DECLASSIFIED

(CLASSIFICATION)

DUN--850-5

APR 19

DE93 012055

DOUGLAS / UNITED NUCLEAR, INC.

OS

RICHLAND, WASHINGTON

1700, 1701

RESTRICTED DATA

THIS DOCUMENT CONTAINS UNCLASSIFIED DATA AS
DEFINED IN THE ATOMIC ENERGY ACT OF 1954.
ITS TRANSMISSION OR THE DISCLOSURE OF ITS
CONTENTS IN ANY MANNER TO AN UNAUTHORIZED
PERSON IS PROHIBITED.

TITLE

MANUFACTURING SECTION SEMIANNUAL SUMMARY REPORT

PERIOD ENDING JUNE 30, 1968

OTHER OFFICIAL CLASSIFIED INFORMATION

THIS MATERIAL CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U. S. C., SECS. 793 AND 794, THE TRANSMISSION OR REVELATION OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

AUTHOR

D. L. DeNeal

CIRCULATING COPY
RECEIVED 700 AREA

OCT 1 1968

RETURN TO
DOUGLAS UNITED NUTRACEUTICALS
DOCUMENT CONTROL CENTER

THIS DOCUMENT MUST NOT BE LEFT UNATTENDED OR WHERE AN UNAUTHORIZED PERSON MAY HAVE ACCESS TO IT. WHEN NOT IN USE, IT MUST BE STORED IN AN APPROVED LOCKED REPOSITORY WITHIN AN APPROVED GUARDED AREA. WHILE IT IS YOUR POSSESSION AND UNTIL YOU HAVE OBTAINED A SIGNED RECEIPT FROM CLASSIFIED FILES, IT IS YOUR RESPONSIBILITY TO KEEP IT AND ITS CONTENTS WITHIN THE LIMITS OF THIS PROJECT AND FROM ANY UNAUTHORIZED PERSON. ITS TRANSMITTAL TO, AND STORAGE AT YOUR PLACE OF RESIDENCE IS PROHIBITED. IT IS NOT TO BE DUPLICATED. IF ADDITIONAL COPIES ARE REQUIRED, OBTAIN THEM FROM THE RELATED ISSUING FILE. ALL PERSONS READING THIS DOCUMENT ARE REQUESTED TO SIGN IN THE SPACE PROVIDED BELOW.

[illegible]

MASTERS

This document is classified

September 1, 1968

by

V.V. Johnson

~~This document consists of
18 pages 30 of
30 copies. Series~~

DISTRIBUTION:

1. T. W. Ambrose	13. C. W. Kuhlman
2. J. J. Bombino	14. A. R. Maguire
3. R. S. Bell	15. W. M. Mathis
4. R. J. Bursey	16. R. Nilson
5. T. M. Clement	17. R. L. Plum - AEC-RL
6. D. L. DeNeal	18. R. W. Reid
7. R. E. Dunn	19. O. C. Schroeder
8. C. N. Gross	20. J. T. Stringer
9. R. W. Hallet, Jr.	21. A. P. Vinther
10. C. D. Harrington	22.-28. Extra
11. R. T. Jessen	29. DUN File
12. V. V. Johnson	30. DUN Record

MANUFACTURING SECTION
SEMIANNUAL SUMMARY REPORT
(PERIOD ENDING JUNE 30, 1968)

By

D. L. DeNeal
Manufacturing Section

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.

~~SECRET~~

DISTRIBUTION RESTRICTED TO U.S. ONLY

MANUFACTURING SECTION
SEMIANNUAL SUMMARY REPORT
(PERIOD ENDING JUNE 30, 1968)

INTRODUCTION

In this sixth semiannual issue, the reactor and power data are shown for the six-month period January through June, 1968 (except for B Reactor which is shown for January and February only because of deactivation at 0200 hours on February 12, 1968), together with data for the three preceding six-month periods. For comparison purpose the two years of experience will continue to be shown by dropping and adding a six-month period with each semiannual issue.

STATISTICAL SUMMARY

The most significant statistics for the two six-month periods during FY-1968, shown by individual reactors on the attached pages, are summarized on pages 3 and 4 for B-C Reactors and the K Reactors (KE-KW). Graphs showing the "Reactor Availability" for FY-1968 appear on pages 17 and 18.

