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MARTIN MARIETTA

Oak Ridge Research Reactor Quarterly Report October, November, and December 1986

T. P. Hamrick
M. K. Ford

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Operations Division
Reactor Operations Section

OAK RIDGE RESEARCH REACTOR QUARTERLY REPORT OCTOBER, NOVEMBER, AND DECEMBER 1986

T. P. Hamrick
M. K. Ford

SPONSOR: J. H. Swanks
Operations Division

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OAK RIDGE RESEARCH REACTOR QUARTERLY REPORT
OCTOBER, NOVEMBER, AND DECEMBER 1986

SUMMARY

The ORR operated at an average power level of 29.9 MW for 88.5% of the time during October, November, and December of 1986.

The reactor was shut down on ten occasions, two of which were unscheduled. Reactor downtime needed for refueling and checks was normal. The reactor remained available for operation 89.4% of the time.

Maintenance activities, both mechanical and instrument, were essentially routine in nature with the exception of two Instrumentation and Controls Change memorandums.

POWER HISTORY

The power history for the quarter is displayed in Figs. 1 through 3.

OPERATIONS

The basic operating data presented in Table 1 indicate that the ORR operation for the quarter was normal.

Details relative to cycles of operation during the quarter are given in Table 2.

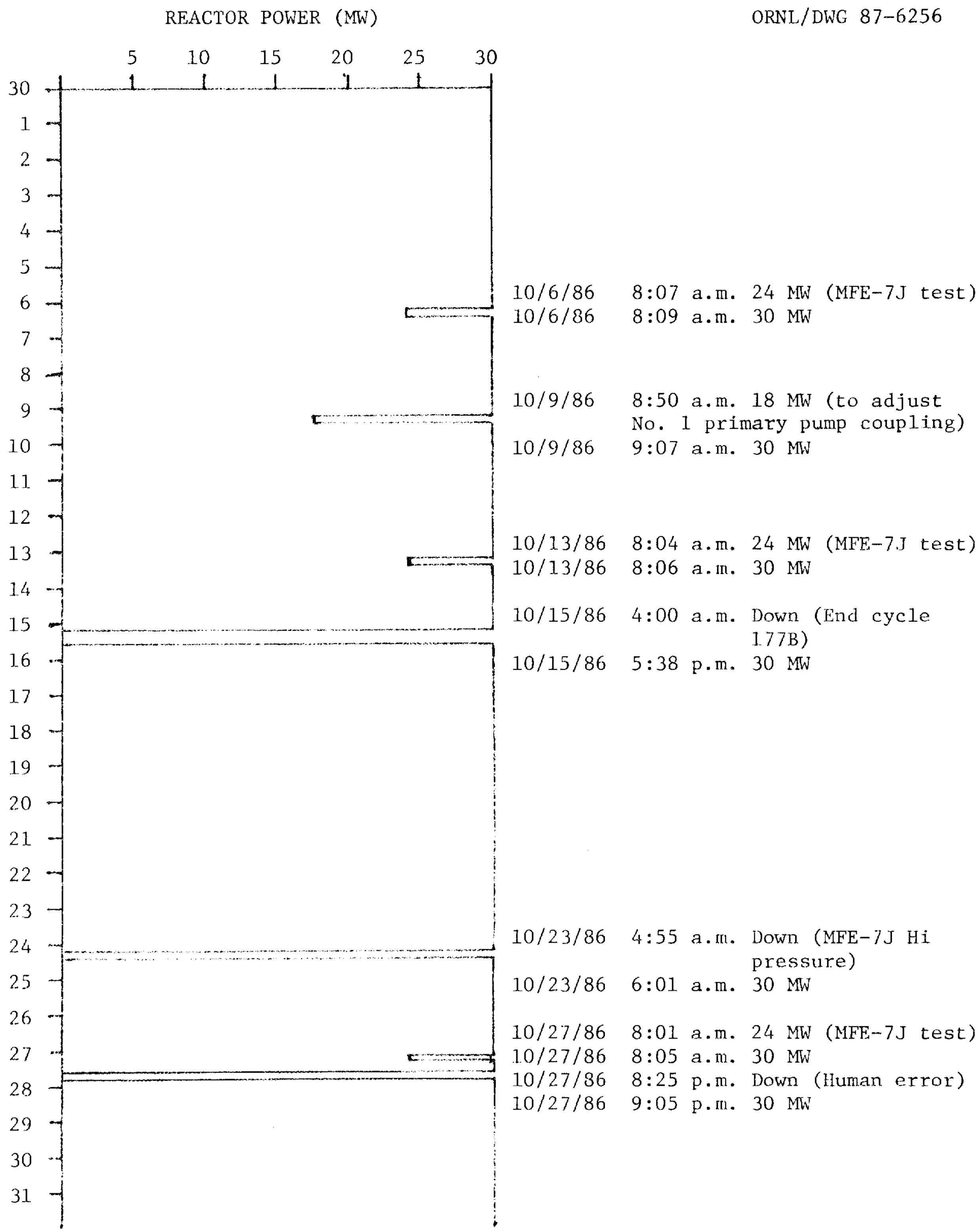

Fig. 1. Reactor power history - October 1986.

