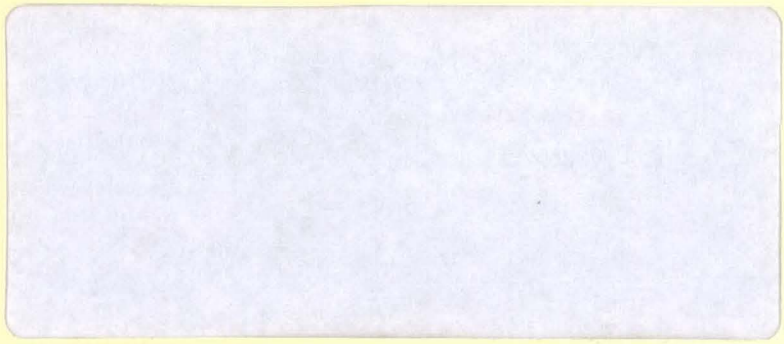
MASTER



DISCLAIMER

QUARTERLY OPERATING REPORT
Second Quarter 1978
DLCS 5000278

Approved by: _____
T. D. Jones
Superintendent

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

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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 second quarter of 1978, the Shippingport Atomic Power Station was in operation with the 1A, 1B, 1C and 1D reactor coolant loops and the 1AC and 1BD purification loops in normal service. The remainder of the expended PWR Core 2 was in storage under shielding water in the deep pit of the Fuel Handling Building. Twelve Core 2 blanket fuel assemblies were shipped offsite this quarter.

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.

During the quarter, the station was operated for the Duquesne Light Company system grid including base load and swing load operation. Thirty-nine swing load operations have been performed on the LWBR Core this quarter to meet the LWBR core operating plan of 50 during this operating phase. The LWBR Core has generated 5282.8 EFPH from start-up through the end of the quarter. The generator load factor this quarter was 71.6%.

The scheduled Spring shutdown of the Station for testing, maintenance, training and modifications was completed as planned. The Station was shutdown on April 21, 1978 when the main unit generator breaker OCB 81 was opened and the turbine-generator shutdown. The plant was cooled down and the 1AC and 1BD Core Removal Cooling Systems placed in service to remove decay heat for reactor coolant temperature control. After completing all the planned shutdown items, the reactor was taken critical and the station returned to service on May 14, 1978 as scheduled. During Station startup, operator training was performed on reactor startups, reactor shutdowns, main unit generator synchronizations, and startups and shutdowns of the flywheel generators.

Prior to station startup following the Spring shutdown, LWBR normal operating pressure was reduced from 2000 psia to 1940 psia which required approved Station Manual changes to setpoints and operating limits. The 1B and 1C feedwater heaters were returned to service on May 15, 1978 following the tube plug repairs to the 1B feedwater heater which were found to be leaking during the shutdown.

An automatic low flow scram occurred on May 7, 1978 with the movable fuel latched but the reactor subcritical at a reactor coolant temperature of approximately 270°F. After performing test procedure LWBR-DLCS 64501, during a plant heatup with the movable fuel latched, a scram occurred while changing main coolant pump speed from fast to slow to control heatup rate. Cause of the scram was attributed to insufficient pump power relay monitoring setpoints for the existing flow conditions. Set point changes will be performed during the Fall 1978 maintenance shutdown.

1. SUMMARY OF OPERATIONS (Cont'd)

Two Safety Insertions occurred during the quarter:

The first occurred on April 22, 1978 with the Station shutdown and the movable fuel latched in accordance with "Reactor Shutdown and Startup for Training" procedures. Upon completing 1D source range alignment, the high voltage switch for 1D source range detector was turned on. This caused a spike on the 1D intermediate range and a safety insertion occurred. The movable fuel inserted 0.3 inches before the insertion was stopped by placing the startup rate protection switch for the 1D channel to the cutout position. Procedure changes were initiated to prevent reoccurrence of the insertion.

The second safety insertion occurred on June 21, 1978 due to improper positioning of the Intermediate/High Power Switch (S20). The movable fuel assemblies inserted 0.06 inches with no effect on operating conditions. The switch will be replaced during the Fall 1978 maintenance shutdown with a positive snap action type switch to prevent reoccurrence.

Mechanism control voltage was lost on April 22, 1978 for a period of 40 minutes during a training reactor shutdown. (Reactor scram function was not affected) Normal voltage was regained and training shutdown continued. Apparent cause was attributed to a defective solid state relay drive for K74 relay or a defective K74 relay. Trouble-shooting was performed and the relay and optical coupler for the solid state driver replaced to prevent reoccurrence..

An unplanned station shutdown was performed on June 18, 1978. While performing the station weekly checks, the 25 volt DC power supply transformer for Power/Flow Bistable No. 2 of the Nuclear Protection System was found to have overheated. The Station was shutdown without unlatching the movable fuel assemblies. The transformer was replaced and the weekly checks for all Power to Flow bistables completed. The reactor was taken critical and the Station returned to service on the same day when the main unit generator was synchronized with the Duquesne Light Company system network.

