eg

MASTER

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.

MASTER

Quarterly Operating Report
Fourth Quarter 1979
DLCS 5000479

Approved by:

J. F. Zagorski
Superintendent

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.

Contract E-(36-1)-292
United States Department of Energy

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

TABLE OF CONTENTS

Preface	i
1. SUMMARY OF OPERATIONS	1
2. SUMMARY OF LWBR STATION PERFORMANCE	4
3. CHEMISTRY	5
4. MAINTENANCE	16
5. TEST PROGRAM	17
6. GLOSSARY	22

Preface

This Quarterly Report is prepared and issued by the Duquesne Light Company to disseminate information relative to all significant activities conducted at the Shippingport Atomic Power Station. Consistent with the premise that Shippingport was built to provide information and not power at competitive costs, this report makes no effort to analyze power production costs and makes no deductions regarding costs which might be achieved if Shippingport had been built and operated solely to produce power.

In preparation of these reports, it has been presumed that the reader has a working knowledge of nuclear reactors, reactor technology and/or electric utility generating station operations. The reader is reminded, however, that this is an operating report rather than a technical report. Anyone desirous of obtaining information on recent technical progress related to the nuclear portion of the Shippingport Atomic Power Station is, therefore, referred to the United States Department of Energy, Technical Information Center at Oak Ridge, Tennessee, where this information is readily available.

1. Summary of Operations

At the beginning of the fourth quarter of 1979, the Shippingport Atomic Power Station was in operation with the 1A, 1B and 1C loops operating and the Station limited to 70% power. The 1D loop was isolated due to a small primary system coolant leak found on the one inch bonnet vent line on the 1D reactor coolant loop manual isolation valve (05-H6-8). The idle 1D coolant loop was cross connected to the operating 1B coolant loop for pressure control through the purification system inlet valves as per approved operating procedures. The 1AC and 1BD purification loops remained in service.

On October 1, while the 1D loop was isolated with the loop hydraulic valves closed, the 1D loop hydraulic valves drifted toward the open position resulting in a mild power transient. The 1D loop hydraulic valves were immediately reclosed restoring previous plant conditions. The Station was then shutdown on the same day to evaluate the cause of the 1D loop hydraulic valve drift.

The reactor shutdown was completed on October 2. The Station was cooled to approximately 150°F with a steam bubble maintained in the pressurizer and the coolant temperature controlled by the reactor plant cooldown heat exchanger.

Weld repairs were completed on the one inch bonnet vent line of the 1D reactor coolant loop manual isolation valve (05-H6-8). Inspection and test confirmed the cause of the 1D loop hydraulic valve drift to be excessive leakage through the 1D hydraulic 3-way selector valve (15-H12-4). Repair of the selector valve was completed and the 1D coolant loop returned to service on October 13 following a hydrostatic test. A Station heat-up was performed and the plant returned to service on October 17 with all four reactor coolant loops operating.

The turbine generator was shutdown on November 1 to repair a weld leak on a turbine extraction steam line drain. The Station was returned to service on November 2.

Another turbine generator shutdown was necessary on November 6 to repair a weld leak upstream of 1B boiler drain valve (41-H16-6). The station was returned to service on November 7 after repairs were completed.

The station was shutdown as planned on December 12 for performance of test procedure LWBR-DLCS 66103, Movable Fuel Assembly Scram Test. Six movable fuel assemblies were scrammed as part of the test requirements. The Station was returned to service on December 13 and remained at full operating capacity through the end of the quarter.

1. Summary of Operations (Cont'd)

The remaining irradiated PWR Core 2 core barrel and miscellaneous refueling tools were in storage under shielding water in the deep pit of the Fuel Handling Building.

The 1A, 1B, 1C and 1D 991 psig self-actuated steam relief valves remained gagged during the quarter to prevent leakage through the valve seats. Gagging of redundant relief valves is permitted by ASME Code and approved operating procedures.

The LWBR Core has generated 13,838.35 EFPH from startup through the end of the quarter.