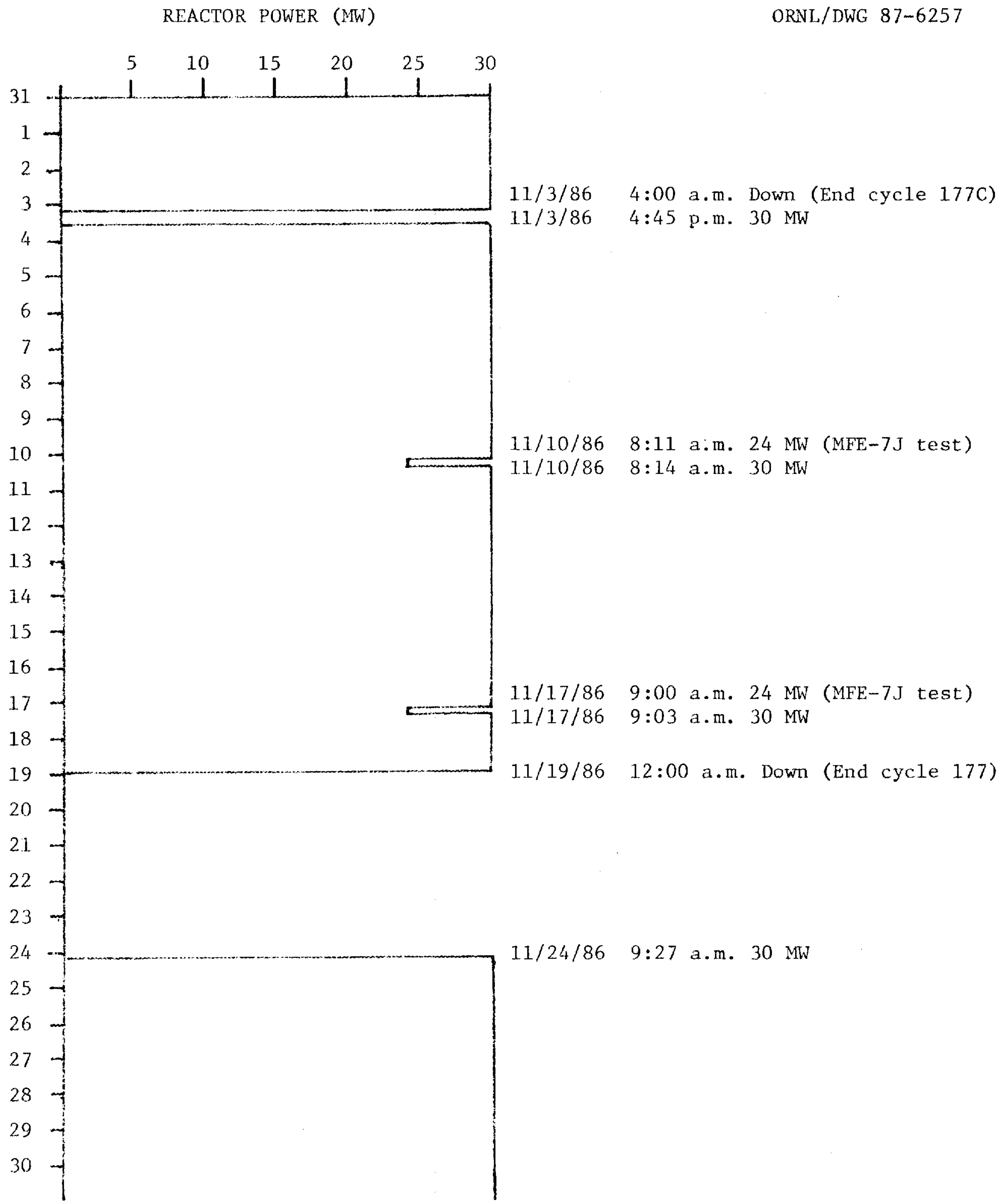

Fig. 2. Reactor power history - November 1986.