Loss of Coolant Accident casualty drills were conducted on each shift of June 19 and 20, 1978. These were in addition to the normal monthly casualty and emergency drills.

The canal water cooler was utilized on June 30, 1978 for component cooling during the interval when it was necessary to remove the reactor plant component cooling water cooler from service for tube cleaning with steel scrapers.

The Reactor Coolant System average leak rate for this quarter was 9.0 gallons per hour. The leakage is collected in the Waste Processing System.

Two environment studies were continued this quarter. The first involves reduction of main unit condenser chlorination and the second, river intake screen fish impingement sampling. Both studies are calendar year 1978 programs.

1. SUMMARY OF OPERATIONS (Cont'd)

There were no radioactive liquid discharges from the Radioactive Waste Processing System to the river this quarter.

The gaseous waste portion of the Radioactive Waste Processing System leak testing was completed on May 31, 1978. [The radioactive liquid waste discharge line to the river remained blanked off to prevent inadvertent radioactive liquid waste discharges.]

During the second quarter of 1978, 2648 cubic feet of radioactive solid waste was shipped out of state for burial. These shipments contained 1.52 curies of radioactivity which does not include irradiated components and irradiated fuel which was shipped offsite (See Maintenance Section).

OFF site

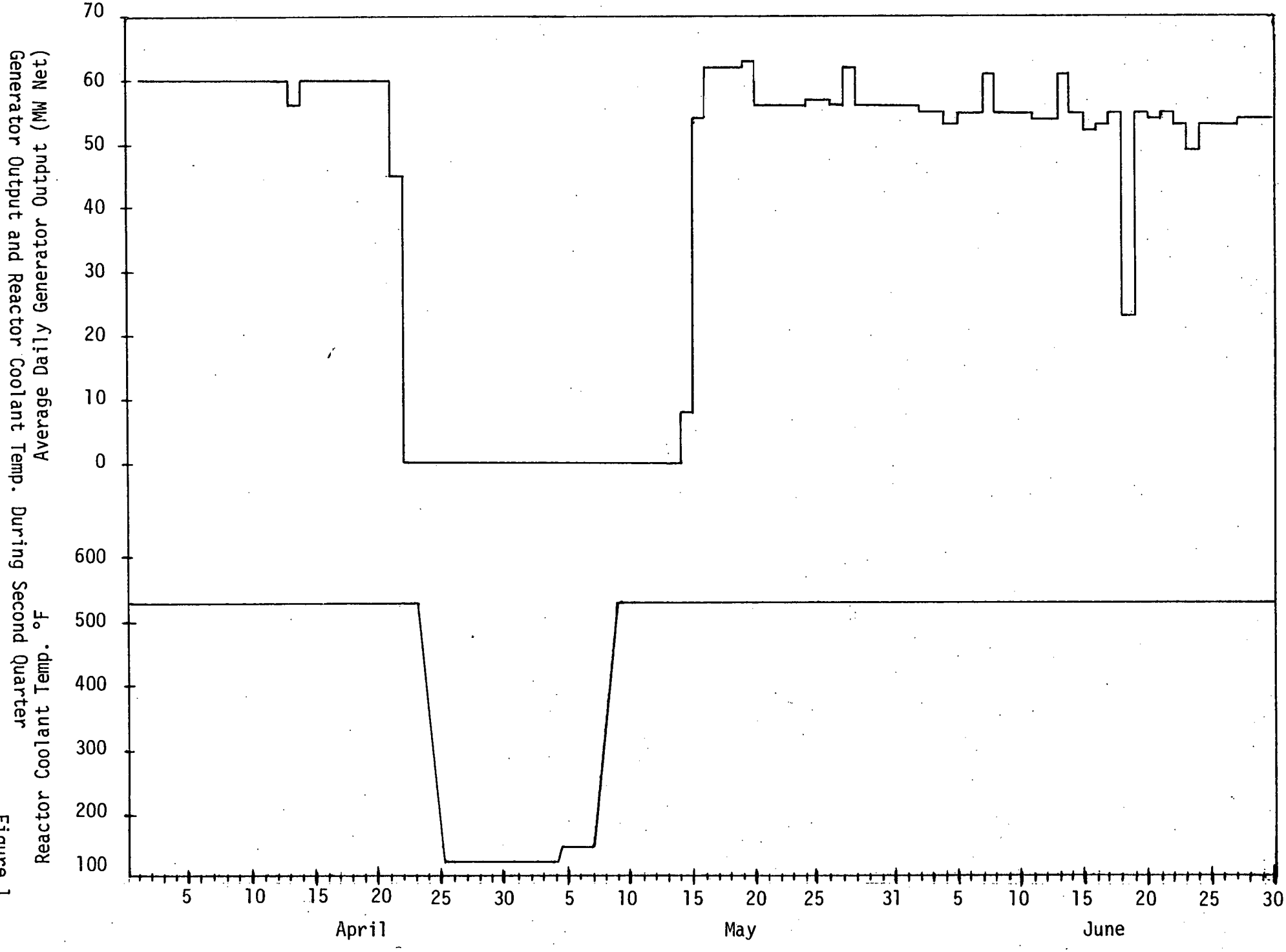

Generator Output and Reactor Coolant Temp. During Second Quarter
Average Daily Generator Output (MW Net)
Reactor Coolant Temp. °F
70
60
50
40
30
20
10
0
600
500
400
300
200
100
5
10
15
20
25
30
5
10
15
20
25
31
5
10
15
20
25
30
April
May
June
DLCS 5000278

Figure 1

2. SUMMARY OF LWBR STATION PERFORMANCE

Electrical output (Gross) to date	kwhr	396,129,000
EFPH to date	hr	5,282.84
EFPH for the quarterly period	hr	1,516.11
Hours reactor critical to date	hr	6,339.6
Hours reactor critical for the quarterly period	hr	1,739.2
No. 1 main unit service hours (quarterly period)	hr	1,611.1
Net Station Output (quarterly period)	kwhr	89,677,000
No. of forced outages*		1

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

3. CHEMISTRY

During the second quarter of 1978, 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 specifications during operations and the two short periods of hot standby, preceeding and following the planned station shutdown, without any exceptions. Refer to Table I and II.

The only out-of-specification conditions which existed in the reactor plant auxiliary systems occurred in the coolant charging system and canal water system. The out-of-specification conditions which existed in the coolant charging system were that of high specific conductance and high pH.* The high pH's and specific conductances were attributed to the presence of ammonia which entered the system during an ammonium hydroxide chemical treatment of the primary coolant system. The coolant charging system water is currently approaching its specifications by the effects of dilution as additional make-up water is added to the Reactor Plant Water Storage Tank. The out-of-specification condition that occurred in the canal water system was that of low pH due to the absorbtion of carbon dioxide.* Continual recirculation of the canal water system raised the pH value to within specifications. Refer to table VI.