The Reactor Coolant System average leak rate for this quarter was 10 gallons per hour when the plant was at normal operating temperature and pressure.

To prevent above normal valve operating system valve seat leakage, the valve operating system water supply valve (15-H16-49) to three-way selector valves for the fail-closed hydraulic valves was closed until required open for valve manipulations. The three-way selector valves will be inspected and repaired as necessary during the planned Spring Shutdown.

There were no radioactive liquid discharges from Radioactive Waste Processing to the river this quarter. The radioactive liquid waste effluent line to the river remained blanked off to prevent inadvertent radioactive liquid waste discharges.

During the quarter 9200 cubic feet of gas was discharged from Radioactive Waste Processing containing approximately 0.0033 curies of radioactivity, mostly Xenon 133 with trace amounts of Xenon 135.

During the fourth quarter of 1979, 1,177 cubic feet of radioactive solid waste was shipped out of state for burial. These shipments contained 0.073 curies of radioactivity which does not include irradiated components. (See Maintenance Section).

During the fourth quarter, on-shift Casualty and Emergency Drills were performed by operating personnel and trainees. Trainees were assigned to observe or perform various evolutions in the normal modes of plant operation.

-3-

2. SUMMARY OF LWBR STATION PERFORMANCE

Electrical output (Gross) to date	kwhr	1,019,237,000
EFPH to date	hr	13,838.35
EFPH for the quarterly period	hr	1,727.35
Hours reactor critical to date	hr	15,980.84
Hours reactor critical for the quarterly period	hr	1,827.84
No. 1 main unit service hours (quarterly period)	hr	1,780.70
Net Station Output (quarterly period)	kwhr	105,747,000
No. of forced outages*		0

* Interruption of electrical output due to protective equipment action and/or operator action.

3. Chemistry

During the fourth quarter of 1979, the Chemistry section maintained specifications in the various plant systems and fulfilled the Station Manual requirements.

Reactor Plant

The reactor coolant system was maintained within all chemical specifications during the periods of cold layup and hot standby. Refer to Tables I and II. During the extensive period of plant operation, the reactor coolant system was also maintained within all specifications with one exception, that of a high hydrogen concentration*. The high out-of-specification hydrogen concentration was attributed to the decomposition of ammonium hydroxide which is added to the reactor coolant system in order to maintain pH control. Subsequent degassifications lowered the hydrogen concentration to within specifications. Refer to Table III.

The only out-of-specification conditions which existed in the reactor plant auxiliary systems occurred in the coolant charging water system and the component cooling water system. The out-of-specification conditions which existed in the coolant charging water system were that of high pH and specific conductance values*. The high pH and specific conductance values in the coolant charging water system were attributed to the presence of ammonia which entered the system by back leakage during addition of ammonium hydroxide to the primary system. No corrective action is required whenever this condition is attributable to the presence of ammonia. Refer to Table VII.

The low out-of-specification chromate concentration* in the component cooling water system was attributed to the effects of dilution as new makeup water was added to the system. The addition of potassium chromate restored the system's chromate concentration to within specifications. Refer to Table VII.

In addition to operational chemistry analyses during this quarter, Test Procedure LWBR-DLCS 58001, Reactor Coolant Fission Product Monitoring During Reactor Startup, was performed in accordance with test requirements, during the four plant startups. Samples of reactor coolant were drawn and analyzed for Gross Iodine and Iodine-131. The results showed no abnormal peaking of Iodine activities as the reactor power was increased in accordance with scheduled power range operations, verifying the integrity of the core cladding. No other formal chemistry testing during this quarter occurred, however Test Procedure LWBR-DLCS 59201, Periodic Radiochemical Analysis of LWBR Reactor Coolant which was performed in the third quarter of 1979, was completed and the results are included in this quarterly operating report. Refer to Tables VIII and IX.

*All of the out-of-specification conditions were of short duration and are not expected to have had a detrimental effect on plant materials.

