DLCS 5000469

MASTER

DUQUESNE LIGHT COMPANY
Shippingport Atomic Power Station

Quarterly
OPERATING REPORT
Fourth Quarter
1969

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Contract AT-11-1-292
United States Atomic Energy Commission

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.

Duquesne Light Company
Shippingport Atomic Power Station
Power Stations Department

QUARTERLY OPERATING REPORT
Fourth Quarter 1969
DLCS 5000469

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

Approved by

F. J. Bissert
Superintendent

Contract AT-11-1-292
United States Atomic Energy Commission

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Reg

TABLE OF CONTENTS

Preface	i
1. SUMMARY OF OPERATIONS	1
2. SUMMARY OF STATION PERFORMANCE	4
3. CHEMISTRY	5
4. MAINTENANCE	15
5. TEST PROGRAM	17
6. GLOSSARY	21

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 advice on recent technical progress related to the nuclear portion of the Shippingport Atomic Power Station is therefore referred to the United States Atomic Energy Commission, Office of Technical Information Extension at Oak Ridge, Tennessee, where this information is readily available.

1. SUMMARY OF OPERATIONS

During the quarterly report period, the Station was operated as required for testing, maintenance and Duquesne Light Company System load demands with the 1A, 1B and 1C Reactor Coolant Loops in service. The 1D Reactor Coolant Loop remained isolated and drained for heat exchanger tube leak repairs and the Heat Dissipation System remained shutdown throughout the quarter.

Three scheduled Station shutdowns were undertaken during the report period. The first began on October 10 at 9:50 PM in order to perform periodic testing and maintenance. On October 11, the 1D Reactor Coolant Loop heat exchanger was pressurized to 1155 psig on the secondary side to determine the location of the heat exchanger tube leak. The leak was successfully located. A Station cooldown was initiated on this date and the LAC Core Removal Cooling System was utilized to maintain primary plant temperature from October 13 through 18. During the cold plant lay-up, the 1C Reactor Coolant Loop was isolated on October 13 in order to permit repairs to the steam header valves. The Operations group conducted casualty drills the week of October 13. The 1C Reactor Coolant Loop was returned to service and the Station Heatup for testing and power operation commenced on October 18. On October 22, the yearly turbine overspeed trip check was performed and the Station returned to power operation at 10:29 AM.

The Number 1 Nuclear Protection System (NPS) positive 24 volt power supply tripped on overload on October 24. Back-up power was supplied from the alternate Number 2 unit until the Number 1 unit was replaced and returned to service on November 1.

Following determination of base value channel factors on October 25, the NPS channel 1B was returned to service. This channel had been isolated in September because of a faulty CIC detector. This detector was replaced during the October 10 to 22 Station shutdown.

The plant was shutdown at 8:57 PM on October 31 for the purpose of changing the control rod program as required by reactor lifetime limitations. This change returned the rod program to sequential Rod Group full withdrawal instead of partial withdrawal. The cause of erratic turbine governor control oil system operation was also determined during this shutdown. Corrective repairs are scheduled for the next Station shutdown. The plant was returned to service at 8:55 AM on November 1.

The third scheduled shutdown occurred at 7:49 PM on November 25. This shutdown necessitated a Station cooldown to less than 200°F in order to repair an unisolable instrument line leak on the 1B boiler feedwater header. Following this repair and a hydrostatic test of the 1B boiler, the Station was heated up and returned to power at 1:35 AM on November 28.

Summary of Operations

DLCS 5000469

On November 19, 128 drums of radioactive waste material weighing 32,085 pounds and containing 500.1 millicuries of radioactivity were shipped off-site for burial.

FIGURE 1

Generator Output, HDS Load and Reactor Coolant Temperature During
Fourth Quarter 1969

2. SUMMARY OF CORE 2 STATION PERFORMANCE

Electrical output (Gross) to date	.kwhr	2,236,292,700
EFPH to date (Blanket operating time)	.hr	15,583.9
EFPH to date (Seed 2 operating time)	.hr	1,931.9
EFPH for the quarterly period	.hr	894.5
Hours reactor critical to date.	.hr	32,706.1
Hours reactor critical for the quarterly period . .	.hr	1,883.4
No. 1 main unit service hours (quarterly period). .	.kwhr	1,867.4
Net Station output (quarterly period)	.kwhr	116,466,000
No. of forced outages*		0

* Interruption of electrical output due to protective relay action and/or operator action as required to protect the Station.

