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Oak Ridge Research Reactor Quarterly Report April, May, and June 1985

T. P. Hamrick
E. D. Lance
M. K. Ford

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Operations Division
Reactor Operations Section

OAK RIDGE RESEARCH REACTOR QUARTERLY REPORT APRIL, MAY, AND JUNE 1985

T. P. Hamrick
E. D. Lance
M. K. Ford

SPONSOR: J. H. Swanks
Operations Division

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OAK RIDGE RESEARCH REACTOR QUARTERLY REPORT
APRIL, MAY, AND JUNE 1985

SUMMARY

The ORR operated at an average power level of 29.9 MW for 86.7% of the time during April, May, and June of 1985.

The reactor was shut down on sixteen occasions, eight of which were scheduled. Reactor downtime needed for refueling and checks was normal. The reactor remained available for operation 91.6% of the time.

Maintenance activities, both mechanical and instrument, were essentially routine in nature with the exception of four 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.

ORNL/DWG-85-14637

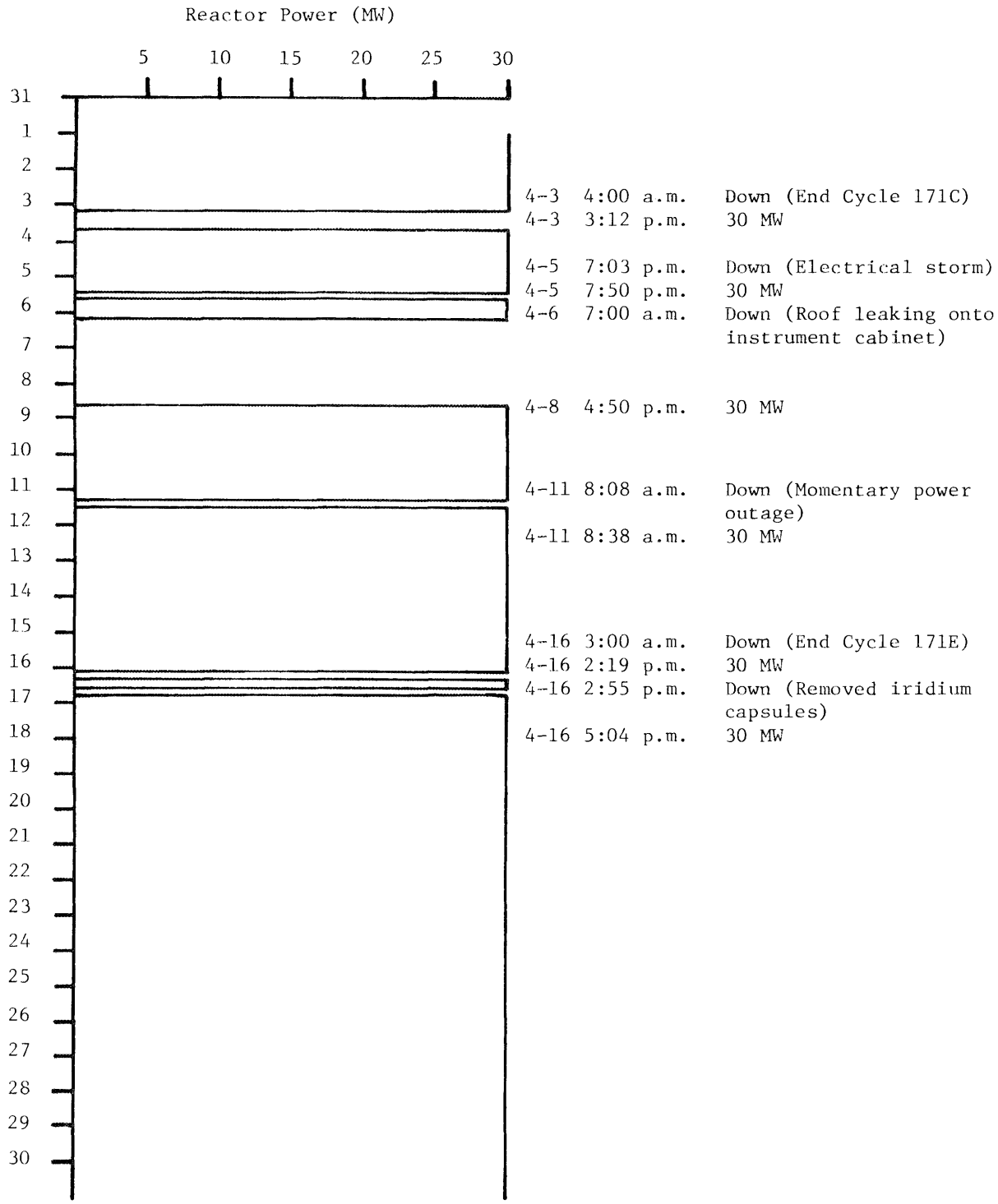

Fig. 1. Reactor power history - April 1985.

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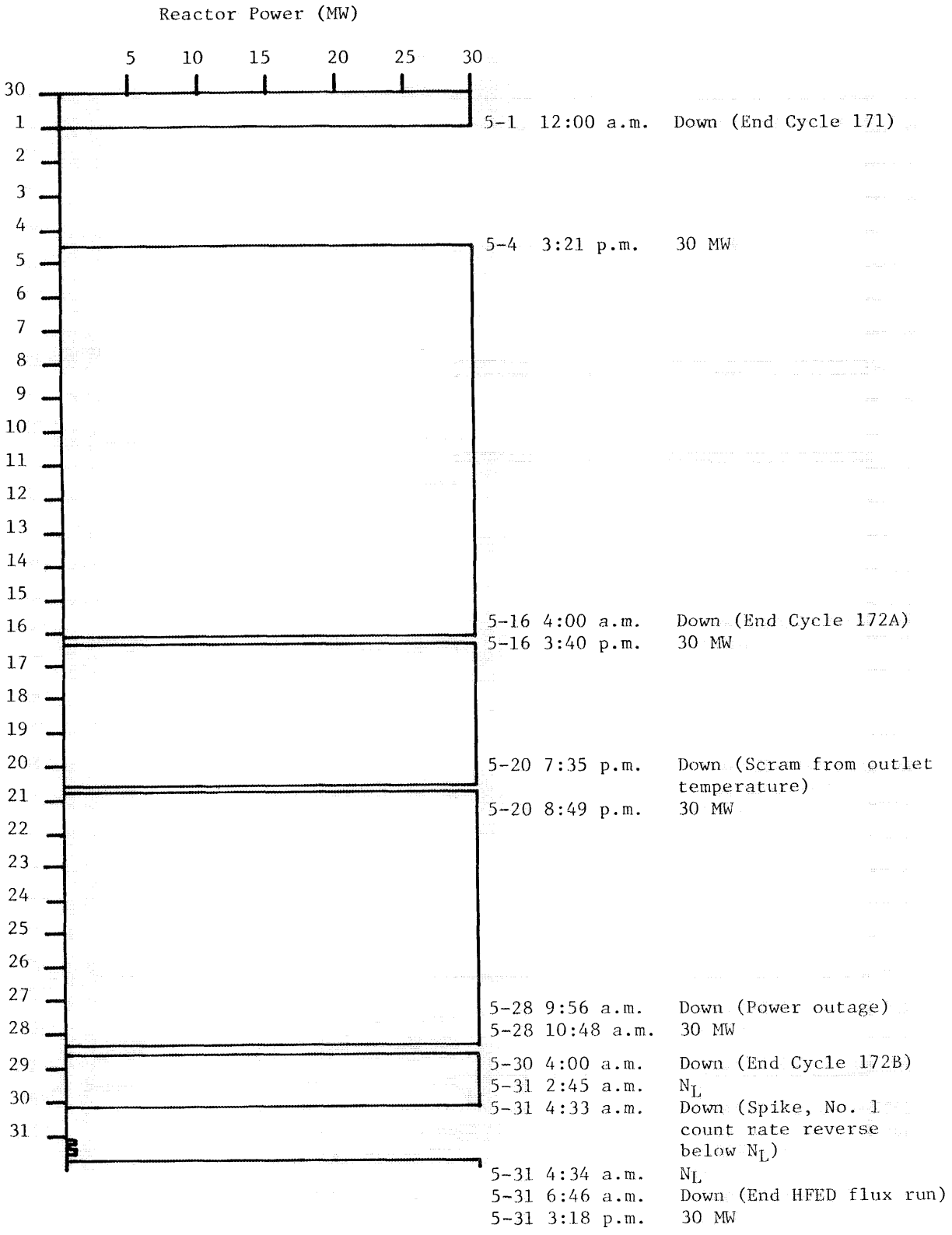

Fig. 2. Reactor power history - May 1985.

