PNWD--2017-HEDR

DE93 000483

SELECTED HANFORD REACTOR AND SEPARATIONS OPERATING DATA FOR 1960-1964

Hanford Environmental Dose Reconstruction Project

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MASTER

SUMMARY

The primary objective of the Hanford Environmental Dose Reconstruction (HEDR) Project is to estimate the radiation dose that populations and individuals could have received as a result of emissions from Hanford Site operations since 1944, with descriptions of the uncertainties inherent in such estimates. A secondary objective is to make project documentation and Hanford-originated references used in the reports available to the public. Hanford-originated documents of potential interest and/or use to the HEDR Project are made publicly available through the U.S. Government's National Technical Information Service and placed in the U.S. Department of Energy Richland Field Office (RL) Public Reading Room in Richland, Washington.

Project work is conducted under several tasks, among which is the Source Terms Task. Under this task, estimates of radioactive emissions from Hanford facilities since 1944 are developed. These estimates are based on historical measurements and production information. The Information Resources Task identifies and retrieves historical production operating information for developing source terms.

The purpose of this letter report is to reconstruct from available information that data which can be used to develop daily reactor operating history for 1960-1964. The information needed for source team calculations (as determined by the Source Terms Task Leader) were extracted and included in this report. The data on the amount of uranium dissolved by the separations plants (expressed both as tons and as MW) is also included in this compilation. A forthcoming letter report will address daily operating information for the separations processes from 1944-1972.

GLOSSARY

E Metal	uranium isotopically enriched to 0.94% or 1.75% U-235 by weight
I & E	tubular slug (fuel element), internally and externally cooled
KER	experimental loops at KE Reactor
KMWD	1000 megawatt days
kW	kilowatts
94 Metal	uranium isotopically enriched to 0.94% U-235 by weight
MWD	megawatt days
Normal U	naturally occurring uranium approximately 99.28% U-238 and 0.72% U-235
Ton	2000 pounds

CONTENTS

INTRODUCTION

The objective of the Hanford Environmental Dose Reconstruction (HEDR) Project is to estimate the radiation dose that individuals could have received as a result of emissions from nuclear operations at the U.S. Department of Energy's (DOE's) Hanford Site since operations began in 1944. The HEDR Project is managed and conducted by Battelle Pacific Northwest Laboratories under the direction of an independent Technical Steering Panel.

The Information Resources Task within the HEDR Project is charged with the responsibility of ensuring that Hanford-originated documents of use in meeting project objectives are found and made available in a timely manner to HEDR Project staff and the public. Project information needs center around 1) information necessary to estimate doses people may have received and 2) information requested by the public on operations and radioactive material releases. The first objective has priority.

Two types of information are needed: 1) facilities operation information necessary to calculate amounts of radioactive materials generated and released to the environment and 2) monitoring information indicating concentrations of radioactive materials in the environs and how those concentrations were measured or calculated.

Calculating source terms is the first step in dose estimation. Much of the information in documents located and provided by Information Resources Task staff is used to develop the source term--the quantities of radionuclides that were released to the environment and the dates of release from various Hanford operations. The quantities of radionuclides available for release at any time are a function of the irradiation history of the fuel, the time elapsed since the fuel was removed from the reactor, and the amount of irradiated fuel being dissolved.

This report addresses data for the years 1960-1964. An earlier report (Gydesen 1992) identifies daily reactor operating reports for the years 1944-1959 and 1965-1971.

QUALITY ASSURANCE AND DATA QUALITY OBJECTIVES

Data quality objectives (DQO) were established in FY 1992 task plans for the Information Resources Task. For this activity, completeness and representativeness were the only data quality objectives identified in the task plan. The approach to achieve these objectives is to use the search tree process to review currently available subject, author, periodical and serial indices of archival documents for those of interest to the project. Achievement of these data quality objectives was to be addressed at the completion of each search effort or report.

Completeness and representativeness were included as data quality objectives to ensure that any discovery of additional information would not alter the project reconstructed results. Achievement of these DQOs has been satisfied by the internal peer reviews performed by the source term task leader and the line manager of the author. The line manager's review ensures that the development of the search trees was adequate and sufficient for this particular activity and the source term task leader's review ensures that the required information has been provided to perform the necessary reconstructed release information required for the source term model. Additionally, a surveillance was performed by the quality engineer verifying that there is objective evidence in the files supporting the destruction of the daily operating documents and that the internal reviews performed were sufficient to address the achievement of the data quality objective.

