BNL-61329
INFORMAL

REACTOR OPERATIONS

BROOKHAVEN MEDICAL RESEARCH REACTOR

BROOKHAVEN HIGH FLUX BEAM REACTOR

H. M. Hauptman, Group Leader, Medical Reactor
J. N. Petro, Group Leader, Instrumentation
O. Jacobi, Group Leader, Maintenance
V. Lettieri, Group Leader, Cold Neutron Facility
N. Holden, Research Coordinator
D. Ports, Group Leader, Operations
R. Petricek, Group Leader, Compliance
Approved: Lance L. Junker, Manager, Reactor Division

SEPTEMBER 1994

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

DISCLAIMER

Part I

Brookhaven Medical Research Reactor

1. Reactor

The reactor ran for 18 days with 28 startups during the month of September. A total of 135.93 Mwhrs of thermal energy were produced bringing the total to date to 21,234.94 Mwhrs.

2. Instrumentation

There were no reportable events during the month of September, 1994.

3. Mechanical Maintenance

All tickler card maintenance was completed.

4. Occurrence Reports

There were no reportable occurrences at the BMRR for the month of September, 1994.

5. Safety

There were no reportable first aid cases at the reactor for the month of September, 1994.

BMRR TECHNICAL SAFETY REQUIREMENTS SURVEILLANCE REQUIREMENTS RECORD

MONTH September **YEAR** 1994

Requirement	Period	Previous Completion Date	Scheduled Date	Completion Date	Deadline if Not Completed
Operations					
Confinement System					
a. Nuclear Incident System (M-4.2.4)	M	08/18/94	09/94	09/19/94	
b. Bldg. Relief Valves (M-4.2.2)	M	09/01/94	09/94	09/15/94	
c. Reactivity Limitation (A-4.3.1)	A	09/20/93	09/94	09/26/94	
Instrumentation					
a. Release Time Rod Holding Magnets (A-4.3.7)	A	09/13/93	09/94	09/21/94	
b. Control Rod Drop Times (Q-4.3.4)	Q	07/20/94	09/94	09/27/94	
c. Control Rod Worths (A-4.3.2)	A	09/20/93	09/94	09/27/94	
d. Control Rod Withdrawal Speed (A-4.3.3)	A	09/13/93	09/94	09/21/94	
e. Response Time AC Power Loss (A-4.3.8)	A	11/08/93	09/94	09/21/94	
f. Radiation Monitors Calibration	A	08/26/93	09/94	10/10/94	

