30
1/21/82
RB

ornl

ORNL/TM--7995

DE82 006949

ORNL/TM-7995

**OAK
RIDGE
NATIONAL
LABORATORY**

**UNION
CARBIDE**

MASTER

**Oak Ridge Research Reactor
Quarterly Report
April, May, and June 1981**

S. S. Hurt, III
E. D. Lance

**OPERATED BY
UNION CARBIDE CORPORATION
FOR THE UNITED STATES
DEPARTMENT OF ENERGY**

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

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
NTIS price codes—Printed Copy: A03; Microfiche A01

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

ORNL/TM--7995

DE82 006949

ORNL/TM-7995

Contract No. W-7405-eng-26

OPERATIONS DIVISION

OAK RIDGE RESEARCH REACTOR QUARTERLY REPORT
APRIL, MAY, AND JUNE 1981

S. S. Hurt, III
E. D. Lance

DISCLAIMER

This book was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

SPONSOR: J. H. Swanks
Director, Operations Division

Date Published - January 1982

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

CONTENTS

SUMMARY	1
POWER HISTORY	2
OPERATIONS	2
FUEL USAGE AND INVENTORY	7
SHUTDOWNS AND POWER REDUCTIONS	9
INSTRUMENTATION AND REACTOR CONTROLS	12
PROCESS SYSTEM	12
MECHANICAL COMPONENTS	12
EXPERIMENT FACILITIES, GASEOUS WASTE FILTERS, AND CORE CHANGES. .	12
ORR IN-SERVICE INSPECTION	25
ORR Reactor Primary Heat Exchanger No. 3	25
Internal Inspection of Aluminum Heat Exchanger in Building 3042 (Pool Heat Exchanger)	25
DISTRIBUTION	27

FIGURE LIST

Figure

1	Reactor Power History - April 1981	3
2	Reactor Power History - May 1981	4
3	Reactor Power History - June 1981	5
4	ORR Lattice Configuration - April 1, 1981 Through April 19, 1981	20
5	ORR Lattice Configuration - April 15, 1981 Through May 11, 1981	21
6	ORR Lattice Configuration - May 11, 1981 Through May 27, 1981	22
7	ORR Lattice Configuration - May 28, 1981 Through June 9, 1981	23
8	ORR Lattice Configuration - June 9, 1981 Through June 30, 1981	24

TABLE LIST

Table

1	ORR Basic Operating Data	6
2	Cycles of Operation	7
3	ORR Fuel Status	8
4	Summary of Shutdowns	9
5	ORR Scheduled Shutdowns, Details	10
6	ORR Unscheduled Shutdowns, Details	11
7	Reduction in ORR Power not Resulting in Shutdowns	11
8	Maintenance and Changes, Instrumentation and Controls . .	13
9	Instrumentation and Controls Design Change Memo 120 . . .	15
10	Process Systems, Maintenance and Changes	15
11	Experiment Facility Usage	17
12	Status of Filters - Gaseous Waste Systems	19

OAK RIDGE RESEARCH REACTOR QUARTERLY REPORT
APRIL, MAY, AND JUNE 1981

S. S. Hurt and E. D. Lance

SUMMARY

The ORR operated at an average power level of 29.8 MW for 90.7% of the time during April, May, and June 1981.

The reactor was shut down on eight occasions, one of which was unscheduled. Reactor downtime needed for refueling, maintenance, and checks was normal, with the reactor remaining available for operation 91.6% of the time.

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

In-service inspection completed during the quarter included:

- 1) ORR Reactor Primary Heat Exchanger No. 3.
- 2) Internal Inspection of the Aluminum Heat Exchanger in Building 3042 (Pool Heat Exchanger).

POWER HISTORY

The power history for the quarter is displayed in Figs. 1-3.

OPERATIONS

The basic operating data presented in Table 1 indicates that the 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.

