
04/21/95	MEDICAL	5.667	TREATMENT ROOM #1	RATS
04/24/95	MEDICAL	5.250	TREATMENT ROOM #1	RATS
04/26/95	MEDICAL	0.250	Pn-TUBE	Gd-158 STDs
04/26/95	MEDICAL	0.367	RADIAL	CELLS W/B-10

DATE	PROJECT	HOURS	FACILITY	DESCRIPTION OF SAMPLE
04/26/95	MEDICAL	5.500	TREATMENT ROOM #1	RATS
04/27/95	REACTOR	1.167	TREATMENT ROOM #2	FOAM
04/27/95	MEDICAL	0.467	TREATMENT ROOM #2	BNCT PATIENT
04/28/95	MEDICAL	6.267	RADIAL	CELLS W/B-10
04/28/95	DAT	3.750	Pn-TUBE	SiO2 SLIDES

TOTAL NO. OF HOURS: 72.14167

TOTAL NO. OF SAMPLE CAPSULES LOADED: 9

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End of Report

# PART II

## Brookhaven High Flux Beam Reactor

April

30 Days

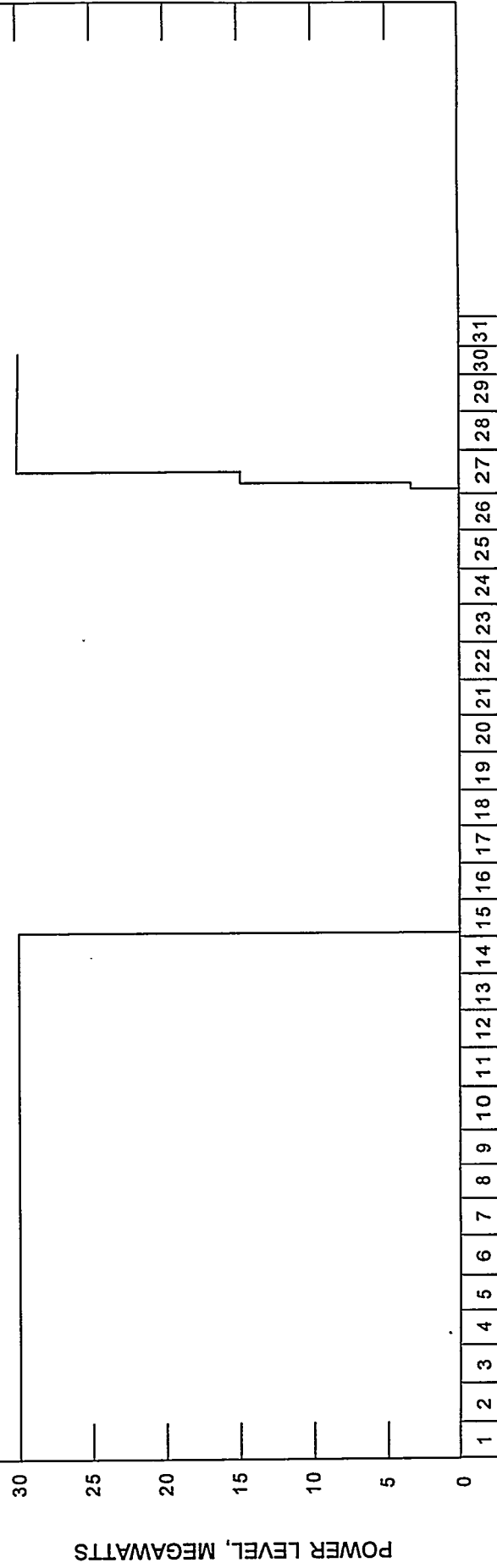
10746 - 10775

Reactor Operation to Date	276,857.17	MWD
Reactor Operation for Month	536.13	MWD
Hours of Operation	436.75	HRS
Average Power Level ((MWDx24) / Hours of Operation)	29.46	MW
Maximum Power Level	30.00	MW
Downtime	39.34	%
Electrical Energy Consumed within HFBR Bldg.	856,000.	KWH
Electrical Energy Consumed by Sec. Water Pumps	180,700.	KWH
Electrical Energy Consumed in Pumphouse 440V System	984,200.	KWH
Total Electrical Energy Consumed within HFBR Complex	2,020,900.	KWH
Electrical Energy Consumed by CNF Compressor	197,600.	KWH
Elements Charged this Month	7	
Elements Discharged this Month	7	
Reactor D <sub>2</sub> O Inventory (within 200 pounds)	102,685.00 (46,577.91)	LBS KG)
Reactor D <sub>2</sub> O Isotopic Purity (Average All Systems)	99.54	%
Helium Consumed (NTP)	21,827.3 (617.)	CF CM)
CO <sub>2</sub> Consumed	10,200. (4,626.)	LBS KG)

APRIL 1995

HFBR

MAXIMUM POWER LEVEL 30.00 MW  
AVERAGE POWER LEVEL 29.46 MW





2. Explanation of Histogram

Operating Cycle No. 279 was in progress at the beginning of this report period. The reactor was shutdown at 0615 hours on April 15, 1995 for scheduled maintenance and refueling.