OPERATING DATA

The last known copy of the five reactor operating reports for 1960 through 1964 (DeNeal 1961-1965) was destroyed in 1969 (Gydesen 1992). The data critical to HEDR Source Term Task needs can be developed from information extracted from the 1960 Reactor Branch monthly reports (Plum 1961-1965) and selected unclassified data extracted from the Monthly Production reports (Travis 1960-1965).

The tables in the five appendixes that follow were photocopied directly from the reports cited above. The full citations and notes about the availability of these source documents are included in the "References" section of this report. Only those portions needed for source term calculations (as determined by the Source Terms Task Leader) were extracted and included in this report. The legibility of the tables varies, depending on the quality of the copy from which they were made. Nonetheless, to avoid introduction of errors when working with large collections of numbers and to hold publication costs to a minimum, the tables have not been retyped.

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APPENDIX A

OPERATING DATA FOR 1960

URANIUM IN TONS
1960

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.		Jan.	Feb.
Normal U	553	578	2,097	2,090	559	584	1,780	2,062	**Normal U**		
Solid	63	60	538	505	79	92					
I&E	490	518	1,559	1,585	480	492			Purex	623	297
									Redox	0	0
									94 Metal		
94 Metal	65.4	63.0	213.6	215.1	59.5	61.5	294.0	301.8	Redox	89.0	52.9
Solid	0.3	0.4	5.8	4.7	1.0	1.5					
I&E	65.1	62.6	207.8	210.4	58.5	60.0					
Depleted U	0	0	0	0	0	0	8.5	8.5			

MWD AND SPECIAL MATERIALS
1960

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
MWD	431,697	379,837							Dissolved	
Normal	377,296	330,821	699,399	667,867	369,920	362,353	1,224,896	1,370,547	445,337[1]	213,573[1]
94 Metal	54,401	49,116	84,690	88,360	44,116	45,446	231,492	230,963	63,413	45,502
Depleted	0	0	0	0	0	0	2,727	2,727	0	0

(1) Purex dissolved all of this

Extracted from Travis 1960b, pages 5 and 7.

COMPARATIVE PILE PERFORMANCE — JAN 1960

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,685	2,080	2,710	1,710	1,815	1,825	3,730	3,810	18,365
Maximum Power Level During Month, MW	1,685	2,080	2,710	1,660	1,815	1,825	3,730	3,810	18,335
Average Power Level While Operating, MW	1,540	1,743	1,595	1,556	1,624	1,684	3,549	3,507	16,778
Maximum Tube Power, KW	1,195	1,228	1,270	1,100	1,179	1,160	2,475	1,520	
Effective Central Tubes	1,440	1,665	1,660	1,525	1,660	1,665	2,515	2,500	
Time Operated Efficiency, %	81.7	79.9	74.4	88.9	79.1	82.4	85.3	85.7	82.2
Operational Limitation	1,190	1,235	1,178	1,100	1,250	1,160	2,475	1,520	
MWD Produced During Month, total	39,016	43,153	36,738	42,897	35,906	43,023	93,825	93,191	431,699
Normal Solid	3,896	4,121	5,872	6,351	3,436	3,531	13,314	12,563	55,084
Normal I&E	32,214	30,261	28,625	29,998	33,501	32,060	67,515	66,004	322,212
9% Metal	2,906	8,771	2,291	6,548	2,969	7,432	12,962	12,624	54,403
Plutonium Produced, grams	29,957	33,269	27,381	32,145	30,877	32,404	83,671	82,783	352,938
Uranium In Reactor At Month End, tons	241.1	226.3	247.5	238.4	242.6	223.2	445.3	445.9	2,310.3
Normal Solid	50.0	41.2	73.6	75.8	45.1	35.4	107.3	109.2	537.6
Normal I&E	176.0	152.1	161.5	142.4	158.6	155.1	292.8	291.6	1,559.1
9% Metal	15.1	33.0	9.4	20.2	12.9	32.7	45.2	45.1	213.6
Uranium Discharged During Month, tons	67.1	44.8	77.6	8.4	26.5	65.7	157.8	171.1	615.0
Normal Solid	6.2	5.1	8.5	4.6	1.2	3.0	27.9	22.6	79.1
Normal I&E	58.0	32.3	64.7	1.6	24.5	54.4	115.6	129.9	480.4
9% Metal	2.9	7.4	4.4	2.8	0.8	8.3	14.3	18.6	59.5
Average Discharge Concentration									
Normal Solid	720	667	718	653	659	713	681	678	677
Normal I&E	686	560	686	642	582	677	670	654	659
9% Metal	818	605	822	842	625	858	790	699	743

Extracted from Travis 1960a, page 10.