Achievements and experience during the period January through June, 1968 and FY 1968 are shown below:

C Reactor experienced no fuel element failures during the period of December 27, 1967 through June 17, 1968. C Reactor also achieved a monthly production record of 70.2 KMWD in March, 1968 exceeding their previous record by 0.1 percent. A fiscal year production record of 621.1 KMWD (FY-1968) was also achieved at C exceeding their previous record by 1.2 percent.

KE Reactor achieved a fiscal year production record of 1289.7 KMWD exceeding their previous record by 0.1 percent.

General

During the January 19, 1968 outage at C Reactor a 44-tube, one-inch overbore test facility was installed.

On June 19, 1968, the KW Reactor experienced a water flow stoppage in a process tube caused by a foreign object entering the venturi. Approximately 39 days of outage were required to clear the channel and complete associated work.

Both of the K Reactors (KE-KW) operated most of the six-month period of January-June, 1968 with five process pumps in service while "Equipment Maintenance Standard" checks were being performed on the sixth pump.

D. L. DeNeal

D. L. DeNeal, Specialist
Production Reports & Administration

DLD:bm

Reactor Statistical Summary

	<u>Jul-Dec</u> <u>1967</u>	<u>Jan-Jun</u> <u>1968</u>
<u>Production (Input)</u>		
<u>Plutonium - KMWDs</u>		
B-C	578.8	365.7
Ks (KE & KW)	1,303.9	1,183.6
Combined	1,882.7	1,549.3
<u>Plutonium - Kgs</u>		
B-C	408.8	271.9
Ks	1,042.4	937.9
Combined	1,451.2	1,209.8
<u>Uranium (U-233) - Grams</u>		
B-C	10,159	8,602
Ks	12,203	22,612
Combined	22,362	31,214
<u>Power Level</u>		
<u>Maximum - Average - MW</u>		
B	1,977	1,967
C	2,161	2,372
KE & KW	4,375	4,387
<u>Average Operating - MW</u>		
B	1,828	1,633
C	2,086	2,289
KE & KW	4,279	4,276
<u>Time Operating Efficiency - (TOE %)</u>		
B-C	80.4	75.4
Ks	82.8	76.0
Combined	81.6	75.8
<u>Reactor Outages - No.</u>		
	<u>B-C</u> <u>Ks</u> <u>Total</u>	<u>B-C</u> <u>Ks</u> <u>Total</u>
Scheduled	2 4 6	4 6 10
Unscheduled	15 11 26	7 9 16
Scrams	4 17 21	4 16 20
<u>Process Tubes Replaced</u>		
B-C	57	52
Ks	6	11
Total	63	63

Reactor Statistical Summary - Contd.

	<u>Jul-Dec</u> <u>1967</u>			<u>Jan-Jun</u> <u>1968</u>		
<u>Process Tube Leaks (Incl. V.S.)</u>						
B-C	14			12		
Ks	2			2		
Total	16			14		
<u>Fuel Element Failures</u>						
	<u>B-C</u>	<u>Ks</u>	<u>Total</u>	<u>B-C</u>	<u>Ks</u>	<u>Total</u>
I&E Natural U.	9	4	13	1	4	5
I&E Enriched U.	2	6	8	1	3	4
Other	0	0	0	0	0	0
<u>Helium Usage - CFD</u>						
B-C	12,795			12,703		
Ks	13,270			9,169		
Total	26,065			21,872		
<u>Outage Work - % Time Allocation</u>						
	<u>B-C</u>	<u>Ks</u>	<u>Total</u>	<u>B-C</u>	<u>Ks</u>	<u>Total</u>
Charge-Discharge	4.8	6.8	5.8	6.2	9.4	8.2
Rupture Removal	3.9	1.1	2.5	0.2	0.9	0.6
Tube Leaks	2.1	0.6	1.4	3.2	1.0	1.8
Tube Replacement	1.3	0.1	0.6	0.7	0	0.3
Other Maintenance	3.4	4.0	3.7	4.4	4.3	4.3
Standard Checks (incl. Equip.	0.8	1.1	1.0	1.0	1.0	1.0
Maint. Standard)						
Production Test	1.6	2.6	2.1	7.1	3.6	4.9
Project Work	0.7	0.1	0.4	0	0	0
Other	1.0	0.8	0.9	1.8	3.8	3.1
Total	19.6	17.2	18.4	24.6	24.0	24.2