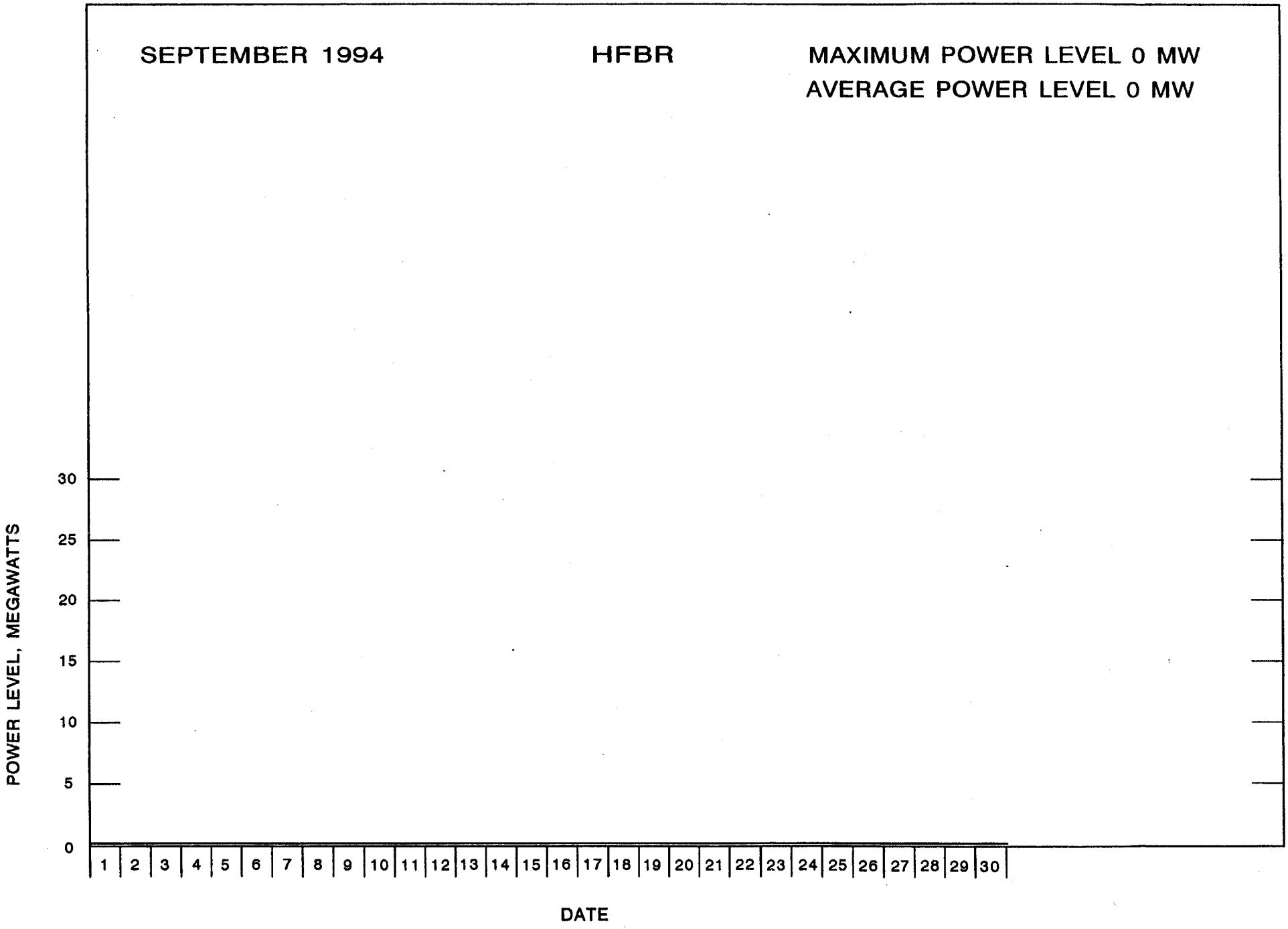
[TSSRR/septechs]

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

SUMMARY OF BMRR IRRADIATIONS
09-01-94 TO 09-30-94

DATE	PROJECT	HOURS	FACILITY	DESCRIPTION OF SAMPLE
09/01/94	DAT	3.250	Pn-TUBE	SiO2 SLIDES
09/01/94	MEDICAL	5.500	RADIAL	CELLS w/B-10
09/02/94	REACTOR	1.833	ANIMAL	BNCT TREATMENT EQMT
09/06/94	MEDICAL	1.550	PATIENT	CELLS
09/06/94	MEDICAL	1.167	PATIENT	CELLS IN GdCl3
09/07/94	MEDICAL	6.717	PATIENT	RATS
09/08/94	MEDICAL	6.883	PATIENT	RATS
09/08/94	DAT	0.267	Pn-TUBE	Th(NO3)4 (Th-232)
09/09/94	MEDICAL	6.917	PATIENT	RATS
09/13/94	MEDICAL	0.617	RADIAL	BPA (B-10) SOLUTION
09/13/94	MEDICAL	0.167	ANIMAL	FLUX MEASUREMENTS
09/13/94	MEDICAL	0.133	Pn-TUBE	In-115 STDS
09/13/94	MEDICAL	2.500	PATIENT	RATS
09/13/94	MEDICAL	1.050	ANIMAL	BNCT PATIENT (FEM)
09/14/94	MEDICAL	2.000	PATIENT	CELLS
09/15/94	MEDICAL	6.450	PATIENT	RATS
09/16/94	MEDICAL	6.000	PATIENT	RATS
09/20/94	MEDICAL	6.333	RADIAL	CELLS w/B-10
09/20/94	DAT	3.450	Pn-TUBE	SiO2 SLIDES
09/22/94	CHEMISTRY	0.333	Pn-TUBE	LIMESTONE
09/22/94	MEDICAL	0.167	Pn-TUBE	GdCl3 (Gd-158)
09/22/94	MEDICAL	2.500	PATIENT	RATS
09/23/94	MEDICAL	1.167	PATIENT	CELLS
09/27/94	MEDICAL	1.383	PATIENT	CELLS
09/29/94	MEDICAL	6.633	RADIAL	CELLS w/B-10
09/29/94	S&EP	0.375	Pn-TUBE	I-127
09/29/94	DAT	3.750	Pn-TUBE	SiO2 SLIDES
09/30/94	MEDICAL	6.567	RADIAL	CELLS w/B-10

