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**OAK RIDGE
NATIONAL
LABORATORY**

MARTIN MARIETTA

**Oak Ridge Research Reactor Shutdown
Maintenance and Surveillance
Quarterly Report
April, May, and June 1988**

G. H. Coleman
D. L. Laughlin

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Research Reactors Division
Reactor Operations Section

OAK RIDGE RESEARCH REACTOR SHUTDOWN MAINTENANCE AND
SURVEILLANCE QUARTERLY REPORT
APRIL, MAY, AND JUNE 1988

G. H. Coleman
D. L. Laughlin

SPONSOR: A. L. Lotts
Research Reactors Division

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OAK RIDGE RESEARCH REACTOR QUARTERLY REPORT
APRIL, MAY, AND JUNE 1988

SUMMARY

The ORR was not operated during April, May, and June of 1988.

Maintenance activities, both mechanical and instrument, were essentially routine in nature. Details of fuel usage and inventory may be found in Table 1.

SHUTDOWNS

Reactor downtime (power level $<N_L$) totaled 2185 hours. A summary of the shutdown is given in Table 2, and details of the scheduled shutdown are contained in Table 3. Shutdown activities are shown in Table 4.

INSTRUMENTATION AND REACTOR CONTROLS

The performance of the instrumentation for the facility was satisfactory, and maintenance required is indicated in Table 5.

PROCESS SYSTEM

The performance of the process system was satisfactory, and maintenance required is indicated in Table 6.

EXPERIMENT FACILITIES, AND GASEOUS-WASTE FILTERS

Experiment facility usage is given in Table 7. Table 8 summarizes the results of efficiency tests of the various gaseous-waste filters.

Table 1. Fuel status

	This quarter	Last quarter
<u>HEU</u>		
Depleted fuel elements transferred for chemical recovery	0	0
Average percent burnup of fuel elements transferred	--	--
New elements, start of quarter	139	139
New elements received	0	0
New elements placed in service	0	0
New elements, end of quarter	139	139
Special or test elements	21	21
Depleted shim-safety rod elements trans- ferred for chemical recovery	0	0
Average percent burnup of shim-safety rods transferred	--	--
New shim-safety rod elements, start of quarter	8	8
New shim-safety rod elements received	0	0
New shim-safety rod elements placed in service	0	0
New shim-safety rod elements, end of quarter	8	8

Table 1. (continued)

	This quarter	Last quarter
<u>LEU</u>		
Depleted fuel elements transferred for chemical recovery	0	0
Average percent burnup of fuel elements transferred	--	--
New elements start of quarter	30	30
New elements received	0	0
New elements placed in service	0	0
New elements end of quarter	30	30
Special or test elements	0	0
Depleted shim-safety rod elements transferred for chemical recovery	0	0
Average percent burnup of shim-safety rods transferred	--	--
New shim-safety rod elements start of quarter	4	4
New shim-safety rod elements received	0	0
New shim-safety rod elements placed in service	0	0
New shim-safety rod elements end of quarter	4	4

Table 2. Analysis of shutdowns

Description of shutdown	Number	Downtime (h)
<u>Scheduled</u>		
Special, DOE shutdown*	1	2185.0
Subtotal:	1	2185.0
<u>Unscheduled</u>		
Subtotal:	0	0000.0
TOTAL:	<u>1</u>	<u>2185.0</u>

*The Department of Energy ordered the Oak Ridge Research Reactor to be placed in permanent shutdown on July 14, 1987.

Table 3. Scheduled shutdowns, details

Date	Duration (h)	End cycle	Remarks
4-1-88 thru 6-30-88	2185.0	--	The ORR was shut down on March 26, 1987, by the Department of Energy orders for shutdown of class A and B reactors. On July 14, 1987, the Department of Energy issued orders for the ORR to be placed in permanent shutdown status.

Table 4. Shutdown activities

Date	Remarks
4-8-88	Removed HSST capsules 6-1 and 6-2 from carriage in reactor pool
4-15-88	Covered NOG filter pit with tarp to keep out water
4-25-88	Removed degasifier from service
4-26-88	Transferred HSST capsule 6-1 to south hot cell
4-16-88	Transferred HSST capsule 6-2 from reactor pool to capsule storage rack center pool
4-16-88	Installed dry tube in CP-D-5 for radiation measurements by I&C
4-19-88	Removed dry tube from CP-D-5, wiped with wet rags, covered with plastic, and returned to tool storage rack
5-9-88	Loaded OD-2 carrier basket with the following: 7 beryllium halves, 14 dummy TRIGA-LEU rods, 5 aluminum isotope stringer spacers, and 8 antimony samples
5-20-88	Closed and tagged ball float valves for pool, degasifier, north and south demineralizers, decay tank, and No. 4 expansion pit sump to prevent water entering NOG system
5-27-88	Changed nitrogen cylinder for evacuation horn third level
6-7-88	Transferred HSST capsule 6-2 to south hot cell
6-7-88	Installed dry tube in rack position 8-E-1 for gamma measurements on fuel elements
6-8-88	Returned dry tube to tool storage rack
6-15-88	Sent samples of oil from four vacuum pumps and one diffusion pump for analysis to determine if they can be sent to salvage
6-15-88	Performed quarterly cell vent functional checks
6-20-88	Broke four pieces of beryllium for shipment to burial ground
6-20-88	Loaded OD-2 scrap carrier with 11 partial pieces of beryllium, 1 holddown arm, and 7 HFED dummy modules