3. Chemistry (Cont'd)

Turbine Plant

The Station was placed in the three different conditions, that of operating, hot standby, and cold wet layup during the quarter. During the period of cold wet layup, the boilers were maintained within all specifications. Refer to Table IV. During the period of hot standby, the boilers exhibited high pH and high specific conductance values*. These out-of-specification conditions were attributed to heating up the boilers which resulted in decomposition of hydrazine to ammonia increasing pH and conductivity. Subsequent boiler drains and refilling operations aided in restoring the pH and specific conductances to within specifications. As a result of some of the draining and refilling operations, the 1A and 1B main unit steam generators experienced low morpholine concentrations*. The addition of morpholine to the affected steam generators corrected the low morpholine concentrations by raising them to within specification. Refer to Table V.

During the extensive period of plant operation, the boilers were maintained within all specifications without exception. Refer to Table VI.

Radioactive Waste Processing

There were no liquid discharges from the Radioactive Waste Processing System to the river during this quarter. Approximately 9200 cubic feet of gas was discharged from the Radioactive Waste Processing System containing approximately 0.0033 curies of radioactivity, mostly Xenon 133 with trace amounts of Xenon 135. The radioactivity released from Shippingport is far too small to have any measurable effect on the general background environmental radioactivity outside the plant.

*All of the out-of-specification conditions were of short duration and are not expected to have had a detrimental effect on plant materials.

TABLE I
REACTOR COOLANT SYSTEM
WATER CONDITIONS AND CHEMICAL ADJUSTMENTS
COLD LAYUP (<200°F)

Chemical Conditions	Specifica- tions	Analytical Results		NH ₄ OH (liters)	H ₂ (Cubic Feet)	Degassifi- cation (Hours)
		min.	max.			
pH @ 25°C	10.10-10.30	10.14	10.21			
Specific Conductance (μmhos/cm)	Consistent with pH	34	39			
Total Gas (cc/kg)	125 cc/kg max.	38	53			
Hydrogen (cc/kg)	17 cc/kg max. 10 cc/kg min.	11.2	18.9*			
Oxygen	0.14 ppm	---	<0.005			
Chemicals Added				6.0	0.0	0.0

* See Chemistry section of QOR for explanation of out of specification data.

TABLE II
REACTOR COOLANT SYSTEM
WATER CONDITIONS AND CHEMICAL ADJUSTMENTS
HOT STANDBY (>200°F)

Chemical Conditions	Specifications	Analytical Results		NH ₄ OH (liters)	H ₂ (Cubic Feet)	Degassification (Hours)
		min	max			
pH @ 25°C	10.10 10.30	10.15	10.23			
Specific Conductance (μmhos/cm)	Consistent with pH	33	42			
Total Gas (cc/kg)	125 cc/kg max.	35	106.7			
Hydrogen (cc/kg)	10 cc/kg min 60 cc/kg max	10.1	59			
Chloride	0.10 ppm max.	N.P.				
Chemicals Added				14.0	0.0	4.75

N.P. Denotes not performed.

TABLE III
REACTOR COOLANT SYSTEM
WATER CONDITIONS AND CHEMICAL ADJUSTMENTS
OPERATING (>200 °F)

Water Conditions	Specifica- tions	Analytical Results		NH ₄ OH (liters)	H ₂ (Cubic Feet)	Degassifi- cation (Hours)
		min.	max.			
pH @ 25°C	10.10 10.30	10.10	10.28			
Specific Conductance (μmhos/cm)	Consistent with pH	24.5	48			
Total Gas (cc/kg)	125 cc/kg max.	72	117			
Hydrogen (cc/kg)	10/cc/kgmin 60 cc/kgmax	26.9	*62.6			
Chloride	0.10 ppm max.	---	<0.10			
Chemicals Added				160.0	0.0	54.38

* Refer to Reactor Plant Section of QOR.

