

REACTOR OPERATIONS
BROOKHAVEN MEDICAL RESEARCH REACTOR
BROOKHAVEN HIGH FLUX BEAM REACTOR

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INFORMAL REPORT

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Part I

Brookhaven Medical Research Reactor

1. Reactor

The reactor ran for 14 days with 15 startups during the month of December. A total of 62.97 Mwhrs of thermal energy were produced bringing the total to date to 21,551.69 Mwhrs.

2. Instrumentation

There were no instrument occurrences during the month of December 1994.

3. Mechanical Maintenance

All scheduled tickler card maintenance was performed.

4. Occurrence Reports

There were two reportable occurrences for the month of December, 1994.

CH-BH-BNL-BMRR-1994-0003, Personnel Contamination - 12/05/94.

CH-BH-BNL-BMRR-1994-0004, Reactor Scram Caused by Trip of Wide Beam Facility Door Switch - 12/20/94.

5. Safety

There were no reportable first aid cases at the Brookhaven Medical Research Reactor for the month of December, 1994.

BMRR TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENTS RECORD

MONTH December YEAR 1994

<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>
Operations					
Confinement System					
a. Nuclear Incident System (M-4.2.4)	M	11/14/94	12/94	12/19/94	
b. Bldg. Relief Valves (M-4.2.2)	M	11/15/94	12/94	12/15/94	
c. Control Rod Seating (M-4.8.6)	M	11/01/94	12/94	12/01/94	
Instrumentation					
a. Control Rod Drop Times (Q-4.3.4)	Q	09/27/94	12/94	01/03/95	

[TSSRR/dectechs]

M = Monthly
 Q = Quarterly
 () = Date of the month in which card is issued
 A/2 = Semi-Annually
 A = Annually

SUMMARY OF BMRR IRRADIATIONS

12/01/94 TO 12/31/94

DATE	PROJECT	HOURS	FACILITY	DESCRIPTION OF SAMPLE
12/01/94	MEDICAL	3.300	TREATMENT ROOM #1	RATS
12/02/94	DAT	3.750	Pn-TUBE	SiO2 SLIDES
12/02/94	MEDICAL	6.167	RADIAL	CELLS w/B-10
12/14/94	MEDICAL	0.250	Pn-TUBE	TISSUE w/Gd-158
12/14/94	MEDICAL	1.833	TREATMENT ROOM #1	CELLS w/B-10
12/14/94	MEDICAL	2.333	TREATMENT ROOM #2	Au FOILS
12/15/94	DAT	3.750	Pn-TUBE	SiO2 SLIDES
12/15/94	MEDICAL	4.417	RADIAL	CELLS w/B-10
12/20/94	MEDICAL	0.467	TREATMENT ROOM #2	TLD's, Au FOILS
12/20/94	MEDICAL	0.250	Pn-TUBE	TISSUE w/Gd & B
12/29/94	CHEMISTRY	0.500	Pn-TUBE	LIMESTONE
12/29/94	DAT	3.750	Pn-TUBE	SiO2 SLIDES
12/29/94	MEDICAL	6.650	RADIAL	CELLS w/B-10
12/30/94	MEDICAL	6.150	RADIAL	CELLS w/B-10, I-125

TOTAL NO. OF HOURS: 43.56667

TOTAL NO. OF SAMPLE CAPSULES LOADED: 6

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PART II

Brookhaven High Flux Beam Reactor

December

31 Days

10625 - 10655

Reactor Operation to Date	274,303.07	MWD
Reactor Operation for Month	797.20	MWD
Hours of Operation	639.20	HRS
Average Power Level ((MWDx24) / Hours of Operation)	29.93	MW
Maximum Power Level	30.00	MW
Downtime	14.08	%
Electrical Energy Consumed within HFBR Bldg.	1,024,000.	KWH
Electrical Energy Consumed by Sec. Water Pumps	250,800.	KWH
Electrical Energy Consumed in Pumphouse 440V System	5,600.	KWH
Total Electrical Energy Consumed within HFBR Complex	1,280,400.	KWH
Electrical Energy Consumed by CNF Compressor	251,200.	KWH
Elements Charged this Month	7	
Elements Discharged this Month	7	
Reactor D ₂ O Inventory (within 200 pounds)	102,664.00 (46,568.39)	LBS KG)
Reactor D ₂ O Isotopic Purity (Average All Systems)	99.52	%
Helium Consumed (NTP)	22,401.4 (633.	CF CM)
CO ₂ Consumed	13,400. (6,078.	LBS KG)

