DLCS

5000474

DUQUESNE LIGHT COMPANY

Shippingport Atomic Power Station

MASTER

Quarterly

OPERATING REPORT

Fourth Quarter

1974

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.

QUARTERLY OPERATING REPORT
Fourth Quarter 1974
DLCS 5000474

Approved By:

T. D. Jones

T. D. Jones
Superintendent

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

NOTICE
This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Energy Research and Development Administration, nor any of their employees, nor any of their contractors, subcontractors, or 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.

DISSEMINATION OF THIS DOCUMENT IS UNLIMITED

See

TABLE OF CONTENTS

Preface	1
1. SUMMARY OF OPERATIONS	1
2. SUMMARY OF CORE 2 STATION PERFORMANCE	2
3. CHEMISTRY	3
4. MAINTENANCE	6
5. TEST PROGRAM	7
6. GLOSSARY	8

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 Atomic Energy Commission, Division of Technical Information Extension at Oak Ridge, Tennessee, where this information is readily available.

1. SUMMARY OF OPERATIONS

During the fourth quarter of 1974, the Shippingport Atomic Power Station was shutdown for PWR/LWBR (Pressurized Water Reactor/Light Water Breeder Reactor) Core Conversion. The 1A Reactor Coolant Loop was isolated from the Reactor for the entire fourth quarter. The 1D loop was isolated on November 17, and the 1C loop was isolated on December 6. These loops are under head tank pressure through their respective fill valves. The BD Core Removal Cooling System remained in service on the 1B loop except during short periods when it was shutdown for testing.

On December 26 while performing a cooldown, following a heat-up test, an operational incident occurred during which the cooldown rate exceeded the 10°F/hour allowable limit. A cooldown rate of 13°F to 14°F/hour was experienced for a two hour period. After an evaluation of this incident, it was concluded that no deleterious effects to the primary coolant system occurred.

Defueling operations continued during the fourth quarter. The Reactor vessel was depressurized and vented to the atmosphere on November 27 and the Reactor water level was lowered to the top of the head vent valve on December 2. The Reactor water level was further lowered to 715' on December 5 and to 707' on December 28.

During the fourth quarter of 1974, 1985 cubic feet of radioactive solid waste was shipped off-site for burial. These shipments contained 0.073 curie of radioactivity.

2. SUMMARY OF CORE 2 STATION PERFORMANCE

Electrical output (Gross) to date.	.kwhr	3,476,592,300
EFPH to date (Blanket operating time).	.hr	23,812.0
EFPH to date (Seed 2 operating time)	.hr	10,160.0
EFPH for the quarterly period.	.hr	0
Hours reactor critical to date	.hr	62,232.7
Hours reactor critical for the quarterly period. . .	.hr	0
No. 1 main unit service hours (quarterly period) . .	.hr	0
Net Station output (quarterly period).	.kwhr	0
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 1974, the chemistry section maintained specifications in the various plant systems and fulfilled station manual requirements.

Reactor Plant

Since the reactor was shutdown the entire quarter, all four reactor coolant loops and the AC and BD purification demineralizers remained out of service. The only out-of-specification reactor coolant chemistry condition this quarter was that of high dissolved oxygen values due to non-deaerated make-up water from the primary water storage tank. See Table I. The only out-of-specification conditions in the reactor plant auxiliary systems were low pH values in the canal waters and high dissolved O₂ values for the coolant charging water. The low pH values for the canal waters were a result of insufficient recirculation. The high dissolved O₂ values for the coolant charging water were the result of non-deaerated water being pumped to the primary water storage tank during operating periods when there are no dissolved O₂ specifications on the charging system. See Table III.

Turbine Plant

The Station has been shutdown the entire quarter. The 1A, 1B, 1C and 1D heat exchangers have been on cold lay-up the entire quarter. The only out-of-specification condition experienced during this quarter was high conductivity in the 1A heat exchanger. The high conductivity was attributed to ammonia forming from hydrazine decomposition. See Table II.