REACTOR STATISTICS

	B			C		
	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968

PRODUCTION (Input Basis)

KMWD - In Nat. U	144.3	261.4	231.4	43.6	157.8	230.2	223.8	191.1
KMWD - In Enr. U	41.2	59.0	40.3	8.2	93.1	109.4	83.3	122.8
KMWD - Total	185.5	320.4	271.7	51.8	250.9	339.6	307.1	313.9
KMWD - % of Forecast	105.2	110.4	99.8	72.2	106.2	101.4	95.2	101.0
Pu (kg) - In Nat. U	121.7	210.8	168.7	30.8	135.9	196.0	161.9	150.2
Pu (kg) - In Enr. U	28.4	40.6	24.1	5.0	64.6	75.6	54.1	85.9
Pu (kg) - Total	150.1	251.4	192.8	35.8	200.5	271.6	216.0	236.1
Conv. Ratio - In Nat. U	0.843	0.806	0.729	0.706	0.861	0.851	0.723	0.786
Conv. Ratio - In Enr. U	0.689	0.688	0.598	0.610	0.694	0.691	0.649	0.699
Polonium - Curies	0	0	0	0	0	0	0	0
Uranium-233 - Grams	5,668	6,639	5,284	952	7,130	5,446	4,875	7,650

OPERATING EFFECTIVENESS (a)

Power Level, Max - MW	1,917	2,148	1,977	1,967	2,257	2,398	2,161	2,372
Power Level, Avg - MW	1,835	2,061	1,828	1,633	2,209	2,330	2,086	2,289
Level Efficiency - %	95.7	95.9	92.5	83.0	97.9	97.2	96.5	96.5
	(79.8)	(b)			(86.3)	(b)		
Time Oper. Effic. - %	54.9	85.9	80.8	75.4	61.7	80.5	80.0	75.4
Production Effic.	52.5	82.4	74.7	62.6	60.4	78.2	77.2	72.8
Effective Cent. Tubes	1,523	1,505	1,454	1,445	1,601	1,622	1,584	1,561
Non-Eq. Loss/Startup	0.33	0.30	0.15	0.25	0.16	0.14	0.15	0.21

(a) Max. PL is Avg of Monthly Maximums; LE = Avg. PL ÷ Max. PL; PE = LE X TOE.
 ECT = Equil. PL ÷ Avg. Power of 10 Most Productive Tubes. NE Loss/Startup is
 Expressed as Days of Equilibrium Operation.

(b) TOE excluding the loss due to work stoppage.

