MASTER

Oak Ridge Research Reactor Quarterly Report July, August, and September of 1975

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OAK RIDGE NATIONAL LABORATORY

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Printed in the United States of America. Available from
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road, Springfield, Virginia 22161
Price: Printed Copy \$4.50; Microfiche \$2.25

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ORNL/TM-5265

Contract No. W-7405-eng-26

OPERATIONS DIVISION

OAK RIDGE RESEARCH REACTOR QUARTERLY REPORT

JULY, AUGUST, AND SEPTEMBER OF 1975

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APRIL 1976

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SUMMARY

The ORR operated at an average power level of 29.8 Mw for 87.2% of the time during July, August, and September of 1975. Twenty-eight fuel elements were declared spent (51.5% average burnup) during the quarter, while forty-two new elements were placed in service. Two shim-rod elements were retired from service at an average burnup of 65.5%.

The reactor was shut down on eight occasions, one of which was unscheduled. One end-of-cycle shutdown accounted for 49.6% of the total downtime. A special shutdown to repair a water leak accounted for 40.6% of the total downtime. The remaining downtime was used principally for refueling, experiment work, and maintenance.

Maintenance activities, both mechanical and instrument, were essentially routine in nature.

All six shim rods were calibrated on August 18, 1975, as reported in Appendix A.

OPERATIONS

The basic operating data presented in Table 1 indicates that the ORR operation for the quarter was normal as compared with recent experience.

Details relative to cycles of operation during the quarter are given in Table 2, while Figures 1 and 2 are plots of shim-rod position versus time for these cycles.

Table 1. . . ORR Basic Operating Data
July, August and September of 1975

	This Quarter	Last Quarter	Year To Date	January through September, 1974
Total energy, Mwd	2,394.1	2,316.9	6,949.1	6,097.9
Average power, Mw/operating hr	29.8	29.8	29.8	29.5
Time operating, %	87.2	85.5	85.9	76.5
Availibility, %	89.7	90.0	89.6	80.7
Reactor water radio- activity, $\frac{\text{c/min}}{\text{ml}}$ (av)	30,500	30,200	30,400	26,600
Pool water radio- activity, $\frac{\text{c/min}}{\text{ml}}$ (av)	610	650	650	490
Reactor water resis- tivity, ohm-cm (av)	861,000	888,000	854,000	824,000
Pool water resis- tivity, ohm-cm (av)	801,000	753,000	791,000	732,000
Fuel elements depleted	28	12	73	65
Average burnup of fuel elements, depleted, %	51.5	53.3	52.3	48.7
Shim rods depleted	2	4	10	10
Average burnup of shim rods depleted, %	65.5	64.6	64.8	62.6
Radioisotope samples	6	17	25	4
Research samples	18	18	41	37

Table 2. Cycles of Operation

Cycle No.	Date Begun	Date Ended	Accumulated Energy (Mwd)
126	June 20, 1975	*August 10, 1975	*1,488.27
127	August 16, 1975	In Progress	1,202.09

* 1,191.99 Mwd this report period.

Figure 1. Shim Rod Position vs Time (Cycle No. 126)

Figure 2. Shim Rod Position vs Time (Cycle No. 127)

FUEL USAGE AND INVENTORY

Forty-two new fuel elements were placed in service during the quarter and twenty-eight were declared spent with an average burnup of 51.5%. Twenty-eight fuel elements and six shim rods were transferred to the Savannah River Plant for chemical separation.

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

Table 3. ORR Fuel Status

	This Quarter	Last Quarter	Jan.-Sept. 1975	Jan.-Sept. 1974
Depleted fuel elements transferred for chemical separation	28	34	121	24
Average percent burnup of fuel elements transferred	49.6	49.9	48.9	46.5
New fuel elements placed in service	42	17	75	40
New fuel elements available for use	23*	57		
Depleted shim rods transferred for chemical separation	6	0	18	4
Average percent burnup of shim rods transferred	63.6	--	64.5	86.4
New shim rods placed in service	2	4	10	10
New shim rods available for use	2	2		

* Includes 4 partial fuel elements.

SHUTDOWNS AND POWER REDUCTIONS

Reactor downtime (power level $< N_L$) totaled approximately 283 hours. A summary of the shutdowns is given in Table 4, and details of each are contained in Tables 5 and 6. Table 7 offers information relative to power reductions which did not result in a shutdown.