Radioactive Waste Disposal System

The total radioactivity, exclusive of tritium, discharged from Shippingport during the quarter was approximately 0.00005 curie, which is less than 0.004% of the allowable limit. The quantity of 0.017 curie of tritium was an insignificant 0.002% of the allowable limit. These radioactivity releases from Shippingport are far too small to have any measurable effect on the general background environmental activity outside the plant.

Table I
Reactor Coolant System
Water Conditions and Chemical Adjustments
Cold Lay-up (<200°F)

Chemical Conditions	Specifications	Analytical Results	
		Min.	Max.
1. pH @ 25°C Min. Max.	6.0 10.50	7.30	8.80
2. Oxygen-ppm Max.	0.14	<0.005	3.12**
3. Chloride-ppm Max.	0.1	<0.05	0.05

**See Reactor Plant Section of QOR.

Table II
Non-Operating Heat Exchangers
Cold Lay-up
Water Chemistry

Water Conditions	Specifications	Non-Operating Heat Exchangers			
		1A	1B	1C	1D
1. Conductivity Max. μmho/cm	30	47*	28	29	27
2. pH @ 25°C Min. Max.	9.50 10.50	10.00 10.49	9.81 10.15	9.89 10.18	9.80 10.18
3. Chloride-ppm Max.	0.50	<0.05	<0.05	<0.05	<0.05
4. Hydrazine-ppm Min. Max.	50 100	57 100	51 91	52 90	52 89
5. Chemicals Used in lbs. N ₂ H ₄ C ₄ H ₉ NO		5.50 --	6.33 --	6.33 --	6.33 --

*See Turbine Plant Section of QOR.

TABLE III

Reactor Plant Auxiliary Systems

Water Conditions

System	Conductivity μhos/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	1650-1700	8.44-9.28	662-700	<0.05-0.25	N.P.	<MDA*-0.96
Coolant Charging Water Specifications	2.50 max.	6.00-8.00	N.S.	0.1 ppm max.	Note**	N.S.
Observed	0.92-1.50	6.18-6.79	N.P.	<0.05	0.006-7.9**	N.P.
Canal Water Specifications	5.00 max.	6.00-8.00	N.S.	N.S.	N.S.	N.S.
Observed	0.56-1.20	5.81***-7.61	N.P.	N.P.	N.P.	<MDA*-1.1

* Multiply tabular value by 4.50×10^{-7} to obtain uc/ml; MDA = 0.49 dpm/ml.

** Should be <0.14 ppm for reactor plant cold shutdown. See Reactor Plant Section of QOR.

*** 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.

4. MAINTENANCE

Repairs of major components, as well as routine maintenance on equipment, instruments, controls and preventive maintenance were performed during this quarterly report period. Major work items completed or in progress during this period are summarized as follows:

Main Unit Turbine

The internal and external components of the Main Unit Turbine remain at the Westinghouse Electric Corporation Turbine Repair Center in Lester, Pennsylvania for overhaul as a result of the turbine failure on February 4, 1974.

Main Unit Generator

The Main Unit Generator Rotor and the Main Unit Generator Exciter remained in East Pittsburgh and Glassport, Pennsylvania, respectively, for inspection and repairs in connection with the Main Unit Turbine failure.

Light Water Breeder Reactor Core Barrel

Began trial fit of stub tubes with guide tube extensions and trained for repair of the discrepant hex cavity in the bottom plate.

RWD Evaporator

Numerous leak repairs were performed on the radioactive waste disposal evaporator during this quarter.

Reactor Pit Containment Enclosure

Construction of the reactor pit containment enclosure was completed during this quarter.

1B MCP

Periodic manual rotation of the 1B main coolant pump started this quarter.

Defueling

Defueling efforts continued with reactor vessel head work involving motor tube mechanism seal cutting.

5. TEST PROGRAM

The Station was shutdown throughout the entire fourth quarter of 1974, and no formal testing was performed.

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)
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
Hc	critical height
HDS	Heat Dissipation System
magamp	magnetic amplifier
MDA	Minimum Detectable Activity
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
RC	.resistance capacitance
μ c	microcuries

Glossary

DLCS 5000474

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 inlet coolant temperature
Th.	reactor outlet coolant temperature
Ts.	time of sample isolation
v/o	percent by volume
VOS	Valve Operating System