3. CHEMISTRY

During the fourth quarter of 1969, the chemistry section maintained chemical specifications in the various plant systems. The following tests were performed in support of the test program:

DLCS 58001 - Reactor Coolant Fission Product Activity

DLCS 59203 - PWR Core 2 Reactor Coolant Crud Study (Crud Fractionation)

Reactor Plant

Reactor Coolant water conditions were maintained according to the Station manual. The LBD purification and the 1D reactor coolant loop remained out of service for the entire quarter. The 1D reactor coolant loop primary side had been drained September 29, 1969. All power operations utilized the 1A, 1B, and 1C reactor coolant loops and the 1AC purification loop. Tables I and II summarize the reactor coolant water conditions obtained during power operation and shutdown periods respectively. No "out of specification" water conditions were observed in the reactor coolant.

The Component Cooling Water System was maintained with water specifications during the quarter except that a pH of 8.20 was observed for a short time. (The specified minimum pH is 8.30). Upon receipt of previously ordered chemicals, the system was treated and the low pH condition corrected. The short period of low pH was not considered deleterious to the system materials. The Canal Water System remained within specifications throughout the entire quarter. At the beginning of the report period, the coolant charging water met all specifications. On October 13, the primary tank was treated with hydrazine for the planned cold shutdown in October. The residual effects of this treatment resulted in the charging water slightly exceeding pH and conductivity specifications until early in December. By mid-December a slight increase above specification in pH and conductivity of the primary charging water resulted from ammonium hydroxide carried to the tank by recirculation for freeze protection. The water conditions of the Reactor Plant Auxiliary Systems are summarized in Table III.

The Cesium 138 activity of the reactor coolant was determined on a routine basis during all plant power operations. The following tabulation lists the average Cesium 138 values calculated for each month of the report period. All values are corrected to a standard base of 67 percent reactor power, four reactor coolant loops, two purification demineralizers in service at 33,000 pounds/hour flow through the demineralizers and 536°F Avg operation. Daily Cesium 138 analyses were performed in December while the FEDAL system was out of service.

Average Cesium 138 Activity

<u>Month</u>	<u>dpm/ml</u>	<u>uc/ml</u>	<u>No. of Observations</u>
October	340	1.55×10^{-4}	6
November	355	1.62×10^{-4}	7
December	357	1.62×10^{-4}	20

At 1825 EFPH on December 11, the reactor coolant tritium activity was 2.3 uc/liter. Previous tritium values observed during Seed 2 operating were 2.1 uc/liter on September 16, 1969 (919 EFPH) and 0.3 uc/liter on July 18, 1969 (162 EFPH).

The third collection of reactor coolant fission products on Core 2 Seed 2 for DLCS 58001 was obtained November 28, during the Station start-up. No evidence of fuel failure was detected.

Reactor coolant crud sample collections were performed October 11 through 13 in accordance with DLCS 59203, Section VI-C in conjunction with the station cooldown. Samples were obtained October 18 and 19 concurrent with the station heat-up according to Section VI B of DLCS 59203 (PWR Core 2 Reactor Coolant Crud Study - Crud Fractionation). Analysis of these samples were in progress at the end of the report period.

Results of a radiochemical analysis of reactor coolant for soluble and insoluble activity as performed each 1000 EFPH during Core 2 operation are presented in Tables IV and V. Results presented are from samples obtained September 18, 1969 at 950 EFPH. Examinations of samples obtained at 1816 EFPH on December 10 remained in progress at the end of the quarter.

In the third quarter, the flow through the IAC purification demineralizer was reduced to 20,000 pounds/hour to reduce the load on the Component Cooling Water System because of high river water temperature. On October 2, the IAC purification flow was increased to 33,000 pounds/hour. The IAC purification demineralizer remained in service for all operations in the report period. The gross non-volatile gamma activity at the inlet to the IAC purification demineralizer after a 15 minute decay time was determined daily during power operation. The activity of these samples ranged from 15,180 cpm/ml at 16 percent reactor power to 80,906 cpm/ml at 57 percent reactor power. Two 120 hour gross gamma activities showed evidence of long lived corrosion products higher than normal count rates. The D.F. observed across the IAC purification demineralizer after 15 minutes decay ranged from 128 to 864. Nine routine weekly crud samples ranged in specific activity from 1.80×10^7 cpm/mg to 4.75×10^7 cpm/mg after a 120 hour decay. The crud concentration of these samples ranged from 1.1 ppb to 4.1 ppb.