Table 4. Summary of Shutdowns

Description of Shutdown	Number	Downtime (hrs)
Scheduled		
Regular, end of cycle.	1	137.500
Regular, refueling, and iodine removal.	2	8.850
Regular, refueling, iodine removal, and research work.	2	11.283
Regular, refueling, iodine removal and maintenance work.	1	6.333
Special, a water leak in the reactor primary water system was repaired.	<u>1</u>	<u>114.700</u>
Subtotal	7	278.666
Unscheduled		
Human error, experiment	<u>1</u>	<u>4.000</u>
Subtotal	<u>1</u>	<u>4.000</u>
Total	8	282.666

Table 5. ORR Scheduled Shutdowns, Details

Date	Duration (hr)	End Cycle	Remarks
7-7-75	3.883	126A	The reactor was refueled and isotope (iodine-xenon) work was completed. Experiment work consisted of repairing a leak in valve box No. 4 for the gas cooled reactor experiments.
7-29-75	5.100	126C	The reactor was refueled and isotope (iodine-xenon) work was completed.
8-10-75	137.500	126D	The shutdown marked the end of cycle 126. After the reactor was refueled and isotope (iodine-xenon) work was completed, the discharge manifold of the reactor primary water pumps was drained. Inspection and leak checking of the discharge manifold continued through most of the end-of-cycle shutdown.
8-18-75	114.700		The reactor was shut down to repair a leak in the reactor primary water system. The discharge manifold of the reactor primary water pumps was valved out and drained. The leak was found on the discharge line, north end of the primary pump house. Repairs were made by drilling, tapping, and installing a 1/4-in. stainless steel plug in the leak hole.
9-2-75	6.333	127A	The reactor was refueled and isotope (iodine-xenon) work was completed. Maintenance work consisted of the I&C Division changing setpoints on the reactor primary water flow ΔP across the reactor core following water flow versus ΔP calibration for core 127A. The changing of the ΔP setpoints was necessary due to recent core configurations using additional fuel elements thereby resulting in a lower ΔP for a given water flow.

Table 5 (continued)

Date	Duration (hr)	End Cycle	Remarks
9-10-75	7.400	127B	The reactor was refueled and isotope (iodine-xenon) work was completed. Experiment work consisted of installing a nose cone experiment in the front face facilities P-5, P-6, for General Electric.
9-29-75	3.700	127C	The reactor was refueled and isotope (iodine-xenon) work was completed.

Table 6. ORR Unscheduled Shutdowns, Details.

Date	Duration (hr)	End Cycle	Remarks
7-15-75	4.000	126B	The power reversed below N_L when the pool primary cooling flow dropped below the setpoint of 500 gpm. This occurred when beam hole HB-5 was filled with water before the air purge was shut off. Air was induced into the system causing the pool cooling pump to cavitate, thereby resulting in the low flow. The reactor was shut down by xenon. The reactor was refueled, isotope (iodine-xenon) work was completed, and an experiment (P-5) was removed.

Table 7. Reductions In ORR Power Not Resulting In Shutdowns

Date	Source of Signal	Type of Signal	Lowest Power (Mw)	Comments
9-11-75	Servo demand	Manual	N_L	The power was lowered to permit the removal of a nose cone experiment from the front face facility P-5, P-6.

INSTRUMENTATION AND REACTOR CONTROLS

The performance of the instrumentation for the complex was quite satisfactory and only rather routine maintenance was required as indicated in Table 8. Table 9 reflects the status of the various fission and ionization chambers.

PROCESS SYSTEM AND MECHANICAL COMPONENTS

Details of maintenance or changes to the process system are given in Table 10. Table 11 summarizes the results of efficiency test of the various gaseous waste filters. There were no repairs or changes related to the reactor mechanical components (drives, bearing, etc.).

EXPERIMENT FACILITIES AND CORE CHANGES

Experiment facility usage is given in Table 12. The core configurations used during the quarter are shown in Figure Nos. 3, 4, 5, and 6.

PROCEDURES, ADDITIONS, AND/OR REVISIONS

There was one revision to the ORR Operating Manual. On August 26, 1975, Part 3.4f (Shipping Fuel Units to the Fuel Recovery Plant) of Section 3 (Pages 3-40a, 3-43o, and 3-44) was revised to correct errors in the revision issued on April 18, 1975.

