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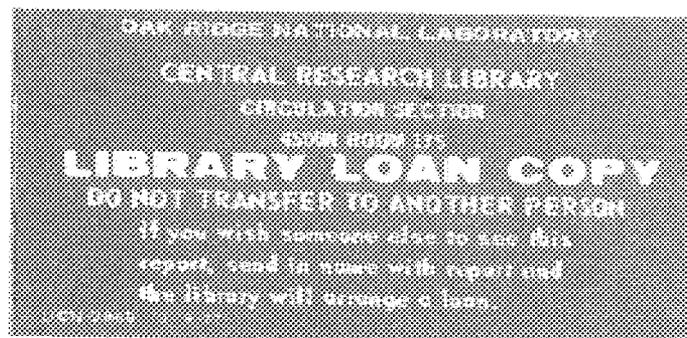
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**OAK RIDGE
NATIONAL
LABORATORY**

MARTIN MARIETTA

**Oak Ridge Research Reactor
Shutdown Maintenance and
Surveillance Quarterly Report
October, November, and December 1988**

G. H. Coleman
D. L. Laughlin



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MARTIN MARIETTA ENERGY SYSTEMS, INC.
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Research Reactors Division
Reactor Operations Section

**OAK RIDGE RESEARCH REACTOR SHUTDOWN MAINTENANCE AND
SURVEILLANCE QUARTERLY REPORT
OCTOBER, NOVEMBER, AND DECEMBER 1988**

G. H. Coleman
D. L. Laughlin

SPONSOR: A. L. Lotts
Research Reactors Division

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OAK RIDGE RESEARCH REACTOR SHUTDOWN MAINTENANCE
AND SURVEILLANCE QUARTERLY REPORT
JULY, AUGUST, AND SEPTEMBER 1988

SUMMARY

The ORR was not operated during October, November, and December 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 2209 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	16	0
Average percent burnup of fuel elements transferred	39	--
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	4	0
Average percent burnup of shim-safety rods transferred	74	--
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	0
Average percent burnup of fuel elements transferred	--	--
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	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	2209.0
Subtotal:	1	2209.0
<u>Unscheduled</u>		
Subtotal:	0	0000.0
TOTAL:	<u>1</u>	<u>2209.0</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
10-1-88 thru 12-31-88	2209.0	--	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
10-3-88	Removed end boxes from 12 HEU elements
10-4-88	Changed underwater saw blade
10-4-88	Removed end boxes from 4 HEU elements
10-5-88	Removed end boxes from 7 HEU elements
10-7-88	Removed end boxes from 9 HEU elements
10-10-88	Removed end boxes from 8 HEU elements
10-11-88	Changed underwater saw blade
10-11-88	Removed end boxes from 5 HEU elements
10-12-88	Rearranged fuel racks in center pool to provide open space below fuel cask loading zone
10-12-88	Removed two experiment storage racks from center pool, rinsed, wiped off, bagged and transferred to burial ground
10-12-88	Placed stainless steel drum on south side of center pool grating and filled with 118 fuel element end boxes from saw box
10-17-88	Removed end boxes from 5 HEU elements
10-18-88	Removed end boxes from 9 HEU elements
10-19-88	Removed end boxes from 19 HEU elements
10-20-88	Removed end boxes from 4 HEU elements
10-21-88	Removed end boxes from 2 HEU elements and 20 LEU elements
10-22-88	Removed end boxes from 13 HEU elements
10-25-88	Transferred B-041 to south hot cell