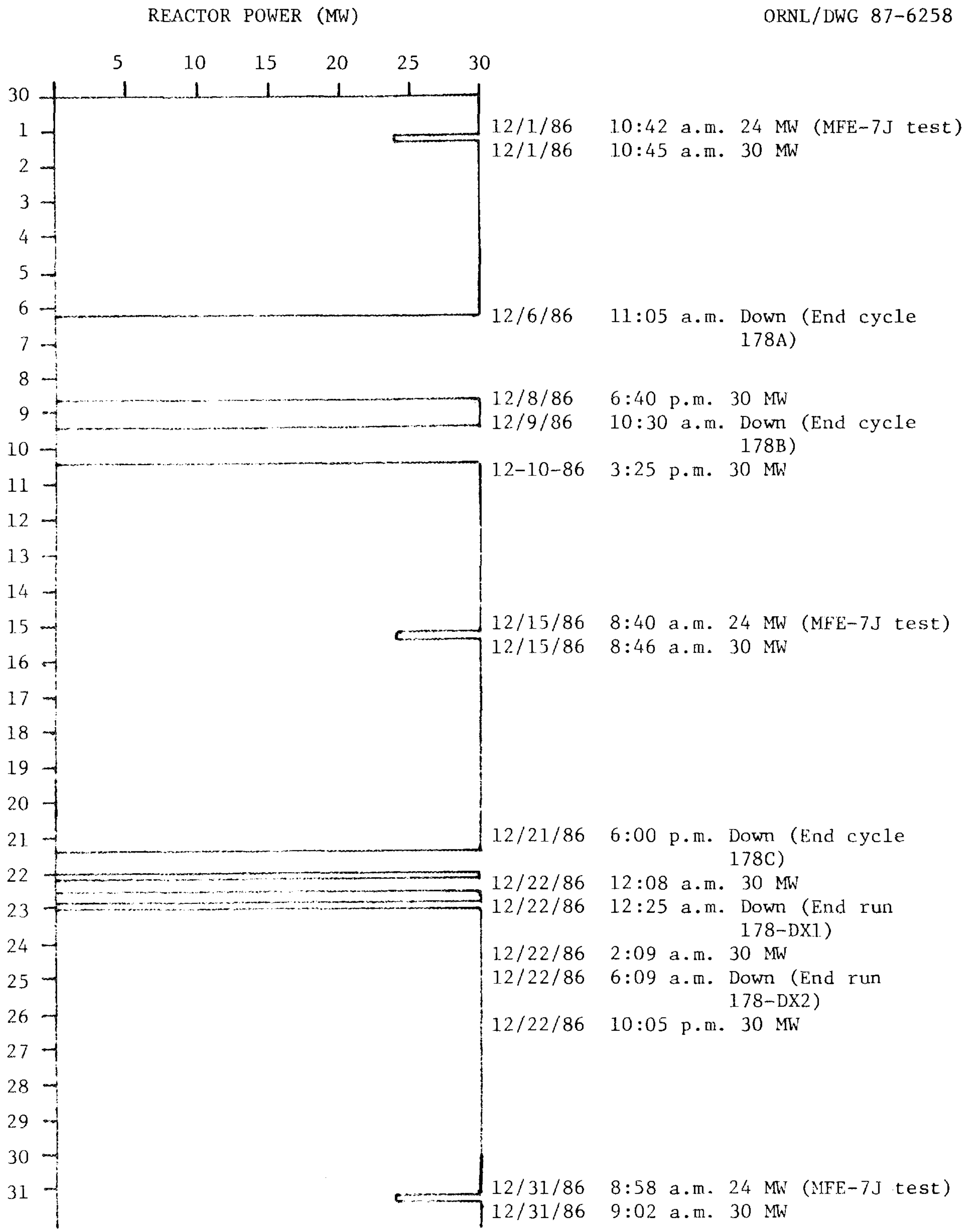

Fig. 3. Reactor power history - December 1986.