ORNL/DWG-85-14639

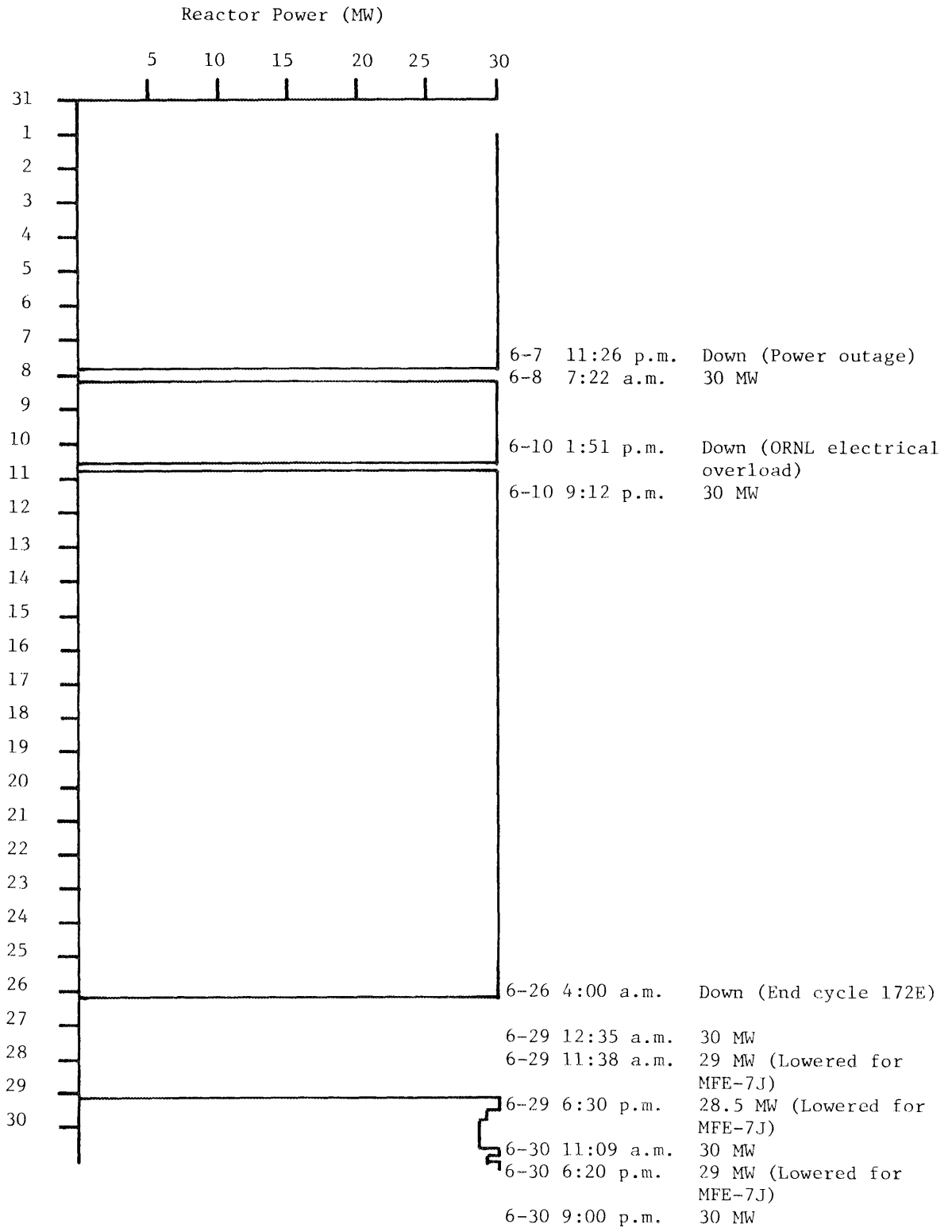

Fig. 3. Reactor power history - June 1985.