On April 26, 1995 at 1345 hours, the reactor was started up to verify Estimated Critical Position. The reactor was operating periodically throughout the next several hours in order to perform for the following activities: Training startups to 100kW, thimble sample reactivity measurements (3), Trimonthly Safety Circuit testing. On April 27, 1995 at 0700 hours reactor power was raised to 4MW for a Health Physics Shield Check, then to 15MW for completion of Tri-monthly Safety Circuit Testing. Reactor power was raised to 30 MW for Operating Cycle No.280 at 0953 hours

3. Operating Difficulties:

A Battery Discharge Capacity Test for Pony Motor GP101A was successfully performed on April 24, 1995. This test completed the acceptance criteria for the new batteries installed in March 1995. The scram fuse for GP101A was subsequently installed. Reference March 1995 Monthly Report.

4. Reactivity Comments:

The excess reactivity at the end of Operating Cycle No. 279 was 0.0\$. The excess reactivity at the beginning of Operating Cycle No. 280 was 21.18 \$.

5. Building Confinement - Test and Changes

The following activities were performed during a planned building confinement break April 19-21, 1995:

The Exit Air Bypass Filters were bypassed to permit painting within the building confinement.

The dust stop roughing and sock particulate filters were replaced in the building exhaust blower suction plenum.

6. Changes to Reactor or Process Systems

None

7. Instrumentation

There were no reportable instrumentation events during the month of April 1995.

8. Mechanical Maintenance

All scheduled tickler card maintenance was completed.

9. Occurrence Reports

There were no reportable occurrences during the month of April, 1995.

10. Experimental Facilities

Experimental work was in progress on the following beam lines from April 1 - 15, 1995 and April 26 - 30, 1995. The reactor was shutdown for maintenance April 15 - 26, 1995.

H-1B Physics Department - Nuclear Structure Group - work in progress.

H-1A Powder diffractometer in service.

H-2 Physics Department - NO EXPERIMENTAL WORK IN PROGRESS

H-3 Biology Department - Structural Biology Group.

H-3A Experimental work in progress.

H-3B Experimental work in progress.

H-4 Physics Department - Neutron Scattering Group.

H-4M Experimental work in progress.

H-4S Experimental work in progress.

H-5 Chemistry Department - Chemistry Department Neutron Scattering Group.

H-6 Chemistry Department - Chemical Crystallography Group.

H-6M & H-6S - Experimental work in progress.

H-7 Physics Department - Neutron Scattering Group.

H-8 Physics Department - Neutron Scattering Group.

H-9 Reactor Division - Cold Neutron Facility.

H-9A Physics - Experimental work in progress.

H-9B Biology - Experimental work in progress.

H-9R Physics - Neutron Reflectometer in-service.

11. Cold Neutron Facility

**Operating History**

The CNF was operating at the beginning of the reporting period. The CNF shutdown with the reactor on April 15th at 0615 hours for scheduled maintenance. The CNF started up with the reactor on April 27th and operated for the remainder of the reporting period.

The CNF operated 427.35 hours during April. There was one hour lost time due to the fact that the CNF cannot fill with hydrogen until the reactor is at 30 MW. The CNF produced cold neutrons 100% of the time that the reactor was at full power.

**Operating Difficulties**

None.

**Maintenance Activities**

All required maintenance and surveillance testing was completed. Commenced work on MRA 95-05, Redesign of Valve N501 and Relocating PIAN501 Pressure Tap. Compressor alignment was checked and corrected. Compressor vibration readings were taken and reviewed with the vendor.

12. Safety

There was one reportable first aid accident for the month of April. The highest quarterly average exposure to radiation for this quarter is 4 mrem.

13. Fuel Element Inventory

Elements in Use as of April 30, 1995

In Reactor(s)	HFBR 28	BMRR 36	64
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Element Movement during the Month

Charged to reactor	7
Discharged from reactor	7

HFBR TECHNICAL SAFETY  
SURVEILLANCE REQUIREMENTS RECORD

April 1995.

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
AA 2.1.exp Chloride Content in Experimental System BIMONTHLY	M	04/01/95	04/10/95	05/18/95
AA 2.1.pri Chloride Content in Primary System BIMONTHLY	M	04/01/95	04/10/95	05/18/95
IR 2.exp Isotopic Purity of Experimental System WEEKLY	M	04/05/95	04/10/95	05/18/95
IR 2.pri Isotopic Purity of Primary System WEEKLY	M	04/05/95	04/10/95	05/18/95
MIS 1.1 Determination of pD with Orion pH meter (Primary System) WEEKLY	M	04/01/95	04/10/95	05/18/95
TC 302 Criticality Alarm System Operability Test MONTHLY	M	03/01/95	04/01/95	05/09/95
TC 310 SPAM Station Checks MONTHLY	M	04/15/95	04/25/95	06/02/95
TC 116A Control Rod Interlock JAN/APR/JUL/OCT	3M	01/22/95	04/15/95	08/05/95
TC 116B SCRAM Logic Action Tests JAN/APR/JUL/OCT	3M	01/22/95	04/15/95	08/05/95
TC 116C SETBACK Logic Action JAN/APR/JUL/OCT	3M	01/22/95	04/15/95	08/05/95