DECEMBER 1994

HFBR

MAXIMUM POWER LEVEL 30MW

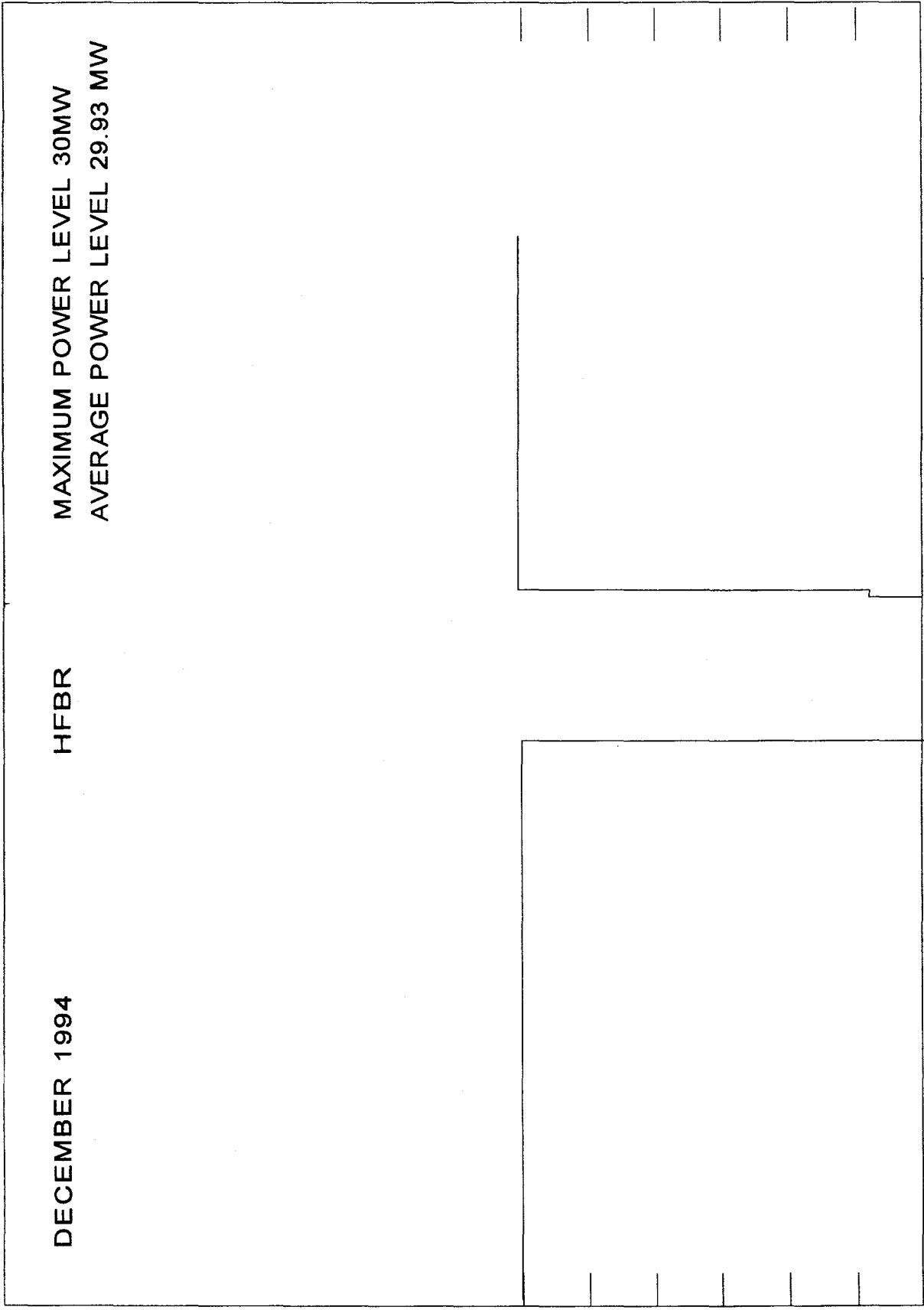
AVERAGE POWER LEVEL 29.93 MW

30
25
20
15
10
5
0

POWER LEVEL, MEGAWATTS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

DATE



2. Explanation of Histogram

Operating Cycle No. 276 was in progress at the beginning of this report period. On December 18, 1994 at 0100 hours, the reactor was shutdown for scheduled maintenance and refueling.

On December 22, 1994 at 1000 hours, the reactor was started up to verify the Estimated Critical Position (ECP). Power was raised to 4MW for a Health Physics shield check and at 1120 hours power was raised to 30MW for Operating Cycle No. 277.

