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Quarterly Operating Report
Fourth Quarter 1980
DLCS 5000480

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Superintendent

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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 1980, the Shippingport Atomic Power Station remained shutdown for the normally planned semi-annual maintenance and testing program, initiated September 12, 1980. The station was in a cooldown condition at approximately 185 F and 300 psig with a steam bubble maintained in the pressurizer and the reactor coolant pumps in slow speed. The reactor plant cooldown heat exchanger was in service to maintain coolant temperature. The 1A, 1B, 1C, and 1D reactor coolant loops and the 1AC and 1BD purification loops remained in service.

The 1A, 1B, and 1C 991 psig self-actuated steam relief valves remained gagged during the quarter to prevent leakage through the valve seats. The 1D steam relief valve was removed during the Spring of 1980 Shutdown for repairs and a blind flange was installed in its place. Gagging and/or removing of redundant relief valves is permitted by ASME Code and approved operating procedures.

The fuel storage pit was undergoing drainage and decontamination. An electrical modification to the Fuel Handling Building crane was completed this quarter.

Operational testing began on November 7. On November 13, the reactor was shutdown and while in this plant condition, a primary coolant leak was discovered on the 1" bonnet vent line of a 1C reactor coolant loop manual isolation valve. Repairs were completed and the loop was hydrotested on November 23. Station heatup began November 24 and was interrupted on November 25 at approximately 384 F to minimize the reactor walkway temperature while repair of the 1B Source Range Detector chain was in progress. The repairs were completed and the heatup resumed November 26.

Maximum power was achieved November 28 and was maintained throughout the remainder of the quarter except as noted below:

Power was reduced on December 4 for completion of test procedure LWBR-DLCS 60701, Dynamic Response of the Reactor Plant to Load Transients.

On December 19 power was again reduced in order to perform portions of test procedure LWBR-DLCS 55201 SIS Periodic Monthly Pump Tests and LWBR-DLCS 62101, Periodic Checkout and Calibration of the Inverse Kinetics Simulator (IKS). A backflush of the condenser was also performed at this time.

1. SUMMARY OF OPERATIONS (Cont'd)

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 were inspected and repaired during the Fall 1980 Shutdown subsequent to the arrival of the replacement parts.

The LWBR Core has generated 19,046.07 EFPD from start-up through the end of the quarter.

The Reactor Coolant System average leak rate for this quarter was 12.2 gallons per hour when the plant was at normal operating temperature and pressure. The leakage is collected in the Radioactive Waste Processing System and processed as reuse water for the reactor plant water storage tank.

On-Shift Casualty and Emergency Drills were performed during the quarter.

There were no radioactive liquid discharges from the Radioactive Waste Processing System 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 this quarter, approximately 0.000025 curies of Xe 133 activity were released from the station. The radioactivity released from Shippingport Station is far too small to have any measurable effect on the general background environmental radioactivity outside the plant.

During the fourth quarter of 1980, 1081 cubic feet of radioactive solid waste was shipped out of state for burial. These shipments contained 0.037 curies of radioactivity.

2. SUMMARY OF LWBR STATION PERFORMANCE

Electrical output (Gross) to date	kwhr	1,403,987,000
EFPH to date	hr	19,046.07
EFPH for the quarterly period	hr	748.09
Hours reactor critical to date	hr	22,157.84
Hours reactor critical for the quarterly period	hr	1,202.36
No. 1 main unit service hours (quarterly period)	hr	1,049.62
Net Station Output (quarterly period)	kwhr	40,784,000
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 1980, 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 periods of operation with one exception, that of low pH.* The low out-of-specification pH was due to depletion of ammonium hydroxide and increased leak rate during plant start up. Ammonium hydroxide was added to the reactor coolant bringing the pH to within specifications. Refer to Table III.

During the period when the plant was in cold layup the reactor coolant system was maintained within all specifications with one exception, that of a high hydrogen concentration.* The high out-of-specification hydrogen concentration was believed to be attributed to the reabsorption of hydrogen gas in the pressurizer. Subsequent degassifications lowered the hydrogen concentration to within specifications. Refer to Table I. All specifications for the reactor coolant system were maintained during the period of hot standby, with one exception, that of low hydrogen concentration.* This condition was attributed to the depletion of hydrogen. Hydrogen was added to the reactor coolant to increase and maintain the hydrogen concentration within specifications. Refer to Table II.