Table 1. Basic operating data
(April-June 1985)

	This quarter	Last quarter	Jan.-June 1985	Jan.-June 1984
Total energy, MWd	2,355.6	1,929.8	4,285.3	4,477.9
Average power, MW	29.9	29.9	29.9	29.6
Time operating, %	86.7	71.8	79.7	83.2
Availability, %	91.6	72.1	82.9	93.0
Reactor water radioactivity, cpm/ml (av)	27,300	32,000	29,650	34.918
Pool water radioactivity, cpm/ml (av)	850	870	860	890
Reactor water resistivity, ohm-cm (av)	1,795,000	1,444,000	1,619,500	1,338,850
Pool water resistivity, ohm-cm (av)	1,038,000	1,145,000	1,092,000	1,272,650
Fuel elements depleted	21	14	35	41
Average burnup of fuel elements depleted, %	47.2	43.4	45.5	47.8
Shim-safety rods depleted	3	2	5	4
Average burnup of shim-safety rods depleted, %	71.7	83.0	76.2	83.8
Radioisotope samples	0	0	0	0
Research samples	7	0	7	22

Table 2. Cycles of operation

Cycle No.	Date begun	Date ended	Accumulated energy (MWd)
171	February 4, 1985	May 1, 1985	797.7[a]
172	May 4, 1985	In progress	1,557.8

[a]MWd this quarter

FUEL USAGE AND INVENTORY

Twenty-seven spent fuel elements and four shim-safety rod fuel sections were shipped for chemical separation. Twenty-one fuel elements and three shim-safety rods were declared spent during the quarter. Seventeen fuel elements and two shim-safety rods were placed in service 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.-June 1985	Jan.-June 1984
Depleted fuel elements transferred for chemical recovery	27	0	27	41
Average percent burnup of fuel elements transferred	44.0	--	44.0	45.6
New elements start of quarter	149	126	--	--
New elements received	--	32	32	55
New elements placed in service	17	9	26	32
New elements end of quarter	132	149	--	--
Special or test elements	21	21	21	21
Depleted shim-safety rod elements transferred for chemical recovery	4	0	4	6
Average percent burnup of shim-safety rods transferred	82.2	--	82.2	82.0
New shim-safety rod elements start of quarter	15	17	--	--
New shim-safety rod elements recieved	0	0	0	6
New shim-safety rod elements placed in service	2	2	4	4
New shim-safety rod elements end of quarter	13	15	15	0

SHUTDOWNS AND POWER REDUCTIONS

Reactor downtime (power level $<N_L$) totaled approximately 290 hours. A summary of the shutdowns is given in Table 4, and details of each 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	86.350
Regular, refueling	1	10.500
Special, flux run	1	7.716
Special, refueling and experiment	4	111.717
Special, to reduce plant electrical load. Refueling required	1	6.583
Subtotal:	8	222.866
Unscheduled		
Equipment failure, reactor	1	0.583
Instrument failure, reactor	2	56.917
Electrical power outage or surge	4	8.334
Human error	1	1.333
Subtotal:	8	67.167
TOTAL:	16	290.033

Table 5. Scheduled shutdowns, details

Date	Duration (h)	End cycle	Remarks
4-3-85	10.500	171C	The reactor was refueled. The No. 3 shim-safety rod was sticking following refueling. The shim-safety rod and the south hold-down arm therefore were changed to eliminate the problem
4-16-85	10.550	171E	The reactor was refueled and the HSST experiment capsules' positions were switched
5-1-85	86.350	171	The shutdown activities included: (1) refueling, (2) the replacement of 3103 makeup valve, (3) the replacement of No. 1 pony motor bearing, (4) cleaning of the primary side of the pool heat exchanger, (5) replacing the bearings and seals on the north facility pump, (6) making HFED cooling gap measurements, and (7) the installation of "Loss of Electrical Power to Main Turbine" annunciators
5-16-85	10.867	172A	The reactor was refueled and HFED cooling gap measurements were made
5-30-85	22.750	172B	The reactor was refueled, the HFED element was reconfigured, and the HSST capsules were replaced with new capsules
5-31-85	7.716	--	A four-hour flux run at N_L was completed for the HFED experiment
6-10-85	6.583	172D	The Laboratory Shift Supervisor requested the shutdown in order to reduce the plant electrical load. The reactor required refueling due to xenon poisoning
6-28-85	67.550	172E	The reactor was refueled and the MFE-4B experiment removed. New experiments MFE-6J and MFE-7J were installed