REACTOR STATISTICS

	KE				KW				TOTAL			
	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
	1966	1967	1967	1968	1966	1967	1967	1968	1966	1967	1967	1968
PRODUCTION (Input Basis)												
KMWD - In Nat. U	343.4	324.6	334.9	328.4	358.5	321.7	328.8	297.2	1,004.0	1,137.9	1,118.9	860.3
KMWD - In Enr. U	104.7	317.0	317.3	309.1	109.6	322.4	322.9	248.9	348.6	807.8	763.8	689.0
KMWD - Total	448.1	641.6	652.2	637.5	468.1	644.1	651.7	546.1	1,352.6	1,945.7	1,882.7	1,549.3
KMWD - % of Forecast	111.9	101.7	102.7	99.6	96.0	101.6	102.3	86.2	104.0	102.9	100.8	93.2
Pu (kg) - In Nat. U	311.2	314.2	287.9	273.2	321.8	308.6	282.5	243.1	890.6	1,029.6	901.0	697.3
Pu (kg) - In Enr. U	77.7	241.0	233.9	235.8	80.6	243.9	238.1	185.8	251.3	601.1	550.2	512.5
Pu (kg) - Total	388.9	555.2	521.8	509.0	402.4	552.5	520.6	428.9	1,141.9	1,630.7	1,451.2	1,209.8
Conv. Ratio - In Nat. U	0.906	0.968	0.860	0.832	0.898	0.959	0.859	0.818	0.887	0.905	0.805	0.810
Conv. Ratio - In Enr. U	0.742	0.760	0.737	0.763	0.735	0.757	0.737	0.746	0.721	0.744	0.720	0.744
Polonium - Curies	0	0	0	0	0	0	0	0	0	0	0	0
Uranium-233 - Grams	7,824	5,783	5,374	16,168	7,902	7,391	6,829	6,444	28,524	25,259	22,362	31,214
OPERATING EFFECTIVENESS (a)												
Power Level, Max - MW	4,365	4,400	4,367	4,388	4,385	4,400	4,382	4,387	12,924	13,346	12,896	13,113
Power Level, Avg - MW	4,289	4,350	4,258	4,320	4,297	4,333	4,300	4,233	12,630	13,074	12,472	12,475
Level Efficiency - %	98.3	98.9	97.5	98.4	98.0	98.5	98.1	96.5	97.7	98.0	96.7	95.1
	(81.7)	(b)			(84.7)	(b)			(83.1)	(b)		
Time Oper. Effic. - %	56.8	81.5	83.2	81.1	59.2	82.1	82.4	70.9	58.1	82.5	81.6	75.8
Production Effic. - %	55.8	80.6	81.1	79.8	58.0	80.9	80.8	68.4	56.8	80.9	78.9	72.1
Effective Cent. Tubes	2,385	2,221	2,176	2,221	2,366	2,139	2,150	2,140	-	-	-	-
Non-Eq. Loss/Startup	0.17	0.10	0.09	0.18	0.18	0.09	0.18	0.19	0.21	0.16	0.14	0.21

(a) Max. PL is Avg. of Monthly Maximums; LE = Avg PL ÷ Max. PL; PE = LE X TOE.
 ECT = Equil. PL ÷ Avg. Power of 10 Most Productive Tubes. NE Loss/Startup is
 Expressed as Days of Equilibrium Operation.

(b) TOE excluding the loss due to work stoppage.

REACTOR STATISTICS

	B				C			
	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Feb 1968	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968
<u>REACTOR OUTAGES (Number, by Cause)</u>								
Charge-Discharge	1	2	1	-	4	7	1	3
Tube Replacement	-	-	-	-	-	-	-	-
Fuel Ruptures	-	3	7	1	1	-	3	1
Tube Leaks (Incl. Van S.)	-	-	1	3	2	2	2	-
Project Work	-	-	-	-	-	-	-	-
Production Tests	-	-	-	-	-	-	-	1
Front Face Leaks	-	-	-	-	-	-	-	-
Rear Face Leaks	1	-	-	-	-	-	-	-
Rods - Horiz. & Vert.	-	-	-	-	-	1	-	-
Reactor Hardware	2	1	1	-	-	2	-	-
Panelit System	-	1	-	1	-	2	4	2
Other Instrumentation	1	-	-	-	-	-	-	-
Electric Power	1	-	-	-	-	-	-	-
Water Flow (105 Bldg.)	-	-	-	-	-	-	-	-
190 Building	-	1	-	1	1	-	-	-
Reactivity Control	-	1	1	-	-	-	-	1
Temperature Control	-	1	-	-	-	-	-	1
Work Stoppage	1	-	-	-	1	-	-	-
Other	2	-	-	-	-	2	-	-
Total Outages	9	10	11	6	9	16	10	9
Outage Recap: (a)								
Scheduled Outages	2	3	1	0	4	7	1	4
Unsched. Shutdowns	4	4	10	4	4	6	5	3
Scrams	3	3	0	2	1	3	4	2

(a) Excluding those which followed scrams or unscheduled outages.