The out-of-specification conditions which existed in the reactor plant auxiliary systems occurred in the coolant charging water system. The out-of-specification conditions were that of high pH and high conductivity. Refer to Table VII. The high pH and conductivity in the coolant charging water system were attributed to the presence of hydrazine, which was added to scavenge dissolved oxygen, and ammonia. No corrective action was required for these out-of-specification conditions.

In addition to operational chemistry analysis during this quarter, Test Procedure LWBR-DLCS 58001, Reactor Coolant Fission Product Monitoring During Reactor Startup, was performed in accordance with test requirements during two plant startups. Samples of reactor coolant were drawn and analyzed for Gross Iodine, Iodine 133, and Iodine 131 activities. 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 core cladding.

Also during this quarter, the Chemistry Section began Test Procedure LWBR-DLCS 59201, Periodic Radiochemical Analysis of LWBR Reactor Coolant.

* 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 three different conditions during the fourth quarter, that of operating, hot standby, and cold wet layup. During the periods of operation, the boilers were maintained within all specifications. Refer to Table VI.

During the period of hot standby, the boilers exhibited high pH* and high conductivity.* These out-of-specification conditions were attributed to hydrazine decomposition to ammonia due to the steaming and venting of the boilers. After continuous steaming and venting, the pH and conductivity of the boilers were restored to within specifications. Refer to Table V.

During the period of cold wet layup the 1A, 1C, and 1D steam generators exhibited a low hydrazine concentration.* This condition was due to the hydrazine being allowed to deplete in anticipation of startup. Refer to Table IV.

Radioactive Waste Processing

There were no liquid discharges from Radioactive Waste Processing System (RWPS) to the river during the fourth quarter. Gaseous discharges totaling approximately 220 cubic feet were released from RWPS this quarter. Their combined activity was approximately 0.000025 curies, mostly Xenon 133. The radioactivity released from Shippingport Station 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	Specifications	Analytical Results		NH ₄ OH (liters)	H ₂ (Cubic Feet)	Degassification (Hours)
		min.	max.			
pH @ 25°C	10.10-10.30	10.11	10.29			
Specific Conductance (μmhos/cm)	Consistent with pH	34	50			
Total Gas (cc/kg)	125 cc/kg max.	28.0	46.1			
Hydrogen (cc/kg)	17 cc/kg max.	10.0	18.1*			
Oxygen	0.14 ppm max.	—	—			
Chloride	0.10 ppm max.	<0.10	<0.10			
Chemicals Added				8.75	10	5

* Refer to Reactor Plant Section of the QOR.

TABLE II
REACTOR COOLANT SYSTEM
WATER CONDITIONS AND CHEMICAL ADJUSTMENTS
HOT STANDBY (>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	10.15	10.23			
Specific Conductance (μmhos/cm)	Consistent with pH	33	43			
Total Gas (cc/kg)	125 cc/kg max.	15.9	59.1			
Hydrogen (cc/kg)	10 cc/kg min					
	60 cc/kg max	5.2*	27.6			
Chloride	0.10 ppm max	<0.10	<0.10			
Chemicals Added				4	128	2

* Refer to Reactor Plant Section of the QOR.

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	10.01*	10.28			
Specific Conductance (μmhos/cm)	Consistent with pH	22	48			
Total Gas (cc/kg)	125 cc/kg max.	25.4	109.5			
Hydrogen (cc/kg)	60 cc/kg max.	14.3	46.8			
Chloride	0.10 ppm max.	<0.10	<0.10			
Chemicals Added				61.6	0	5.2

* Refer to Reactor Plant Section of the QOR.

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

Water Conditions	Specifications	Boilers			
		1A	1B	1C	1D
pH @ 25°C	Min. 9.30 Max. 10.50	9.30 9.80	9.30 9.80	9.38 9.75	9.32 9.79
Specific Conductance	Min. ----- Max. 30 μ mhos/cm	13 18	13 19	13 17	13 18
Chloride	Min. ----- Max. 0.20 ppm	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1
Hydrazine	Min. 50 ppm Max. 100 ppm	44* 93	53 100	42* 100	40* 100
Chemicals Used (lbs.) N ₂ H ₄		12.5	12.5	12.5	12.5

* Refer to Turbine Plant Section of the QOR.