TABLE IV
NON-OPERATING BOILER CHEMISTRY
COLD LAYUP (<200°F) WATER CHEMISTRY

Water Conditions	Specifications		Boilers							
	min.	max.	1A		1B		1C		1D	
pH @ 25°C	9.30	10.50	9.54	9.68	9.62	9.70	9.63	9.74	9.49	9.82
Specific Conductance	-----	30 μ hos/cm	12	17	15	18	15	18	15	18
Chloride	-----	0.20 ppm	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Hydrazine	50 ppm	100 ppm	60	98	65	93	63	100	70	100
Chemicals Used (lbs.)										
N_2H_4			22		16		16		22	

TABLE V
NON-OPERATING BOILER CHEMISTRY
HOT STANDBY (>200°F) WATER CHEMISTRY

Water Conditions	Specifications		Boilers							
	min.	max.	1A		1B		1C		1D	
pH @ 25°C	8.50	9.30	8.51	*9.87	8.57	*9.96	8.60	*9.75	8.76	*9.88
Specific Conductance	-----	10 µmhos/cm	4.1	*28	3.7	*30	3.5	*22	3.9	*25
Chloride	-----	0.20 ppm	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Morpholine	0.50 ppm	6.00 ppm	0.42*	2.9	0.22*	3.06	0.50	2.86	2.1	4.05
Silica	-----	5.00 ppm		0.62		1.12		1.22		0.55
Chemicals Used (lbs.)										
C ₄ H ₉ NO				2.42		2.20		2.53		1.65

* Refer to Turbine Plant Section of QOR.

TABLE VI
OPERATING BOILER CHEMISTRY
OPERATING (>200°F) WATER CHEMISTRY

Water Conditions	Specifications		Boilers							
	min.	max.	1A		1B		1C		1D	
pH @ 25°C	8.50	9.30	8.50	9.01	8.57	9.06	8.58	9.08	8.54	9.07
Specific Conductance	-----	10 μ mhos/cm	3.1	6.6	3.3	6.1	3.1	6.2	3.6	5.7
Chloride	-----	0.20 ppm	<0.10		<0.10		<0.10		<0.10	
Hydrazine	0.005 ppm	0.125 ppm	0.025	0.115	0.027	0.073	0.030	0.073	0.037	0.105
Morpholine	0.50 ppm	6.00 ppm	0.65	2.25	0.90	2.15	0.90	2.25	0.80	2.05
Silica	----	5 ppm	0.36	0.66	0.40	0.77	0.40	1.05	0.32	1.00
Chemicals Used (lbs.)										
N_2H_4			20.25		20.25		20.25		20.25	
C_4H_9CO			66.87		66.87		66.87		66.87	

TABLE VII
REACTOR PLANT AUXILIARY SYSTEMS
WATER CONDITIONS

System	Conductivity $\mu\text{mhos/cm}$	pH @ 25°C	Concentration in ppm			Gross Gamma Activity $-\mu\text{Ci/ml}$
			$\text{CrO}_4^{=}$	Cl^-	Dissolved O_2	
Component Cooling Specifications	N.S.	N.S.	500 - 1000	1.0 ppm Max.	N.S.	N.S.
Observed	N.P.	N.P.	489*-670	<0.10 - 0.30	N.P.	<MDA - 1.6×10^{-7}
Coolant Charging Water Specifications	2.50 max.	6.00-8.00	N.S.	0.10 ppm max	**NOTE	N.S.
Observed	3.4*-8.6*	6.72-9.20*	N.P.	<0.10	0.005-7.3	N.P.
Canal Water Specifications	5.00 max.	5.80-8.00	N.S.	N.S.	N.S.	1.0×10^{-6}
Observed	0.98 - 1.7	5.80-7.84	N.P.	N.P.	N.P.	3.5×10^{-7} - 4.2×10^{-7}

MDA is $8.39 \times 10^{-8} \mu\text{Ci/ml}$

N.S.: No limit needed, therefore, no limit has been specified.

N.P.: Analysis is not necessary and not performed.

**NOTE: Specification is <0.14 ppm for reactor plant cold wet layup.

* Refer to Reactor Plant Section of QOR.