SPECIAL TESTS

Shim-Rod Calibrations - All six shim rods were calibrated for the core configuration for Cycle 127A (Figure 5) as reported in Appendix A.

ORR LATTICE LOADING

For Fuel Cycles 126A

	1	2	3	4	5	6	7	8	9
A	Be	Be	F	F	F	F	I ¹³¹	Be	Be
B	Be	F	F	SR	F	SR	F	Be	Be
C	Be	F	Ex	F	F	F	F	F	Be
D	Be	F	F	SR	F	SR	F	HT	Be
E	Be	F	Ex	F	F	F	Ex	F	Be
F	Be	F	F	SR	F	SR	F	F	Be
G	Be	Be	Be	Be	Be	Be	Be	Be	Be

<u>LATTICE COMPONENT</u>	<u>NUMBER</u>
Fuel	<u>28</u>
Shim Rod (SR)	<u>6</u>
Beryllium (Be)	<u>24</u>
Experiment (E)	<u>3</u>
Iodine Sleeve (¹³¹ I)	<u>1</u>
Isotope Stringer (Iso)	<u>0</u>
Hydraulic Tube (HT)	<u>1</u>

Figure 3. ORR Lattice Configuration - July 1, 1975 through July 7, 1975.

ORR LATTICE LOADING

For Fuel Cycles 126B, C, D

	1	2	3	4	5	6	7	8	9
A	Be	Be	Be	F	F	F	I ¹³¹	Be	Be
B	Be	F	F	SR	F	SR	F	Be	Be
C	Be	F	Ex	F	F	F	F	F	Be
D	Be	F	F	SR	F	SR	F	HT	Be
E	Be	F	Ex	F	F	F	Ex	F	Be
F	Be	F	F	SR	F	SR	F	F	Be
G	Be	Be	Be	Be	Be	Be	Be	Be	Be

<u>LATTICE COMPONENT</u>	<u>NUMBER</u>
Fuel	<u>27</u>
Shim Rod (SR)	<u>6</u>
Beryllium (Be)	<u>25</u>
Experiment (E)	<u>3</u>
Iodine Sleeve (¹³¹ I)	<u>1</u>
Isotope Stringer (Iso)	<u>0</u>
Hydraulic Tube (HT)	<u>1</u>

Figure 4. ORR Lattice Configuration - July 8, 1975, through August 10, 1975.

ORR LATTICE LOADING

For Fuel Cycles 127A

	1	2	3	4	5	6	7	8	9
A	Be	Be	I ¹³¹	F	F	F	N _F	Be	Be
B	Be	F	F	SR	F	SR	F	Be	Be
C	Be	F	Ex	F	F	F	F	F	Be
D	Be	F	F	SR	F	SR	F	HT	Be
E	Be	F	Ex	F	F	F	Ex	F	Be
F	Be	F	F	SR	F	SR	F	F	Be
G	Be	Be	Be	Be	Be	Be	Be	Be	Be

LATTICE COMPONENTNUMBER

Fuel	<u>27</u>
Shim Rod (SR)	<u>6</u>
Beryllium (Be)	<u>24</u>
Experiment (E)	<u>3</u>
Iodine Sleeve (¹³¹ I)	<u>1</u>
Isotope Stringer (N _F)	<u>1</u>
Hydraulic Tube (HT)	<u>1</u>

Figure 5. ORR Lattice Configuration - August 16, 1975, through September 30, 1975.

ORR LATTICE LOADING

For Fuel Cycles 127B, C, D

	1	2	3	4	5	6	7	8	9
A	Be	Be	I_{131}	F	F	F	Be	Be	Be
B	Be	F	F	SR	F	SR	F	Be	Be
C	Be	F	Ex	F	F	F	F	F	Be
D	Be	F	F	SR	F	SR	F	HT	Be
E	Be	F	Ex	F	F	F	Ex	F	Be
F	Be	F	F	SR	F	SR	F	F	Be
G	Be	Be	Be	Be	Be	Be	Be	Be	Be

<u>LATTICE COMPONENT</u>	<u>NUMBER</u>
Fuel	<u>27</u>
Shim Rod (SR)	<u>6</u>
Beryllium (Be)	<u>25</u>
Experiment (E)	<u>3</u>
Iodine Sleeve (^{131}I)	<u>1</u>
Isotope Stringer (Iso)	<u>0</u>
Hydraulic Tube (HT)	<u>1</u>

Figure 6. ORR Lattice Configuration- August 23, 1975, through September 30, 1975.