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

Water Conditions	Specifications	Boilers			
		1A	1B	1C	1D
pH @ 25°C	Min. 8.50 Max. 9.30	8.97 9.91*	8.80 9.95*	8.80 9.90*	8.87 9.97*
Specific Conductance	Min. ----- Max. 10 μ hmos/cm	3.5 20*	3.2 23*	3.6 25*	3.4 27*
Chloride	Min. ----- Max. 0.20 ppm	----- <0.1	----- <0.1	----- <0.1	----- <0.1
Morpholine	Min. 0.50 ppm Max. 6.0 ppm	0.7 6.0	0.7 6.0	0.9 6.0	0.9 6.0
Chemicals Used (lbs.) C ₄ H ₉ NO		2.95	3.00	2.95	2.95

* See Turbine Plant Section of QOR.

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

Water Conditions	Specifications	Boilers			
		1A	1B	1C	1D
pH @ 25°C	Min. 8.50 Max. 9.30	8.60 9.12	8.60 9.17	8.63 9.15	8.60 9.10
Specific Conductance	Min. ----- Max. 10 µmhos/cm	3.1 6.2	3.0 6.2	3.1 5.9	3.0 6.1
Chloride	Min. ----- Max. 0.20 ppm	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1
Hydrazine	Min. 0.005 ppm Max. 0.125 ppm	0.025 0.105	0.008 0.100	0.008 0.120	0.020 0.115
Morpholine	Min. 0.50 ppm Max. 6.0 ppm	0.60 2.65	0.50 2.55	0.70 2.30	0.60 2.35
Chemicals Used (lbs)					
N ₂ H ₄		20.19	20.19	20.19	20.19
C ₄ H ₉ NO		52.10	52.10	52.10	52.10

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.	8.30 - 10.50	500 - 1000	1.0 Max.	N.S.	N.S.
Observed	NP	NP	531 - 864	<0.1 - 0.53	NP	<MDA - 1.84×10^{-7}
Coolant Charging Water Specifications	2.50 max.	6.00 - 8.00	N.S.	0.10 max.	**	N.S.
Observed	3.7 - 7.4*	8.63 - 9.20*	N.P.	<0.10	<0.005-0.030	NP
Canal Water Specifications	5.00 max.	5.80 - 8.00	N.S.	N.S.	N.S.	N.S.
Observed	1.0 - 1.2	5.82 - 6.50	NP	NP	NP	<MDA - 5.20×10^{-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.

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

*Refer to Reactor Plant Section of QOR.

4. MAINTENANCE

Scheduled preventive as well as corrective maintenance, was performed on plant equipment during this report period. The scheduled testing and maintenance shutdown was completed this quarter.

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

Turbine Plant

The overhaul of the B Traveling Screen was continued.

A Service Boiler Feed Pump was repaired.

The Seal Oil System Relief Valve was repaired.

The overhaul of the B Turbine Throttle Valve was completed.

The 1B Boiler Feedwater Pump Discharge Check Valve (M2-A2) was replaced.

The Moisture Separator was inspected and repaired.

The wells for condenser conductivity cells were cleaned.

The Main Unit Condenser was cleaned.

Overhaul of the Service Boiler Air Compressor was initiated.

Turbine and Generator Annunciator Panel Modifications were initiated and completed.

Condenser Hotwell was cleaned and inspected.

Reactor Plant

The Pressurizer Pressure Narrow Range Heater Controls were repaired.

The replacement of the 1A and 1D Reactor Coolant Pump D/P Cells was completed.

Repairs were completed on a defective portion of the Chemical Shutdown Tie Line.

4. MAINTENANCE (Cont'd)

The replacement of the Air Treatment Hydraulic Pump Discharge Relief Valves were completed.

A wooden housing was constructed over outside Safety Injection System Piping.

Removal of defective Safety Injection System Piping Heat Trace was completed and replacement initiated.

Removal of damaged Safety Injection System Pipe Insulation was initiated and replacement initiated.

The Radioactive Waste Processing Cooling Water Pump was repaired.

Repairs were initiated on the 40 point temperature monitor.

A new sample station in the Decon Room was installed.

A Movable Fuel Control System SCR Drawer was replaced and the defective drawer repaired.

The 1" bonnet vent line of a 1C reactor coolant loop manual isolation valve was repaired.

Refueling

Modification of the Fuel Handling Building crane was ongoing during this period.

Decontamination of the Canal Fuel Storage Pit was ongoing during this period.

5. TEST PROGRAM

The primary objective of the test program during the quarterly report period was to continue monitoring the LWBR Core characteristics as it depletes for subsequent proof of breeding. The Fall 1980 Shutdown for testing and maintenance, which began on September 12, was completed in late November. Monitoring of the flow coefficient of reactivity continued during the Fall 1980 Shutdown.