Table 4. (continued)

Date	Remarks
6-21-88	Loaded OD-2 scrap carrier with 10 partial pieces of beryllium, 1 holddown arm, 1 sample holder, and 2 N _f trays
6-22-88	Broke 10 pieces of beryllium for shipment to burial ground
6-23-88	Loaded OD-2 scrap carrier with 12 partial pieces of beryllium and 1 holddown arm
6-24-88	Broke 8 pieces of beryllium for shipment to burial ground
6-27-88	Loaded OD-2 scrap carrier with 14 partial pieces of beryllium and 1 beryllium insert
6-29-88	Loaded OD-2 scrap carrier with 13 partial pieces of beryllium
6-30-88	Broke 6 pieces of beryllium for shipment to burial ground
6-30-88	Measured channel gap spacing of 20 LEU fuel elements
6-30-88	Continued scanning of LEU and HEU elements to determine fission product content
6-30-88	Continued wetting wood of secondary towers as a means of fire prevention
6-30-88	Water quality during quarter: pool water resistivity ohm-cm 1,107,000; reactor water resistivity ohm-cm 964,000; and pool and reactor water radioactivity cpm/ml BG

Table 5. Maintenance and changes, instrumentation and controls

Date	Component	Trouble or change	Reason or maintenance
4-8-88	Seismic channel C	--	I&C personnel checked battery voltage
4-19-88	3042 monitrons	Spiking	I&C personnel repaired and returned to service first level north center and northeast monitrons
4-26-88	Reactor vessel	--	I&C personnel performed radiation measurements inside vessel interior
4-27-88	FRCAS	--	I&C personnel performed bimonthly checks of system
4-29-88	Reactor vessel	--	I&C personnel completed radiation measurements in vessel, highest reading obtained 138,000 R/h in CP-D-5
5-6-88	Basement pH meter	Erratic reading	I&C personnel replaced probe
5-27-88	Alpha or beta-gamma monitor	Spiking	I&C personnel repaired and returned to service in control room
6-7-88	Fuel elements	--	I&C personnel performed gamma measurements on 5 fuel elements
6-9-88	FRCAS	--	I&C personnel performed quarterly checks
6-15-88	First level negative pressure manometers	--	I&C personnel installed new manometers at north and south personnel doors first level

Table 5. (continued)

Date	Component	Trouble or change	Reason or maintenance
6-23-88	Cell vent	--	I&C personnel performed quarterly surveillance functional tests on PT-65, PT-66, and radiation alarms
6-23-88	NOG	--	I&C personnel performed quarterly surveillance functional tests on PT-63, PT-64, and radiation alarms
6-23-88	Seismic channels	--	I&C personnel tested "B" and "C" channels

Table 6. Process systems, maintenance and changes

Date	Component	Remarks
4-5-88	Room 308	Insulators completed removal of asbestos insulation from lines to permit removal of the lines
4-5-88	OD-2 baskets	Lifting bar installed in eight baskets
4-6-88	West truck doors	Reinstalled closure spring for south side of west truck doors
4-6-88	B-9 cubicle	Cell vent filters changed
4-8-88	HSST capsules 6-1 and 6-2	P&E personnel disconnected lines for removal from carriage
4-8-88	HSST capsule 6-1	P&E personnel prepared capsule for transfer to hot cell
4-12-88	Sandpiper pumps	P&E personnel repaired 2 pumps
4-12-88	NOG east filter bank	QA&I personnel ran elemental iodine test. Results - 99.939%
4-14-88	NOG west filter bank	QA&I personnel ran elemental iodine test. Results - 99.952%
4-26-88	HSST capsule 6-2	P&E personnel prepared capsule for transfer to hot cell
4-27-88	Vent fan	P&E personnel installed new motor on south vent fan in third level changehouse
4-27-88	Valve box 3	P&E personnel removed 15 valves for transfer to HFIR
4-29-88	VITRO and OD-2 scrap carriers	Riggers transferred VITRO to 3029 and OD-2 to ORR
5-5-88	Room 113	P&E personnel started removing equipment
5-9-88	Door work platform	Riggers transferred from east truck door to west truck door

Table 6. (continued)