During this quarter, test procedure LWBR-DLCS 58001, "Reactor Coolant Fission Product Monitoring During Reactor Startup," was performed twice in accordance with test requirements. 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. Additional testing during this quarter included test procedure LWBR-DLCS 59201, "Periodic Radiochemical Analysis of LWBR Reactor Coolant." At the time of this writing the results of test procedure LWBR-DLCS 59201 were not yet complete. Results of the test will be included in the third Quarter Operating Report of 1978.

TURBINE PLANT

At the beginning of the second quarter, the station was in operation which included base load and swing load operations. During this quarter a planned station shutdown occurred. This necessitated the main unit boilers transcend through the operating, hot standby and cold layup conditions.

While the boilers were in cold wet layup, all specifications were maintained without any exceptions. However, out-of-specification conditions did exist as the boilers were taken from the cold layup mode to that of hot standby. These out-of-specification conditions included high specific conductance, high pH values, and low morpholine concentrations.* All of these out-of-specification conditions were experienced as the boilers were "steaming down" in preparation for station startup. The high pH values and specific conductances were attributed to the decomposition of hydrazine into ammonia.

3. CHEMISTRY (Cont'd)

TURBINE PLANT (cont'd)

The low morpholine concentrations were attributed to the boiler feed system being out-of-service. Once the "steaming" period was completed and the ammonia shown to be less than 2.0 ppm, the pH values and specific conductivities decreased to within specifications. Subsequent chemical treatment and the return of the boiler feed system to service re-established morpholine control in the boilers. Refer to tables III and IV.

The only out-of-specification conditions which occurred in the boilers during operation were those of high specific conductance, and low morpholine concentrations.* This was due to out-of-specification make-up water being added to the boilers from the deaerator. Ensuing boiler blowdowns lowered the specific conductances, and chemical treatment with morpholine returned the boilers to within specifications. Refer to table V.

RADIOACTIVE WASTE PROCESSING

There were no liquid discharges from the Radioactive Waste Processing System this quarter. However, one gaseous discharge to the environment occurred which resulted in release of 0.00776 curies over a period of approximately 91 days.