Thirty-one tests were performed during the report period. Twenty-nine tests were completed and two remained incomplete or in progress at the end of the quarter. Table VIII lists these tests and Figure 2 indicates the performance dates.

Test Procedure LWBR-DLCS 55201, Safety Injection System Monthly Periodic Pump Test, was satisfactorily performed each month during the quarter. Individual testing of the Boiler Feed Pumps was conducted satisfactorily in December. These pumps are only tested quarterly as specified in the procedure. The flowrates obtained for the new deepwell pump, 53-G2-4009, continue to show an overall decreasing trend for the quarter. However, the flowrate is still above the minimum acceptance limit of 250 gpm. During the October performance, a section of the pump's discharge piping was cleaned which caused a slight increase (5 gpm) in the flowrate. However, subsequent performances in November and December confirmed the decreasing trend and the flowrate is approaching the acceptance limit. Several courses of corrective action are under consideration at this time. The No. 2 SIS heat exchanger cooling water pumps, 19-G1-1 and 2, were satisfactorily tested each month during the quarter.

The twelfth performance of test procedure LWBR-DLCS 55203, SIS Quarterly Periodic Valve Test, was satisfactorily completed in December. All valves, except the 1A and 1B Boiler Feed Pump SIS Recirculation Isolation Valves, 453-H13-4001 and 4002, were tested during this performance. The valves not tested will be tested when proper plant conditions exist as required by the test procedure. The test verifies that various Safety Injection System valves are operational by opening and closing the valves and recording the operating times.

The eighth performance of test procedure LWBR-DLCS 56802, Reactor Plant Container Integrity Test (Butterfly Valve Test), which was initiated last quarter was satisfactorily completed during the Fall Shutdown. The test checked proper operation of the air treatment butterfly valves and proper pressurization of the inlet and exhaust interspaces between the butterfly valves.

5. Test Program (Cont'd)

The fifteenth performance of test procedure LWBR-DLCS 58201, Delayed Neutron Loop Monitoring System Checkout Test, was satisfactorily completed during the Fall Shutdown. This test calibrates the flow and activity recorders in the DN Loop Monitoring System. During the performance of this test an abnormally high background count rate was observed on the Channel 1 monitor following the completion of the BF3 plateau curve for this channel.* The problem was traced to the No. 4 BF3 junction box. The No. 5 spare BF3 group was connected in place of the No. 4 group and a new BF3 plateau curve was performed. Following this troubleshooting, all data was found to be acceptable. The intermittent noise problems observed last quarter have not been observed during power operation.

Test procedure LWBR-DLCS 58301, Delayed Neutron Loop Monitoring System (Operation During Station Startup), was performed satisfactorily two 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. The second (38th overall) performance was interrupted due to plant problems on November 13. The test was restarted on November 26 and performed in its' entirety by November 28.

The eleventh performance of test procedure LWBR-DLCS 58401, Delayed Neutron Loop Monitoring System Operational Test, was satisfactorily performed following return to maximum power operation after the Fall 1980 Shutdown. This test determines the delayed neutron emitter activity in the A and/or B loop sampled flow using scalars connected to the Delayed Neutron Loop Monitors. During the performance of the test it was observed that the flow rates of the monitors were reversed on the new recorders.* The test was delayed to investigate the problem. On December 3, the test was restarted. At the same time voltage measurements were taken to determine where the wiring was reversed. The problem was determined, the test was completed and a Trouble Record was written to document the problem and to suggest corrective action. No other problems were encountered during the performance of the test.

The first performance of test procedure LWBR-DLCS 60102, Source Range Detector Response As A Function of Detector Axial Position, which was initiated last quarter, was satisfactorily completed during the Fall Shutdown. During the test performance the support chain for the "C" channel BF3 detector became disengaged from the well cap.* The detector and chain were retrieved per a Trouble Record and the axial position of all four source range detectors were verified as a precautionary measure. The test completed with no other problems.

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

5. Test Program (Cont'd)

The second performance of test procedure LWBR-DLCS 60701, Dynamic Response of Reactor Plant to Load Transients, was satisfactorily completed following the Fall Shutdown. A load transient from 22 MW to 43 MW was accomplished on November 7. The plant operated at 43 MW until November 13 when the test was interrupted due to plant problems. The final load transients from 43 MW to 58 MW and 58 MW to 43 MW were accomplished on December 4.