Table 1. Basic operating data
(October-December 1986)

	This quarter		Last quarter		Calendar year 1986		Calendar year 1985
Total energy, MWd	2,433.6		2,303.9		8,353.9		8,198.5
Average power, MW	29.9		29.9		29.8		29.8
Time operating, %	88.5		83.9		76.7		75.3
Availability, %	89.4		86.3		84.6		80.0
Reactor water radioactivity, cpm/ml (av)	42,600		38,000		40,550		30,250
Pool water radioactivity, cpm/ml (av)	2,000		1,600		1,568		953
Reactor water resistivity, ohm-cm (av)	1,065,000		1,375,000		1,262,000		1,497,500
Pool water resistivity, ohm-cm (av)	891,000		951,000		923,000		1,052,750
	HEU	LEU	HEU	LEU	HEU	LEU	HEU
Fuel elements depleted	4	0	18	0	49	0	80
Average burnup of fuel elements depleted, %	53.1	NA	52.3	NA	50.4	NA	46.0
Shim-safety rods depleted	2	0	0	0	6	0	8
Average burnup of shim-safety rods depleted, %	75.5	NA	NA	NA	76.0	NA	77.2
Radioisotope samples	0		0		0		0
Research samples	0		24		88		25

Table 2. Cycles of operation

Cycle No.	Date begun	Date ended	Accumulated energy (MWd)
177	September 11, 1986	November 19, 1986	2,012.2[a]
178	November 24, 1986	In progress	696.5

[a]MWd this quarter

FUEL USAGE AND INVENTORY

Four fuel elements and two shim-safety rods were declared spent during the quarter. Eleven fuel elements and two shim-safety rods were placed in service during this quarter.

Other details of fuel usage and inventory may be found in Tables 1 and 3.

Table 3. Fuel status

	This quarter	Last quarter	Jan.-Dec. 1986	Jan.-Dec. 1985
HEU				
Depleted fuel elements transferred for chemical recovery	0	0	46	75
Average percent burnup of fuel elements transferred	--	--	46.8	45.3
New elements, start of quarter	139	139	--	--
New elements received	0	0	0	72
New elements placed in service	0	0	2	57
New elements, end of quarter	139	139	--	--
Special or test elements	21	21	21	21
Depleted shim-safety rod elements transferred for chemical recovery	0	0	5	7
Average percent burnup of shim-safety rods transferred	--	--	81.8	78.4
New shim-safety rod elements, start of quarter	8	8	--	--
New shim-safety rod elements received	0	0	0	1
New shim-safety rod elements placed in service	0	0	2	8
New shim-safety rod elements, end of quarter	8	8	8	--

Table 3. (continued)

	This quarter	Last quarter	Jan.-Dec. 1986	Jan.-Dec. 1985
LEU				
Depleted fuel elements transferred for chemical recovery	0	0	0	0
Average percent burnup of fuel elements transferred	—	—	—	—
New elements start of quarter	52	46	80	—
New elements received	0	19	80	—
New elements placed in service	11	13	59	—
New elements end of quarter	41	52	—	—
Special or test elements	0	0	0	0
Depleted shim-safety rod elements transferred for chemical recovery	0	0	0	0
Average percent burnup of shim-safety rods transferred	—	—	—	—
New shim-safety rod elements start of quarter	8	8	0	0
New shim-safety rod elements received	0	0	12	0
New shim-safety rod elements placed in service	2	0	0	0
New shim-safety rod elements end of quarter	6	8	8	—

SHUTDOWNS AND POWER REDUCTIONS

Reactor downtime (power level $<N_L$) totaled approximately 235 hours. A summary of the shutdowns is given in Table 4, and details of each scheduled shutdown are contained in Table 5. Table 6 describes unscheduled shutdowns, while Table 7 describes power reductions which did not result in shutdowns.

Table 4. Analysis of shutdowns

Description of shutdown	Number	Downtime (h)
Scheduled		
Regular, end of cycle	1	126.750
Regular, refueling	2	32.133
Regular, refueling and experiment work	3	59.250
Special, flux runs	2	16.167
Subtotal:	8	234.300
Unscheduled		
Equipment failure, experiment	1	0.250
Human error	1	0.350
Subtotal:	2	0.600
TOTAL:	10	234.900

Table 5. Scheduled shutdowns, details

Date	Duration (h)	End cycle	Remarks
10-15-86	11.050	177B	The reactor was refueled and measurements on HFED experiment were performed
11-3-86	11.283	177C	The reactor was refuled and measurements on HFED experiment were performed
11-19-86	126.750	177	Shutdown activities included: (1) refueling, (2) replacing the pool primary pump, and (3) completing various reactivity runs for iridium and europium isotope assemblies
12-6-86	36.917	178A	Shutdown activities included: (1) refueling, (2) measuring the HFED experiment, and (3) changing the core piece on the MFE-7J experiment
12-9-86	26.833	178B	Shutdown activities included refueling and replacing depleted shim-safety rods
12-21-86	5.300	178C	The reactor was refueled
12-22-86	1.533	--	Core 178DX1 base run was completed
12-22-86	14.633	--	Core 178DX2 4-h irradiation of the HFIR dosimetry test was completed in core position A-1