3. Operating Difficulties

On December 5, 1994, Pony Motor GP101B current was observed fluctuating between 2 and 10 amps for approximately a 1 hour period and a momentary trip of the GP101B Current High/Low scram occurred. The current then settled out at approximately 1.5 amps, lower than the normal value of 2.0 amps. The scram fuse for GP101B Current was removed to place the channel in a tripped condition. A Temporary Operating Procedure, requiring increased surveillance and guidance on Pony Motor shutdown, was issued until further investigation could be conducted during the next reactor shutdown. Troubleshooting by the Reactor Maintenance Group (RMG), during the reactor shutdown, revealed worn brushes and carbon on the commutator. The brushes were replaced and GP101B tested satisfactory.

On December 21, 1994 "D₂O Level Low" scram channels L1a106 and LA102 and "D₂O Level Low-Low Reactor" channel L1a106 annunciators alarmed during pressurization of the reactor vessel. Other vessel level instruments indicated the expected value of 228 inches. Troubleshooting by RIG identified a faulty helium flow controller shared by both L1a106 and LA102. The flow controller was subsequently replaced and tested satisfactory.

4. Reactivity Comments

The excess reactivity at the end of Operating Cycle No. 276 was 0.0\$. The excess reactivity at the start of Operating Cycle No. 277 was 21.12\$.

5. Building Confinement Test and Changes

A scheduled confinement break took place December 18, 1994 by placing the Exit Air Bypass Filter Facility in the filter bypass mode to permit epoxy pours within the confinement building. Confinement was restored on December 20, 1994.

6. Changes to Reactor or Process Systems

None.

7. Instrumentation

There were no instrument occurrences during the month of December 1994.

8. Mechanical Maintenance

All scheduled tickler card maintenance was performed.

9. Occurrence Reports

There was one reportable occurrence at the High Flux Beam Reactor for the month of December, 1994.

CH-BH-HFBR-1994-0015, Radioactive Contamination on Experimental Level (Crystal Sample - 12/22/94).

10. Experimental Facilities

Experimental work was in progress on the following beam lines from December 1 - 17, 1994 and December 22 - 31, 1994. The reactor was shutdown for maintenance December 18 - 21, 1994.

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 automatically vented and purged at 1015 hours on 12/4/94. The CNF restarted at 1836 hours on 12/4/94 and the moderator chamber was filled to approximately 37 SCF of hydrogen. The CNF completed a planned vent and purge at 0907 hours on 12/17/94 and, the reactor shutdown at 0100 hours on 12/18/94. The CNF started up with the reactor on 12/22/94 and the moderator chambers was filled to approximately 37 SCF at 1249 hours. The CNF continued to operate until the end of the reporting period.

The CNF operated 612.0 hours during December. Lost time was due to a failed power supply and a planned vent and purge. The CNF produced cold neutrons 96% of the time the reactor was at full power.

Operating Difficulties

The CNF automatically vented and purged on 12/4/94 when the 5 VDC, 1000 mA power supply failed. The failure of the power supply caused a short that caused a momentary loss of power to the CNF console. The loss of power to the CNF console caused the automatic vent and purge. The failed power supply was replaced and post work testing was satisfactorily completed. The CNF was refilled later that same day.

The CNF completed a planned vent and purge on 12/17/94 to allow the CNF technicians sufficient time to complete surveillance testing and maintenance work during the extremely short reactor shutdown period. As a result, the CNF was able to start up with the reactor at the end of the planned shutdown.

The CNF lost 8.3 hours due to the power supply failure and 15.9 hours due to the planned vent and purge.

Maintenance Activities

All required maintenance and surveillance testing was completed.

12. Safety

There were no first aid or lost time accidents for the month of December 1994.

13. Fuel Element Inventory

Elements in Use as of December 31, 1994

In Reactor(s)	HFBR 28	BMRR 35	63
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Element Movement during the Month

Charged to reactor	7		
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Discharged from reactor	7		
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**HFBR TECHNICAL SPECIFICATION
SURVEILLANCE REQUIREMENTS RECORD**

December 1994.