Table 6. Unscheduled shutdowns, details

Date	Duration (h)	End cycle	Remarks
4-5-85	0.417	--	The reactor scrammed as a result of an electrical surge during a storm
4-6-85	56.900	171D	The control room roof developed a leak, allowing water to run onto instrument cabinets. The reactor was manually scrammed
4-11-85	0.250	--	A scram occurred due to a brief interruption of electrical power to the primary cooling pumps
4-16-85	1.333	--	Due to a late request for irridium from Isotopes, the reactor was shut down following a startup. The irridium was installed in the core, and the reactor was restarted
5-20-85	0.583	--	The automatic makeup valve at the reactor cooling tower failed shut, resulting in a loss of secondary cooling. A setback to below N_L occurred from outlet temperature
5-28-85	0.500	--	A scram occurred due to a momentary loss of TVA power
5-31-85	0.017	--	A reverse occurred due to noise on No. 1 count rate period, during a flux run at N_L
6-7-85	7.167	172B	A power outage to the Laboratory caused the reactor to scram. Refueling was completed

Table 7. Reductions in power not resulting in shutdown

Date	Source of signal	Type of signal	Lowest power (MW)	Comments
6-29-85	Manual	Lowering of demand	28.5	The reactor was operated at between 28.5 and 29 MW for 26.180 hours due to high temperature alarms on MFE-7J experiment. Operation was resumed at 30 MW after the alarm set points were adjusted

INSTRUMENTATION AND REACTOR CONTROLS

The performance of the instrumentation for the facility was satisfactory, and maintenance required is indicated in Table 8. Four 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 9.

Table 8. Maintenance and changes, instrumentation and controls

Date	Component	Trouble or change	Reason or maintenance
4-4-85	No. 1 Log-N channel	Water damage (roof leak)	The log-N amplifier was replaced
4-8-85	Various amplifier cabinets	Roof leak	The amplifier cabinets were checked for damage from a roof water leak
5-3-85	Cell ventilation system	Upgrading	A new annunciator entitled "Loss of Electrical Power to Main Turbine" was installed (Change Memo No. 134)
5-23-85	Reactor tower basin level	Upgrading	A gauge was installed in the control room
5-30-85	South N-16 channel	Erratic	The recorder drive cable and fiber gear were replaced
6-26-85	Primary strainer _P	Spurious alarms	The high/low alarm switches were replaced
6-27-85	Reactor tower fan control	Operation failure	The stepping motor was replaced

Table 9. Instrumentation and controls design change memorandums

Change memo number	Title of change	Reason for change	General description of change
ORR-130	Computer to control room interfacing	To monitor various reactor operating, measuring, and testing parameters	A PDP 11/23 computer is interfaced to monitor 15 analog signals and 30 on-off alarm signals. Electrical isolation is provided for all signals monitored. The computer scans all input signals each time there is a selected annunciator alarm or an operator request. Signal conditions at the time of request are printed out on remote terminals in the control room and in the reactor supervisors' office A scaled voltage signal from each control rod position synchro converter monitors each control rod position and passes through an isolated signal conditioner providing ±1500-V dc, 220-V ac rms voltage isolation between the synchro converter to the computer. Analog signals are taken from the current loops of each of the following reactor operating parameters: (1) two reactor primary cooling inlet temperatures, (2) two reactor primary cooling outlet temperatures, (3) reactor primary cooling flow, (4) one reactor pool cooling inlet temperature, (5) one reactor pool cooling outlet temperature, and (6) reactor pool cooling flow

Table 9. (Continued)

Change memo number	Title of change	Reason for change	General description of change
			These current loop signals pass through isolated signal conditioners providing ±1500-V dc, 220-V ac rms voltage isolation between the measuring channels and the computer. A neutron flux level signal is taken from the ion chamber which is used for the reactor startup noise monitor channel and modified through a flux amplifier and transmitted to the computer
			Thirty annunciator alarm functions have been selected for monitoring by the computer. The auxiliary contacts in the annunciator are used to provide the on-off signal required for the computer and the auxiliary contacts are adequate isolation between the reactor controls and the computer
			Provisions are made for future reactor measuring and testing parameters between the control room and the computer