The radioactivity released from Shippingport is far too small to have any measurable effect on the general background environmental activity 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

Hot Standby (>200°F)

CHEMICAL CONDITIONS	SPECIFICATIONS	ANALYTICAL RESULTS Min.	Max.	NH_4OH (liters)	H_2 (Cu. Ft.)	Degassification (hours)
pH @ 25°C	10.10 - 10.30	10.11	10.26			
Conductivity (μmhos/cm)	Consistent with pH	31	46.8			
Chloride	0.10 ppm max.	-----	<0.10			
Total Gas	125 cc/Kg max.	23.2	77			
Hydrogen	60 cc/Kg max. 10 cc/Kg min.	10	26.3			
Chemicals added				2.0	52	9.2

TABLE II

REACTOR COOLANT SYSTEM

Water Conditions and Chemical Adjustments

Operating Conditions

CHEMICAL CONDITIONS	SPECIFICATIONS	ANALYTICAL RESULTS Min.	Max.	NH_4OH (liters)	H_2 (cu. ft.)	DEGASSIFI-cation (hours)
pH @ 25°C	10.10 - 10.30	10.11	10.29			
Conductivity (μmhos/cm)	Consistent with pH	25	52			
Chloride	0.10 ppm max.	------	<0.10			
Total Gas	125 cc/Kg max.	35.1	121			
Hydrogen	60 cc/Kg max.	13.9	58			
	10 cc/Kg min.					
Chemicals added				129.75	0.0	63.85

TABLE III

Non-Operating Boiler Chemistry

Cold Lay Up (<200°F) Water Chemistry

WATER CONDITIONS	SPECIFICATIONS	BOILERS			
		1A	1B	1C	1D
Conductivity	Min. --------	18	21	21	20
	Max. 30 μmhos/cm	23	24	24	24
Chloride	Min. --------	------	--------	-----	------
	Max. 0.20 ppm	<0.10	<0.10	<0.10	<0.10
Hydrazine	Min. 50 ppm	50	51	51	50
	Max. 100 ppm	74	62	64	64
pH @ 25°C	Min. 9.50	9.53	9.54	9.58	9.59
	Max. 10.50	9.77	9.68	9.70	9.71
Chemicals used (lbs.)					
N_2H_4		23.75	27.00	23.75	27.00

TABLE IV

Non-Operating Boiler Chemistry

Hot Standby (>200°F) Water Chemistry

WATER CONDITIONS	SPECIFICATIONS	BOILERS			
		1A	1B	1C	1D
Conductivity	Min. --------	6.9	5.8	5.9	6.5
	Max. 10 μmhos/cm	24*	24*	24*	24*
Chloride	Min. --------	<0.10	<0.10	<0.10	<0.10
	Max. 0.20 ppm	0.10	0.10	0.10	0.10
Morpholine	Min. 0.50 ppm	0.0*	0.0*	0.0*	0.10*
	Max. 6.0 ppm	4.1	3.6	3.5	2.0
pH @ 25°C	Min. 8.50	8.85	8.87	8.91	8.81
	Max. 9.30	9.66*	9.64*	9.58*	9.67*
Chemicals used (lbs.)					
N_2H_4		0.0	0.0	0.0	0.0
C_4H_9NO		0.981	0.954	1.044	1.097

*See Turbine Plant Section of Q.O.R.

TABLE V

Operating Boiler Water Chemistry

Volatile Water Chemistry

WATER CONDITIONS	SPECIFICATIONS	BOILERS 1A	1B	1C	1D
Conductivity	Min. -------	4.7	5.4	5.6	5.6
	Max. 10 µmhos/cm	9.8	11*	11*	9.6
Chloride	Min. -------	<0.10	<0.10	<0.10	<0.10
	Max. 0.20 ppm	0.10	0.10	0.10	0.10
Hydrazine	Min. 0.005 ppm	0.021	0.015	0.010	0.021
	Max. 0.125 ppm	0.063	0.052	0.047	0.060
Morpholine	Min. 0.50 ppm	0.32*	0.40*	0.25*	0.40*
	Max. 6.00 ppm	2.36	2.26	2.30	2.30
Silica	Min. --------	0.80	0.80	0.62	0.70
	Max. 25 ppm	1.00	1.00	1.25	1.42
pH @ 25°C	Min. 8.50	8.56	8.60	8.61	8.61
	Max. 9.30	9.11	9.21	9.14	9.16
Chemicals Used (lbs.)					
N_2H_4		12.66	12.66	12.66	12.66
C_4H_9NO		17.15	17.15	17.15	17.15

*See Turbine Plant Section of Q.O.R.

TABLE VI

Reactor Plant Auxiliary Systems
Water Conditions

System	Conductivity μmhos/cm	pH at 25°C	Conc. - ppm			Gross Gamma Activity - dpm/ml
			CrO_4^{--}	Cl^-	Dis. O_2	
Component Cooling Specifications	N.S	8.30 - 10.50	500-1000	1 ppm max.	N.S.	N.S.
Observed	N.P	N.P.	535-616	0.030-0.53	N.P.	<MDA - 2.57×10^{-7}
Coolant Charging Water Specifications	2.50 max.	6.00 8.00	N.S.	0.1 ppm max.	Note	N.S.
Observed	3.2 - 7.8*	7.16 - 9.02*	N.P.	<0.10	0.005 - 6.00	N.P.
Canal Water Specifications	5.00 max.	8.00	N.S.	N.S.	N.S.	N.S.
Observed	0.68 - 2.90	5.48* - 6.06	N.P.	N.P.	N.P.	<MDA - 3.6×10^{-5}

Specification is <0.14 ppm for reactor plant cold wet layup.
See Reactor Plant Section of QOR.