Table 8. Maintenance and Changes, Instrumentation and Controls

Date	Component	Trouble or Change	Reason or Maintenance
No. 1 Counting-Rate Channel			
7-22-75 through 7-29-75	Count rate and count rate period recorder	Erratic readout	The pre-amplifier and amplifier were changed out. The trouble still exists.
8-8-75	No. 1 fission chamber (TSM-1- F52 IC-8138)	Defective	Installed chamber TSM-2-F45 (IC-8289).
8-18-75	Chamber drive	Unit replaced	The drive was replaced in order to correct an erratic readout.
No. 2 Counting-Rate Channel			
8-1-75	Count rate and count rate period recorders	Erratic readout	The pulse amplifier and the log count rate meter amplifier were replaced to correct the erratic readout.
9-15-75	Counting-rate recorder slide- wire	Unit replaced	The recorder slide-wire was replaced to correct the erratic readout.
No. 1 Log-N Channel			
No maintenance or changes were required.			
No. 2 Log-N Channel			
No maintenance or changes were required.			

Table 8 (continued)

Date	Component	Trouble or Change	Reason or Maintenance
		No. 1 Safety Channel	No maintenance or changes were required.
		No. 2 Safety Channel	No maintenance or changes were required.
		No. 3 Safety Channel	
9-29-75	No. 3 safety recorder	Slow power response	The constant current regulator was replaced.
		Magnet Amplifiers	No maintenance or changes were required.
		Nos. 1 and 2 Gamma Channels	No maintenance or changes were required.
		North N ¹⁶ and South N ¹⁶ Channels	No maintenance or changes were required.
		Micromicroammeter Channel	No maintenance or changes were required.

Table 8 (continued)

Date	Component	Trouble or Change	Reason or Maintenance
Servo Channel			
7-29-75	Servo amplifier	Abnormal operation during startup	A loose tube in the amplifier was reseated.
Reactor Noise Monitor			
			No maintenance or changes were required.
Process Instrumentation			
7-8-75	Primary pumps bearing temperature recorder	Faulty chart drive motor	The chart drive motor was replaced.
7-23-75	Pool demineralizer dynalog	Erratic read-out	The dynalog was retubed to correct an erratic readout.
8-20-75	Pool water activity recorder	No response	The amplifier was replaced.
10-3-75	Reactor water dynalog	Erratic readout	The amplifier was retubed.
9-26-75	North demineralizer resistance probe	Erratic readout	The probe was cleaned.

Table 8 (continued)

Date	Component	Trouble or Change	Reason or Maintenance
Radiation-Detection Instrumentation			
8-28-75	Reactor water radiation module	Erratic readout	The module was replaced.
9-15-75	Reactor primary water activity recorder monitor	Unit replaced	The gamma monitor and probe were replaced.

Table 9... Present Status of Ionization Chambers and Fission Chambers.

Chamber Serial No.	Location	Present Service	Date Present Service Started	Previous Service	Remarks
Installed Chambers					
PCP-III-106-66-9	Position 7	No. 1 safety and No. 2 log N	September, 1966 (safety)	None	No trouble; fabricated at ORNL. Compensated section used from February, 1969, until March, 1970, as No. 1 log N. Used as No. 2 log N from May 28, 1973.
CTC-2 (C-768)	Position 3	Noise monitor	January 24, 1973	LITR-BSR	Served as LITR safety chamber from February, 1962, to July, 1965. Modified for underwater service in 1969. In- stalled in the BSR in April, 1970, and in August the chamber was removed to storage.
PCP-III-106A, SN-72-3	Position 2	No. 2 safety and No. 1 log N	May 15, 1975	None	None
PCP-II-106-66-3	Position 4	No. 3 safety	May, 1964 (safety) March, 1970 (log N)	None	No trouble; fabricated by ORNL.
PCP-II-106-63-4	Position 5	Servo and micromicro- ammeter	June, 1964	None	No trouble; fabricated by ORNL.