Table 9. (Continued)

Change memo number	Title of change	Reason for change	General description of change
ORR-131	ORR heat power measuring channel	Provide new flow and temperature instrumentation for both reactor and pool coolant combined heat-power calculation	New instrumentation for the digital display of reactor cooling temperatures and flow is provided on the right sections of the control desk. The general description is as follows: (1) provides additional functional capabilities that are not included in the present equipment, and (2) provides for more accurate readout devices for less risk of human errors in monitoring reactor operating parameters The present differential temperature and reactor outlet temperature sensors and recorders along with the present flow transmitter and recorder are retained for reactor protection system functions. The new temperature and flow measuring channels provide for reactor control and operating parameter information New thermowells were selected from manufacturer standard sizes to match the diameter and insertion length of the platinum resistance temperature probes to ensure good thermal contact to the cooling water. The thermowells are installed in the reactor primary cooling lines near the location of the present temperature sensors in existing pipe penetrations. Similar thermowells

Table 9. (Continued)

Change memo number	Title of change	Reason for change	General description of change
			and resistance thermometer probes are installed on the primary inlet and outlet cooling lines of the pool heat exchanger The temperature signal conditioners and power supplies are located in an enclosure outside the pipe chase and alongside the pool heat exchanger in the basement. The outputs from the signal conditioners are 4 to 20 mA current loops which are transmitted to the control room where the temperatures are read out on digital panel meters located on the operating console. The reactor primary cooling flow and pool cooling flow signals are derived from electronic differential pressure transmitters connected in parallel with the existing differential pressure transmitters. The primary coolant flow transmitter is located in the venturi pit at the pump house with the 4- to 20-mA output signal transmitted to the control room where the flow information is modified (square root) and displayed on a digital panel meter located on the operating console. The pool cooling-flow differential-pressure transmitter is located in the reactor building basement in parallel with the present differential flow transmitter. The 4- to 20-mA output signal is

Table 9. (Continued)

Change memo number	Title of change	Reason for change	General description of change
			transmitted to the control room where the pool cooling-flow information is modified (square root) and displayed on a digital panel meter located on the operating console
ORR-134	Cell-ventilation electric blower monitoring	Ensure that the ORR will not operate above 300 kW when the cell-ventilation blower is not operating	A setback function, as well as a control room alarm, is provided to ensure that the ORR will not operate above 300 kW (N_L) when the cell-ventilation electric blower is not operating An auxiliary contact was installed on the cell-ventilation electric blower motor starter located in the stack area and connected in series with a relay in the ORR control circuit with a N.C. contact in the "lower-setback" circuit (R-24X), a N.O. contact in the "auxiliary reverse request" circuit (R-31) to automatically reduce the reactor power, and another contact for an annunciator (AP-62) alarm "Cell Vent Electric Blower" on the control room vertical board Drawing RC2-21-5 is also being revised to show the removal of FE-119 and its associated circuitry. This change was effected by improvements and modifications at the ORNL 3039 Exhaust Stack area

Table 9. (Continued)

Change memo number	Title of change	Reason for change	General description of change
ORR-135	Reactor secondary tower basin water-level monitor	To provide control room monitoring of basin level	A remote pneumatic signal from the reactor secondary tower basin water level transmitter (LT-30) to a level indicator on Vertical Board 3 in the ORR control room is provided. A spare pneumatic tube and an unused pressure indicator are utilized for the remote basin water level monitor. A constant differential flow controller (1 to 1 ratio relay) is installed at the reactor tower secondary pump house to isolate the penumatic signal to the control room

Table 10. Process systems, maintenance and changes

Date	Component	Remarks
		Reactor primary cooling system
5-7-85	North facility cooling pump	The bearings and seals were replaced
		Reactor secondary cooling system
5-1-85	Makeup valve and line	The automatic valve was replaced, and a leak on the line was repaired
5-30-85	Automatic makeup valve	The valve was replaced
		Emergency cooling system
5-2-85	No. 1 dc unit	The bearings in the pony motor were replaced
		Cell-ventilation system
5-16-85	Annunciator panel	A new alarm was installed for "Loss of Electrical Power to Main Turbine"
		Pool secondary cooling system
6-5-85	Pool cooling fan	The coupling was replaced
		Miscellaneous
5-7-85	Underwater saw	The saw feed piston was replaced