APRIL 1981

FIG. 1

ORNL-DWG 81-23932

MAY 1981

FIG. 2

JUNE 1981

FIG. 3

ORNL-DWG 81-23934

Table 1. ORR Basic Operating Data
 Period: April, May, and June 1981

	This Quarter	Last Quarter	Year To Date	April, May, & June 1980
Total energy, MWd	2,462.6	2,228.6	4,691.3	4,663.2
Average power, MW/operating h	29.8	27.9 ^a	28.9	29.8
Time operating, %	90.7	88.9	89.8	86.1
Availability, %	91.6	92.6	92.1	93.5
Reactor water radio- activity, $\frac{\text{c/min}}{\text{ml}}$ (av)	21,100	19,500	20,300	20,350
Pool water radio- activity, $\frac{\text{c/min}}{\text{ml}}$ (av)	320	330	325	515
Reactor water resis- tivity, ohm-cm (av)	2,301,000	1,799,000	2,050,000	1,655,500
Pool water resis- tivity, ohm-cm (av)	1,794,000	2,074,000	1,934,000	864,000
Fuel elements depleted	21	14	35	41
Average burnup of fuel elements depleted, %	52.8	53.0	52.9	46.8
Shim rods depleted	2	2	4	4
Average burnup of shim rods depleted, %	78.1	77.1	77.6	75.4
Radioisotope samples	41	29	70	39
Research samples	0	0	0	1

^aLower than normal due to an experiment requiring lower power.

Table 2. Cycles of Operation

Cycle No.	Date Begun	Date Ended	Accumulated Energy (MWd)
156	February 15, 1981	April 19, 1981	540.5 ^a
157	April 25, 1981	In progress	1922.1

^aMWd this quarter.

FUEL USAGE AND INVENTORY

Twenty-one fuel elements and two shim rods were declared spent during the quarter, with an average burnup of 52.8% for the fuel elements and 78.1% for the shim rods. Twenty-eight new fuel elements and two new shim rods were placed in service.

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

Table 3. ORR Fuel Status

	This Quarter	Last Quarter	January - June 1981	January - June 1980
Depleted fuel elements transferred for chemical separation	0	36	36	48
Average percent burnup of fuel elements transferred	-	48.5	48.5	52.7
New elements start of quarter	62	62	-	-
New elements received	35	28	63	59
New elements placed in service	28	28	56	40
New elements end of quarter	69	62	-	-
Special or test elements	21	21	-	-
Depleted shim rods transferred for chemical separation	0	2	2	4
Average percent burnup of shim rods transferred	-	74.2	74.2	77.3
New shim rod elements start of quarter	21	23	-	-
New shim rod elements received	0	0	0	25
New shim rod elements placed in service	2	2	4	4
New shim rod elements end of quarter	19	21	-	-

SHUTDOWNS AND POWER REDUCTIONS

Reactor downtime (power level $<N_L$) totaled approximately 203 hours. A summary of the shutdowns is given in Table 4, and details of each are contained in Table 5. Table 6 offers information relative to unscheduled shutdowns, while 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 (h)
<u>Scheduled</u>		
Regular, end of cycle	1	143.200
Regular, refueling	4	24.200
Special, refueling and experiment work	1	30.533
Special, flux monitor run	<u>1</u>	<u>4.483</u>
Subtotal:	7	202.416
<u>Unscheduled</u>		
Instrument failure, experiment	<u>1</u>	<u>0.083</u>
Subtotal:	1	0.083
TOTAL:	<u>8</u>	<u>202.499</u>

Table 5. ORR Scheduled Shutdowns, Details

Date	Duration (h)	End Cycle	Remarks
4-2-81	7.183	156-C	The reactor was refueled.
4-19-81	143.200	156	The end of operating cycle 156 shutdown activities included: 1) refueling, 2) the completion of quarterly instrument checks, 3) the cleaning of the primary and secondary sides of pool heat exchanger, 4) the replacement of the fan motor on pool secondary cooling tower, 5) the removal of the HFED experiment and installation of the MFE-4B experiment, and 6) the installation of a check valve on the north vessel slant tube for the new syphon-break system.
5-11-81	5.383	157-A	The shutdown activities included: 1) refueling, 2) the installation of HFED experiment, and 3) the loading of monitors in HFED and GTIP experiments.
5-11-81	4.483	-	The flux run for HFED and GTIG experiments was completed and the monitors were removed.
5-27-81	30.533	157-B	The shutdown activities included: 1) refueling, 2) the installation of a new surveillance capsule for PVS experiment, and 3) the reinstallation of TRIGA-LEU experiment.
6-9-81	6.467	157-C	The reactor was refueled.
6-24-81	5.167	157-D	The reactor was refueled.

