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Oak Ridge Research Reactor Shutdown Maintenance and Surveillance Quarterly Report April, May, and June 1989

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Research Reactors Division
Reactor Operations Section

**OAK RIDGE RESEARCH REACTOR SHUTDOWN MAINTENANCE AND
SURVEILLANCE QUARTERLY REPORT
APRIL, MAY, AND JUNE 1989**

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**OAK RIDGE RESEARCH REACTOR SHUTDOWN MAINTENANCE
AND SURVEILLANCE QUARTERLY REPORT
APRIL, MAY, JUNE 1989**

SUMMARY

The ORR was not operated during April, May, and June of 1989.

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 2183 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	79
Average percent burnup of fuel elements transferred	0	37
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 transferred for chemical recovery	0	0
Average percent burnup of shim-safety rods transferred	0	0
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
<u>LEU</u>		
Depleted fuel elements transferred for chemical recovery	0	56
Average percent burnup of fuel elements transferred	0	25
New elements start of quarter	30	30
New elements received	0	0

Table 1. Continued

	This quarter	Last quarter
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	10
Average percent burnup of shim-safety rods transferred	0	25
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)
<i>Scheduled</i>		
Special, DOE shutdown*	1	2183
Subtotal	<u>1</u>	<u>2183</u>
<i>Unscheduled</i>		
Subtotal	0	0000.0
TOTAL	<u>1</u>	<u>2183</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
4-1-89 through 6-30-89	2183	--	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.

Table 4. Shutdown activities

Date	Remarks
4-10-89	Transferred fuel mini plate CZA-4 (A-192-D) from vault to MBA 035, 3033 annex for disposal.
4-10-89	Replaced mask filters and canisters in evacuation package.
4-12-89	Enclosed stored aluminum ladder in yellow plastic.
4-12-89	Placed radiation and danger tags on items hanging in pool.
4-12-89	Posted asbestos warning sign on door to "PW" room north side of basement.
4-13-89	Solid State personnel removed crystal from HN-4 and transferred to HFIR.
4-25-89	Posted "safety work permit required" sign at entrance to pipe chase.
4-26-89	Transferred one empty fuel rack and one 7-up rack to burial ground.
4-27-89	Transferred one triga-LEU rod, 16 mini plates, and 37 pieces of scrap mini plates to Building 3037 for disposal.
5-17-89	Transferred whirly pump from South pad to HFIR.
5-22-89	Determined that the capacity of emergency diesel generator fuel tank is 3000 gallons.
5-24-89	Changed out one nitrogen cylinder for evacuation horn third level and one for basement.
5-24-89	Transferred oil storage drum from Building 3103 to HFIR.
6-5-89	Sent 2-L sample of primary water to analytical lab 4500-S room F-50 for analysis.
6-7-89	Sent truckload of miscellaneous green tagged equipment from first level South to salvage.
6-9-89	Transportation audit for Building 3042 conducted by transportation committee.
6-28-89	Transferred 19 Al/Cd sleeves from wood box to two salvage drums. Drums to be picked up by hazardous waste personnel.

Table 4. Shutdown activities

Date	Remarks
6-30-89	Cleanup of Building 3095 in progress.
6-30-89	Continued wetting of secondary towers as a means of fire protection.
6-30-89	Water quality during quarter: pool water resistivity ohm-cm was 979,918, reactor water resistivity ohm-cm was 963,378, and pool and reactor water radioactivity cpm/mL. BG.

Table 5. Maintenance and changes, instrumentation and controls

Date	Component	Reason or maintenance
4-12-89	Shimrod release timers	I&C removed and transferred to HFIR for use in WRCC.
4-13-89	FR&CAS	I&C performed bimonthly check.
5-31-89	Base radio station	I&C changed out base station
6-6-89	NOG	I&C calibrated PT-63 & PT-64
6-6-89	Cell vent	I&C calibrated PT-65 & PT-66
6-7-89	NOG	I&C personnel performed second-quarter surveillance functional tests on PT-63, PT-64, and radiation alarms.
6-7-89	Cell vent	I&C personnel performed second quarter surveillance functional tests on PT-65, PT-66, and radiation alarms.
6-8-89	Seismic channels	I&C personnel tested "B" and "C" channels.
6-8-89	Recorder TR-2	I&C personnel functionally tested and calibrated.
6-8-89	Recorder TR-902	I&C personnel functionally tested and calibrated.
6-15-89	Building CAMs	I&C replaced cracked high voltage meter cover face on poolside CAM and power supply for basement South CAM.
6-19-89	FR&CAS	I&C personnel performed quarterly checks.