Reactor Outages 1960

Reactor outages for the month of January are as follows:

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
12/30	1/1	42.6	Removal of a stuck I&E 94 metal production test rupture from tube 1764.
1/10	1/11	35.8	Removal of an I&E regular metal rupture from tube 3268 and charge-discharge.
1/21	1/24	77.0	Removal of a stuck I&E regular metal rupture from tube 1686 and charge-discharge.
1/24	1/25	19.8	Removal of a stuck I&E regular metal rupture from tube 2676.
1/31	Still Down		Removal of an I&E regular metal rupture from tube 1575.

C REACTOR

1/3	1/4	33.7	Removal of an I&E regular metal rupture from tube 2168.
1/14	1/16	40.6	Removal of an I&E regular metal rupture from tube 2171. Thermocouples were installed on vertical rows 51 thru 57.
1/21	1/23	37.4	Removal of an I&E regular metal rupture from tube 2576 and charge-discharge.
1/24	1/26	38.1	Removal of a stuck I&E regular metal rupture from tube 3861 and charge-discharge.

D REACTOR

1/4	1/9	117.9	Completed scheduled charge-discharge and tube replacement.
1/9	1/9	1.9	Venturi change in tubes 1991 and 2491.

Extracted from Plum 1961, January, pages 2-5.

D REACTOR (cont.)

1/25	1/27	52.3	Removal of pump shaft fragment (from No. 7 pump at 190 Bldg.) from crossheader screens and front face fittings and charge-discharge.*
1/31	Still Down		Temperature control due to a faulty ball valve on a PCCF Tube.

DR REACTOR

1/10	1/11	37.3	Removal of an I&E regular metal rupture from tube 1570. Completed charge-discharge and maintenance.
1/21	1/22	44.9	Leak testing. Tube 2185 was replaced.
1/24	1/24	0.3	Panellit trip.
1/24	1/24	0.2	Panellit trip.

F REACTOR

1/4	1/9	115.3	Water leak. Charge-discharge and tube replacement. Installation of crossheader differential gauges.
1/23	1/25	39.1	Removal of a stuck I&E regular metal rupture from tube 1182 and charge-discharge.
1/25	1/25	1.4	Manually tripped due to insufficient rods for control.

H REACTOR

1/9	1/10	32.7	Charge-discharge following maintenance on front face cap. Replaced ten leaking rear pigtails.

* Shaft fragments were dislodged on 1/15 at the time No. 7 pump was being started up following impeller replacement. Cause of fail has not yet been determined.

Extracted from Plum 1961, January, pages 2-5.

H REACTOR (cont.)

1/20	1/22	52.7	Removal of a stuck I&E regular metal rupture from tube 2981. Charge-discharge and tube replacement.
1/23	1/23	3.8	Adjustment of gas composition.
1/23	1/23	0.7	Panellit trip.
1/26	1/28	40.5	Leak testing and replacement of tube 1960. Removal of a stuck I&E regular metal rupture from tube 3183.
1/28	1/28	0.6	Panellit trip.

KER REACTOR

1/11	1/13	44.9	Removal of a solid regular metal rupture from tube 4345. Charge-discharge and tube replacement.
1/13	1/13	6.0	Poison discharge. A delay of about 2.5 hours was experienced due to the malfunction of a "C" elevator relay.
1/25	1/27	46.9	Removal of a stuck I&E regular metal rupture from tube 2052. Charge-discharge.
1/27	1/27	0.9	Beckman trip due to a surge on instrument power supply.
1/27	1/28	3.3	Poison discharge.
1/31	Still Down		Trip due to a faulty dump valve on KER Loop 2.

KER REACTOR

1/4	1/5	38.9	Panellit trip due to an I&E regular metal rupture from tube 3075 and charge-discharge.
1/6	1/6	2.9	Poison discharge.
1/22	1/24	6.4	Removal of an I&E regular metal rupture from tube 3866 and charge-discharge.
1/25	1/25	4.4	Poison discharge.

Extracted from Plum 1961, January, pages 2-5.