Table 11. Experiment facility usage

Facility	Access flange	Date installed	Date removed	Description of experiment	Division or sponsor
C-3	None	10-28-84	6-28-85	Aluminum-base, dispersion-type fuel plates (HFED)	Engineering Technology
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	6-28-83		Aluminum-base, dispersion-type fuel plates (HFED)	Engineering Technology
E-7	V-5	7-29-83	6-26-85	Material test, fusion program (MFE-4B)	Engineering Technology
Poolside[a] facility	None	2-21-85	5-30-85	Material test (HSST-5, Nos. 7 and 8)	Engineering Technology
Poolside[a] facility	None	5-30-85		Material test (HSST-5, Nos. 9 and 10)	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[b]	Operations

[a]The LWR metallurgical pressure-vessel benchmark facility was installed on 4-21-80. The Heavy Section Steel Technology (HSST) Program uses the facility for irradiations.

[b]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, 1-12-75	3-13-85	DOP	99.994
Charcoal	Both banks	North, 11-9-83 South, 2-2-81	11-27-84	Elemental iodine	99.980
		Basement hood exhaust			
CWS	South	3-11-85	3-3-85	DOP	99.998
CWS	North	3-11-80	3-3-85	DOP	99.997
		Normal off-gas			
CWS	West[b]	9-5-84	3-13-85	DOP	99.990
Charcoal	West[b]	9-5-84	6-18-85	Elemental iodine	99.820
CWS	East	5-1-85	6-20-85	DOP	99.996
Charcoal	East	5-1-85	6-20-85	Elemental iodine	99.976
		Pressurizable off-gas[c]			

[a]The CWS filters in the cell-ventilation system were checked in series.
[b]Not in service. HEPA and charcoal filters are to be replaced and tested before use.
[c]The POG system is on standby; therefore, all filter tests have been discontinued.

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Lattice loading

For fuel cycles 171-C

	1	2	3	4	5	6	7	8	9
A	Be	F	F	F	F	F	F	F	Be
B	Be	Be	F	SR	F	SR	F	133 Xe Be	Be
C	Be	F	HFED E	F	F	F	Al	F	Be
D	Be	F	F	SR	F	SR	F	F	Be
E	Be	F	Ir Be	F	F	F	MFE 4B E	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	Be	Be	Be	Be	Be	Be	Be	Be	Be

Lattice component	Number
Fuel (F)	28
Shim-safety rod (SR)	6
Beryllium (Be)	26
Experiment (E)	2
Xenon production sleeve (^{133}Xe)	1
Iridium (Ir)	1
Aluminum (Al)	1

Fig. 4. Lattice configuration - March 14-April 3, 1985.

ORNL/DWG-85-14641

Lattice loading

For fuel cycles 171-D

	1	2	3	4	5	6	7	8	9
A	Be	F	F	F	F	F	F	F	Be
B	Be	Be	F	SR	F	SR	F	133 Xe Be	Be
C	Be	F	F	F	F	F	Al	F	Be
D	Be	F	F	SR	F	SR	F	F	Be
E	Be	F	Ir Be	F	F	F	MFE 4B E	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	Be	Be	Be	Be	Be	Be	Be	Be	Be

Lattice component	Number
Fuel (F)	29
Shim-safety rod (SR)	6
Beryllium (Be)	26
Experiment (E)	1
Xenon production sleeve (^{133}Xe)	1
Iridium (Ir)	1
Aluminum (Al)	1

Fig. 5. Lattice configuration - April 3-6, 1985.

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Lattice loading

For fuel cycles 171-E

	1	2	3	4	5	6	7	8	9
A	Be	F	F	F	F	F	F	F	Be
B	Be	Be	F	SR	F	SR	F	^{133}Xe Be	Be
C	Be	F	HFED E	F	F	F	Al	F	Be
D	Be	F	F	SR	F	SR	F	F	Be
E	Be	F	Ir Be	F	F	F	MFE 4B E	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	Be	Be	Be	Be	Be	Be	Be	Be	Be

Lattice component	Number
Fuel (F)	28
Shim-safety rod (SR)	6
Beryllium (Be)	25
Experiment (E)	2
Xenon production sleeve (^{133}Xe)	1
Iridium (Ir)	1
Aluminum (Al)	1

Fig. 6. Lattice configuration - April 8-16, 1985.