Turbine Plant

The 1D heat exchanger remained out of service for the entire quarter. Cold lay-up specifications were maintained in the heat exchanger from September 27 until draining of the secondary side on October 12 for inspection and repair of primary to secondary leakage. The remaining heat exchangers were utilized for all power operations during the quarter. During the station shutdown from October 10 to October 22, the 1A, 1B and 1C heat exchangers were maintained under cold lay-up specifications from October 13 through October 18. Hot lay-up specifications were maintained for the remainder of the October shutdown and on November 25 through 28 during the station shutdown for repair of a feedwater instrumentation line leak. No evidence of primary to secondary leakage was detected in the operating heat exchangers during the report period. On November 30, following the return of the station to power operation on November 28, chloride concentrations in the 1B and 1C heat exchangers reached 0.51 ppm (specified 0.50 max). Blowdown restored required concentrations and no additional rapid chloride increases were noted through the end of the quarter. Summaries of boiler water analyses under operating and shutdown conditions are presented in Tables VI and VII.

Radioactive Waste Disposal

Five surge and decay tanks of liquid radioactive waste were processed during the quarter. The tritium content of these tanks ranged from 1.06 uc/liter to 1.84 uc/liter. Radioactive liquid waste was also processed from the chemical waste tank through the evaporator directly to the test tanks. The tritium content of this waste was 7.0 uc/liter. One test tank of evaporator distillate was returned to the 1A surge tank. All other water processed was suitable for discharge to the environment.

The Xe^{133} activity of the Vent Gas System ranged from 1.18 dpm/cc (5.37×10^{-7} uc/cc) to 16.6 dpm/cc (7.55×10^{-6} uc/cc) for the report period.

TABLE I
Reactor Coolant System
Water Conditions and Chemical Adjustments
Operating Conditions

October 1 - December 31, 1969

Chemical Condition	Specifications	Analytical Results		NH ₄ OH Additions Liters	Degassification Hours
		Min.	Max.		
1. pH @ 25° C	10.20 ± 0.10	10.11	10.30	223.1	183
2. Specific Conductivity umhos	- - - -	34.0	55.0		
3. Ammonia - ppm	- - - -	18	25		
4. Total Gas - cc/kg	125 Maximum	25	106		
5. Hydrogen - cc/kg	10 - 60	11	59		

TABLE II

Reactor Coolant System

Water Conditions and Chemical Adjustments

Shutdown Conditions

October 1 - December 31, 1969

Chemical Conditions	Temp.	Specifications	Analytical Results		NH ₄ OH Additions Liters	H ₂ Addition cu. ft.
			Min.	Max.		
1. pH @ 25° C	> 200°F	10.10 - 10.30	10.10	10.30	10	0
	< 200°F	6.0 - 10.5	9.88	10.28	0	0
2. Total Gas - cc/kg	> 200°F	80 Maximum	15	57		
	< 200°F	25 Maximum*	-	-		
3. Hydrogen - cc/kg	> 200°F	10 - 60	10	27		
	< 200°F		-	-		
4. Oxygen - ppm	> 200°F	< 0.14				
	< 200°F	< 0.3	0.010	0.030		
5. Chloride - ppm	> 200°F	< 0.1	N.D.	0.05		
	< 200°F	< 0.1	N.D.	N.D.		

Shutdown periods October 10 - 22 and November 25 - 28, 1969 (< 200°F October 13 through October 18, 1969).

* Degassification to 25 cc/kg must be accomplished prior to reducing reactor coolant pressure below the minimum required for reactor coolant pump operation.

TABLE III
Reactor Plant Auxiliary Systems
Water Conditions

October 1 - December 31, 1969

System	Specific Conductivity umhos	pH at 25° C	Cond. - ppm			Gross Gamma* Activity-dpm/ml
			CrO ₄	Cl	Dis. O ₂	
Component Cooling Specifications	none	8.30-10.50	500-1000	1 ppm max.	none	none
Observed	1380-1960	8.20- 9.75	557- 848	<0.05-0.30	-	Bkgd.
Coolant Charging Water Specifications	2.50 max.	6.00- 8.00	none	0.1 ppm max.	none**	none
Observed	1.40-10.7	6.40- 9.30	none	<0.05	1.3-14.0	none
Canal Water Specifications	5.00 max.	6.00- 8.00	none	none	none	none***
Observed	0.64-1.15	6.00- 6.24	none	none	none	Bkgd. - 18 ± 10