The fifth performance of test procedure LWBR-DLCS 60801, Nuclear Protection System (Checkout of High Th, Low Loop Pressure and High P/F Circuitry), was satisfactorily completed during the Fall Shutdown. The test procedure checks various circuit response times and setpoints associated with the NPS. All data obtained was satisfactory except the 1A and 1C Loop Pressure time responses tested out of tolerance at 6.7 seconds each (specification is less than 6 seconds).^{*} The Norwood receiver was cleaned and lubricated, and the time response test repeated. Satisfactory response times of 5.6 seconds for the 1A and 5.1 seconds for the 1C Loop pressures were obtained.

The eighth performance of test procedure LWBR-DLCS 60901, Periodic Intercalibration of Temperature Sensing Elements, which was initiated last quarter was satisfactorily completed November 3. All eight Norwood temperature indicators required adjustment when checked at 521 F. Subsequent resistance values obtained required the recalibration of the 1DTh Norwood. During the 3 point temperature check, other temperature instruments that required recalibration were the 1DTb Bristol and the Tave instrument. The 1ATb and 1DTb Bristol points were slightly out of specification at the 510 F check.^{*} This data was accepted since it is out of the normal range of operation.

The eighth performance of test procedure LWBR-DLCS 61001, Periodic Calibration of Pressure Instrumentation, was satisfactorily completed during the Fall Shutdown. Only the Pressurizer Pressure Wide Range Bailey Recorder and Pressurizer Pressure Narrow Range Norwood were calibrated during this performance. The Bailey Wide Range Recorder calibration was required since maintenance had been performed on it. Calibration of the Pressurizer Pressure Narrow Range Norwood instrument was necessary since meter faces were replaced to facilitate plant operation at reduced pressure beyond 18,000 EFPH. During the calibration of this instrument it was necessary to replace a magnetic amplifier to eliminate instrument oscillation. The instrumentation subsequently calibrated satisfactorily.

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

5. Test Program (Cont'd)

The fifth performance of test procedure LWBR-DLCS 61201, Periodic Calibration of Pressurizer Level Instrumentation, was satisfactorily conducted during the Fall Shutdown, for both the Narrow and Wide Range instruments. The Wide Range instrument calibration was repeated because the "as left" null voltage and compensator setting variations were unsatisfactory.* The calibration procedure was revised and the calibration was performed to tighter specifications. However, when the plant was returned to operation at normal operating temperature and pressure, an unexplained shift in the Wide Range instrument indication occurred.* The instrument has been placed out-of-service and the problem is being investigated.

The fifth performance of test procedure LWBR-DLCS 61401, Periodic Calibration of Reactor Plant Differential Pressure Instrumentation was conducted during the Fall Shutdown for the 1A and 1D Reactor Coolant Pump D/P cells. A satisfactory calibration for the 1A instrument, using this procedure, could not be obtained, therefore, a supplementary method documented in a Trouble Record was used to obtain the best possible data.* Both instruments only provide signals to the Data Acquisition System and have been functioning satisfactorily since the calibration.

The twenty-second and twenty-third performances of test procedure LWBR-DLCS 62101, Periodic Checkout and Calibration of the Inverse Kinetics Simulator (IKS), were satisfactorily completed during the quarter. This testing was required to support planned physics testing.

The second performance of test procedure LWBR-DLCS 62401, Safety Injection Instrumentation Calibration, which was initiated last quarter, was satisfactorily completed this quarter during the Fall Shutdown. Only the Pressurizer Level No. 1 and No. 2 instruments were calibrated. Bistable checks were performed for the Reactor Pressure No. 1 and No. 2 instruments. During the performance of the test, it was determined that the Pressurizer Level No. 2 d/p cell required replacement. The cell was replaced and subsequently calibrated satisfactorily.

The seventh performance of test procedure LWBR-DLCS 63202, Flow Coefficient of Reactivity, was satisfactorily completed during the physics testing sequence at the end of the Fall Shutdown. A four fast speed pumps to three fast speed pumps flow coefficient was measured. Also, at this time, a three fast speed pumps to two fast speed pumps flow coefficient was measured in conjunction with the second performance of test procedure LWBR-DLCS 78601, Reactor Plant Sound Monitoring Using the Bell and Howell Tape Recorder.