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Lattice loading

For fuel cycles 171-F

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

Lattice component	Number
Fuel (F)	28
Shim-safety rod (SR)	6
Beryllium (Be)	26
Experiment (E)	2
Iridium (Ir)	1
Aluminum (Al)	1

Fig. 7. Lattice configuration - April 16-May 1, 1985.

ORNL/DWG-85-14644

Lattice loading

For fuel cycles 172-A, B, C, D, & E

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

Lattice component	Number
Fuel (F)	28
Shim-safety rod (SR)	6
Beryllium (Be)	27
Experiment (E)	2
Iridium (Ir)	2

Fig. 8. Lattice configuration - May 1-June 26, 1985.

ORNL/DWG-85-14645

Lattice loading

For fuel cycles 172-F

	1	2	3	4	5	6	7	8	9
A	Be	F	F	F	F	F	F	F	Be
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	Ir Be	F	Ir Be	F	Be
F	Be	Be	F	SR	F	SR	F	Be	Be
G	Be	Be	Be	Be	Be	Be	Be	Be	Be

Lattice component	Number
Fuel (F)	27
Shim-safety rod (SR)	6
Beryllium (Be)	27
Experiment (E)	3
Iridium (Ir)	2

Fig. 9. Lattice configuration - June 28-30, 1985.

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	8-15-84	7-25-83
Core ΔP channel	8-15-84	7-29-83
^{16}N channel calibration	5-3-85	1-28-85
North-facility flow channel calibration	4-25-84	7-27-83
South-facility flow channel calibration	4-25-84	7-27-83
Normal off-gas vacuum monitor calibration	7-26-84	7-27-83
Pressurizable off-gas vacuum monitor calibration	Out of service	
Building ventilation flow monitor calibration	10-25-84	7-27-84
The dc pony motor battery bank		
Load-test No. 1 bank	7-22-84	11-9-83
Load-test No. 2 bank	5-1-85	4-22-84
Load-test No. 3 bank	1-20-85	2-4-84
Annually		
Safety-level channels calibration	5-3-85	2-28-85
Log-N channels calibration	5-2-85	1-28-85
ΔT channels calibration	7-26-84	7-26-83
Reactor water exit temperature channels calibration	7-26-84	8-2-83
Fission chamber channels calibration	5-2-85	2-3-85
Speed measurements of the shim-safety rod drive motors	5-3-85	2-3-85
Calibration of shim-safety rods	2-4-85	2-4-84
Reactivity assigned to the servo-control system	2-4-85	2-4-84
Semiannually		
Pressure drop measurements across NOG filters	6-30-85	3-24-85
Pressure drop measurements across POG filters	Out of service	
NOG filter system efficiency		
Elemental iodine test - east bank	6-20-85	11-29-84
Elemental iodine test - west bank	6-18-85	11-15-84
Dioctyl phthalate test - east bank	6-20-85	3-13-85
Dioctyl phthalate test - west bank	3-13-85	9-20-84

Table 13. (Continued)

Test	Most recent	Previous
Semiannually (continued)		
POG filter system efficiency	Out of service	
Containment closure system function test	5-2-85	2-4-85
Cell-ventilation filter system efficiency		
Elemental iodine measurements	11-27-84	6-14-84
Dioctyl phthalate measurements	3-13-85	9-20-84
Radiation monitoring equipment calibration	4-1-85	2-1-85
Stack radiation monitor calibration	6-28-85	12-18-84
Quarterly		
Primary coolant flow channels tested	5-30-85	3-1-85
^{16}N channels tested	5-3-85	2-28-85
North-facility flow channels tested	5-30-85	3-1-85
South-facility flow channels tested	5-30-85	3-1-85
Normal off-gas vacuum monitor tested	5-30-85	3-1-85
Pressurizable off-gas vacuum monitor tested	Out of service	
Building ventilation flow monitor tested	5-30-85	3-1-85
Manual scrams tested	5-30-85	3-1-85
Measurement of release time and time of flight for the shim-safety rods	5-3-85	2-3-85
Subcriticality with each shim-safety rod at its upper limit while all other shim-safety rods are fully inserted	5-3-85	2-3-85

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