Date	Component	Remarks
5-10-88	OD-2 scrap carrier	Riggers transferred to burial ground, unloaded, and returned to ORR
5-18-88	Power cords	Electrician inspected and placed stickers on control room power cords
5-18-88	West truck doors	Millwright locked out controls and began repair of doors
5-18-88	Room 113	Riggers delivered 32 fireproof file cabinets for storage of HFIR records
5-24-88	Condensate drain line	Insulators removed asbestos insulation from line in third level changehouse to permit unstopping drain line
5-24-88	55 gal drums	Laborers transferred 76 new drums from top of Building 3001 to 3095 warehouse
5-26-88	LITR fuel carrier	QA&I personnel inspected
6-1-88	OD-2 scrap carrier	QA&I personnel inspected
6-2-88	West truck doors	P&E personnel completed repairs
6-3-88	Building 3042 and crane	P&E personnel relamped
6-13-88	Valve 447-B	P&E personnel tightened packing on demineralized water supply valve to makeup tank
6-13-88	Lunch room H&V unit	P&E personnel replaced steam trap
6-13-88	AC tower	P&E personnel replaced fan belts
6-13-88	First level H&V unit	P&E personnel replaced one belt
6-13-88	Building steam	Steam plant closed, tagged, and locked steam supply valve to building so repairs could be made to lines and traps

Table 6. (continued)

Date	Component	Remarks
6-14-88	Room 205	Insulators removed asbestos from steam line
6-17-88	Building steam	Steam plant unlocked and opened building steam supply valve
6-21-88	OD-2 carrier	Riggers transferred carrier to burial ground, unloaded, and returned to ORR
6-21-88	NOG west filter bank	QA&I personnel ran elemental iodine test. Results - 99.971%
6-22-88	OD-2 carrier	Riggers transferred carrier to burial ground, unloaded, and returned to ORR.
6-22-88	Cell vent filter bank	QA&I ran elemental iodine test. Results - 99.882%
6-23-88	NOG east filter bank	QA&I personnel ran elemental iodine test. Results - 99.940%
6-23-88	OD-2 carrier	Riggers transferred carrier to burial ground, unloaded, and returned to ORR
6-24-88	OD-2 carrier	Riggers transferred carrier to burial ground, unloaded, and returned to ORR
6-24-88	Building overhead crane	QA&I personnel load tested 20 ton crane at 125% of rated load
6-28-88	OD-2 carrier	P&E personnel replaced collectors for crane trolley
6-30-88	OD-2 carrier	Riggers transferred carrier to burial ground, unloaded, and returned to ORR

Table 7. Experiment facility usage

Facility	Access flange	Date installed	Date removed	Description of experiment	Division or sponsor
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	Research Reactors

^aThe facility is on standby.

Table 8. Status of filters, gaseous waste systems

Type filter	Bank designation	Date last changed	Date last tested	Type test	Retention efficiency (%)
<u>Cell-ventilation system</u>					
CWS	Overall ^a	North, 4-16-80 South, 8-14-85	3-29-88	DOP	99.992
Charcoal	Both banks	North, 6-30-87 South, 1-29-88	6-22-88	Elemental iodine	99.882 ^b
<u>Basement hood exhaust</u>					
CWS	South	3-11-80	3-29-88	DOP	99.992
CWS	North	3-11-80	3-29-88	DOP	99.997
<u>Normal off-gas</u>					
CWS	West	3-29-88	3-29-88	DOP	99.992
Charcoal	West	3-29-88	6-21-88	Elemental iodine	99.971
CWS	East	3-29-88	3-29-88	DOP	99.998
Charcoal	East	3-29-88	6-23-88	Elemental iodine	99.940

^aThe CWS filters in the cell-ventilation system were checked in series.

^bFilter retention efficiency 99.882% unsatisfactory, filters to be changed.

SUMMARY OF SURVEILLANCE TESTS

Table 9 is a tabulation of the completion dates of the shutdown surveillance tests required by the technical specifications. This table reflects only the shutdown surveillance requirements for the ORR facility. The technical specifications document is currently under revision to address only shutdown surveillance requirements. This document will be submitted to RORC and DOE for review and approval. 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 9. Summary of surveillance tests

Test	Most recent	Previous
<u>Biennially</u>		
Normal off-gas vacuum monitor calibration	10-1-87	9-5-86
Building ventilation flow monitor calibration	5-5-87	11-19-86
<u>Semiannually</u>		
Pressure-drop measurements across NOG filters	6-26-88	3-27-88
NOG filter system efficiency		
Elemental iodine test - east bank	6-23-88	4-12-88
Elemental iodine test - west bank	6-21-88	4-14-88
Diocetyl phthalate test - east bank	3-29-88	9-3-87
Diocetyl phthalate test - west bank	3-29-88	9-3-87
Containment closure system function test	6-15-88	2-23-88
Cell-ventilation filter system efficiency		
Elemental iodine measurements	6-22-88	2-10-88
Diocetyl phthalate measurements	3-29-88	9-3-87
Radiation monitoring equipment calibration	4-7-88	1-8-88
Stack radiation monitor calibration	2-26-88	11-24-87

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