Table 6. ORR Unscheduled Shutdowns, Details

Date	Duration (h)	End Cycle	Remarks
5-7-81	0.083	-	The slide wire on the temperature recorder for MFE-4A experiment broke resulting in the recorder driving full scale. A reactor setback ensued with power sagging below N_L .

Table 7. Reduction in ORR Power not Resulting in Shutdowns

Date	Source of Signal	Type of Signal	Lowest Power (MW)	Remarks
5-7-81	Reactor primary flow ΔP	Setback	6	Automatic action of the primary bypass valve reduced the water flow to 17,000 gpm and the corresponding ΔP to the setback setpoint.

INSTRUMENTATION AND REACTOR CONTROLS

The performance of the instrumentation for the complex was satisfactory with maintenance required as indicated in Table 8. There was one Instrumentation and Controls Design Change Memo (ORR-120) completed during the quarter as shown in Table 9.

PROCESS SYSTEM

The performance of the process system was satisfactory with maintenance required as indicated in Table 10.

MECHANICAL COMPONENTS

The performance of the mechanical components was satisfactory and only routine maintenance was required.

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, 5, 6, 7, and 8.

Table 8. Maintenance and Changes, Instrumentation and Controls

Date	Component	Trouble	Corrective Action
<u>No. 1 Counting Rate Channel</u>			
4-20-81	Count-rate recorder amplifier	Erratic readout	The amplifier was replaced.
<u>No. 2 Counting Rate Channel</u>			
4-20-81	Count-rate period recorder amplifier	Erratic readout	The amplifier was replaced.
<u>No. 1 Log-N Channel</u>			
4-20-81	Period recorder amplifier	Faulty amplifier	The amplifier was replaced.
6-9-81	Log-N recorder amplifier	Would not calibrate	The amplifier was replaced.
<u>No. 2 Log-N Channel</u>			
6-10-81	Ionization chamber	Failed	The No. 2 safety chamber in position No. 2 is now No. 2 Log-N channel, type RS-C-1-1210-201, serial No. X5923
6-11-81	Power supply	Replacement	Installed a new compensated power supply (+195 V) (-30 V)
6-30-81	Log-N recorder amplifier	Erratic readout	The amplifier was replaced.

Table 8. Maintenance and Changes, Instrumentation and Controls (Cont'd)

Date	Component	Trouble	Corrective Action
<u>No. 2 Safety Channel</u>			
6-10-81	Ionization chamber	Failure	Installed an uncompensated chamber in position No. 6, type RS-C-2-808-202, serial No. 2182
<u>No. 2 Signal Amplifier</u>			
6-10-81	Amplifier	Inoperative	The amplifier was repaired and returned to service.
<u>Process Instrumentation</u>			
4-22-81	No. 1 exit temperature recorder balance motor	Inoperative	The balance motor was replaced.
6-9-81	Reactor primary inlet temperature controller transmitter	Erratic control	The transmitter was replaced.
6-24-81	Reactor primary inlet temperature controller	Erratic control	The controller was replaced.
<u>Radiation Instrumentation</u>			
4-30-81	Normal off-gas radiation recorder amplifier	Erratic control	The amplifier was replaced.

Table 9. Instrumentation and Controls Design Change Memo 120

Title of Change	Reason for Change	Remarks
Pony motor volt-amp alarms	General upgrading of the alarm circuit for DC units Nos. 1, 2, and 3	The switch units were replaced with the Transmation Model 240A for voltage monitoring and model 340A for current monitoring.