Table 6. Process systems, maintenance and changes

Date	Component	Remarks
4-4-89	Truck doors	P&E performed programmed maintenance on East and West truck doors.
4-4-89	B-9 cubicle	P&E changed cell vent air filter.
4-10-89	Overhead crane	QA&I performed 6-month visual inspection.
4-11-89	Hood vent fans	P&E performed programmed maintenance on basement lab hood vent fans.
4-13-89	Vent damper	P&E removed control valve for North vent damper in basement lab to shop for repair.
4-13-89	Control room AC	P&E performed programmed maintenance on control room air conditioner.
4-14-89	Elevator	P&E performed programmed maintenance.
4-14-89	File cabinets	Riggers transferred 31 cabinets from first level North to salvage.
4-14-89	Building steam	P&E removed failed steam regulators and relief valve from steam station above basement lab.
4-19-89	Primary water line	P&E performed programmed maintenance on 24-in valve in strainer pit at Building 3085.
4-20-89	Hygrometer	P&E returned to HFIR from second level West.
4-21-89	West truck doors	P&E replaced stop brackets.
4-25-89	Process sump pump	P&E completed repair of low-level pump.
4-26-89	Process sump pump	P&E replaced nonworking low-level pump with repaired spare pump.
5-1-89	Overhead crane	P&E relamped crane lights.

Table 6. Continued

Date	Component	Remarks
5-1-89	Centravac	P&E shutdown centravac, switched pumps, and restarted centravac.
5-3-89	Sump pump	P&E replaced coupling on low-level process sump pump.
5-8-89	Centravac	A.C. personnel reset and restarted centravac.
5-11-89	Building steam	P&E installed repaired steam regulators and relief valve for steam station above basement lab. Steam to building turned on.
5-11-89	Building CAMs	P&E performed programmed maintenance.
5-12-89	Control room AC	P&E replaced fan shaft and bearings and returned to service.
5-17-89	HFIR equipment	Riggers transferred inner cylinder tool and two boxes of equipment to HFIR.
5-19-89	Building elevator	P&E performed programmed maintenance.
6-14-89	Room 113	P&E installed shelving for storage of HFIR records.
6-19-89	East truck doors	P&E performed programmed maintenance.
6-22-89	HB-1	Riggers transferred green tagged neutron diffractometer and accessories from first level to truck for shipment to Missouri.
6-22-89	Building 3095	Riggers delivered four steel boxes to 3095 for use in cleanup of building.

Table 6. Continued

Date	Component	Remarks
6-22-89	Process sump	P&E removed low level sump pump to rebuild it.
6-26-89	Shutdown supplies	Riggers transferred 13 rolls of blotting paper from Building 3095 to Building 3042 basement.

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 (%)
<i>Cell-Ventilation system</i>					
CWS	Overall ^a	North, 4-16-80 South, 8-14-85	3-16-89	DOP	99.994
Charcoal	Both banks	North, 6-30-87 South, 1-29-88	6-22-88	Elemental iodine	99.882 ^{b,c}
<i>Basement hood exhaust</i>					
CWS	South	3-9-89	3-16-89	DOP	99.991
CWS	North	3-9-89	3-16-89	DOP	99.994
<i>Normal off-gas</i>					
CWS	West	1-27-89	3-16-89	DOP	99.998
Charcoal	West	1-27-89	1-31-89	Elemental iodine	99.900
CWS	East	1-27-89	3-16-89	DOP	99.996
Charcoal	East	1-27-89	2-1-89	Elemental iodine	99.883 ^b

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

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

^cFissionable material removed from facility.

DOE granted technical specification suspension.

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 that are not reported are satisfied by routine completion of daily and weekly check sheets, startup checklists, hourly data sheets, the operating logbook, and miscellaneous quality assurance tests.

Table 9. Summary of surveillance tests

Test	Most recent	Previous
<i>Biennially</i>		
Normal off-gas vacuum monitor calibration	6-7-89	10-1-87
Building ventilation flow monitor calibration	6-7-89	5-5-87
<i>Semiannually</i>		
Pressure-drop measurements across NOG filters	6-26-89	3-27-89
NOG filter system efficiency		
Elemental iodine test - east bank	2-1-89	6-23-88
Elemental iodine test - west bank	1-31-89	12-29-88
Diocetyl phthalate test - east bank	3-16-89	9-20-88
Diocetyl phthalate test - west bank	3-16-89	9-20-88
Containment closure system function test	3-14-89	9-29-88
Cell-ventilation filter system efficiency ^a		
Elemental iodine measurements	6-22-88	2-10-88
Diocetyl phthalate measurements	3-16-89	9-20-88
Radiation monitoring equipment calibration	6-6-89	3-13-89
Stack radiation monitor calibration	5-18-89	2-8-89

^aFissionable material removed from facility.
DOE granted technical specification suspension.

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