REACTOR STATISTICS

REACTOR OUTAGES (Number, by Cause)	KE				KW				TOTAL			
	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968
	1966	1967	1967	1968	1966	1967	1967	1968	1966	1967	1967	1968
Charge-Discharge	2	4	1	3	3	4	3	3	10	17	6	9
Tube Replacement	-	-	-	-	-	-	-	-	-	-	-	-
Fuel Ruptures	3	-	2	2	2	1	6	5	6	4	18	9
Tube Leaks (Incl. Van S.)	-	-	2	-	-	1	-	1	2	3	5	4
Project Work	-	-	-	-	-	-	-	-	-	-	-	-
Production Tests	-	2	1	1	-	1	-	-	-	3	1	2
Front Face Leaks	-	-	-	-	-	1	-	-	-	1	-	-
Rear Face Leaks	-	-	-	-	-	-	-	-	1	-	-	-
Rods - Horiz. & Vert.	-	-	-	-	-	-	-	-	-	1	-	-
Reactor Hardware	1	1	2	1	-	1	1	1	3	5	4	2
Panelit System	1	4	5	6	3	3	3	5	4	10	12	14
Other Instrumentation	-	-	2	1	-	3	-	-	1	3	2	1
Electric Power	-	-	1	-	-	-	1	-	1	-	2	-
Water Flow (105 Bldg.)	-	-	-	-	-	-	-	1	-	-	-	1
190 Building	-	-	-	1	-	-	1	-	1	1	1	2
165 Building	-	1	-	-	1	-	-	-	1	1	-	-
Reactivity Control	-	-	1	-	-	1	-	-	-	2	2	1
Temperature Control	-	-	-	-	-	-	-	-	-	1	-	1
Work Stoppage	-	-	-	-	1	-	-	-	3	-	-	-
Other	1	-	-	-	-	-	-	-	3	2	-	-
Total Outages	8	12	17	15	10	16	15	16	36	54	53	46
Outage Recap: (a)												
Scheduled Outages	3	5	1	3	3	5	3	3	12	20	6	10
Unsched. Shutdowns	4	0	5	3	3	3	6	6	15	13	26	16
Scrams	1	7	11	9	4	8	6	7	9	21	21	20

(a) Excluding those which followed scrams or unscheduled outages.

REACTOR STATISTICS

	B				C			
	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Feb 1968	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968
<u>OUTAGE WORK (% Time Allocation, Including Cooling Time and Startup Preparation)</u> (a)								
Charge-Discharge	2.6	5.8	3.5	3.3	5.7	8.7	6.1	6.9
Rupture Removal	-	0.8	0.7	0.9	0.1	-	7.1	0.1
Tube Leaks (Inc. Van S.)	1.0	1.8	2.7	10.9	1.3	1.5	1.5	1.4
Tube Replacement	1.4	1.2	2.1	-	1.1	1.3	0.4	0.8
Other Maintenance	10.7	2.6	5.4	3.0	3.8	6.2	1.4	4.7
Standard Check	0.5	0.6	0.8	0.4	1.3	0.9	0.8	1.2
Production Test	1.1	1.1	1.8	1.0	0.3	0.4	1.4	8.4
Project Work	1.6	-	1.1	-	0.1	0.4	0.3	-
Work Stoppage	24.9	-	-	-	24.6	-	-	-
Other	1.3	0.2	1.1	5.1	-	0.1	1.0	1.1
Total	45.1	14.1	19.2	24.6	38.3	19.5	20.0	24.6

SCRAMS (Number, by Cause)

Reactor Operations: (b)

Equip. Failure - 105
 " " - 190
 Impropr. Proced. - 105
 " " - 190
 Unexplained Trips
 Other Inst. Trips
 Manual Trips
 Subtotal

Test Facilities
 Elect. Power Supply
 Total Scrams

	1	-	-	-	-	1	-	2
	1	-	-	1	1	-	-	-
	1	-	-	1	-	-	1	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	2	3	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	2	3	0	1	1	3	4	2
	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-
	3	3	0	1	1	3	4	2

(a) Allocation per standard "Reactor Outage Time Reporting Procedure."

(b) Excluding scrams due to fuel failures and process tube leaks.