Table 10. Process Systems, Maintenance and Changes

Date	Component	Remarks
<u>Reactor Primary Cooling System</u>		
4-2-81	Bypass valve	The packing was tightened to stop a leak.
5-6-81	South facility pump	The seals and bearings were replaced.
<u>Reactor Secondary Cooling System</u>		
4-22-81	Oil line	The lines were replaced.
5-12-81	Acid system	Completed installation of new acid tank and lines.

Table 10. Process Systems, Maintenance and Changes (Cont'd)

Date	Component	Remarks
<u>Pool Secondary Cooling System</u>		
4-21-81	Fan motor	The fan motor was replaced.
5-28-81	Fan motor	The bearings were replaced in the motor.
<u>Emergency Cooling System</u>		
4-23-81	Nos. 1, 2, and 3 DC units	Functional tests of equipment and alarms were performed and adjustments made where needed. The new monitoring system installation as per I&C change memo No. ORR-120 was completed.
<u>Emergency Electrical System</u>		
4-21-81	Diesel generator	The routine end-of-cycle load test was performed with satisfactory results.
<u>Miscellaneous</u>		
6-1-81	H and V unit No. 3	The bearings were replaced in the blower motor.
6-5-81	Basement sump pump	The portable deep well pump was replaced and the level controller was repaired.
6-9-81	No. 6. shim rod	The lower limit switch was replaced and the setpoint was checked.

Table 11. Experiment Facility Usage

Facility	Access Flange	Date Installed	Date Removed	Description of Experiment	Division or Other Sponsor
A-2	None	4-17-81		Long half-life fission product	Operations
C-1	None	6-26-79		Isotopes (tritium samples)	Operations
C-3	None	5-11-81		Aluminum base dispersion type fuel plate (HFED)	Engineering Technology
D-8	V-3	6-26-80		Gamma thermometer proof test (GTIG)	Engineering Technology
E-3	V-9	3-16-81		Materials test fusion program (MFE-4A)	Engineering Technology
E-7	V-5	3-19-81		Material test fusion program (MFE-4B)	Engineering Technology
E-9	V-4	5-28-81		Low enrichment fuel test (TRIGA- LEU)	Engineering Technology
Poolside window	None	4-21-80		LWR metallurgical pressure vessel benchmark facility	Engineering Technology
Poolside window	None	6-26-80		Pressure vessel simulator and dummy surveillance capsule B	Engineering Technology
HB-1	None	9-78		Neutron spectrometer	Solid State Physics
HB-2	None	9-78		Neutron spectrometer	Solid State Physics

Table 11. Experiment Facility Usage (Cont'd)

Facility	Access Flange	Date Installed	Date Removed	Description of Experiment	Division or Other Sponsor
HB-3	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

Table 12. Status of Filters - Gaseous Waste Systems

Type Filter	Bank Designation	Date Last Tested		Type Test	Retention Efficiency (%)
<u>Cell-Ventilation System</u>					
CWS	Overall ^a	North, 4-16-80 South, 1-12-75	3-6-81	DOP	99.981
Charcoal	Both banks	North, 9-16-74 South, 2-2-81	2-10-81	Elemental Iodine	99.99
Charcoal	Both Banks	North, 9-16-74 South, 2-2-81	2-12-81	Methyl Iodide	99.97
<u>Basement Hood Exhaust</u>					
CWS	South	3-10-80	3-6-81	DOP	99.987
CWS	North	3-10-80	3-6-81	DOP	99.996
<u>Normal Off-Gas</u>					
CWS	West	5-28-81	6-4-81	DOP	99.99
Charcoal	West	5-28-81	6-3-81	Elemental Iodine	99.99
CWS	East	1-15-81		DOP	99.993
Charcoal	East	1-15-81	1-20-81	Elemental Iodine	99.99
Charcoal	West	5-28-81	6-2-81	Methyl Iodide	98.26
<u>Pressurizable Off-Gas^b</u>					

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

^bThe POG system is on standby; therefore, all filter tests have been discontinued.