N.S.: No limit needed, therefore, no limit has been specified.
N.P.: Analysis is not necessary and not performed.
MDA is $8.39 \times 10^{-8} \mu Ci/ml$

4. MAINTENANCE

A scheduled testing and maintenance shutdown was performed during this quarter. Also routine and preventive maintenance was performed. The major work areas are summarized as follows:

SPRING SHUTDOWN

Items that were worked on during the shutdown included, turbine plant valve repacking and repair, 1B Feedwater Heater tube leak repairs, Hydrogen Burner Aftercooler in RWP replacement and Neutron Barrier (in the Auxiliary Enclosure) installation. The Reactor Plant Component Cooling Water Cooler Turbine Plant Component Cooling Water Cooler, the Main Unit Condenser, and the Condensate Cooler were cleaned.

REACTOR PLANT

Major maintenance items included overhaul of the Fill Pump, overhaul of the 1C Vent Gas Compressor, replacement of a Nuclear Protection System transformer and overhaul of the RWP evaporator compressor.

TURBINE PLANT

Major maintenance items included replacement of a 10 inch treated water line.

PWR II - FUEL SHIPMENTS

The Irradiated Fuel Shipping Container was shipped off-site for storage on May 16, 1978. On May 22, 1978 the M-160 Irradiated Fuel Shipping Container arrived on site. The M-160 was loaded with twelve PWR-II Blanket Fuel Assemblies. The M-160 container was then shipped for disposal of the expended fuel assemblies on June 14, 1978. The remainder of the quarter was spent in preparation of disposal of PWR-I & II irradiated components currently stored in the canal. A mechanical and electrical inspection of the fuel handling building main crane was performed during the quarter with no major deficiencies noted.

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. The first scheduled testing and maintenance shutdown occurred during the quarter from April 21 to May 15.

Thirty four tests were performed during the report period. Thirty-one tests were completed and three remained in progress at the end of the quarter. Table VII lists these tests and Figure 2 indicates the performance dates. Information pertaining to chemistry tests may be found in the chemistry section of this report.

The second performance of test procedure LWBR-DLCS 50001, Seismic Scram System Functional Test, was satisfactorily performed with the exception of a low trigger time delay for a horizontal sensor of Seismic Trigger #1. However, the overall performance of the #1 Trigger is considered to be acceptable.

The three required performances of test procedure LWBR-DLCS 55201, Safety Injection System Monthly Periodic Pump Tests, were performed during the quarter. The tests continue to verify proper flow rate to the SIS heat exchangers from the deepwell pumps, 19-G1-1 and 2 and 53-G2-4009. However, the new deepwell pump 53-G2-4009 has shown a steady decrease in flowrate over the months. Recommendations have been made by Bettis to Naval Reactors to run the pump longer, and to change from curves to formulas to more accurately figure the flowrate. Section IX.A of the procedure was not performed during April due to lack of an appropriate time to reduce power so that only one Boiler Feed Pump could be run at a time. However satisfactory Boiler Feed Pump performance has been demonstrated in the May and June tests.

The initial performance of test procedure LWBR-DLCS 55203, SIS Quarterly Periodic Valve Test, partially performed during the first quarter, was completed satisfactorily during the planned shutdown. This test verifies various Safety Injection valves are operational by opening and closing the valves and recording the operating time. Sections of this test were performed on differenct occasions due to high boron concentration in the lines for valves 53-H12-4004 and 4005, and the untimeliness of the coal strike. All remaining valves were tested and met the acceptance criteria.

The initial performance of test procedure LWBR-DLCS 55202, SIS Semi-Annual Periodic Pump Tests, was satisfactorily performed. This test verifies proper operation of the following Safety Injection pumps: booster, high pressure, No. 1 and No. 2 flooding, No. 1 Recirculation, and 1A and 1B gravity drain. All pumps met their respective acceptance criteria. Some difficulty was experienced with the discharge flow path of the Gravity Drain Pumps. This was corrected by the appropriate procedure revision. Satisfactory pump performance was obtained after the revision was incorporated and the pumps were properly vented.

5. TEST PROGRAM (cont'd)

The initial performance of test procedure LWBR-DLCS 55204, SIS Semi-Annual Periodic Valve Test, was satisfactorily completed. Various SIS motor operated and solenoid operated valves were tested for proper operation by this test. All valves operated properly from both switch and/or relay control. Operating times for opening and closing were all satisfactory.

The third performance of test procedure LWBR-DLCS 56802 was satisfactorily performed. This test checked proper operation of the air treatment butterfly valves and proper pressurization of the inlet and exhaust interspaces between the butterfly valves.