Table 6. Unscheduled shutdowns, details

Date	Duration (h)	End cycle	Remarks
10-23-86	0.250	---	An experiment scram was received from MFE-7J due to primary gas high pressure
10-27-86	0.350	---	A scram condition occurred from the south ^{16}N channel during routine on-line testing

Table 7. Reductions in power not resulting in shutdowns

Date	Source of signal	Type of signal	Lowest power (MW)	Comments
10-6-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J
10-9-86	Manual	Demand decrease	18	The power was lowered in order to de-energize No. 1 primary pump for a coupling adjustment
10-13-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J
10-20-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J
10-27-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J
11-10-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J
11-17-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J
12-1-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J
12-15-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J
12-31-86	Manual	Demand decrease	24	The power was momentarily lowered for continuity checks on MFE-7J

INSTRUMENTATION AND REACTOR CONTROLS

The performance of the instrumentation for the facility was satisfactory, and maintenance required is indicated in Table 8. Two instrumentation and controls design change memorandums were completed this quarter as shown in Table 9.

PROCESS SYSTEM

The performance of the process system was satisfactory, and maintenance required is indicated in Table 10.

MECHANICAL COMPONENTS

The performance of the mechanical components was satisfactory.

EXPERIMENT FACILITIES, GASEOUS-WASTE FILTERS, AND CORE CHANGES

Experiment facility usage is given in Table 11. Table 12 summarizes the results of efficiency tests of the various gaseous-waste filters. The core configurations used during the quarter are shown in Figs. 4 through 15.

Table 8. Maintenance and changes, instrumentation and controls

Date	Component	Trouble or change	Reason or maintenance
10-15-86	Servo channel	Improper servo response at low power levels	The range selector switch was cleaned and adjusted
10-20-86	Primary pump bearings	Improper temperature readouts	The recorder was calibrated and the printer head repaired
10-23-86	Servo channel	Sluggish servo response at N_L	The flux amplifier was replaced
11-3-86	Control rod seat lights	System upgrade	A backup dc battery and inverter were installed
11-3-86	Reactor protection system	System upgrade	Three magnet current modules were modified
11-14-86	NOG radiation monitoring system	Erroneous spiking	The radiation detector was replaced
11-17-86	South N-16 channel	Loss of recorder response	The recorder amplifier was replaced
12-2-86	South N-16 channel	Improper recorder response	The amplifier was replaced
12-15-86	Pool level channel	Erroneous recorder output	The air output signal tubing between the north standpipe and the level recorder was replaced

Table 9. Instrumentation and controls design change memorandums

Change memo number	Title of change	Reason for change	General description of change
ORR-133 Add. 5	Reactor protection system upgrade, coincidence matrix module, magnet switch, and matrix module	To alleviate oscillations in the coincidence matrix circuitry of the reactor protection system	Insufficient output capacitance on a 15-volt regulator necessitated a substitution of larger capacitors for the existing ones. The previous capacitor values were 0.1 microfarads. The replacement capacitor values are 0.47 microfarads. The new capacitor is physically larger and compatible
ORR-140	Seat switch backup power	To provide backup electrical power for rod-in-seat indication in the event of loss of both building normal and diesel emergency ac power	A 12 volt dc to 115 volt ac inverter and monitoring circuitry were installed to provide emergency backup power for all six of the control rod seat circuits. The voltage source for the dc to ac inverter is a 12 volt class 72 automtic wet cell battery with charging unit

Table 10. Process systems, maintenance and changes

Date	Component	Remarks
		Reactor primary cooling system
10-9-86	No. 1 primary pump	The motor to pump coupling was adjusted
		Reactor secondary cooling system
11-9-86	No. 2 secondary pump	The coil and transformer on the pump starter circuit was replaced
		Pool primary cooling system
11-20-86	Primary pump	The pool primary pump was replaced
		Emergency cooling system
11-14-86	No. 2 dc unit	The amperage alarm box and low motor amperage meter were replaced
12-15-86	No. 1 dc unit	The No. 5 battery was replaced
		Normal off-gas system
11-3-86	Beam hole liners	A new block valve on main NOG header from the beam hole liner purge panel was replaced
11-17-86	Filter pit	A valve and heat tape on the water trap fill line were replaced
		Miscellaneous
12-8-86	Demineralized water	The demineralized water line from Building 3004 to the storage tanks was isolated by inserting a block valve