Table 4. Continued

Date	Remarks
10-26-88	Covered GE-700 carrier fire shield and base with tarps
10-27-88	Removed fuel cask lid from GE-700 carrier and installed basket for elements
10-27-88	Loaded GE-700 carrier with 20 HEU elements, drained, purged remaining water from carrier to NOG, and left on purge overnight to remove remaining moisture
10-28-88	Completed procedure for loading and shipping GE-700 carrier
11-1-88	Transferred B-041 minus 2 plates from south hot cell to N-7up rack
11-1-88	Transferred C-025 to south hot cell
11-2-88	Covered GE-700 fire shield with tarp
11-3-88	Transferred C-025 minus 2 plates from south hot cell to storage rack No. IX, position No. 4
11-3-88	Transferred N-006 to south hot cell
11-4-88	Transferred N-006 minus 2 plates from south hot cell to storage rack No. III, position No. 20
11-4-88	Transferred B-043 to south hot cell
11-6-88	GE-700, loaded fuel cask, transferred to Savannah River
11-8-88	GE-700, empty fuel cask, returned to Building 3042
11-9-88	Loaded GE-700 carrier with 20 LEU elements, drained, purged remaining water from carrier to NOG, and left on air purge to remove remaining moisture at 5:00 a.m. Removed from air purge at 4:05 p.m.
11-10-88	GE-700 carrier placed on air purge at 8:15 a.m. and removed from air purge at 2:00 p.m. Took approximately 17 h to reach 380 ppm on hygrometer
11-10-88	Transferred C-024 to south hot cell
11-15-88	Transferred N-007 to south hot cell

Table 4. Continued

Date	Remarks
11-15-88	Sent truck load of file cabinets, desks, and tables to Salvage
12-5-88	Changed out nitrogen cylinder for basement evacuation horn
12-16-88	Changed out the two nitrogen cylinders for third level evacuation horn
12-22-88	Transferred SNM material belonging to F. B. K. Kam from Building 3042 vault to Building 3127 vault
12-22-88	Shipping personnel installed security seal No. 00116 on GE-700 cask
12-31-88	Continued scanning of LEU elements and shim rods to determine fission product content
12-31-88	Continued wetting wood of secondary towers as a means of fire prevention
12-31-88	Water quality during quarter: pool water resistivity ohm-cm was 943,000, reactor water resistivity ohm-cm was 934,000, and pool and reactor water radioactivity cpm/ml BG

Table 5. Maintenance and changes, instrumentation and controls

Date	Component	Reason or maintenance
10-12-88	FRCAS	I&C personnel performed quarterly checks
10-19-88	Pool top monitor	I&C personnel transferred to shop for repair
10-20-88	Reactor water activity	I&C personnel installed small source on detector to keep off downscale alarm
10-28-88	Cell vent	I&C personnel replaced building vent duct gamma monitor module
11-4-88	Reactor water activity	I&C personnel adjusted zero
11-7-88	Reactor water activity	I&C personnel replaced gamma monitor
12-2-88	PDT-76	I&C personnel repaired leak on air supply line
1-11-89	Cell vent*	I&C personnel performed fourth quarter surveillance functional tests on PT-65, PT-66 and radiation alarms
1-11-89	NOG*	I&C personnel performed fourth quarter surveillance functional tests on PT-63, PT-64, and radiation alarms
1-11-89	Seismic channels*	I&C personnel tested "B" and "C" channels

*Extension granted for completion of fourth quarter I&C surveillance checks until January 12, 1989.

Table 6. Process systems, maintenance and changes

Date	Component	Remarks
10-3-88	Basement hood and vent	P&E personnel performed programmed maintenance on laboratory hoods and basement vent
10-5-88	Underwater saw	P&E personnel replaced bolt that secures frame with saw blade to holder
10-7-88	Overhead crane	P&E personnel inspected
10-11-88	Room 205	P&E personnel repaired steam leak
10-11-88	Lunch room refrigerator	P&E personnel replaced power cord
10-11-88	Motorized bridge	P&E personnel replaced outlet cover plate
10-12-88	Process sump pump	P&E personnel tightened loose wire
10-14-88	Changehouse H&V unit	P&E personnel removed asbestos from drain line
10-19-88	Control room A/C	P&E personnel replaced belts
10-19-88	Overhead crane	P&E personnel in process of changing out bearing for large hook
10-20-88	Pool cooling and demineralizer pump	P&E personnel performed programmed maintenance
10-20-88	Building 3042	P&E personnel relamped in building
10-21-88	Overhead crane	P&E personnel delivered platform for working on crane electrical wires
10-21-88	Building 3042 roof	P&E personnel repaired leaks
10-22-88	Overhead crane	P&E personnel completed repairs
10-22-88	Underwater light	P&E personnel repaired