TOTAL NO. OF HOURS=86
TOTAL NO. OF SAMPLE CAPSULES LOADED=8


SEPTEMBER 1994
HFBR
MAXIMUM POWER LEVEL 0 MW
AVERAGE POWER LEVEL 0 MW
POWER LEVEL, MEGAWATTS
30
25
20
15
10
5
0
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
DATE

PART II

Brookhaven High Flux Beam Reactor

September

30 Days

10534 - 10563

Reactor Operation to Date	272,228.63	MWD
Reactor Operation for Month	0.00	MWD
Hours of Operation	0.00	HRS
Average Power Level ((MWDx24) / Hours of Operation)	0.00	MW
Maximum Power Level	0.00	MW
Downtime	100.00	%
Electrical Energy Consumed within HFBR Bldg.	438,000.	KWH
Electrical Energy Consumed by Sec. Water Pumps	4,400.	KWH
Electrical Energy Consumed in Pumphouse 440V System	2,200.	KWH
Total Electrical Energy Consumed within HFBR Complex	444,600.	KWH
Electrical Energy Consumed by CNF Compressor	60,000.	KWH
Elements Charged this Month	0	
Elements Discharged this Month	0	
Reactor D_2O Inventory (within 200 pounds)	103,491.00 (46,943.51	LBS KG)
Reactor D_2O Isotopic Purity (Average All Systems)	99.53	%
Helium Consumed (NTP)	14,300. (404.	CF CM)
CO2 Consumed	5,000. (2,268.	LBS KG)

2. Explanation of Histogram

The reactor was not operated during the month of September. The reactor has been shutdown since August 18, 1994 for scheduled maintenance, refueling and continuation of the investigation of elevated tritium levels in the CO_2 cavity. Based upon the final results of all the inspections, test procedures and evaluations it was concluded that these elevated tritium levels was caused by a water (D_2O) spill in the reactor pit during repair of emergency level indicator, LI109 (see January and February monthly reports). Further details may be found in Occurrence Report CH-BH-BNL-HFBR-1994-0009.

3. Operating Difficulties

On September 7, 1994 in preparation for a five year battery test by the Reactor Instrument Group, there was a momentary interruption of 24 VDC power, as a lug was lifted from the battery post to connect a test cable causing an unplanned trip of the Nuclear Incident Alarm System (NIAS). The test was terminated and the NIAS system was reset after restoring building ventilation to normal. This event was categorized as an unusual occurrence and further details may be found in Occurrence Report CH-BH-BNL-HFBR-1994-0010.

On September 14, 1994 at approximately 1200 hours, during fuel discharging operations, a spent fuel element suspended over the reactor was inadvertently dropped back into the reactor vessel. The fuel element, which came to rest on the transition plate, appeared undamaged. Visual inspection of the top of the reactor core and other vessel components also revealed no damage. The dropped element was returned to its core position and fuel discharging operations were suspended. This event was categorized as an unusual occurrence and further details may be found in Occurrence Report CH-BH-BNL-HFBR-1994-0011.