Table 9 (continued)

Chamber Serial No.	Location	Present Service	Date Present Service Started	Previous Service	Remarks
Installed Chambers					
TSM-2-F45	Poolside	No. 1 counting rate north	August 8, 1975	ORR	Used as No. 1 counting rate from April 26, 1971, until December 5, 1972.
CTC-5 (C-770)	Position 8	Chamber dis- connected	October, 1971	LITR	Used as No. 1 safety at the LITR; modified for ORR-BSR underwater service.
PCP-II-105-63-2	Poolside, south	No. 1 gamma, south	April 26, 1972	ORR	Used as No. 2 gamma, north, from April, 1964, until December, 1970.
PCP-II-105-63-3	Poolside, north	No. 2 gamma, north	August 17, 1971	ORR	Used as No. 1 gamma, south, from April, 1964, until March, 1970.
TSM-3-F29	Poolside	No. 2 counting rate	October 24, 1972	None	Replaced fission chamber "snake" assembly TSM-1- F52.
Spare Chambers					
PCP-II-105-63-1	Instrumenta- tion & controls shop	Awaiting repair	April 26, 1972	ORR	Used as No. 1 gamma, south from March 31, 1970, until April 26, 1972.

Table 9 (continued)

Chamber Serial No.	Location	Present Service	Date Present Service Started	Previous Service	Remarks
Spare Chambers					
S27-34R-F29	ORR plug storage	Awaiting repair	April 26, 1971	ORR	Used as No. 1 counting rate from July 28, 1970, to April 26, 1971.
S3-8R-F22	ORR plug storage	Awaiting repair	April 26, 1971	ORR	Used as No. 2 counting rate from January 14, 1970, to April 26, 1971.
TSM-1-F52	ORR plug storage	Awaiting repair	December 5, 1973		Used as No. 2 counting rate (south) from April 26, 1972, until October 27, 1972.
CTC-1	Instrumenta- tion & controls shop	Awaiting repair	October, 1971	ORR	Used as noise monitor from March, 1962, until October 1, 1971.
CTC-4 (C-769)	ORR plug storage			LITR	Used as No. 2 safety in the LITR; modified for ORR-BSR underwater ser- vice.

Table 9 (continued)

Chamber Serial No.	Location	Present Service	Date Present Service Started	Previous Service	Remarks
PCP-III-106-66-5	Instrumenta- tion & control shop	Awaiting repair		ORR	Used as No. 2 safety and log N. from September 27, 1968, to July 22, 1970, and from May 7, 1971, to May 20, 1971; from November, 1971, to January 24, 1973, as No. 2 safety and until May 28, 1973, as No. 2 log N.

Table 10. Process Systems, Maintenance and Changes

Date	Component	Remarks
Reactor Primary Water System		
8-11-75. through 8-14-75	Discharge manifold of the primary water pumps	Visual inspection of the 24 in. manifold and leak checking of the discharge lines from the electric shutdown and gasoline operated pumps indicated a possible leak on the discharge line of the electric shutdown pump and a possible leak in the 24 in. line at ~ the point of the north exit from beneath the pump house.
8-12-75	No. 2 primary water pump	A broken spring on the mission check valve was replaced.
8-14-75	Electrical shutdown pump for the primary water system	A broken spring on the check valve was replaced.
8-18-75 through 8-23-75	Discharge manifold of the primary water pump	The water make-up rate increased to ~ 7.5 gpm thereby initiating a decision to shut down the reactor for locating and repairing a leak in the reactor primary discharge manifold of the primary water pumps. A leak was found in the 24 in. line just outside the north wall of the pump house. The hole was drilled, tapped, and plugged with a 1/4 in. stainless steel plug. The water make-up rate returned to ~ 3.7 gpm following the line repairs.
8-4-75	Reactor secondary cooling acid control system	A faulty check valve on the discharge line of the acid pumps was replaced.
8-12-75	Cooling tower	The basin and screens were cleaned. A crack in the basin was repaired.

Table 10. (continued)

Date	Component	Remarks
Reactor Primary Water System		
9-12-75	Acid control system	A leak on the discharge line from the acid pump was repaired.
Pool Secondary Cooling System		
7-25-75	Acid control system	The faulty drain line from the pH probe was replaced.
8-11-75 through 8-15-75	Cooling tower	A new vibration switch was installed outside the fan housing. A complete check out of the switch was performed with satisfactory results.
8-11-75 and 8-12-75	Cooling tower	The flume on the tower was repaired.
Emergency Cooling System		
7-7-75	No. 1 dc unit	Reset the alarm point, which had drifted, to clear the annunciator in the control room.
8-14-75	Nos. 1, 2, and 3 dc units	Functional tests of the equipment and alarms confirmed that the systems were in satisfactory condition.
9-15-75 and 9-17-75	Nos. 1 and 2 dc units	New solid state voltage sensitive relays were installed.
9-29-75	No. 2 dc unit	Replaced a defective amp meter.

