Quarterly Operating Report
First Quarter 1981
DLCS 5000181

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Superintendent

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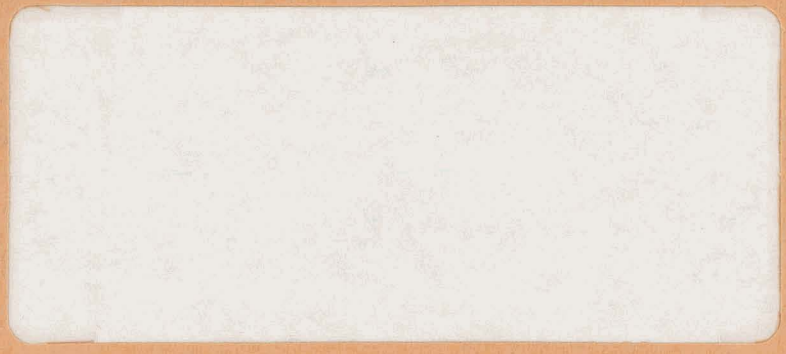

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Preface

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 first quarter of 1981, the Shippingport Atomic Power Station was operating with the 1A, 1B, 1C, and 1D reactor coolant loops and the 1AC and 1BD purification loops 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 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.

During the quarter, the Station was operated for Duquesne Light Company System grid at maximum base load with the exception of two short duration shutdowns:

On February 10, the station reduced load because the hand calorimetrics both read greater than NIave and the 1A and 1B calorimetric computers were both out of service. The station commenced a further load reduction to support test procedure LWBR DLCS 64601, Bank Reactivity Worth and Temperature and Power Coefficients of Reactivity at Power. On February 11, the station was placed in a shutdown without unlatching condition while awaiting completion of the Turbine casing drain line repair. On February 12, the reactor was taken critical in the intermediate range and the Turbine was placed on turning gear. The station returned to maximum load on February 13.

The station load was reduced to 59% on March 16 to support the brush replacement on the 1C flywheel generator. The station returned to maximum power , but later that same day, a rapid station shutdown was initiated due to a rupture of a tube in the gland steam condenser. The station was placed in a shutdown without unlatching condition. The ruptured tube and three adjacent tubes were plugged. The station returned to maximum power on March 19.

The remaining irradiated PWR Core 2 core barrel and miscellaneous refueling tools were in storage under shielding water in the deep pit. The fuel storage pit was undergoing drainage and decontamination.