On September 23, 1994 at approximately 0130 hours Operations personnel reported a small water leak on the equipment level. The leak was from outside rain water leaking through the concrete wall on the equipment level. A confinement test as described later in this report confirmed that the hairline crack was insignificant and repairs could be delayed and scheduled for a future shutdown.

On September 26, 1994 at 2210 hours the control room received a leak detector alarm from the HFBR equipment level. An operator responded to the equipment level and noted a strong acrid smell and immediately left the area. The shift supervisor ordered a precautionary evacuation of the HFBR Facility (Building 750). Monitoring of the control room instrumentation was established at the South Lobby. A fire/rescue team and a reactor operator were dispatched to the equipment level wearing SCBA to sample for atmospheric chemical contaminants. A pipe break in the building air conditioning secondary cooling water system was found and isolated by the Operator. The cause of the chemical odor was a bromine/chlorine compound used to chemically treat the water. The control room was remanned on September 27 at approximately 0400 hours and access to the equipment level was restricted as plans were

made to for reentry and cleanup. Normal access to the equipment level was restored on September 30, 1994. This event was categorized as an unusual occurrence and further details may be found in Occurrence Report CH-BH-BNL-HFBR-1994-0012.

4. Reactivity Comments

None.

5. Building Confinement Test and Changes

A surveillance test was performed on September 25, 1994 to satisfy the Building Confinement Leak Rate Technical Safety Requirements. Calculations performed at the completion of a 12 hour, 1 psi confinement leak rate test indicated a leak rate of 4.85 $\pm$.11% per day which meets the TSR upper limit of 6.2% per day.

Building confinement was considered broken since the September 26, 1994 chemical release reported above, due to possible degradation of the Exit Air Bypass Filter Facility. On September 28, 1994 a collection efficiency test was performed on the HEPA filters. The resulting efficiency of the test was 99.979%. On September 29, 1994 an iodine absorption test of the charcoal filters was performed. The results of this test were unsatisfactory but were within one percent of passing. The test was rescheduled for October 3, to allow at least 3 days of normal air flow through the filters to remove absorbed contaminants.

6. Changes to Reactor or Process Systems

The Gamewell transmitters used to transmit the NIAS and fire alarm signals from the HFBR to the Fire and Security Group were replaced. The NIAS alarm is now transmitted to Security via the Moseler System. Both fire and NIAS alarm are transmitted to the firehouse via the Wormald Site Fire Alarm System, through the Data Gathering Panel in the HFBR lobby. Installation by the Site Fire Alarm Group and testing by Operations personnel was completed satisfactorily on September 21, 1994.

7. Instrumentation

During routine testing of the 24 VDC Battery Bank, the constant loads connected to the battery were deenergized. The test was terminated and an occurrence report generated. Details of this event are in UOR CH-BH-BNL-HFBR-1994-0010.

8. Mechanical Maintenance

All scheduled tickler card maintenance was performed.

9. Occurrence Reports

There were three reportable occurrences at the HFBR during the month of September, 1994.

CH-BH-BNL-HFBR-1994-0010, Unplanned Trip of Nuclear Incident Alarm System (NIAS) During Maintenance Testing - 9/7/94.

CH-BH-BNL-HFBR-1994-0011, Dropped HFBR Spent Fuel Element During Fuel Discharging Operation - 9/14/94.

CH-BH-BNL-HFBR-1994-0012, Precautionary Evacuation of Building 750 Due to Chemical Odor - 9/26/94.

10. Experimental Facilities

The reactor was shutdown for the month of September, 1994. There was no experimental work being performed.

11. Cold Neutron Facility

Operating History

The CNF was shutdown for the entire month of September, 1994.

Operating Difficulties

None.

Maintenance Activities

All required maintenance and surveillance testing was completed. Started installation of new helium refrigerator temperature diodes and indicator, MRA #94-13.

12. Safety

There were four reportable first aid cases for the month of September, 1994.