Table 10. (continued)

Date	Component	Remarks
Electrical Systems		
8-11-75	Miscellaneous breaker	Routine end-of-cycle inspection and cleaning were performed.
through 8-15-75	panels for electric motors, dc batteries, battery racks, overhead crane, and control room instrument cabinets	Dust filters for the control room instrument cabinets were changed as needed.
8-12-75	Diesel generator	The routine end-of-cycle load test was performed with satisfactory results.
Cell-Ventilation System		
8-13-75	Steam turbine	A faulty valve (PV-110) was repaired. The generator in the stack area was operated for two hours. The results were satisfactory.
Normal Off-Gas System		
8-21-75	Steam turbine	A steam leak to the turbine was repaired.
Miscellaneous		
7-2-75	Reactor pool motorized bridge	The control switch was repaired.
7-10-75	Safety shower near acid tank at the reactor secondary cooling tower	A broken water line to the shower was repaired.

Table 10 (continued)

Date	Component	Remarks
Miscellaneous		
7-12-75	Air-conditioner cooling tower	Broken belts for the tower fan were replaced.
7-21-75 through 7-25-75	North reactor demineralizer resin columns	The cation and anion resins were found to be broken down. The anion was replaced with 37 cu. ft. of amerlite IRA-400 resin and the cation with 10 cu. ft. of IR-120-S.
8-4-75	Bldg. 3004 (demineralizer)	A new gasket was installed in the backwash valve on the No. 2 demineralizer unit.
8-11-75	KWH monitor meters	One meter was installed in Bldg. 3042 basement and one was installed at Bldg. 3085. These meters will measure the KWH used for each area.
8-13-75	Hydraulic tube No. 2	A water leak in the system was repaired. New direction indicators were painted on each tube station.
8-15-75	No. 3 shim-rod electrical circuit	Faulty contacts on relay No. 45 (clutch) were repaired.
8-18-75	Potable water line supply west side of Bldg. 3004	A break in the line was repaired.
8-25-75	No. 5 sump pump	The pump became defective and was replaced.
9-3-75	Spare deep well pump	Satisfactory repairs were made on one defective pump.
9-5-75	Steam trap	A faulty trap over the lab in the ORR basement was replaced.

Table 10 (continued)

Date	Component	Remarks
Miscellaneous		
9-15-75	Air conditioner unit in the sub-pile room of the ORR basement	Satisfactory repairs were performed after the unit had failed.
9-29-75	Steam tracing	Replaced three faulty traps and one strainer.

Table 11. Status of Filters - Gaseous Waste System

Type Filter	Bank Designation	Date Installed	Date Last Tested	Type Test	Retention Efficiency (%)
Cell Ventilation System					
CWS	Overall*	North, 6-20-73 South, 1-12-65	9-19-75	DOP	99.997
Charcoal	Both Banks	North, 9-16-74 South, 10-17-67	9-18-75	Elemental Iodine	99.940
Charcoal	Both Banks	North, 9-16-74 South, 10-17-67	9-27-75	Methyl Iodide	62.170
Pressurizable Off-Gas					
CWS	North	5-5-75	9-19-75	DOP	99.955
CWS	South	10-18-67	9-19-75	DOP	99.996
Charcoal	North	2-26-73	5-7-75	Elemental Iodine	99.985
Charcoal	North	2-26-73	2-25-75	Methyl Iodide	79.73
Charcoal	South	8-11-75	8-11-75	Elemental Iodine	99.993
Charcoal	South	8-11-75	--	--	No methyl Iodide tests have been made on new filters.

*The CWS filters in the cell ventilation system were checked in series.

Table 11. (continued)

Type Filter	Bank Designation	Date Installed	Date Last Tested	Type Tested	Retention Efficiency (%)
Basement Hood Exhaust					
CWS	South	2-16-72	3-12-75	DOP	99.998
CWS	North	2-16-72	3-12-75	DOP	99.998
Normal Off-Gas					
CWS	West	6-18-75	9-19-75	DCP	99.998
CWS	East	6-12-75	9-19-75	DCP	99.999
Charcoal	West	6-18-75	6-18-75	Elemental Iodine	99.997
Charcoal	East	7-29-75	8-12-75	Elemental Iodine	99.997
Charcoal	West	6-18-75	8-26-75	Methyl Iodide	96.74
Charcoal	East	7-29-75	8-26-75	Methyl Iodide	99.41

Table 12. Experiment Facility Usage.