TABLE VIII
PRIMARY SYSTEM LONG LIVED CRUD ANALYSIS

Date	EFPH At Sample Time	Volume of Coolant in Liters	Crud Weight In mg	Activity in $\mu\text{Ci/ml}$								% Acc.
				^{60}Co	^{58}Co	^{95}Zr	^{59}Fe	^{51}Cr	^{54}Mn	Other	Total	
8/18/79	11,309.2	937.83	6.89	1.8×10^{-5}	4.2×10^{-5}	4.4×10^{-5}	1.6×10^{-6}	8.2×10^{-6}	1.9×10^{-6}	None	7.5×10^{-5}	97.9

-14-

TABLE IX
LWBR STARTUP AND POWER RANGE TESTING ACTIVATION AND FISSION PRODUCT ANALYSIS

Date	Sample Time	Sample Location	Flow Rate Lbs/Hr	Rx EFPE	No. of Loops In Service	No. IX'S in Ser.	% Reactor Power	Measured Activities in $\mu\text{Ci/ml}$ at Sample Time											Gross Alpha
								* Gross Iodine	** 131 I	** 133 I	89 Sr	90 Sr	140 Ba	134 Cs	137 Cs	133 Xe	135 Xe	** 41 Ar	
8-17-79	1310	AC-BIX	6.5×10^4	11,290.0	4	2	98	8.61×10^{-4}	4.1×10^{-6}	6.2×10^{-5}									
8-19-79	0315	AC-BIX	6.52×10^4	11,321.97	4	2	97									1.34×10^{-4}	3.4×10^{-4}	2.7×10^{-3}	
8-20-79	0318	AC-BIX	6.47×10^4	11,345.6	4	2	97				4.4×10^{-7}	7.2×10^{-10}	8.6×10^{-7}	8.9×10^{-8}	8.3×10^{-8}				1.6×10^{-9}

* Gross Iodine values are extrapolated to 100% power and maximum purification flow at one hour after sampling.

** Activity is extrapolated to 100% power and maximum purification flow at sample time.

4. Maintenance

Scheduled and corrective maintenance was performed on plant equipment during this report period.

Significant work items completed or in progress during this period are summarized as follows:

Turbine Plant

The water treating clarifier sludge scraper remained out of service due to an excessive buildup of silt. On December 22 the clarifier was pumped out and several feet of silt was taken off site. Due to time limitations, the clarifier had to be returned to service before it was completely pumped out. The job will be completed sometime during the next quarter, at which time the scraper will be inspected and returned to service.

Reactor Plant

The 1D loop isolation valve bonnet vent line weld repair was completed early in this quarter. D loop was hydrostaticly tested on October 12 and the plant was returned to service on October 17.

The RWP evaporator hotwell replacement was completed in this quarter. The steam coil was also replaced. After a brief period of operation, the evaporator was shutdown for repairs.

In addition, a problem with the #1 Diesel Generator 86 lockout relay was diagnosed and corrected.

Refueling

The PWR-2 upper core barrel was separated from the lower barrel and set aside for subsequent disposal.

5. Test Program

The primary objective of the test program during the quarterly report period was to continue reactivity depletion of the LWBR Core for proof of breeding. Two short duration planned shutdowns occurred during the quarter to monitor the value of the flow coefficient of reactivity.

Thirty tests were performed during the report period. Twenty-seven tests were completed and three remained in progress at the end of the quarter. Table X lists these tests and Figure 2 indicates the performance dates.

Test Procedure LWBR-DLCS 50001, Seismic Scram System Functional Test, was satisfactorily performed in October following replacement of Seismic Trigger #1. The trigger alignment portion of the procedure was performed for the #1 Trigger only, however, the remainder of the test was performed for the entire system. The purpose of the test was to align the seismic trigger, verify proper operation of system components and to verify proper interface with the Nuclear Protection System.

Test Procedure LWBR-DLCS 55201, Safety Injection System Monthly Periodic Pump Tests, was satisfactorily performed each month during the quarter. Individual testing of the Boiler Feed Pumps was conducted only during the December test performance (quarterly) as required by the test procedure. Both pumps operated satisfactorily. Proper flow rate to the SIS heat exchangers from deepwell pumps, 19-G1-1 and 2 was verified during each of the monthly performances of the test. The new deepwell pump, 53-G2-4009, was tested each month and has been exhibiting a downward trend in flow rate, but is still above the minimum acceptance limit of 250 gpm. Further testing will be conducted each month to determine if the pump's flowrate is stabilizing.