1. SUMMARY OF OPERATIONS (Cont'd)

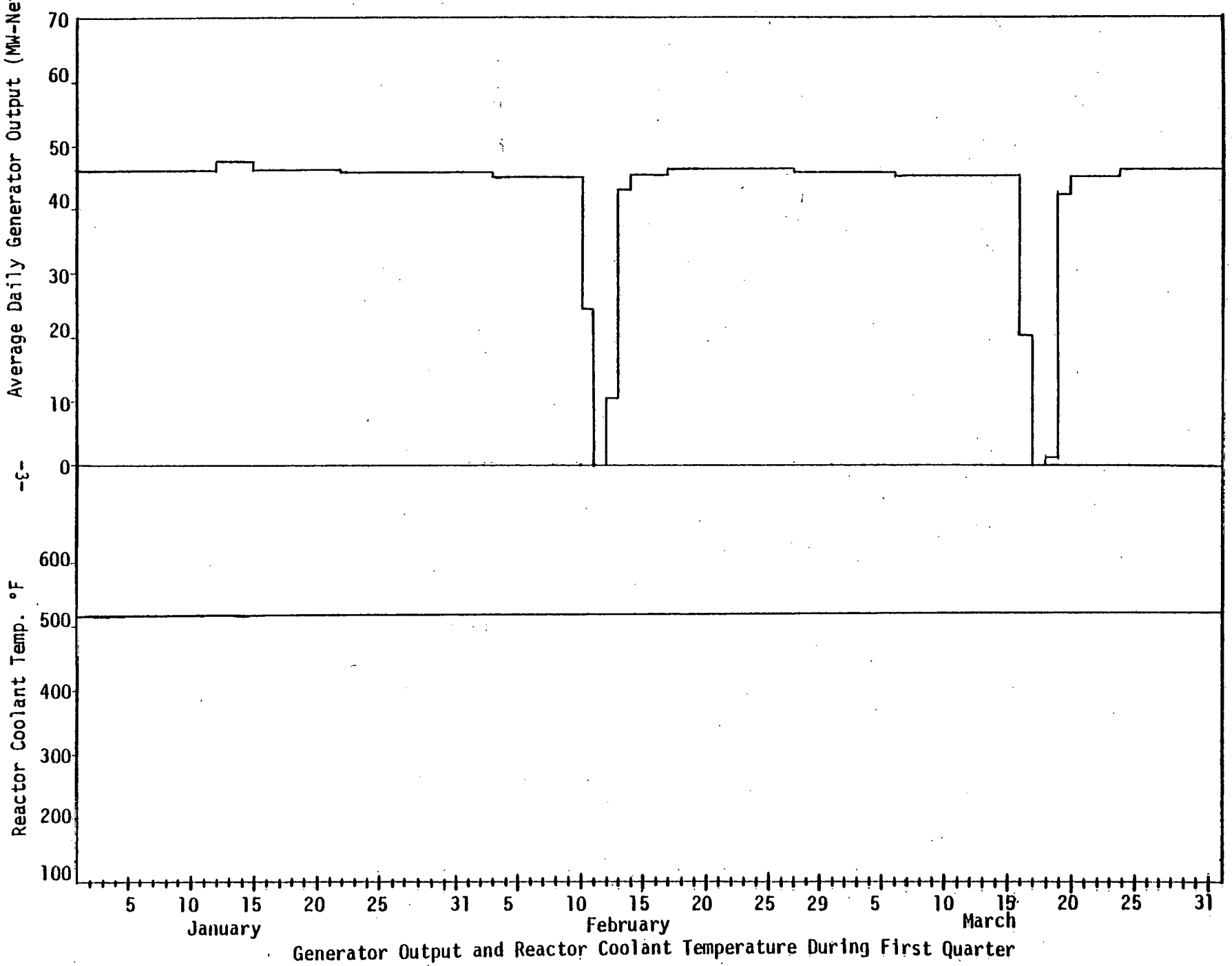
The LWBR Core has generated 20,645.54 EFPH from start-up through the end of the quarter.

The Reactor Coolant System average leak rate for this quarter was 9.5 gallons per hour. 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. Also, there were no gaseous discharges from the Radioactive Waste Processing System during the quarter.

During the first quarter of 1981, a total of 977.5 cubic feet of radioactive solid waste was shipped out of state for burial. The shipments contained 0.098 curies of radioactivity.



Generator Output and Reactor Coolant Temperature During First Quarter

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Figure 1

2. SUMMARY OF LWBR STATION PERFORMANCE

Electrical output (Gross) to date	kwhr	1,523,989,000
EFPH to date	hr	20,645.54
EFPH for the quarterly period	hr	1,599.47
Hours reactor critical to date	hr	24,255.43
Hours reactor critical for the quarterly period	hr	2,097.59
No. 1 main unit service hours (quarterly period)	hr	2,071.22
Net Station Output (quarterly period)	kwhr	93,699,000
No. of forced outages*		1

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

3. CHEMISTRY

During the first quarter of 1981, the Chemistry section maintained specifications in the various plant systems and fulfilled the Station Manual requirements.

Reactor Plant

The Station was placed in two different conditions, operating and hot standby, during the first quarter of 1981. The reactor coolant system was maintained within all specifications during these two conditions with one exception which occurred during an operating period. The reactor coolant exhibited a high out-of-specification pH* value which was attributed to the accuracy of the pH meter. Additional samples were drawn and analyzed and within two hours the pH returned to within specification limits. Refer to Tables I and II.