The fourth performance of test procedure LWBR-DLCS 58201, DN Loop Monitoring System Checkout, was satisfactorily completed. Proper operation of DNLM system is determined by checking the flowrate through each monitor, the count rate calibration of each amplifier channel, and the background and neutron sensitivity of each monitor assembly. During the performance of the test, only one channel (#3) in monitor #2 was found to be malfunctioning. All five channels for monitor #1 were found to be operating satisfactorily. A WIC has been written to repair the defective channel and monitor #2 remained in service with 4 operational amplifiers consistent with manual requirements.

Two performances of test procedure LWBR-DLCS 58301, DNLM System (Operation During Station Startup) were satisfactorily performed, as required for each reactor startup. The delayed neutron activity level in the sample flow from the A and/or B main coolant loops was continuously recorded during station startup to test for possible fuel assembly cladding defects.

The seventh performance of test procedure LWBR-DLCS 58401 DNLM System Operational Test, was satisfactorily performed following a return to full power after the planned Spring shutdown. This test determines the delayed neutron emitter activity in the A and/or B loop sampled flow using scalers connected to the DN loop monitors. This performance is for the period between the spring and fall shutdown for 1978. Data was obtained for both #1 and #2 monitors, as a faulty isolation valve for the #2 monitor was repaired during the planned spring shutdown.

The second performance of radiation surveys LWBR-DLCS 58601, Periodic Radiation Survey of the Reactor Vessel Head, and LWBR-DLCS 58501, External Radiation Levels of Reactor Coolant System Piping and Components and Purification System Heat Exchangers, were satisfactorily performed just after the start of the planned spring shutdown.

The second performance of test procedure LWBR-DLCS 60901, Periodic Intercalibration of Temperature Sensing Elements, was satisfactorily completed during the quarter. A one point hot calibration (531^{0}F) was used for this test performance. Several instruments (all Bristol recorder channels, 1C T_c Norwood, and the T_{avg} auctioneering units) required recalibration. All were recalibrated per the test procedure successfully.

The third performance of test procedure LWBR-DLCS 61001, Periodic Calibration of Pressure Instrumentation, was satisfactorily completed. This test calibrates the static pressure instrumentation for the reactor coolant loops, the pressurizer wide and narrow range, reactor pressure and obtains calibration curves for the Data Acquisition System for these instruments. Only the pressurizer pressure

narrow range and the 1D loop pressure instrument was calibrated during this performance. During the performance of this test, pilot relief valve 06-H18-1 was actuated. The plant was solid at the time, and primary system pressure decreased as the relief valve discharge filled the line up to isolation valve 06-H2-7. All main coolant pumps were shutdown and the test stopped until plant conditions were checked. Each main coolant pump was then restarted and the test continued. A procedure change has been initiated to preclude reoccurrence. The data obtained meets the acceptance criteria for this test.

The third performance of test procedure LWBR-DLCS 61201, Periodic Calibration of Pressurizer Level Instrumentation, was satisfactorily completed. This test calibrates the pressurizer level wide and narrow range instrumentation, and scales the data logger for these points. All data met the acceptance criteria and no unusual problems were encountered during test performance.

Test procedure LWBR-DLCS 61301, Periodic Calibration of Reactor Plant Flow Instrumentation, was performed satisfactorily. Only the 1D loop flow instrumentation was calibrated at this time. This completes the second calibration of the 1D loop flow instrumentation and the fourth performance of the test. The test indicated that a calibration of the Data Acquisition data logger was required. This calibration was satisfactorily completed. All data met the acceptance criteria and no unusual problems were encountered.

The third performance of test procedure LWBR-DLCS 62101, Periodic Checkout and Calibration of the Invense Kinetics Simulator (IKS), was satisfactorily performed. Test signals were applied to the input circuits of the Brown recorders, IKS computer and Kiethley picoammeters to assure each instrument was functioning properly prior to scheduled physics testing.

The second performance of test procedure LWBR-DLCS 62202, Periodic Calibration of Pressure Switches in the Steam Pressure Instrumentation, was satisfactorily completed. Ten of the steam pressure instrumentation switches were found to be out of tolerance (535 $\pm$ 10 psig) during a scheduled operations quarterly check. The test procedure was performed for all switches and all switches, in the as left condition, were within 535 $\pm$ 5 psig.

The following physics test procedures were all satisfactorily performed during the Spring shutdown:

Second performance of LWBR-DLCS 63201, LWBR Pressure Coefficient of Reactivity.

The third performance (second performance of the abbreviated version) of LWBR-DLCS 63301, Xenon Reactivity Transient.

Second performance of LWBR-DLCS 64401, Core Shutdown Reactivity and Azimuthal Reactivity Symmetry.

Second performance of LWBR-DLCS 64501, Movable Fuel Assembly (12 Module) Bank Reactivity Worth and Temperature Coefficient of Reactivity at Zero Power.