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
TC 116D SCRAM & SETBACK Trip Point & Channel Interdependency JAN/APR/JUL/OCT	3M	01/22/95	04/15/95	08/05/95
TC 116E Nuclear Instrumentation Performance JAN/APR/JUL/OCT	3M	02/02/95	04/27/95	08/17/95
TC 116F LOLOLOW AND LOLOW Logic Action & Channel Interdependency JAN/APR/JUL/OCT	3M	01/23/95	04/17/95	08/07/95
TC 175 Main Control Rod SCRAM Times (Digital System) JAN/APR/JUL/OCT	3M	01/22/95	04/15/95	08/05/95
TC 291 Low-Low-Low Level Pony Motor Trip Relay Test JAN/APR/JUL/OCT	3M	02/01/95	04/16/95	08/06/95
TC 296 LI-107 / LI-109 Operability Check JAN/APR/JUL/OCT	3M	03/13/95	04/22/95	08/12/95
TC 324 Review of HFBR Management Technical and Rad Safety Support JAN/APR/JUL/OCT	3M	01/05/95	04/14/95	08/04/95
TC 117 Bldg. Confinement Leak Rate MAR/SEP	6M/2Y DUE	09/25/94	01/28/95	09/09/95
TC 205 Annual Test - 250V DC Batteries NO. 1 & NO. 2 APR	A	04/13/94	04/22/95	07/22/96
TC 225 HFBR Technical Specification Review APR	A DUE		04/29/94	07/29/95

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
TC 327 Secondary Cooling Water System Holdup Tank Valves Test MAY	A		04/30/95	07/30/96
TC 202A Load Test Pony Motor Battery Supplies APR 1996	5Y	06/03/92	04/24/95	10/24/00
TC 205A.5Y Load Test - 250V DC Batteries NO. 1 APR 1995	5Y DUE		02/21/91	08/21/96
TC 205B.5Y Load Test - 250V DC Batteries NO. 2 APR 1995	5Y DUE		02/25/91	08/25/96
TC 1143 Review of HFBR Experiments JUN	2Y		04/15/95	10/15/97
HE 3&11(A) 24 VDC Battery Float Voltage MONTHLY	M	03/31/95	04/28/95	06/05/95
HG 8(A) LI-109 24 VDC Float Voltage and Battery Operability Check JAN/APR/JUL/OCT	3M	01/03/95	04/17/95	08/07/95
HB 140 RRa-305 & 306 Power Supply Calibration APR	A DUE	04/19/93	04/14/94	07/14/95
HB 27 RRa-105 Calibration APR	A DUE	04/21/93	04/22/94	07/22/95
HB 39 RRa-306 Calibration APR	A DUE	04/21/93	04/15/94	07/15/95
HP 36 LI-107 Calibration FEB	A DUE	02/02/93	02/10/94	05/10/95

**NOTE:** LI107 IS OUT OF SERVICE DUE TO A  
CLOGGED DIP TUBE.

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
HR 10 Aux Rod Worth Measurement APR	A	07/11/94	04/26/95	07/26/96
HR 12...82 (A) Main Rod Reactivity Measurement MAR/SEP	A	07/11/94	04/26/95	07/26/96
HE 3&11(D) 24 VDC Battery Discharge Sep 1994	5Y	04/19/95	04/19/95	10/19/00
TC 627E 250V Monthly Battery Inspection MONTHLY	M	03/01/95	04/03/95	05/11/95
TC 632E Monthly Pony Motor Battery Inspection MONTHLY	M	03/01/95	04/03/95	05/11/95

...end...

## SUMMARY OF HFBR IRRADIATIONS

04/01/95 TO 04/30/95

DATE	PROJECT	HOURS	FACILITY	DESCRIPTION OF SAMPLE
04/01/95	CHEMISTRY	20.000	V-10	LIMESTONE
04/04/95	CHEMISTRY	20.083	V-10	LIMESTONE
04/07/95	PHYSICS	46.167	V-14	Cu-63
04/11/95	CHEMISTRY	20.000	V-10	LIMESTONE
04/13/95	MEDICAL	4.750	V-14	Au-197
04/13/95	DAT	0.333	V-11	SiO2 SLIDES
04/14/95	UNIV. OF MARYLAND	3.000	V-11	TEFLON FILTER
04/26/95	REACTOR	0.083	V-16	STANDARD Al CAPSULE
04/26/95	REACTOR	0.083	V-15	7" START-UP CAPSULE
04/26/95	REACTOR	0.167	V-16	8" SOLID 6061 CAPSULE

TOTAL NO. OF HOURS: 114.6667

TOTAL NO. OF SAMPLE CAPSULES LOADED: 10

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End of Report