The eighth performance of test procedure LWBR-DLCS 55203, SIS Quarterly Periodic Valve Test, was satisfactorily completed during the quarter. The test, which verifies that various Safety Injection System Valves are operational by opening and closing the valves and recording the operating times, was conducted in December for all the valves except 53-H12-4004 and 4005. These valves will be tested during the Spring 1980 Shutdown when the SIS lines are drained, which is in accordance with the requirements of the test procedure.

Test Procedure LWBR-DLCS 58301, DNLM System (Operation During Station Startup) was performed satisfactorily four times during this quarter during each reactor startup. The delayed neutron activity level in the sample flow from the A and B main coolant loops was continuously recorded during each station startup to test for possible fuel assembly cladding defects. The test data obtained thus far is satisfactory and no indications of fuel assembly cladding defects have been detected.

5. Test Program (Cont'd)

The sixth performance of test procedure LWBR-DLCS 60901, Periodic Inter-calibration of Temperature Sensing Elements, was satisfactorily completed on December 13. The test, which was initiated on October 17 was performed for the 1D Th Narrow Range Norwood only. Repairs were made to the instrument and the calibration performed per the test procedure. A one-point check at 531°F was conducted and the instrument required minor adjustment.* Subsequent "as found" resistance measurements indicated that no further calibration was required.

The eleventh and twelfth performances of test procedure LWBR-DLCS 62101, Periodic Checkout and Calibration of the Inverse Kinetics Simulator (IKS), were satisfactorily completed during the quarter. Both performances of the test were required to support planned periodic physics testing. During the eleventh performance of the test, the "A" Channel Brown Recorder did not meet the acceptance criteria.* Subsequent maintenance corrected the problem. During the twelfth performance, the "D" Channel Brown Recorder failed to meet the acceptance criteria.* Repairs will be made to the recorder prior to the next performances of the test. It should be noted that only one Brown Recorder need be in service for the IKS to be considered operational.

The eighth and ninth performances of test procedure LWBR-DLCS 64601, Bank Reactivity Worth and Moderator and Power Coefficients of Reactivity at Power, were satisfactorily completed in November and December. The purpose of this testing is to monitor the value of the flow coefficient of reactivity. Test data obtained met the procedure acceptance criteria.

The first performance of test procedure LWBR-DLCS 66103, Movable Fuel Assembly Scram Test, was conducted in December in conjunction with test procedure LWBR-DLCS 64601. Modules I-1, I-2, I-3, II-1, II-2, and III-2 were satisfactorily tested this quarter as required by the Test Index. The remaining modules will be tested in the next performance of the test.

The fourth performance of test procedure LWBR-DLCS 78501, Movable Fuel Assembly Critical Bank Height in Response to Primary Coolant Temperature Transients, was satisfactorily conducted in mid-October. Only the measurement of the 12 module reactivity worth was performed at this time.

The first, second, third and fourth performances of test procedure LWBR-DLCS 78801, Alternate Method of Charging Chemicals Into the Reactor Coolant System, were conducted in late October and early November. The objective of the test was to determine the acceptability of charging chemicals into the Reactor Coolant System with the Charging Pump taking suction from the Chemical Addition Vessel versus the existing parallel suction method presently in use. The test was successful and a revision to the Volume I Operating Manual will be issued.

*None of the out-of-specification conditions or equipment problems compromised reactor safety or core protection.

5. Test Program (Cont'd)

Test Procedure LWBR-DLCS 79001, Hydrostatic Test of Repair Weld on the Th Manual Valve Bonnet Vent Line (05-H6-8), was satisfactorily completed in October following the weld repair on the 1D Loop.

Test Procedure LWBR-DLCS 79101, No. 1 Inverter Performance Test, was satisfactorily performed on November 21, and the Inverter was returned to service on the same day. The test was performed to verify proper operation of the inverter following a short voltage transient.*

The following test procedures, which are on-going tests, remained in progress during the quarter:

Test Procedure LWBR-DLCS 66001, Reactivity Lifetime Test.