Table 11. Experiment facility usage

Facility	Access flange	Date installed	Date removed	Description of experiment	Division or sponsor
C-3	V-10	6-28-85		Material test, fusion program (MFE-7J)	Engineering Technology
C-7	V-2	6-28-85		Material test, fusion program (MFE-6J)	Engineering Technology
E-3	None	6-28-85		Aluminum-base, dispersion-type fuel plates (HFED)	Engineering Technology
HB-1	None	9-78		Neutron spectrometer	Solid State Physics
HB-2	None	11-1-58		Neutron diffraction experiments	Solid State Physics
HB-4	None	9-78		Neutron spectrometer	Solid State Physics
HB-6	None	4-76		Neutron small-angle scattering facility	Solid State Physics
HN-3	None	11-59		Activation analysis	Analytical Chemistry
HN-4	None	12-15-63		Neutron diffraction experiment	Instrumentation and Controls
South facility	None	12-16-63		Cold-finger plug[a]	Operations

[a]The facility is on standby.

Table 12. Status of filters, gaseous waste systems

Type filter	Bank designation	Date last changed	Date last tested	Type test	Retention efficiency (%)
		Cell-ventilation system			
CWS	Overall[a]	North, 4-16-80 South, 8-14-85	9-23-86	DOP	99.995
Charcoal	Both banks	North, 11-9-83 South, 8-14-85	5-31-86	Elemental iodine	99.900
		Basement hood exhaust			
CWS	South	3-11-80	9-23-86	DOP	99.998
CWS	North	3-11-80	9-23-86	DOP	99.996
		Normal off-gas			
CWS	West[b]	8-14-85	10-28-86	DOP	99.996
Charcoal	West[b]	8-14-85	10-28-86	Elemental iodine	99.986
CWS	East	9-5-86	9-23-86	DOP	99.968
Charcoal	East	9-5-86	10-3-86	Elemental iodine	99.985

[a]The CWS filters in the cell-ventilation system were checked in series.
[b]Not in service.

ORNL/DWG-87-6259

Lattice loading

For fuel cycles 177-B, C

	1	2	3	4	5	6	7	8	9
A	DF	Be	F	F	F	F	F	Be	DF
B	Be	Be	F	SR	F	SR	F	Be	Be
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Be	F	F	SR	F	SR	F	F	Be
E	Be	F	HFED E	F	Al	F	Al	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	25
Shim-safety rod (SR)	6
Beryllium (Be)	23
Experiment (E)	3
Aluminum (Al)	2
Dummy fuel (DF)	4

Fig. 4. Lattice configuration - October 1-November 3, 1986.

ORNL/DWG-87-6260

Lattice loading

For fuel cycles 177-D, 178-AX1

	1	2	3	4	5	6	7	8	9
A	DF	Be	Be	F	F	F	Be	Be	DF
B	Be	Be	F	SR	F	SR	F	Be	Be
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Be	F	F	SR	F	SR	F	F	Be
E	Be	F	HFED E	F	F	F	Al	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	24
Shim-safety rod (SR)	6
Beryllium (Be)	25
Experiment (E)	3
Aluminum (Al)	1
Dummy fuel (DF)	4

Fig. 5. Lattice configuration - November 3-21, 1986.

ORNL/DWG-87-6261

Lattice loading

For fuel cycles 178-AX2

	1	2	3	4	5	6	7	8	9
A	DF	Be	Be	F	F	F	Be	Be	DF
B	Be	Ir	F	SR	F	SR	F	Be	Be
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Be	F	F	SR	F	SR	F	F	Be
E	Be	F	HFED E	F	F	F	Al	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	24
Shim-safety rod (SR)	6
Beryllium (Be)	24
Experiment (E)	3
Iridium (Ir)	1
Aluminum (Al)	1
Dummy fuel (DF)	4

Fig. 6. Lattice configuration - November 21, 1986.

ORNL/DWG-87-6262

Lattice loading

For fuel cycles 178-AX3

	1	2	3	4	5	6	7	8	9
A	DF	Be	Be	F	F	F	Be	Be	DF
B	Be	Be	F	SR	F	SR	F	Be	Be
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Be	F	F	SR	F	SR	F	F	Be
E	Be	F	HFED E	F	F	F	Ir	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	24
Shim-safety rod (SR)	6
Beryllium (Be)	25
Experiment (E)	3
Iridium (Ir)	1
Dummy fuel (DF)	4

Fig. 7. Lattice configuration - November 21, 1986.