REACTOR STATISTICS

	KE				KW				TOTAL			
	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
	1966	1967	1967	1968	1966	1967	1967	1968	1966	1967	1967	1968
OUTAGE WORK (% Time Allocation, Including Cooling Time and Startup Preparation)(a)												
Charge-Discharge	4.6	7.6	6.1	7.9	6.6	5.8	7.4	11.0	4.9	7.0	5.8	8.2
Rupture Removal	1.3	-	0.9	1.3	1.1	0.4	1.4	0.4	0.6	0.3	2.5	0.6
Tube Leaks (Incl. Van S.)	-	-	1.1	-	-	2.7	0.2	2.0	0.6	1.5	1.4	1.8
Tube Replacement	-	0.1	0.2	0.1	1.2	-	-	-	0.9	0.6	0.6	0.3
Other Maintenance	9.2	3.9	3.4	5.0	3.6	3.9	4.6	3.6	6.8	4.2	3.7	4.3
Standard Check	0.8	0.8	0.7	1.1	0.4	0.5	1.4	0.8	0.8	0.7	1.0	1.0
Production Test	1.6	5.6	3.0	2.7	1.1	4.5	2.3	4.5	1.0	2.9	2.1	4.9
Project Work	-	-	0.1	-	0.3	-	0.1	-	0.5	0.1	0.4	-
Work Stoppage	24.9	-	-	-	25.5	-	-	-	25.0	-	-	-
Other	0.8	0.5	1.3	0.8	1.0	0.1	0.2	0.7	0.8	0.2	0.9	1.2
Flow Stoppage	43.2	18.5	16.8	18.9	40.8	17.9	17.6	29.1	41.9	17.5	18.4	24.2
Total												

SCRAMS (Number, by Cause)

Reactor Operations:	(b)				(d)				(e)			
	Equip. Failure	"	Impropr. Proced.	"	Unexplained Trips	Other Inst. Trips	Manual Trips	Subtotal	Test Facilities	Elect. Power Supply	Total Scrams	
Equip. Failure - 105	-	-	-	-	-	-	-	-	-	-	-	-
" - 190	-	-	-	-	-	-	-	-	-	-	-	-
Impropr. Proced. - 105	-	-	-	-	-	-	-	-	-	-	-	-
" - 190	-	-	-	-	-	-	-	-	-	-	-	-
Unexplained Trips	-	-	-	-	-	-	-	-	-	-	-	-
Other Inst. Trips	-	-	-	-	-	-	-	-	-	-	-	-
Manual Trips	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	-
Test Facilities	1	1	-	1	-	-	-	-	1	1	-	1
Elect. Power Supply	-	-	1	-	1	-	-	-	1	-	2	-
Total Scrams	1	7	11	9	4	8	8	8	9	21	21	20

(a) Allocation per standard "Reactor Outage Time Reporting Procedure."

(b) Excluding scrams due to fuel failures and process tube leaks.

(c) High speed scanning system.

(d) Includes scrams caused by venturi screen plugging.

(e) Includes a scram caused by a flow stoppage in a process tube.

REACTOR STATISTICS

	B				C			
	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Feb 1968	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968
<u>OUTAGE TIMES (Hours, Average)</u>								
Charged to Scrams	18.6	4.0	0	25.3	15.6	8.0	10.7	2.9
Cooling Time	6.5	2.4	2.6	5.0	5.4	3.2	3.4	4.6
Startup Preparation	4.3	4.9	5.4	6.6	4.1	6.0	6.5	6.0
<u>OTHER STATISTICS</u>								
Equil. Recov. Time (a)	2	2	0	12	21	21	0	10
Charge-Disch. Rate (b)	20.9	18.8	11.4	0	13.9	12.1	7.5	9.6
Tubes Replaced - Total	38	31	48	5	22	28	9	47 ^(d)
Water Leaks:								
Process Tube	2	2	2	5	5	1	1	2
Van Stone Flange	3	9	6	4	0	2	5	1
Failures - I&E Nat. U	0	3	7	1	1	0	2	0
Failures - I&E Enr. U	0	0	1	0	0	0	1	1
Failures - Other	0	0	0	0	0	0	0	0
Disch. Expos.: (c)								
Nat. U - Weapons	582	550	594	609	597	601	721	574
Nat. U - Nondefense	0	920	1,462	1,179	0	0	1,650	1,403
Enr. U - Weapons	790	851	923	768	826	842	909	836
Enr. U - Nondefense	0	0	1,873	1,529	0	0	1,737	1,515

- (a) Minutes, average, as defined and reported by Technical Division.
 (b) Tubes/hour, average for standard charging of regular fuel as defined in the "Reactor Outage Time Reporting Procedure."
 (c) MWD/T.
 (d) Includes 43 1" overbore tubes (37 zirconium and 6 aluminum).