Test Procedure LWBR-DLCS 78601, Reactor Plant Sound Monitoring Using the Bell and Howell Tape Recorder.

Test Procedure LWBR-DLCS 78701, Comparison of Reactor Plant Pressure and Pressurizer Temperature Instrumentation.

Finally, it should be noted that test procedure LWBR-DLCS 70801, Transferring Test Tank Water to a Canal Pit, is considered to be complete. The procedure for transferring water, which has been carried as an on-going test, has been incorporated into the Volume I Operating Manual.

*None of the out-of-specification conditions or equipment problems compromised reactor safety or core protection.

TABLE X

Tests Performed During Fourth Quarter of 1979

LWBR-DLCS 5000106	Seismic Scram System Functional Test
LWBR-DLCS 5520124-26	SIS Monthly Periodic Pump Tests
LWBR-DLCS 5520308	SIS Quarterly Periodic Valve Test
LWBR-DLCS 5800119-22	Reactor Coolant Fission Product Monitoring During Reactor Startup
LWBR-DLCS 5830124-27	DN Loop Monitoring System (Operation During Station Startup)
LWBR-DLCS 5920104	Periodic Radiochemical Analysis of LWBR Reactor Coolant
LWBR-DLCS 6090106	Periodic Intercalibration of Temperature Sensing Elements
LWBR-DLCS 6210111-12	Periodic Checkout and Calibration of the Inverse Kinetics Simulator (IKS)
LWBR-DLCS 6460108-09	Bank Reactivity Worth and Moderator and Power Coefficients of Reactivity at Power
LWBR-DLCS 6610301	Movable Fuel Assembly Scram Test
LWBR-DLCS 7850104	Movable Fuel Assembly Critical Bank Height in Response to Primary Coolant Temperature Transients
LWBR-DLCS 7880101-04	Alternate Method of Charging Chemicals Into The Reactor Coolant System
LWBR-DLCS 7900101	Hydrostatic Test of Repair Weld on the Th Manual Valve Bonnet Vent Line (05-H6-8)
LWBR-DLCS 7910101	No. 1 Inverter Performance Test

Tests Remaining in Progress at End of Report Period

LWBR-DLCS 66001	Reactivity Lifetime Test
LWBR-DLCS 7860101	Reactor Plant Sound Monitoring Using the Bell and Howell Tape Recorder
LWBR-DLCS 7870101	Comparison of Reactor Plant Pressure and Pressurizer Temperature Instrumentation

Performance Dates of Tests Performed During the Fourth Quarter

Figure 2

6. GLOSSARY

AIX	after ion exchanger (outlet)
a/o	atomic percent
BAPL.	Bettis Atomic Power Laboratory
BIX	before ion exchanger (inlet)
CIC	compensated ionization chamber
DAS	Data Acquisition System
DE	demineralizer effluent
DF.	decontamination factor
DOE	Department of Energy
EFPH	equivalent full power hour
Hc	critical height
LWBR	Light Water Breeder Reactor
magamp	magnetic amplifier
MDA	Minimum Detectable Activity
mR	milliroentgen
mrem	milliroentgen equivalent man
NIS	Nuclear Instrumentation System
NPS	Nuclear Protection System
ORMS	Operational Radiation Monitoring System
PWR	Pressurized Water Reactor
QOR	Quarterly Operating Report
R	roentgen

6. GLOSSARY (Cont'd)

RC		resistance capacitance
RCS		Reactor Coolant System
rem		roentgen equivalent man
RPC		Reactor Plant Container
RWPS		Radioactive Waste Processing System
STP		standard temperature and pressure
su		smear unit (100 sq. cm)
Tavg		average reactor coolant temperature
Tc		reactor inlet coolant temperature
Th		reactor outlet coolant temperature
Ts		time of sample isolation
μ Ci		microcuries
V/O		percent by volume
VOS		Valve Operating System