ORNL/DWG-87-6263

Lattice loading

For fuel cycles 178-AX4

	1	2	3	4	5	6	7	8	9
A	DF	Be	Be	F	F	F	Be	Be	DF
B	Be	Be	F	SR	F	SR	F	Be	Be
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Eu	F	F	SR	F	SR	F	F	Be
E	Be	F	HFED E	F	F	F	Ir	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	24
Shim-safety rod (SR)	6
Beryllium (Be)	24
Experiment (E)	3
Europium (Eu)	1
Iridium (Ir)	1
Dummy fuel (DF)	4

Fig. 8. Lattice configuration - November 21, 1986.

ORNL/DWG-87-6264

Lattice loading

For fuel cycles 178-AX5

	1	2	3	4	5	6	7	8	9
A	DF	Be	Be	F	F	F	Be	Be	DF
B	Be	Be	F	SR	F	SR	F	Be	Be
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Eu	F	F	SR	F	SR	F	F	Be
E	Be	F	HFED E	F	F	F	Ir	F	Be
F	Eu	Be	F	SR	F	SR	F	Be	Be
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	24
Shim-safety rod (SR)	6
Beryllium (Be)	23
Experiment (E)	3
Europium (Eu)	2
Iridium (Ir)	1
Dummy fuel (DF)	4

Fig. 9. Lattice configuration - November 21, 1986.

ORNL/DWG-87-6265

Lattice loading

For fuel cycles 178-AX6

	1	2	3	4	5	6	7	8	9
A	DF	Be	Be	F	F	F	Be	Be	DF
B	Be	Be	F	SR	F	SR	F	Be	Be
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Eu	F	F	SR	F	SR	F	F	Be
E	Be	F	HFED E	F	F	F	Ir	F	Be
F	Eu	Ir	F	SR	F	SR	F	Be	Be
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	24
Shim-safety rod (SR)	6
Beryllium (Be)	22
Experiment (E)	3
Europium (Eu)	2
Iridium (Ir)	2
Dummy fuel (DF)	4

Fig. 10. Lattice configuration - November 21, 1986.

ORNL/DWG-87-6266

Lattice loading

For fuel cycles 178-AX7, 178-A

	1	2	3	4	5	6	7	8	9
A	DF	Be	Be	F	F	F	Be	Be	DF
B	Be	Ir	F	SR	F	SR	F	Ir	Be
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Eu	F	F	SR	F	SR	F	F	Eu
E	Be	F	HFED E	F	F	F	Ir	F	Be
F	Eu	Ir	F	SR	F	SR	F	Be	Eu
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	24
Shim-safety rod (SR)	6
Beryllium (Be)	18
Experiment (E)	3
Europium (Eu)	4
Iridium (Ir)	4
Dummy fuel (DF)	4

Fig. 11. Lattice configuration - November 21-December 6, 1986.

ORNL/DWG-87-6267

Lattice loading

For fuel cycles 178-B

	1	2	3	4	5	6	7	8	9
A	DF	Be	F	F	F	F	F	Be	DF
B	Eu	Ir	F	SR	F	SR	F	Ir	Eu
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Eu	F	F	SR	F	SR	F	F	Eu
E	Be	F	HFED E	F	Ir	F	Ir	F	Be
F	Eu	Be	F	SR	F	SR	F	Be	Eu
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	25
Shim-safety rod (SR)	6
Beryllium (Be)	15
Experiment (E)	3
Europium (Eu)	6
Iridium (Ir)	4
Dummy fuel (DF)	4

Fig. 12. Lattice configuration - December 8-9, 1986.

ORNL/DWG-87-6268

Lattice loading

For fuel cycles 178-C, 178-D

	1	2	3	4	5	6	7	8	9
A	DF	Be	F	F	F	F	F	Be	DF
B	Eu	Ir	F	SR	F	SR	F	Ir	Eu
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Eu	F	F	SR	F	SR	F	F	Eu
E	Be	F	HFED E	F	F	F	Ir	F	Be
F	Eu	Ir	F	SR	F	SR	F	Be	Eu
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	26
Shim-safety rod (SR)	6
Beryllium (Be)	14
Experiment (E)	3
Europium (Eu)	6
Iridium (Ir)	4
Dummy fuel (DF)	4

Fig. 13. Lattice configuration - December 10-21, December 23-31, 1986.

ORNL/DWG-87-6269

Lattice loading

For fuel cycles 178-DX1, 178DX2

	1	2	3	4	5	6	7	8	9
A	DF	Be	F	F	F	F	F	Be	* Al
B	Eu	Ir	F	SR	F	SR	F	Ir	Eu
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Eu	F	F	SR	F	SR	F	F	Eu
E	Be	F	HFED E	F	F	F	Ir	F	Be
F	Eu	Ir	F	SR	F	SR	F	Be	DF
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

*178-DX2 HFIR core piece inserted in A-9.