5. TEST PROGRAM (Cont'd)

The third and fourth performances of test procedure LWBR-DLCS 63501, Flux Wire Activations, were performed during the quarter. The third performance was for Xenon free conditions and used thorium flux wires. The fourth performance was for equilibrium Xenon conditions and used Cu Ni flux wires.

The first performance of test procedure LWBR-DLCS 66101, Movable Fuel Control System Drive Mechanism and Bypass Inlet Flow Periodic Test was satisfactorily completed during the quarter. Loss of a Scram trace resulted on module I-1 due to a malfunctioning cable or accelerometer. Also loss of a sound recording for module II-2 resulted from testing equipment malfunction somewhere in the system. However all other data was obtained satisfactorily and the Control Drive Mechanisms performed satisfactorily.

A number of special test procedures were performed during the quarter and are listed as follows:

LWBR-DLCS 76901, Replacement D.G. Load Sequencer Operational Check-out Test, was satisfactorily performed to check modification made during the planned Spring Shutdown.

LWBR-DLCS 77001, Core Exit Thermocouple Performance Check, was satisfactorily performed consistant with the installation of Core Removal Cooling for the planned Spring Shutdown.

LWBR-DLCS 77501, Determination of the Effect of a Special Neutron Shield for the Shippingport Reactor Plant, was performed following the installation of shielding material. Test results demonstrate that although a considerable reduction in the neutron levels was obtained, neutron radiation areas still exist in the Auxiliary Enclosure, Axial Flux Measurement System cubicle and the catwalk over the Auxiliary Enclosure. An evaluation is continuing to determine if further shielding will be added during the next planned shutdown.

Three special test procedures of an operational nature were satisfactorily performed during the quarter and are listed as follows:

LWBR-DLCS 70801 Transferring Test Tank Water to a Canal Pit.

LWBR-DLCS 77301, Flow Verification of Blow-off Tank Spray Water Cooler (09-F1-1)

LWBR-DLCS 77401, Non-Reuse Flush from 08-H16-39 to 411-H16-4005

Finally, Test procedures LWBR-DLCS 65901, Reactor Pressure Drop and Coolant Flow Characteristics and LWBR-DLCS 66001, Reactivity Lifetime Test, which are on-going tests, continued through the report period.

TABLE VII

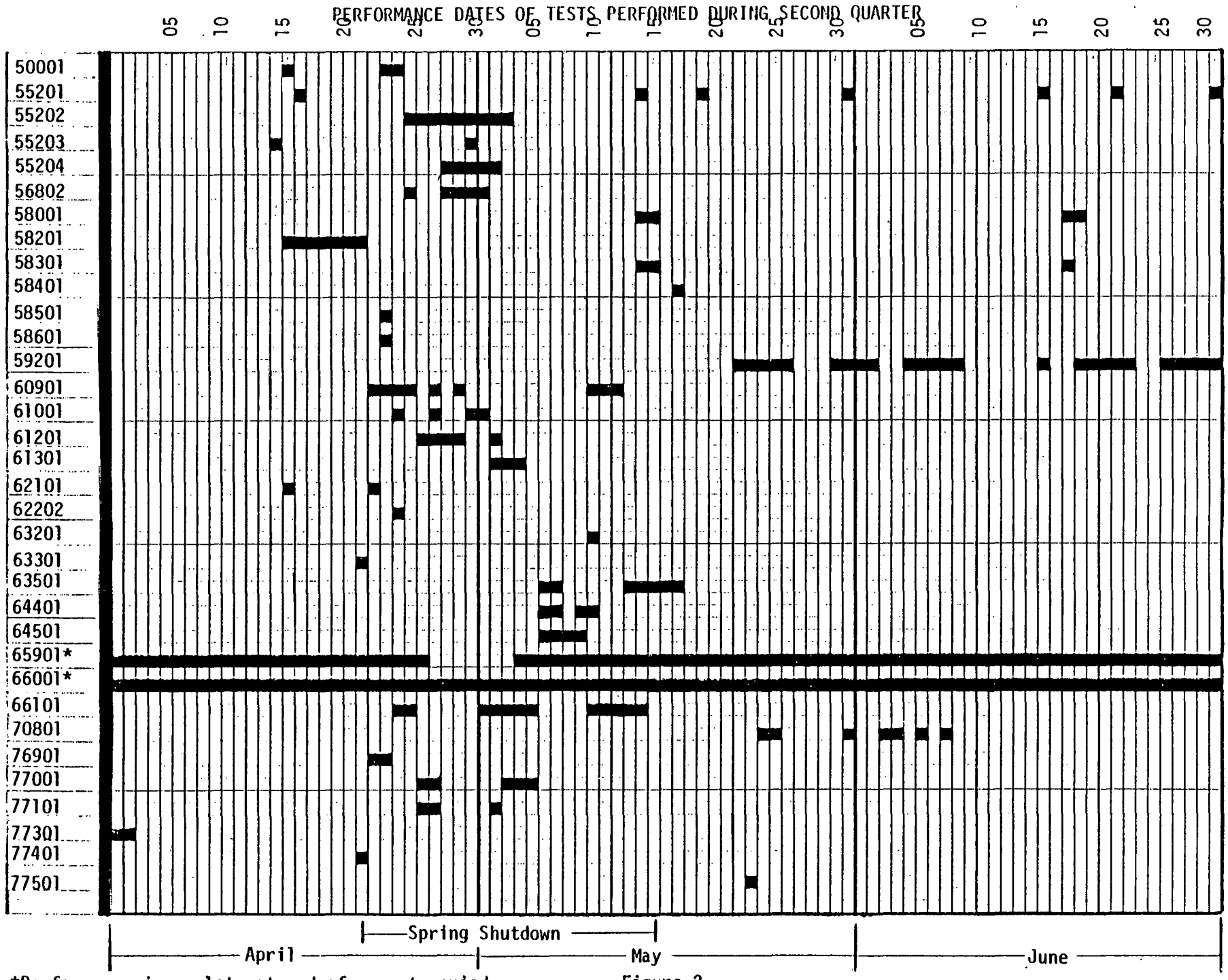
TESTS PERFORMED DURING SECOND QUARTER OF 1978