Facility	Access Flange	Date Installed	Date Removed	Description of Experiment	Division or Other Sponsor
C-3	V-10	6-20-75		OG-3 capsule experiment	Reactor
D-8	V-3	3-10-67		Hydraulic tube No. 2 used for isotope production and short term irradiations	Operations
E-3	V-6	5-6-75		P-13T capsule experiment	Reactor
E-7	V-5	6-20-75		OF-2 capsule experiment	Reactor
A-7	None	6-20-75	8-10-75	Radioisotopes (iodine & xenon)	Operations
A-7	None	8-15-75	8-23-75	10.56 gms of 61% enriched $K^{36}Cl$	Operations
A-3	None	8-15-75		Radioisotopes (iodine & xenon)	Operations
P-5	None	5-7-75	7-15-75	Tensile specimens	Metals & Ceramics
P-5 & P-6	None	9-10-75	9-11-75	Nose cone experiment	General Electric
GCR-P7-A	None	8-8-72		GB-10 capsule experiment	Reactor
HB-2	None	7-58		Neutron diffraction experiments	Solid States Physics
HB-3	None	11-1-59		Neutron diffraction experiments	Solid States Physics
HB-4	None	7-58		Neutron diffraction experiments	Chemistry
HB-6	None				Solid States

Table 12 (continued)

Facility	Access Flange	Date Installed	Date Removed	Description	Division or Other Sponsor
HB-3	None	11-59		Activation analysis	Analytical Chemistry
HN-4	None	12-15-63		Void determinations in irradiated materials	Solid States Physics
HN-4	None	12-15-63		"Fly's Eye" two-dimensional neutron detector for neutron diffraction and radiography	Instrumentation and Controls

APPENDIX A
INTRA-LABORATORY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

August 18, 1975

TO: Distribution

SUBJECT: Calibration of ORR Shim Rods

The ORR shim rods were calibrated on August 15, 1975, at the beginning of Cycle 127. The reactor was fueled with loading 127-A which contained 5754 grams of ^{235}U .

This calibration was necessary since the configuration has changed due to experiment insertions in CP-C3, CP-E3, and CP-E7.

A summary of the calibration is given along with previous results in Table 1. The upper limits for No. 4 and No. 6 shim rods were set at 27.25 inches.

The minimum shim rod positions at critical for all operation is:

- a. Shim rods 1 through 6 ganged at 14.1 inches withdrawn or;
- b. Shim rods 3 through 6 ganged at 12.2 inches withdrawn with shim rods 1 and 2 at the upper limit.

The differential and integral worth curves are attached.

Table 1. Results of Shim-Rod Calibration ($\% \frac{\Delta k}{k}$)

Shim Rod No.	6-22-73 Cycle 113A 4893g*	8-26-73 Cycle 114A 5097g*	12-6-73 Cycle 116A 5164g*	3-1-75 Cycle 124A 4767g**	8-15-75 Cycle 127A 5754g***
1	2.215	1.787	1.758	2.195	2.367
2	2.070	2.341	2.604	2.443	2.643
3	2.750	4.270	4.306	4.379	3.840
4	5.220	6.253	6.501	6.182	5.777
5	3.440	4.002	2.867	4.507	3.588
6	6.350	5.712	4.372	5.524	5.510

Table 1. (Continued)

Shim Rod No.	6-22-73 Cycle 113A 4893g*	8-26-73 Cycle 114A 5097g*	12-6-73 Cycle 116A 5164g*	3-1-75 Cycle 124A 4767g**	8-15-75 Cycle 127A 5754g***
1-2	4.285	4.128	4.362	4.638	5.010
3-6	17.600	20.237	18.046	20.592	18.715
1-6	22.045	24.365	22.408	25.230	23.725

* 31 fuel positions, including shim rods.

** 28 fuel positions, including shim rods.

*** 33 fuel positions, including shim rods.

T. P. Hamrick
T. P. Hamrick

S. S. Hurt III
S. S. Hurt, III

TPH:SSH:dsp

Attachments

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