The out-of-specification conditions which existed in the reactor plant auxiliary systems occurred in the coolant charging water system and in the canal water system. Refer to Table V. The high pH's and conductivities exhibited by the coolant charging water system were attributed to the presence of ammonia, which results from the breakdown of the hydrazine that is added to the system to scavenge oxygen during periods of cold wet layup. No corrective action is required when this condition occurs.

In addition to the operational chemistry analyses during this quarter, Test Procedure LWBR-DLCS 58001, Reactor Coolant Fission Product Monitoring During Reactor Startup, was performed in accordance with test requirements during two plant startups. During each performance of the test, reactor coolant samples 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 the core cladding.

*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)

Test Procedure LWBR-DLCS 59201, Periodic Radiochemical Analysis of LWBR Reactor Coolant, which was in progress during the fourth quarter of 1980, was completed in the first quarter of 1981. The results of the test were forwarded to Bettis for evaluation.

Turbine Plant

The Chemistry section maintained the main unit boilers within all specifications during both conditions, operating and hot standby, which the station was placed in this quarter. Refer to Tables III and IV.

Radioactive Waste Processing

There were no liquid or gaseous discharges from the Radioactive Waste Processing System (RWPS) during the first quarter of 1981.

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 (Cubic Feet)	Degassification (Hours)
pH @ 25°C	10.10-10.30	10.23-10.28			
Specific Conductance (μmhos/cm)	Consistent with pH	43 - 48			
Total Gas (cc/kg)	125 cc/kg max.	61.5 - 97.3			
Hydrogen (cc/kg)	10cc/kg min 60cc/kg max	17.1 - 31.7			
Chloride	0.10 ppm max.	<0.10-<0.10			
Chemicals Added			6	0	0

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

Water Conditions	Specifications	Analytical Results min. max.	NH_4OH (liters)	H_2 (Cubic Feet)	Degassification (Hours)
pH @ 25°C	10.10-10.30	10.11-10.31*			
Specific Conductance (μmhos/cm)	Consistent with pH	30 - 49			
Total Gas (cc/kg)	125 cc/kg max.	73.3-112.5			
Hydrogen (cc/kg)	60 cc/kg max.	27.2-48.9			
Chloride	0.10 ppm max.	<.10- <.10			
Chemicals Added			109.5	0	20.4

*Refer to Reactor Plant Section of QOR

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TABLE III
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	8.55 9.20	8.56 9.15	8.57 9.06	8.58 9.20
Specific Conductance	Min. ---- Max. 10 µmhos/cm	3.0 6.5	3.4 8.1	3.3 6.6	3.2 8.6
Chloride	Min. ---- Max. 0.20 ppm	<0.1	<0.1	<0.1	<0.1
Morpholine	Min. 0.50 ppm Max. 6.0 ppm	0.50 3.10	0.50 4.40	0.55 3.50	0.50 4.00
Chemicals Used (lbs.)					
C_4H_9NO		1.71	1.71	1.71	1.71

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TABLE IV
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	8.55 8.96	8.53 9.02	8.50 8.98	8.54 9.00
Specific Conductance	Min. ---- Max. 10 µmhos	3.1 6.4	2.9 6.7	3.3 6.5	3.0 6.6
Chloride	Min. ---- Max. 0.20 ppm	<.10 <.10	<.10 <.10	<.10 <.10	<.10 <.10
Hydrazine	Min. 0.005 ppm Max. 0.125 ppm	.005 .120	.010 .063	.008 .050	.005 .115
Morpholine	Min. 0.50 ppm Max. 6.0 ppm	0.50 3.05	0.50 3.30	0.50 3.20	0.50 3.05
Chemicals Used (lbs.)					
N_2H_4		21.5	21.5	21.5	21.5
C_4H_9NO		76.6	76.6	76.6	76.6