* Multiply tabular value by 4.55×10^{-7} to obtain uc/ml

** Should be < 0.14 ppm for reactor plant cold shutdown

*** Normally near background

TABLE IV

Primary System Resin and Crud Analysis

EFPH	In Service		Out Service		Type Sample	Volume Coolant Liters	Crud Weight mg	Resin Weight gms.	Sp. Act.* cpm/ml @ 120 hrs	Activity dpm/mg at 120 hr. **								% γ Acc.
	Date	Time	Date	Time						Co ⁶⁰	Co ⁵⁸	Fe ⁵⁹	Cr ⁵¹	Mn ⁵⁴	Hf ¹⁸¹	Zr ⁹⁵	W ¹⁸⁷	
950	9/18/69	1400	9/19/69	1400	Crud	437	1.61		$\times 10^7$	$\times 10^6$	$\times 10^5$	$\times 10^5$	$\times 10^5$	$\times 10^5$	$\times 10^4$	$\times 10^4$	-	
									2.30	31.6	13.0	100	1.72	13.0	0.09	0.13	-	91
950	9/18/69	1400	9/19/69	1400	Resin	219		5.01	$\times 10^2$	$\times 10^2$	$\times 10^2$	$\times 10$	$\times 10$	$\times 10^2$				
									1.70	0.68	0.41	0.17	0.18	0.12				25

* For conversion to the microcurie unit, multiply tabular value by 1.07×10^{-6} ** For conversion to the microcurie unit, multiply tabular value by 4.55×10^{-7}

TABLE V
1000 Hour Fission and Activation Product Analysis
Core 2 Seed 2

1000 Hour Run EFPH	Cs 137 dpm/ml*	I 131 dpm/ml*	I 133 dpm/ml*	Xe 133 dpm/ml*	Ar 41 dpm/ml*
950	nondetectable	4.2	104	29	1.43×10^4

* Multiply tabular value by 4.55×10^{-7} to obtain uc/ml

TABLE VI
Operating Heat Exchanger Chemistry
Water Chemistry
October 1 - December 31, 1969

Water Conditions	Specifications	Operating Heat Exchangers			
		1A	1B	1C	1D
1. Dis. Salts - ppm	Min. --- Max. 1000	26 162	21 173	26 188	
2. Phosphate - ppm	Min. 5 Max. 100	16 100	8 100	10 100	
3. Chloride - ppm	Min. 0 Max. 0.5	0.20 0.50	0.17 0.51	0.18 0.51	
4. Hydrazine - ppm	(residual)	0.015 0.13	0.017 0.13	0.019 0.13	
5. Silica - ppm	Min. 0 Max. 25	1.00 2.14	0.55 2.40	0.95 3.60	
6. pH at 25° C	Min. 9.50 Max. 11.00	9.70 10.73	9.50 10.71	9.58 10.75	
7. Chemicals Used, lbs. Na ₃ PO ₄ Na ₂ HPO ₄ NaH ₂ PO ₄		36 10 0	36.5 10 0	37.5 9.5 0	

TABLE VII
Non-Operating Heat Exchanger
Water Chemistry
October 1 - December 31, 1969

Water Conditions	Specifications	Non-Operating Heat Exchangers			
		1A*	1B*	1C*	1D**
1. Dis. Salts - ppm	Min. --- Max. 1000	47 126	42 139	54 181	82
2. Phosphate - ppm	Min. 5 Max. 100	16 62	16 66	16 76	16
3. Chloride - ppm	Min. --- Max. 0.50	0.15 0.40	0.15 0.40	0.15 0.40	0.35
4. pH at 25° C	Min. 10.0*** Max. 11.0	10.10 10.58	10.12 10.69	10.22 10.86	10.10
5. Hydrazine - ppm (Hot lay-up)	Min. Residual Max. ---	0.021 0.34	0.030 0.30	0.030 0.38	
(Cold lay-up)	Min. 50 Max. 100	96	100	94	57
6. Chemicals Used (Pounds)					
Na ₃ PO ₄		6	6	6	
Na ₂ HPO ₄		1.5	1.5	1.5	
N ₂ H ₄		15	15	15	

* 1A, 1B, and 1C laid up Oct. 10 through Oct. 22 and Nov. 25 through Nov. 28 (Cold lay up Oct. 13 through 19).