REACTOR STATISTICS

	KE			KW			TOTAL				
	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968	Jan-Jun 1968
<u>OUTAGE TIMES (Hours, Average)</u>											
Charged to Scrams	0.5	11.1	7.8	13.5	6.8	8.1	7.3	41.2	10.4	7.8	23.3
Cooling Time	5.5	4.3	4.4	4.6	5.1	4.3	4.2	4.9	5.6	3.5	4.8
Startup Preparation	7.3	6.7	4.9	5.6	5.3	5.0	7.4	9.3	5.2	5.9	6.9
<u>OTHER STATISTICS</u>											
Equil. Recov. Time (a)	0	0	0	9	0	0	0	9	-	-	-
Charge-Disch. Rate (b)	26.7	18.8	19.3	19.7	20.0	17.5	13.6	11.4	19.2	16.0	13.8
Tubes Replaced - Total	4	8	5	6	6	9	1	5	70	76	63
Water Leaks:											
Process Tube	0	0	1	0	0	2	0	1	7	5	8
Van Stone Flange	0	0	1	0	0	1	0	1	3	12	6
Failures - I&E Nat. U	2	0	1	2	1	0	3	2	4	3	5
Failures - I&E Enr. U	0	0	3	0	0	1	3	3	0	1	4
Failures - Other	1	0	0	0	1	0	0	0	2	0	0
Disch. Expos.: (c)											
Nat. U - Weapons (c)	649	645	656	641	663	599	652	615	634	621	633
Nat. U - Nondefense (c)	0	943	1,469	1,062	0	1,024	1,374	1,099	0	993	1,204
Enr. U - Weapons (c)	907	827	820	804	897	863	819	801	866	845	805
Enr. U - Nondefense (c)	0	0	1,370	1,699	0	0	1,110	1,771	0	0	1,619
Special Depl.				2,773				2,813			2,794

- (a) Minutes, average, as defined and reported by Technical Division.
 (b) Tubes/hour, average for standard charging of regular fuel as defined in the "Reactor Outage Time Reporting Procedure."
 (c) MWD/T.

REACTOR STATISTICS

	B				C			
	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Feb 1968	Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Jun 1968
<u>OTHER STATISTICS - contd.</u>								
Helium Loss/CF/Day	4,221	10,358	7,539	5,011	6,540	7,902	5,256	7,692
Fuel Charge: (At End of Period)								
Tons Nat. U	155.4	178.0	177.4	-	152.4	165.1	154.7	145.6
" Enr. U	54.0	39.5	39.6	-	61.2	49.5	57.5	71.6
Tube Loadings: (At End of Period)								
Net. U Elems/Tube	31	31	31	-	31	31	31	31
Enr. U Els/Tube (Sh)	33	33	33	-	34	34	34	34
Enr. U Els/Tube (lg)	43	43	43	-	42	42	42	42
Mixers/Tube	1	1	1	-	1	1	1	1
Dry Channels	2	2	2	-	4	4	5	6
Water Tubes	1	1	0	-	4	5	7	6
Graph. Stringers	8	8	9	-	10	10	10	11
Non-Fuel Productive Tubes:								
In Blanket	168	112	112	-	84	84	84	84
Elsewhere	-	-	-	-	-	-	-	13