LWBR-DLCS 5000102	Seismic Scram System Functional Test
LWBR-DLCS 5520107-09	SIS Monthly Periodic Pump Tests
LWBR-DLCS 5520201	SIS Semi-Annual Periodic Pump Tests
LWBR-DLCS 5520301	SIS Quarterly Periodic Valve Test
LWBR-DLCS 5520401	SIS Semi-Annual Periodic Valve Test
LWBR-DLCS 5680203	Reactor Plant Container Integrity Test (Butterfly Valve Test)
LWBR-DLCS 5800109-10	Reactor Coolant Fission Product Monitoring During Reactor Startup
LWBR-DLCS 5820104	DN Loop Monitoring System Checkout Test
LWBR-DLCS 5830111-12	DN Loop Monitoring System (Operation During Station Startup)
LWBR-DLCS 5840107	ND Loop Monitoring System Operational Test
LWBR-DLCS 5850102	External Radiation Levels of Reactor Coolant System Piping and Components and Purification System Heat Exchangers
LWBR-DLCS 5860102	Periodic Radiation Survey of the Reactor Vessel Head
LWBR-DLCS 5920101	Periodic Radiochemical Analysis of LWBR Reactor Coolant
LWBR-DLCS 6090102	Periodic Intercalibration of Temperature Sensing Elements
LWBR-DLCS 6100103	Periodic Calibration of Pressure Instrumentation
LWBR-DLCS 6120103	Periodic Calibration of Pressurizer Level Instrumentation
LWBR-DLCS 6130104	Periodic Calibration of Reactor Plant Flow Instrumentation
LWBR-DLCS 6210103	Periodic Checkout and Calibration of the Inverse Kinetics Simulator (IKS)
LWBR-DLCS 6220202	Periodic Calibration of Pressure Switches in Steam Pressure Instrumentation
LWBR-DLCS 6320102	Pressure Coefficient of Reactivity
LWBR-DLCS 6330103	Xenon Reactivity Transient
LWBR-DLCS 6350103-04	Flux Wire Activations
LWBR-DLCS 6440102	Core Shutdown Reactivity and Core Azimuthal Reactivity Symmetry
LWBR-DLCS 6450102	Movable Fuel Assembly (12 Module) Bank Reactivity Worth and Temperature Coefficient of Reactivity at Zero Power
LWBR-DLCS 6610101	Movable Fuel Control System Drive Mechanism and BIF Periodic Test
LWBR-DLCS 7690101	Replacement D.G. Load Sequencer Operational Checkout Test
LWBR-DLCS 7700101	Core Exit Thermocouple Performance Check
LWBR-DLCS 7710101	LWBR Safety Injection Control System Modification Checkout
LWBR-DLCS 7730101	Flow Verification of Blow-off Tank Spray Water Cooler (09-F1-1)
LWBR-DLCS 7740101	Non-Reuse Flush from 08-H16-39 to 411-H16-4005
LWBR-DLCS 7750101	Determination of the Effect of a Special Neutron Shield for the Shippingport Reactor Plant.

TABLE VII

TESTS REMAINING IN PROGRESS AT END OF REPORT PERIOD

LWBR-DLCS 65901	Reactor Pressure Drop and Coolant Flow Characteristics
LWBR-DLCS 66001	Reactivity Lifetime Test
LWBR-DLCS 7080101	Transferring Test Tank Water to a Canal Pit



*Performance incomplete at end of report period

Figure 2

DLCS 5000278

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

HDS . . . . . .Heat Dissipation System

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

μCi . . . . . .microcuries

v/o . . . . . .percent by volume

VOS . . . . . Valve Operating System