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TABLE V
REACTOR PLANT AUXILIARY SYSTEMS
WATER CONDITIONS

System	Conductivity μmhos/cm	pH @ 25°C	Concentration in ppm			Gross Gamma Activity -μci/ml
			$CrO_4^{=}$	Cl^-	Dissolved O_2	
Component Cooling Specifications	N.S.	8.30 - 10.50	500-1000	1.0 ppm Max	N.S.	N.S.
Observed	N.P.	N.P.	535 - 767	<0.10 - 0.21	N.P.	<MDA - 1.57×10^{-7}
Cooling Charging Water Specifications	2.50 max.	6.00 - 8.00	N.S.	0.10 ppm Max	**	N.S.
Observed	3.1 - 7.9*	8.22 - 8.60*	N.P.	<0.10 -<0.10	N.P.	N.P.
Canal Water Specifications	5.0 max.	5.80 - 8.00	N.S.	N.S.	N.S.	1.0×10^{-6}
Observed	1.1 - 1.9	5.84 -. 6.15	N.P.	N.P.	N.P.	2.3×10^{-7}-9.75×10^{-7}

MDA is 9.89×10^{-8} μCi/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.

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4. MAINTENANCE

Scheduled preventive as well as corrective maintenance, was performed on plant equipment during this report period.

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

Turbine Plant

The overhaul of the B Traveling Screen was completed.

Overhaul of the Service Boiler Air Compressor was completed.

The Caustic Pump was repaired.

A shed was constructed at the Caustic Pump.

A leak in the fire line was repaired.

The Clearwell Level Controller was repaired.

Accumulated wood at the A screen was removed.

The door on Turbine Basement B-2 to the Chlorine bottles was repaired.

Ventilation duct work used when cleaning the Delaval Oil Purifier was installed.

An air line to the Lime Tank for agitation was fabricated.

The Clarifier was desludged.

The Gland Steam Condenser was repaired.

The #1 and #3 Heating return pumps were repaired.

The #1 and #2 Control Air Compressors were overhauled.

4. MAINTENANCE (Cont'd)

Reactor Plant

Replacement of Safety Injection System piping heat trace was continued.

Replacement of damaged Safety Injection System pipe insulation was continued.

Repairs were completed on the 40 point temperature monitor.

The Chemical Waste Transfer pump 43-G15-1 was repaired.

The Blowoff Tank Wide Range Pressure Instrument was calibrated.

The 1A Air Treatment Exhaust Fan Motor was rewound and a new shaft installed.

The High Radiation part of the door leading to Air Lock #1 was moved from the top of the stairs to the level of the air lock.

The placing of buzzers on all high radiation area doors was initiated.

The 1A Air Treatment hydraulic pump motor 19-G3-1 was repaired.

Solenoid valve 43-H12-6 was repaired.

Modifications to Radiological Control RP30A Modules was initiated.

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.

The Fuel Handling Building Crane 125 ton and 25 ton hooks were both load tested.

Extraction Crane modifications were continued.

The Job Order for fabrication of the Fuel Storage Racks was initiated.

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. In addition, the value of the flow coefficient of reactivity was monitored once during the quarter as planned.

Twelve tests were performed during the report period. Ten tests were completed and two remained incomplete or in progress at the end of the quarter. Table VI 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 in January and February. The test could not be performed in March due to unsatisfactory calibration data which had been obtained for a vibration meter. The meter is expected to be recalibrated and returned to the site in early April. The April performance of the test will be conducted at this time, including individual testing of the Boiler Feed Pumps, which is a quarterly requirement. The flowrates obtained for the new deepwell pump, 53-G2-4009, remained relatively constant for the two test performances. Since the maximum permitted power level has been reduced to 80%, a reduction in the minimum acceptable flowrate to 150 gpm for this pump, has been approved. The No. 2 SIS heat exchanger cooling water pumps, 19-G1-1 and 2, were tested satisfactorily in each performance this quarter.

The thirteenth performance of test procedure LWBR-DLCS 55203, SIS Quarterly Periodic Valve Test, was satisfactorily completed in March. 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 during the Spring 1981 Shutdown since plant conditions will be as required at this time. The test verifies that various Safety Injection System valves are operational by opening and closing the valves and recording the operating times.

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.

5. TEST PROGRAM (Cont'd)

The twenty-fourth performance of test procedure LWBR-DLCS 62101, Periodic Checkout and Calibration of Inverse Kinetics Simulator (IKS), was satisfactorily completed during the quarter to support planned physics testing. Out-of-tolerance data was observed on the upper scale portion of the "A" Brown Recorder.* This data was subsequently accepted by Bettis since the problem does not affect the quality of recorded data in the normal operating range of the instrument.