ORR LATTICE LOADING

For Fuel Cycles 156-C, -D

	1	2	3	4	5	6	7	8	9
A	BE	BE	F	F	F	F	F	BE	BE
B	BE	F	F	SR	F	SR	F	BE	BE
C	ISO	F	AL	F	F	F	AL	F	BE
D	BE	F	F	SR	F	SR	F	E	BE
E	BE	F	E	F	AL	F	E	F	BE
F	BE	F	F	SR	F	SR	F	F	BE
G	BE	BE	BE	BE	BE	BE	BE	BE	BE

LATTICE COMPONENT

NUMBER

Fuel (F)	<u>27</u>
Shim Rod (SR)	<u>6</u>
Beryllium (BE)	<u>23</u>
Experiment (E)	<u>3</u>
Xenon Sleeve (¹³³ XE)	<u>0</u>
Isotope Stringer (ISO)	<u>1</u>
Aluminum (AL)	<u>3</u>

Fig. 4. ORR Lattice Configuration - April 1, 1981 - April 19, 1981

ORR LATTICE LOADING

For Fuel Cycles 157-A

	1	2	3	4	5	6	7	8	9
A	BE	BE	F	F	F	F	F	BE	BE
B	BE	F	F	SR	F	SR	F	E	BE
C	ISO	F	AL	F	F	F	AL	F	BE
D	BE	F	F	SR	F	SR	F	E	BE
E	BE	F	E	F	AL	F	E	F	BE
F	BE	F	F	SR	F	SR	F	F	BE
G	BE	BE	BE	BE	BE	BE	BE	BE	BE

LATTICE COMPONENT

NUMBER

Fuel (F)	<u>27</u>
Shim Rod (SR)	<u>6</u>
Beryllium (BE)	<u>22</u>
Experiment (E)	<u>4</u>
Xenon Sleeve (¹³³ XE)	<u>0</u>
Isotope Stringer (ISO)	<u>1</u>
Aluminum (AL)	<u>3</u>

Fig. 5. ORR Lattice Configuration - April 15, 1981 - May 11, 1981

ORR LATTICE LOADING

For Fuel Cycles 157-B

	1	2	3	4	5	6	7	8	9
A	BE	BE	F	F	F	F	F	BE	BE
B	BE	F	F	SR	F	SR	F	¹³³ XE	BE
C	ISO	F	E	F	F	F	AL	F	BE
D	BE	F	F	SR	F	SR	F	E	BE
E	BE	F	E	F	AL	F	E	F	BE
F	BE	F	F	SR	F	SR	F	F	BE
G	BE	BE	BE	BE	BE	BE	BE	BE	BE

LATTICE COMPONENT

NUMBER

Fuel (F)	<u>27</u>
Shim Rod (SR)	<u>6</u>
Beryllium (BE)	<u>22</u>
Experiment (E)	<u>5</u>
Xenon Sleeve (¹³³ XE)	<u>1</u>
Isotope Stringer (ISO)	<u>1</u>
Aluminum (AL)	<u>2</u>

Fig. 6. ORR Lattice Configuration - May 11, 1981 - May 27, 1981

ORR LATTICE LOADING

For Fuel Cycles 157-C

	1	2	3	4	5	6	7	8	9
A	BE	BE	F	F	F	F	F	BE	BE
B	BE	BE	F	SR	F	SR	F	¹³³ XE	BE
C	BE	F	E	F	F	F	AL	F	BE
D	ISO	F	F	SR	F	SR	F	E	BE
E	BE	F	E	F	AL	F	E	F	BE
F	BE	F	F	SR	F	SR	F	F	E
G	BE	BE	BE	BE	BE	BE	BE	BE	BE

LATTICE COMPONENT

NUMBER

Fuel (F)	<u>26</u>
Shim Rod (SR)	<u>6</u>
Beryllium (BE)	<u>22</u>
Experiment (E)	<u>4</u>
Xenon Sleeve (¹³³ XE)	<u>1</u>
Isotope Stringer (ISO)	<u>1</u>
Aluminum (AL)	<u>3</u>