Table 6. Continued

Date	Component	Remarks
10-22-88	Experiment equipment	Riggers transferred to HFIR
10-22-88	Pool tools	P&E personnel made new blade for fuel hook
10-25-88	Overhead crane	QA&I personnel, inspected and load tested at 125% rated load of 20 ton
10-26-88	GE-700 carrier	Riggers transferred from Burial Ground No. 4 to second level west in Building 3042
10-27-88	GE-700 carrier	P&*E personnel assisted with hook up of carrier
10-28-88	Changehouse H&V unit	P&E personnel worked on heater and drain line
10-28-88	GE-700 carrier	Riggers placed cask on base, covered with the fire shield, and completed tie down
10-28-88	GE-700 carrier	QA&I completed inspection of carrier and tie-down
10-28-88	Overhead crane	Riggers removed work platform
11-1-88	Changehouse H&V unit	P&E personnel completed repairs on heater and condensate line, and returned to service
11-1-88	GE-700 carrier	P&E personnel transferred trailer with GE-700 carrier to steam plant for weighing and evaluation
11-2-88	Gamma scan detector	P&E and I&C personnel replaced detector
11-2-88	GE-700 carrier	Riggers returned to Building 3042 while trailer is being remodified
11-4-88	HFIR equipment	Riggers delivered and stored first level south
11-4-88	GE-700 carrier	Riggers transferred to HFIR

Table 6. Continued

Date	Component	Remarks
11-9-88	GE-700 carrier	Riggers removed fire shield and transferred carrier from trailer to second level west in Building 3042
11-9-88	Control room A/C	A/C personnel installed new oil failure control switch
11-11-88	Building 3042 emergency lights	Electrician relamped
11-14-88	LITR carrier	P&E personnel installed stud on top and two studs on drawer of carrier
11-15-88	Fuel rack No. VI	Riggers transferred to Building 3010
11-16-88	Building 3085 heaters	P&E personnel performed programmed maintenance
11-18-88	Building 3042 elevator	P&E personnel repaired first level outside door latch
11-18-88	Primary pump test blocks	P&E personnel placed plexiglass covers over blocks
11-21-88	Building 3085	P&E personnel repaired steam leak
11-22-88	Building 3085	P&E personnel replaced steam trap in No. 2 pump cell
11-22-88	No. 1 H&V unit	P&E personnel replaced both belts
11-30-88	Centravac	A/C personnel shutdown centravac and A/C tower for the winter
12-8-88	Emergency diesel generator	P&E personnel performed programmed maintenance
12-8-88	Building 3042 A/C units	P&E personnel performed programmed maintenance
12-14-88	Building 3042 CAMs	P&E personnel performed programmed maintenance

Table 6. Continued

Date	Component	Remarks
12-15-88	Building 3042 CAMs	P&E personnel replaced air hoses on basement east, first level northeast, and third level hot cell CAMs
12-20-88	OD-2 steel baskets	P&E personnel installed lifting bars in ten steel baskets
12-22-88	GE-700 carrier	Riggers placed on Metler trailer, installed fire shield over carrier, secured, and completed tie down
12-29-88	NOG west filter bank	QA&I personnel performed iodine test. Results - 99.960% efficient
12-30-88	South process sump pump	P&E personnel replaced flexible coupling and pump discharge check valve

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	9-20-88	DOP	99.986
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	9-20-88	DOP	99.996
CWS	North	3-11-80	9-20-88	DOP	99.994
<u>Normal off-gas</u>					
CWS	West	3-29-88	9-20-88	DOP	99.996
Charcoal	West	3-29-88	12-29-88	Elemental iodine	99.960
CWS	East	3-29-88	9-20-88	DOP	99.996
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	12-25-88	9-25-88
NOG filter system efficiency		
Elemental iodine test - east bank	6-23-88	4-12-88
Elemental iodine test - west bank	12-29-88	6-21-88
Dioctyl phthalate test - east bank	9-20-88	3-29-88
Dioctyl phthalate test - west bank	9-20-88	3-29-88
Containment closure system function test	9-29-88	6-15-88
Cell-ventilation filter system efficiency		
Elemental iodine measurements	6-22-88	2-10-88
Dioctyl phthalate measurements	9-20-88	3-29-88
Radiation monitoring equipment calibration	10-6-88	7-6-88
Stack radiation monitor calibration	11-21-88	7-5-88

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