The eighteenth performance of test procedure LWBR-DLCS 64601, Bank Reactivity Worth and Moderator and Power Coefficients of Reactivity at Power, was satisfactorily completed in February. The purpose of this testing is to monitor the value of the flow coefficient of reactivity. All test data obtained met the procedure acceptance criteria. Test procedure LWBR-DLCS 78601, Reactor Plant Sound Monitoring using the Bell and Howell Tape Recorder was scheduled to be performed in conjunction with LWBR-DLCS 64601, but could not be performed since the recorder was not functioning properly. The results of test procedure LWBR-DLCS 64601 were not compromised by the failure to obtain sound recordings.

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

The sixth performance of Test Procedure LWBR-DLCS 61801, Periodic Calibration of Total Feedwater Flow and Temperature Instrumentation.

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

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

TABLE VI

Tests Performed During First Quarter of 1981

LWBR-DLCS 5520139 - 40	SIS Monthly Periodic Pump Tests
LWBR-DLCS 5520313	SIS Quarterly Periodic Valve Tests
LWBR-DLCS 5800133 - 34	Reactor Coolant Fission Product Monitoring During Reactor Startup
LWBR-DLCS 5830139 - 40	DN Loop Monitoring System (Operation During Station Startup)
LWBR-DLCS 5920106	Periodic Radiochemical Analysis of LWBR Reactor Coolant
LWBR-DLCS 6210124	Periodic Checkout and Calibration of the Inverse Kinetics Simulator (IKS)
LWBR-DLCS 6460118	Bank Reactivity Worth and Moderator and Power Coefficients of Reactivity at Power

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

LWBR-DLCS 6180106	Periodic Calibration of Total Feedwater Flow and Temperature Instrumentation
LWBR-DLCS 66001	Reactivity Lifetime Test