** 1D under cold lay up Sept. 27 to Oct. 12, 1969 - drained Oct. 12, 1969 through Dec. 31, 1969.

*** The pH is maintained 0.1 below the theoretical phosphate - pH curve

4. MAINTENANCE

Routine repairs of major components, instruments and controls and preventive maintenance were performed during the quarterly report period. Major repairs performed are summarized as follows:

Fuel Handling Building Rolling Steel Door

The rolling steel door located at the railroad track entrance to the Fuel Handling Building which malfunctioned and damaged several steel door slats during the third quarterly report period, was repaired and returned to service on November 21, 1969.

1D Heat Exchanger

During normal plant operation, a primary to secondary leak was discovered in the 1D reactor coolant loop heat exchanger. The leak was confirmed by the use of an F18 sample on August 8, 1969 and ascertained to be approximately 1.2 to 1.6 gallons per hour. The leaking tube was located by applying water head pressure to the secondary side of the heat exchanger and the rupture was found to be at the first support plate from the inlet tubesheet.

The leaking tube was verified by eddy current testing. The outlet and inlet tube sheets were then shielded with lead plates which were fabricated in advance in various sizes to minimize radiation exposure during shielding operations. The leaking tube and one other sample tube were removed from the heat exchanger and shipped to Bettis Atomic Power Laboratory for further inspection and analysis.

The plenum walls of the outlet side of the heat exchanger were decontaminated by means of electrolytic descaling. A preliminary eddy current inspection program, which required the inspection of approximately one-third (1094 tubes) of the tube bundle, was initiated on December 5 and completed on December 23. Borescoping operations were then undertaken at the end of the report period to inspect the tube support plate.

Axial Flux Measurement System

Due to obstructions in the Axial Flux System for several of the six core locations at which flux wire chimblees are installed, the flux wire drive systems were cleaned and exercised. New drive cables were then installed for all locations. Core grid location C-8 remained out of service due to an obstruction in its thimble. In addition, core grid location F-11 required the use of a modified wire for proper operation. The drive assemblies for each of the five operable core grid locations were then calibrated. Upon completion of a successful pressure test to insure the integrity of the system, the Axial Flux System was made available for service.

1C-2 Surge Tank Transfer Pump

The 1C-2 surge tank transfer pump at RWDS was overhauled during the report period. Shaft bushings were replaced. The pump was cleaned and reassembled by the end of the report period.

Service Air Compressor

The service air compressor located in the B-4 turbine basement was overhauled during the report period. Rotor bearings, seals and guide vanes were replaced.

When the compressor was returned to service, the inboard bearing of the high pressure section failed allowing the rotor assembly to drop. The spacer ring contacted the bore of the cylinder head, cutting two grooves in the head. The bore was machined out and a 1/8 inch spacer sleeve was shrunk into the cylinder head. The bore was then machined to its original dimensions. In addition, the service air aftercooler was replaced and a new unit installed. Work on the service air compressor remained in progress at the end of the report period.

1B Reactor Coolant Pump

The modified Core 1 reactor coolant pump, which had been temporarily installed in the 1B reactor coolant loop and removed during Core 2 Seed 1 - Seed 2 refueling, was partially disassembled in preparation for storage. The thrust runner was removed and stored separately. A dummy thrust runner was then fabricated and installed in its place. The pump was then placed into storage at the north end of the Fuel Handling Building.

5. TEST PROGRAM

The primary objective of the test program during the quarterly report period was to continue reactivity depletion of Core 2 Seed 2 in order to determine irradiation and reactivity lifetime properties and core power distribution as a function of lifetime. Other objectives for this period were to perform periodic calibrations of primary plant temperature and flow instrumentation and secondary plant feedwater instrumentation. Tests were also performed to check the operation of the FEDAL System, Axial Flux Measurement system and control rod drive mechanisms. Radiation surveys were taken on the reactor vessel head and reactor coolant loops and purification demineralizers. The reactor plant container integrity was checked at the butterfly valves.

Thirteen tests were performed during the report period. Eleven tests were completed and two remained in progress at the end of the quarter. Table VIII lists these tests and Figure 2 displays the performance dates. Information pertaining to chemistry tests may be found in the chemistry section of this report.

The primary plant temperature sensing elements were calibrated on October 11, 13-16 and 19-22 (DLCS 60901) and the flow instrumentation for the 1A, 1B, 1C and 1D reactor coolant loops was calibrated on October 14-16 (DLCS 61301). Calibration of the 1A and 1B total feedwater flow and temperature instrumentation (DLCS 61801) was performed on November 10, 13, 14 and 24. The Data Acquisition System was scaled in conjunction with the above calibrations (DLCS 60401).