Lattice component	Number
Fuel (F)	26
Shim-safety rod (SR)	6
Beryllium (Be)	14
Experiment (E)	3
Europium (Eu)	5
Iridium (Ir)	4
Aluminum (Al)	1
Dummy fuel (DF)	4

Fig. 14. Lattice configuration - December 21-22, 1986.

ORNL/DWG-87-6270

Lattice loading

For fuel cycles 178-DX3

	1	2	3	4	5	6	7	8	9
A	GHMD	Be	F	F	F	F	F	Be	DF
B	Eu	Ir	F	SR	F	SR	F	Eu	Ir
C	Be	F	MFE 7J E	F	F	F	MFE 6J E	F	Be
D	Eu	F	F	SR	F	SR	F	F	Eu
E	Be	F	HFED E	F	F	F	Ir	F	Be
F	DF	Ir	F	SR	F	SR	F	Eu	Eu
G	DF	Be	Be	Be	Be	Be	Be	Be	DF

Lattice component	Number
Fuel (F)	26
Shim-safety rod (SR)	6
Beryllium (Be)	13
Experiment (E)	3
Europium (Eu)	6
Iridium (Ir)	4
Gamma heating mearuement device (GHMD)	1
Dummy fuel (DF)	4

Fig. 15. Lattice configuration - December 22, 1986.

SUMMARY OF SURVEILLANCE TESTS

Table 13 is a tabulation of the completion dates of the surveillance tests required by the Technical Specifications. This table contains all the surveillance tests scheduled for frequencies of one quarter or longer. Other surveillance requirements which are not reported are satisfied by routine completion of daily and weekly check sheets, start-up checklists, hourly data sheets, the operating logbook, and miscellaneous quality assurance tests.

Table 13. Summary of surveillance tests

Test	Most recent	Previous
Biennially		
Primary cooling flow channel calibration		
Direct flow channel	9-5-86	8-8-85
Core ΔP channel	9-5-86	8-14-85
^{16}N channel calibration	9-5-86	5-8-86
North-facility flow channel calibration	5-8-86	4-25-84
South-facility flow channel calibration	5-8-86	4-25-84
Normal off-gas vacuum monitor calibration	9-5-86	8-12-85
Building ventilation flow monitor calibration	11-19-86	11-22-85
The dc pony motor battery bank		
Load-test No. 1 bank	9-1-86	11-3-85
Load-test No. 2 bank	5-4-86	11-3-85
Load-test No. 3 bank	2-20-86	11-3-85
Annually		
Safety-level channels calibration	11-21-86	9-4-86
Log-N channels calibration	11-20-86	9-5-86
ΔT channels calibration	3-6-86	8-21-85
Reactor water exit temperature channels calibration	3-6-86	8-21-85
Fission chamber channels calibration	11-20-86	9-5-86
Speed measurements of the shim-safety rod drive motors	12-10-86	9-26-86

Table 13. (Continued)

Test	Most recent	Previous
Annually (continued)		
Calibration of shim-safety rods	11-23-86	9-7-86
Reactivity assigned to the servo-control system	11-23-86	9-7-86
Semiannually		
Pressure-drop measurements across NOG filters	12-28-86	9-28-86
NOG filter system efficiency		
Elemental iodine test - east bank	9-23-86	5-15-86
Elemental iodine test - west bank	10-28-86	5-20-86
Dioctyl phthalate test - east bank	9-23-86	3-7-86
Dioctyl phthalate test - west bank	10-28-86	9-23-86
Containment closure system function test	11-19-86	9-2-86
Cell-ventilation filter system efficiency		
Elemental iodine measurements	5-31-86	12-10-85
Dioctyl phthalate measurements	9-23-86	3-7-86
Radiation monitoring equipment calibration	10-13-86	7-14-86
Stack radiation monitor calibration	9-5-86	5-6-86
Quarterly		
Primary coolant flow channels tested	11-21-86	9-5-86
^{16}N channels tested	11-21-86	9-4-86
North-facility flow channels tested	11-21-86	9-5-86
South-facility flow channels tested	11-21-86	9-5-86
Normal off-gas vacuum monitor tested	11-19-86	9-5-86

Table 13. (Continued)

Test	Most recent	Previous
Quarterly (continued)		
Building ventilation flow monitor tested	11-19-86	9-5-86
Manual scrams tested	11-21-86	9-5-86
Measurement of release time and time of flight for the shim-safety rods	12-10-86	9-26-86
Subcriticality with each shim-safety rod at its upper limit while all other shim-safety rods are fully inserted	12-10-86	9-26-86

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