REACTOR STATISTICS

	KE				KW				TOTAL			
	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
	1966	1967	1967	1968	1966	1967	1967	1968	1966	1967	1967	1968
OTHER STATISTICS - contd.												
Helium Loss/CF/Day	6,138	8,699	8,370	3,719	4,771	5,914	4,900	5,450	21,670	32,873	26,065	21,872
Fuel Charge: (At End of Period)		(a)	(b)			(a)	(b)			(a)		
Tons Nat. U	325.4	243.6	282.2	162.1	353.6	231.9	274.8	110.7	986.8	818.6	889.1	418.4
" Enr. U	105.6	194.0	162.0	243.5	84.3	202.7	166.6	274.0	305.1	485.7	425.7	589.1
Tube Loadings: (At End of Period)												
Nat. U Elems/Tube	38	38	38	38	38	38	38	38	-	-	-	-
Enr. U Els/Tube (Sh)	46	46	46	46	46	46	46	46	-	-	-	-
Enr. U Els/Tube (Lg)	51	51	51	51	51	51	51	51	-	-	-	-
Mixers/Tube	1	1	1	1	1	1	1	1	-	-	-	-
Dry Channels	3	3	3	3	5	7	8	9	14	16	18	18
Water Tubes	6	6	4	5	5	5	4	4	16	17	15	15
Graph. Stringers	6	6	6	6	7	7	7	8	31	31	32	25
Non-Fuel Productive Tubes:												
In Blanket	192	77	77	77	80	83	79	191	524	356	352	352
Elsewhere	-	5	-	216	6	15	-	214	6	20	-	443

(a) Includes 45.2 tons of special depleted uranium in each of the KE and KW Reactor E-D loadings (PITA-048).

(b) Includes the 46.0 tons at KE and 46.2 tons at KW of special depleted uranium in the E-D loadings (PITA-048).

DECLASSIFIED

WATER PLANT STATISTICS

B

Jul-Dec 1966	Jan-Jun 1967	Jul-Dec 1967	Jan-Feb 1968
-----------------	-----------------	-----------------	-----------------

WATER PLANT OPERATIONS

River Water Pumped-MMG	39,689
Water Exported-MMG	-
Water Treated-MMG	39,658

Chem. Consumption-ppm:

Alum	11.853
Bauxite	.531
Chlorine	.871
Sulfuric Acid	15.020
Filter Conditioner	0.019

Process Water-MMG

Proc. Water-GPM, Normal	36,456
Process Water Analysis:	215,000
Turbidity-ppm	.005
pH	6.82
Cl Residual-ppm	.17
Dichromate-ppm	.90

STEAM PLANT OPERATIONS

Generation-MMG Lbs.	135.8
Gener.-lbs/Hr., Max.	61,200
" -lbs/Hr., Avg.	32,400

Lbs. Steam/Gal. Oil	100.9
Lbs. Steam/lbs. Coal	-

(a) K Reactors only.

(b) B-C Reactors only.

WATER PLANT OPERATIONS

River Water Pumped-MMG	40,790	53,841	53,291	13,467
Water Exported-MMG	3,036	3,165	3,626	1,343
Water Treated-MMG	13,480	20,716	20,093	4,810

Chem. Consumption-ppm:

Alum	0.154	0.140	0.183	3.795
Bauxite	4.532	4.681	3.926	3.076
Chlorine	0.702	0.699	0.704	0.478
Sulfuric Acid	23.000	27.390	23.210	30.221
Filter Conditioner	0.016	0.024	0.012	0.009

Process Water-MMG

Proc. Water-GPM, Normal	14,119	21,698	20,897	5,255
Process Water Analysis:	90,600	94,800	95,000	92,500
Turbidity-ppm	.004	.005	.004	.004
pH	6.67	6.58	6.60	6.58
Cl Residual-ppm	.17	.18	.09	.05
Dichromate-ppm	1.00	.85	.75	.65

STEAM PLANT OPERATIONS

Generation-MMG Lbs.	331.7	365.9	352.2	67.6
Gener.-lbs/Hr., Max.	139,000	97,500	96,800	108,000
" -lbs/Hr., Avg	74,700	84,700	79,900	93,900

Lbs. Steam/lb. Coal	9.33	9.17	8.82	9.07
---------------------	------	------	------	------

DECLASSIFIED

REACTOR AVAILABILITY
(PERCENT OF TIME REACTORS OPERATED PLUS
SCHEDULED SHUTDOWN TIME)
FY 1968

B - REACTOR

C - REACTOR

REACTOR AVAILABILITY
PERCENT OF TIME REACTORS OPERATED PLUS
SCHEDULED SHUTDOWN TIME
FY 1968

KE - REACTOR

KW - REACTOR

← FOUR REACTOR AVERAGE →

← THREE REACTOR AVERAGE →

END

DATE
FILMED

6 / 14 / 93