Performance Dates of Tests Performed During the First Quarter

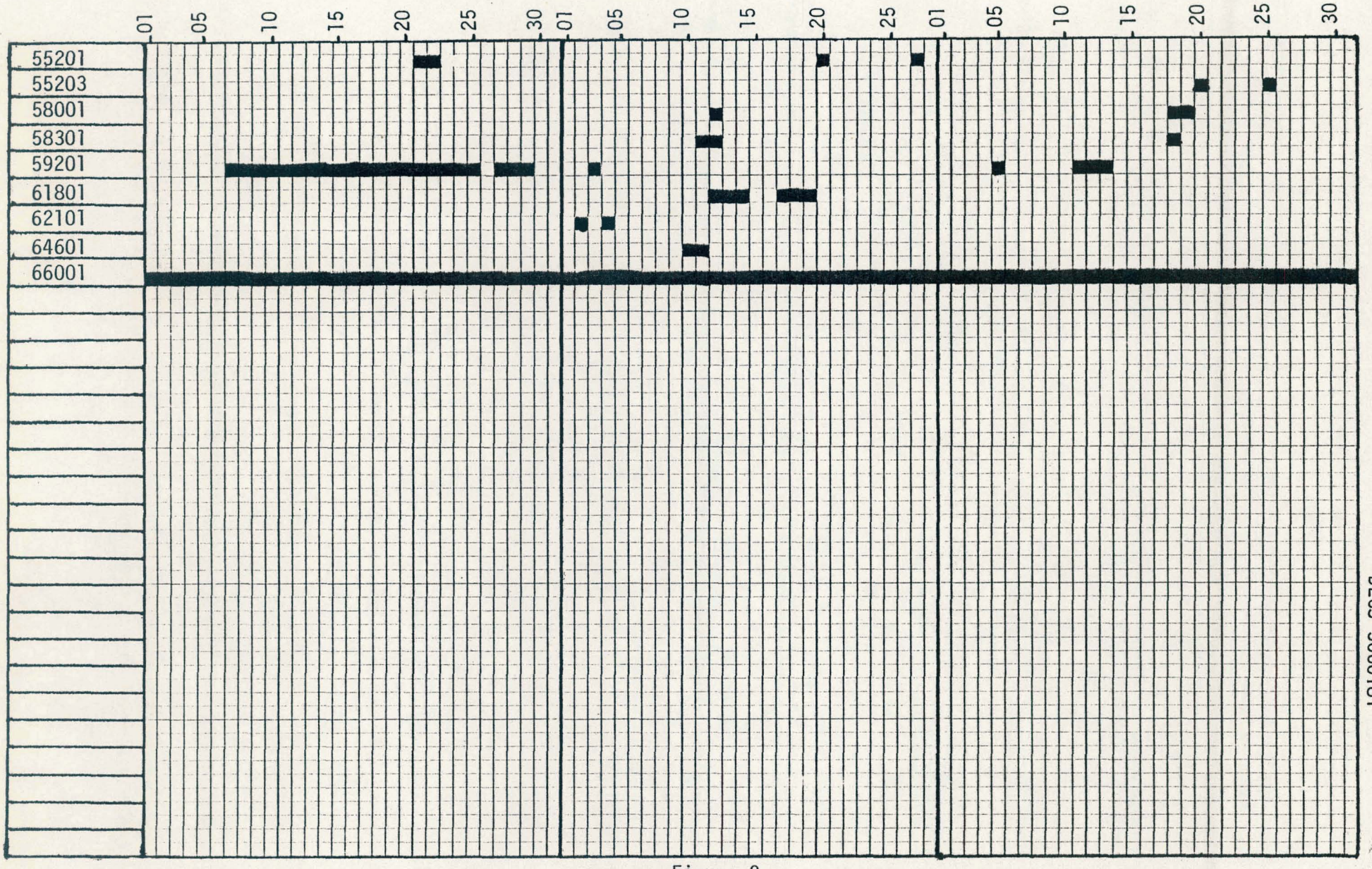

Figure 2

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6. HEALTH PHYSICS

External Radiation Exposure

Table VII provides information on radiation exposure experience of Duquesne Light Company personnel at the Shippingport Station. Table VII is based on a standard form used for radiation exposure experience at central station nuclear power plants.

ANNUAL REPORT OF EXTERNAL RADIATION EXPOSURE EXPERIENCE AT SHIPPINGPORT

-1980-

TABLE VII

Work & Job Function	Number of Personnel (>100 mrem) Station Emp.	Other Emp.	Total Man-Rem Station Emp.	Other Emp.
Reactor Operations & Surveillance				
Maintenance Personnel	0		0	
Operating Personnel	18		2.5	
Radiological Control Personnel	2		0.6	
Supervisory Personnel	1		0.2	
Engineering Personnel	0		0	
Routine Maintenance				
Maintenance Personnel	27		7	
Operating Personnel	0		0	
Radiological Control Personnel	11		2.5	
Supervisory Personnel	7		1.5	
Engineering Personnel	0		0	
Inservice Inspection	0		0	
Special Maintenance				
Maintenance Personnel	20		5.3	
Operating Personnel	0		0	
Radiological Control Personnel	11		2.5	
Supervisory Personnel	12		2.6	
Engineering Personnel	0		0	
Waste Processing				
Maintenance Personnel	5		1.5	
Operating Personnel	3		0.5	
Radiological Control Personnel	0		0	
Supervisory Personnel	2		0.4	
Engineering	1		0.1	
Refueling	0		0	
TOTAL				
Maintenance Personnel	52	5*	13.8	2.2
Operating Personnel	21		3	
Radiological Control Personnel	24	6**	5.6	1
Supervisory Personnel	22		4.7	
Engineering Personnel	1		0.1	
GRAND TOTAL	120	11	27.2	3.2

*Three of these people are included in the station column also (they have received >100 mrem at both Shippingport Atomic Power Station & Beaver Valley Power Station)

**All six of these people are included in the station column also (they have received >100 mrem at both Shippingport Atomic Power Station & Beaver Valley Power Station)

7. 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

7. 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