Fig. 7. ORR Lattice Configuration - May 28, 1981 - June 9, 1981

ORR LATTICE LOADING

For Fuel Cycles 157-D, -E

	1	2	3	4	5	6	7	8	9
A	BE	BE	F	F	F	F	F	BE	BE
B	BE	BE	F	SR	F	SR	F	BE	BE
C	BE	F	E	F	F	F	AL	F	BE
D	ISO	F	F	SR	F	SR	F	E	BE
E	BE	F	E	F	AL	F	E	F	BE
F	BE	F	F	SR	F	SR	F	F	E
G	BE	BE	BE	BE	BE	BE	BE	BE	BE

<u>LATTICE COMPONENT</u>	<u>NUMBER</u>
Fuel (F)	<u>26</u>
Shim Rod (SR)	<u>6</u>
Beryllium (BE)	<u>23</u>
Experiment (E)	<u>5</u>
Xenon Sleeve (¹³³ XE)	<u>0</u>
Isotope Stringer (ISO)	<u>1</u>
Aluminum (AL)	<u>2</u>

Fig. 8. ORR Lattice Configuration - June 9, 1981 - June 30, 1981

ORR IN-SERVICE INSPECTION

Subject: ORR Reactor Primary Heat Exchanger No. 3
Inspection Date: April 22, 1981

1. Both heads have light pitting and corrosion.
 2. A light coating was found on the second pass tubes at the exit end.
 3. Approximately 20 tubes at the supply end had partial blockage (pebbles and wood).
 4. One (1) pressure gage was broken and needs replacing.
- Vessel is in satisfactory condition for present use.

Subject: Internal Inspection of Aluminum Heat Exchanger
in Building 3042 (Pool Heat Exchanger)

Inspection Date: April 22, 1981

On April 22, 1981 the head was removed and the tube bundle withdrawn from the heat exchanger for routine maintenance. QA&I was asked to inspect the vessel at this time. The inspection involved the internal surface of the shell, external surfaces of the tube bundle, the tube ends, the tube sheet, and the heat.

All surfaces, except for the baffle plates, are clean and free of corrosion. The areas of shallow corrosion on the baffle plates, as noted in the 1980 report, show no significant change. These areas could not have an adverse effect on the operation of the vessel, therefore the heat exchanger was acceptable for continued service.

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

DO NOT MICROFILM

ORNL/TM-7995

INTERNAL DISTRIBUTION

1. S. J. Ball	17-19. E. D. Lance
2. F. T. Binford	20. R. V. McCord
3. G. H. Burger	21. J. A. Ray
4. C. D. Cagle	22. T. M. Sims
5. T. E. Cole	23. K. W. Sommerfeld
6. G. H. Coleman	24. J. H. Swanks
7. J. A. Conlin	25. R. D. Taylor
8. B. L. Corbett	26. J. R. Thomas
9. I. T. Dudley	27. K. W. West
10. W. A. Duggins	28-29. Laboratory Records Department
11. T. A. Gabriel	30. Laboratory Records, ORNL R.C.
12. T. P. Hamrick	31-32. Central Research Library
13. R. W. Hobbs	33. Document Reference Section
14. S. S. Hurt	34. ORNL Patent Section
15-16. R. R. Judkins	

EXTERNAL DISTRIBUTION

- 35. Safety and Environmental Control Division, DOE, Oak Ridge
- 36. C. Moller, Atomic Energy Board, Pelindaba, Prive Bag X256, Pretoria, SOUTH AFRICA
- 37. M. Jacquemain, Head, Technical Department ILL, Institute Max von Laue-Paul Langevin, CEDEX 156, 38 Grenoble-Gare, FRANCE
- 38. Office of Assistant Manager for Energy Research and Development, Department of Energy, Oak Ridge Operations Office, Oak Ridge, Tennessee 37830
- 39. Robert J. Swanenburg de Veye, Head, Research Reactor Department, Reactor Centrum Nederland, Westerduinway 3-Petten (N.-H), THE NETHERLANDS
- 40-66. Technical Information Center, Oak Ridge
- 67. A. C. Woods, A.A.E.C. Research Establishment, New Illawarr Rd., Lucas Hts., N.S.W., AUSTRALIA
- 68. M. Nakai, NAIG Nuclear Research Laboratory, Nippon Atomic Industry Group Co., Ltd., 4-1, Ukishimacho, Kawaskaki City, JAPAN