The seed fuel element at core location G-10 was monitored by the FEDAL system on October 22, November 1 and 27 during station start-up (DLCS 58301). The tests yielded normal results indicating no cladding failures in this element.

The Axial Flux Measurement System operation was checked out on December 8, initiating the Axial Flux Measurement Test (DLCS 63502). The flux thimble at core location C-8 was obstructed and could not be used throughout the test. The thimble at core location F-11 would pass only a modified test wire. Zircaloy and iron-manganese wires were irradiated on December 10 at 67 per cent reactor power-equilibrium xenon conditions. Unexpected restrictions necessitated the use of modified wires at core locations D-9 and G-7, as well as F-11. A total of six zircaloy and three iron-manganese wires were irradiated at this time.

The Control Rod Drive Mechanism Periodic Test (DLCS 66101) was performed on October 19 and 20. During the control rod withdrawal portions of the test, twenty-two control rod position indicator coil voltage readings were checked against questionable data obtained during the performance of the Control Rod Drive Mechanism Precritical Operating Test (Operating Temperature) (DLCS 6550303) of June, 1969. Several minor changes were made to correct the data previously obtained.

A radiation profile of the IBD purification demineralizer was obtained on October 6 (DLCS 58501) after the ID reactor coolant loop had been isolated for repair of the leaking heat exchanger tubes. On October 15 through 17, during Station shutdown, radiation surveys were performed on the 1A, 1B, 1C and 1D reactor coolant loops and the 1AC and 1BD purification demineralizers (DLCS 58501) as well as the reactor vessel head (DLCS 58601). The 1AC demineralizer was again surveyed on December 23 (DLCS 58502, Method One) with reduced reactor coolant flow through the demineralizer and the reactor operating at a reduced power level.

The Reactor Plant Container integrity was checked at the butterfly valves (DLCS 56802) October 13 through 17. An acceptable leak rate was obtained for the 1C and 1D supply valves following cleaning of the valve seats and adjustment of the packing. The 1A and 1B exhaust valve seats were coated with silicone lubricant in order to achieve an acceptable leak rate. Leakage through these valves does not present a safeguards problem because, in the event of a loss of coolant accident, the cavities between the valves are pressurized to prevent leakage out of the reactor plant container. However, plans are being made to make repairs to the valves to improve their leak tightness.

TABLE VIII

Tests Performed During Fourth Quarter 1969

DLCS 5680210	Reactor Plant Container Integrity Test (Butterfly Valve Test)
DLCS 5830182-84	FEDAL System (Operation During Station Start-Up)
DLCS 5850124,25	External Radiation Levels of Reactor Coolant System Piping and Components and Purification System Demineralizers and Heat Exchangers
DLCS 5850202	Radiation Survey of Demineralizers
DLCS 5860111	Periodic Radiation Survey of the Reactor Vessel Head
DLCS 6040109	Data Acquisition System Calibration Test
DLCS 6090109	Periodic Intercalibration of Temperature Sensing Elements
DLCS 6130108	Periodic Calibration of Reactor Plant Flow Instrumentation
DLCS 6180109	Periodic Calibration of Feedwater Instrumentation
DLCS 6350223	Axial Flux Measurement Test (Power Range-Equilibrium Xenon)
DLCS 6610104	Control Rod Drive Mechanism Periodic Test

Tests Remaining In Progress At End of Report Period

DLCS 6590102	Reactor Pressure Drop and Coolant Flow Characteristics
DLCS 6600102	Reactivity Lifetime Test

FIGURE 2
PERFORMANCE DATES
OF
TESTS PERFORMED DURING FOURTH QUARTER OF 1969

October

November

December

* Performance incomplete at end of report period.

6. GLOSSARY

AEC	United States Atomic Energy Commission
AIX	after ion exchanger (outlet)
a/o	atomic percent
BAPL	Bettis Atomic Power Laboratory
BIX	before ion exchanger (inlet)
bkgd.	background
CIC	compensated ionization chamber
DAS	Data Acquisition System
DE	demineralizer effluent
DF	decontamination factor
EFPH	equivalent full power hour
FEDAL	Failed Element Detection and Location System
FMI	flow measurement instrumentation
Hc	critical height
HDS	Heat Dissipation System
magamp.	magnetic amplifier
MELBA	Multipurpose Extended Life Blanket Assembly
mr.	milliroentgen
mrem.	milliroentgen equivalent man
NPS	Nuclear Protection System
ORMS	Operational Radiation Monitoring System
PWR	Pressurized Water Reactor
R	roentgen

Glossary

DLCS 5000469

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