13. Fuel Element Inventory

Elements in Use as of September 30, 1994

In Reactor(s)	HFBR 28	BMRR 35	63

Element Movement during the Month

Charged to reactor	0
Discharged from reactor	0

HFBR TECHNICAL SPECIFICATION
SURVEILLANCE REQUIREMENTS RECORD

September 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	09/19/94	09/26/94	11/03/94
AA 2.1.pri *Chloride Content in Primary System* BIMONTHLY	M	09/19/94	09/26/94	11/03/94
IR 2.exp *Isotopic Purity of Experimental System* WEEKLY	M	09/19/94	09/26/94	11/03/94
IR 2.pri *Isotopic Purity of Primary System* WEEKLY	M	09/19/94	09/26/94	11/03/94
MIS 1.1 *Determination of pD with Orion pH meter (Primary System)* WEEKLY	M	09/19/94	09/26/94	11/03/94
TC 302 *Criticality Alarm System Operability Test* MONTHLY	M	08/01/94	09/02/94	10/10/94
TC 310 *SPAM Station Checks* MONTHLY	M	08/15/94	09/17/94	10/25/94
TC 116E *Nuclear Instrumentation Performance* JAN/APR/JUL/OCT	3M **OVERDUE**	03/24/94	06/08/94	09/28/94
TC 116F *LOLOLOW AND LOLOW Logic Action & Channel Independency* JAN/APR/JUL/OCT	3M	06/04/94	09/13/94	01/03/95

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
TC 291 *Low-Low-Low Level Pony Motor Trip Relay Test* JAN/APR/JUL/OCT	3M	06/07/94	09/12/94	01/02/95
TC 324 *Review of HFBR Management Technical and Rad Safety Support* JAN/APR/JUL/OCT	3M	07/11/94	09/30/94	01/20/95
TC 117 *Bldg. Confinement Leak Rate* MAR/SEP	6M	04/16/94	09/25/94	05/07/95
TC 134 *Exit Air Bypass Filter Tests* SEP	A	04/21/94	09/29/94	12/29/95
TC 160 *HFBR Main Control Rod Shutdown Margin Test* AUG	A **DUE**	09/04/92	09/03/93	12/03/94
HE 3&11(A) *24 VDC Battery Float Voltage* MONTHLY	M **DUE**	07/29/94	08/31/94	10/08/94
HE 3&11(B) *24 VDC Battery Load Test* SEP	A	09/10/93	09/12/94	12/12/95
HP 22 *NSS CH1 Chamber Characteristics Curve* MAR/JUN/SEP/DEC	A **DUE**	03/03/94	06/14/94	09/14/95
HP 25 *NSS CH2 Chamber Characteristics Curve* MAR/JUN/SEP/DEC	A **DUE**	03/03/94	06/16/94	09/16/95
HP 28 *NSS CH3 Chamber Characteristics Curve* MAR/JUN/SEP/DEC	A **DUE**	03/03/94	06/14/94	09/14/95
HR 12...82(A) *Main Rod Reactivity Measurement* MAR/SEP	A **DUE**	06/14/93	07/11/94	10/11/95

Requirement	Tech Spec Period	Previous Completion Date	Current Completion Date	Tech Spec Deadline
HT 67-70 *FCF Chambers (RRa-101, 102, 103 and Spare) Calibration* MAR/JUN/SEP/DEC	A **DUE**	03/03/94	06/16/94	09/16/95
HU 54 *FIa-301 Calibration* SEP	A	09/22/93	09/23/94	12/23/95
HU 58 *FI-303 Calibration* SEP	A	09/22/93	09/23/94	12/23/95
HU 331-333 *Peak Acceleration Recorder Calibration* Sep 1994/Mar 1996	18M	04/01/93	09/29/94	07/29/96
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	08/01/94	09/01/94	10/09/94
TC 632E *Monthly Pony Motor Battery Inspection* MONTHLY	M	08/01/94	09/01/94	10/09/94

...end...

SUMMARY OF HFBR IRRADIATIONS
09-01-94 TO 09-30-94

NO IRRADIATIONS PERFORMED