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
AA 2.1.exp Chloride Content in Experimental System BIMONTHLY	M	12/12/94	12/27/94	02/03/95
AA 2.1.pri Chloride Content in Primary System BIMONTHLY	M	12/12/94	12/27/94	02/03/95
IR 2.exp Isotopic Purity of Experimental System WEEKLY	M	12/12/94	12/27/94	02/03/95
IR 2.pri Isotopic Purity of Primary System WEEKLY	M	12/12/94	12/27/94	02/03/95
MIS 1.1 Determination of pD with Orion pH meter (Primary System) WEEKLY	M	12/07/94	12/12/94	01/19/95
TC 302 Criticality Alarm System Operability Test MONTHLY	M	11/01/94	12/01/94	01/08/95
TC 310 SPAM Station Checks MONTHLY	M	11/14/94	12/21/94	01/28/95
HE 3&11(A) 24 VDC Battery Float Voltage MONTHLY	M DUE	11/01/94	11/30/94	01/07/95
HB 126&127 GA-101A & B Pump Circuits Cal, Trip Pt & Time Delay Check JUN/DEC	6M	06/02/94	12/20/94	08/01/95

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
HO 88...HU143 Criticality Alarm System Calibration JUN/DEC	6M	07/19/94	12/15/94	07/27/95
HB 10-12 NSS Amplifier Calibration JUN/DEC	A	06/20/94	12/01/94	03/01/96
HB 247 CH 9 Internal 7.5 VDC Battery Load Test and Replacement DEC	A	12/14/93	12/27/94	03/27/96
HB 53 Pyrometer Recorder and Thermocouple (TRa-3,4,9,6,11) Calib JUN/DEC	A	06/06/94	12/02/94	03/02/96
HO 22-28 FIa-10-16 Calibration DEC	A	11/29/93	12/19/94	03/19/96
HO 56 LIa-103 Calibration DEC	A	11/30/93	12/19/94	03/19/96
HP 22 NSS CH1 Chamber Characteristics Curve MAR/JUN/SEP/DEC	A	10/12/94	12/06/94	03/06/96
HP 25 NSS CH2 Chamber Characteristics Curve MAR/JUN/SEP/DEC	A	10/12/94	12/06/94	03/06/96
HP 28 NSS CH3 Chamber Characteristics Curve MAR/JUN/SEP/DEC	A	10/12/94	12/06/94	03/06/96
HR 12...82 (A) Main Rod Reactivity Measurement MAR/SEP	A DUE	06/14/93	07/11/94	10/11/95
HT 10 TI-25 Calibration DEC	A	11/18/93	12/02/94	03/02/96

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
HT 49 PdIa-102 Calibration JUN/DEC	A	07/08/94	12/20/94	03/20/96
HT 50 PdIa-103 Calibration JUN/DEC	A	07/08/94	12/20/94	03/20/96
HT 51 PdRa-101 Calibration JUN/DEC	A	07/08/94	12/20/94	03/20/96
HT 67-70 FCF Chambers (RRa-101, 102, 103 and Spare) Calibration MAR/JUN/SEP/DEC	A	10/12/94	12/20/94	03/20/96
HU 71 TI-26 Calibration DEC	A	11/18/93	12/02/94	03/02/96
HW 209 TI-27 Calibration DEC	A	11/18/93	12/02/94	03/02/96
HE 3&11(D) 24 VDC Battery Discharge Sep 1994	5Y DUE		11/27/89	05/27/95
TC 627E 250V Monthly Battery Inspection MONTHLY	M	11/01/94	12/01/94	01/08/95
TC 632E Monthly Pony Motor Battery Inspection MONTHLY	M	11/01/94	12/01/94	01/08/95

...end...

SUMMARY OF HFBR IRRADIATIONS

12/01/94 TO 12/31/94

DATE	PROJECT	HOURS	FACILITY	DESCRIPTION OF SAMPLE
12/02/94	PHYSICS	71.500	V-14	Cu-63
12/06/94	PHYSICS	94.867	V-14	Cu-63
12/06/94	CHEMISTRY	26.000	V-10	LIMESTONE
12/09/94	PHYSICS	71.167	V-14	Cu-63
12/09/94	DAT	0.333	V-11	SiO2 SLIDES
12/09/94	REACTOR	0.017	V-11	I-127
12/13/94	REACTOR	0.017	V-11	I-127
12/13/94	CHEMISTRY	26.000	V-10	LIMESTONE
12/15/94	MEDICAL	6.000	V-10	GOLD
12/18/94	LOS ALAMOS	1548.000	V-15	MgTiO3, MgTiO5, AlTiO5, MgFeO4
12/22/94	DAT	0.333	V-11	SiO2 SLIDES
12/28/94	MEDICAL	26.500	V-10	LIMESTONE
12/28/94	UNIV. OF MARYLAND	33.000	V-14	TEFLON/CELLULOSE FILTERS

TOTAL NO. OF HOURS: 1903.733

TOTAL NO. OF SAMPLE CAPSULES LOADED: 13

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