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

5. Test Program (Cont'd)

The tenth performance of test procedure LWBR-DLCS 64401, Core Shutdown Reactivity and Azimuthal Reactivity Symmetry, was satisfactorily completed during the physics testing sequence at the end of the Fall Shutdown. During the ambient temperature portion of the procedure, a reactor scram occurred when switch S501 was placed in the "Test" position. The scram signals were reset and the synchro bus was energized. Switch S501 was cycled twice and no spikes were observed on the NIS Recorders. The test was re-started and no further problem was observed with the switch.

The eighth performance of test procedure LWBR-DLCS 64501, Reactivity Worth and Temperature Coefficient of Reactivity at Zero Power, was satisfactorily completed during the physics testing sequence at the end of the Fall Shutdown. The bank worth and temperature coefficient were measured at both ambient and operating temperatures and satisfactory values were obtained.

Test Procedure LWBR-DLCS 79701, RWP Resin Storage Tanks Resin Level Determination, was satisfactorily performed in early October to determine the remaining capacity of the tanks. It was determined that the depleted resin should be removed. Test procedure LWBR-DLCS 79901, Sampling Depleted Resin in the RWP Resin Storage Tanks, was then satisfactorily performed to characterize the activity of the depleted resin.

Test procedure LWBR-DLCS 79801, Integrity Test of 12" Condensate Line Between Valves 453-H2-4001 and M5-DD2, was satisfactorily completed during the Fall Shutdown, following replacement of this section of condensate line.

Test procedure LWBR-DLCS 80001, Hydrostatic Test of Repair Welds on the Manual Valve Bonnet Vent Line (05-H6-5), was satisfactorily completed following the applicable repair welds.

Other testing which was incomplete or in progress at the end of the quarter included:

The sixth performance of test procedure LWBR-DLCS 59201, Periodic Radiochemical Analysis of LWBR Reactor Coolant.

Test procedure LWBR-DLCS 66001, Reactivity Lifetime Test, which is an on-going test.

TABLE VIII

Tests Performed During Fourth Quarter of 1980

LWBR-DLCS 5520136-38	SIS Monthly Periodic Pump Tests
LWBR-DLCS 5520312	SIS Quarterly Periodic Valve Tests
LWBR-DLCS 5680208	Reactor Plant Container Integrity Test (Butterfly Valve Test)
LWBR-DLCS 5800131-32	Reactor Coolant Fission Product Monitoring During Reactor Startup
LWBR-DLCS 5820115	DN Loop Monitoring System Checkout Test
LWBR-DLCS 5830137-38	DN Loop Monitoring System (Operation During Station Startup)
LWBR-DLCS 5840111	DN Loop Monitoring System Operational Test
LWBR-DLCS 6010201	Source Range Detector Response As A Function of Detector Axial Position
LWBR-DLCS 6070102	Dynamic Response of Reactor Plant to Load Transients
LWBR-DLCS 6080105	Nuclear Protection System (Checkout of High Th, Low Loop Pressure and High P/F Circuitry)
LWBR-DLCS 6090108	Periodic Intercalibration of Temperature Sensing Elements
LWBR-DLCS 6100108	Periodic Calibration of Pressure Instrumentation
LWBR-DLCS 6120105	Periodic Calibration of Pressurizer Level Instrumentation
LWBR-DLCS 6140105	Periodic Calibration of Reactor Plant Differential Pressure Instrumentation
LWBR-DLCS 6210122-23	Periodic Checkout and Calibration of the Inverse Kinetics Simulator (IKS)
LWBR-DLCS 6240102	Safety Injection Instrumentation Calibration
LWBR-DLCS 6320207	Flow Coefficient of Reactivity
LWBR-DLCS 6440110	Core Shutdown Reactivity and Azimuthal Reactivity Symmetry
LWBR-DLCS 6450108	Reactivity Worth and Temperature Coefficient of Reactivity at Zero Power
LWBR-DLCS 7860102	Reactor Plant Sound Monitoring Using the Bell and Howell Tape Recorder
LWBR-DLCS 7970101	RWP Resin Storage Tanks Resin Level Determination
LWBR-DLCS 7980101	Integrity Test of 12" Condensate Line Between Valves 453-H2-40001 and M5-DD2
LWBR-DLCS 7990101	Sampling Depleted Resin In The RWP Resin Storage Tanks
LWBR-DLCS 8000101	Hydrostatic Test of Repair Weld on the Tc Manual Valve Bonnet Vent Line (05-H6-5)

Tests Incomplete or in Progress at the End of the Report Period

LWBR-DLCS 5920106	Periodic Radiochemical Analysis of LWBR Reactor Coolant
LWBR-DLCS 66001	Reactivity Lifetime Test

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