COMPARATIVE PILE PERFORMANCE FEB 1960

	B	C	D	DR	F	H	JE	KW	TOTAL
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,780	1,825	1,890	3,800	3,840	18,710
Maximum Power Level During Month, MW	1,730	2,070	1,765	1,780	1,825	1,890	3,800	3,840	18,700
Average Power Level While Operating, MW	1,594	1,781	1,639	1,533	1,699	1,708	3,372	3,598	16,924
Maximum Tube Power, KW	1,190	1,200	1,167	1,080	1,236	1,130	1,470	1,496	
Effective Central Tubes	1,450	1,635	1,490	1,555	1,460	1,630	2,535	2,475	
Time Operated Efficiency, %	74.8	73.8	86.7	69.2	68.8	79.1	78.3	82.5	76.5
Operational Limitation	1,190	1,200	1,173	1,100	1,260	1,150	1,480	1,520	
MWD Produced During Month, total	34,587	37,696	41,178	30,769	33,911	39,165	76,577	86,071	379,937
Normal Solid	3,491	3,698	6,659	6,009	2,947	3,066	9,304	11,260	46,434
Normal I&E	28,199	26,301	31,627	21,080	28,303	29,309	56,871	62,697	284,387
9% Metal	2,877	7,697	2,892	3,680	2,661	6,790	10,402	12,117	49,116
Plutonium Produced, grams	28,690	30,594	33,811	24,817	28,364	34,037	68,613	76,760	325,565
Uranium In Reactor At Month End, tons	239.8	226.4	246.9	238.7	241.4	222.2	443.8	446.1	2,305.3
Normal Solid	49.8	41.2	73.5	75.6	44.8	33.4	77.9	109.2	505.4
Normal I&E	173.4	151.9	163.3	137.0	183.2	156.1	327.3	292.6	1,584.8
9% Metal	16.6	33.3	10.1	26.1	13.4	32.7	38.6	44.3	215.1
Uranium Discharged During Month, tons	72.9	50.1	33.1	246.1	83.0	54.3	65.8	140.1	645.4
Normal Solid	7.1	2.4	7.3	15.7	5.2	6.2	32.6	15.7	92.2
Normal I&E	61.9	44.7	23.9	127.3	73.5	42.5	15.8	102.8	491.8
9% Metal	3.9	3.0	0.9	3.1	4.3	5.6	18.2	22.4	61.7
Average Discharge Concentration									
Normal Solid	714	665	727	642	760	681	459	712	614
Normal I&E	588	645	719	675	624	582	712	631	622
9% Metal	839	752	899	847	765	987	676	679	735

Extracted from Travis 1960b, page 10.

Reactor Outages 1960

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
1/31	2/2	38.8	Removal of an I&E regular metal rupture from tube 1575 and miscellaneous maintenance.
2/2	2/2	3.1	Investigated the high water exit on tube 1564.
2/9	2/11	40.1	Panellit trip and charge-discharge.
2/11	2/11	21.6	Removal of an I&E regular metal rupture from tube 3880.
2/27	2/29	73.9	Removal of a stuck I&E regular metal rupture from tube 3284 and charge-discharge.

C REACTOR

2/4	2/5	39.9	Removal of a stuck I&E regular metal rupture from tube 2875. Seven zirconium tubes were installed.
2/6	2/7	29.2	Removal of a stuck I&E regular metal rupture from tube 2276.
2/7	2/7	4.0	Poison discharge.
2/10	2/12	63.5	Removal of a stuck I&E regular metal rupture from tube 1478 and charge-discharge.
2/13	2/13	3.1	Poison discharge.
2/14	2/15	28.5	Removal of a stuck I&E regular metal rupture from tube 0765. Retubed three channels.
2/15	2/15	.9	Panellit trip.
2/29	Still Down		Removal of an I&E regular metal rupture from tube 3087. Charge-discharge is in progress.

Extracted from Plum 1961, February, pages 2-5.

D REACTOR

1/31	2/2	45.2	Temperature control due to a faulty ball valve on a PCCF tube. Miscellaneous maintenance work performed.
2/21	2/24	65.9	Scheduled charge-discharge, tube replacement and trip-out tests.

DR REACTOR

2/1	2/1	.4	Panellit trip due to a faulty light socket in the PCCF control system.
2/1	2/3	45.4	PCCF charging machine hung up while attempting to discharge ball valve tube 2173. Completed leak testing.
2/3	2/3	1.4	High pressure Panellit trip.
2/4	2/4	.7	Unexplained trip on No. 1 safety circuit.
2/11	2/13	37.3	Charge-discharge following the correction of a loose Venturi assembly.
2/13	2/13	.3	Panellit trip, probably due to solid aluminum charge seating in the tube.
2/18	2/23	127.6	Loose Venturi on tube 3467. Charge-discharge and leak testing.
2/24	2/24	1.5	Continuation of trip-out testing.

F REACTOR

2/1	2/6	134.9	Scheduled charge-discharge and maintenance.
2/6	2/7	29.2	Manual trip due to insufficient control rods.
2/25	2/29	80.7	Removal of a stuck I&E regular metal rupture from tube 1985. Charge-discharge.

Extracted from Plum 1961, February, pages 2-5.

H REACTOR

2/8	2/10	36.4	Removal of a solid regular metal rupture from tube 0755 and an I&E regular metal rupture from tube 0770. Charge-discharge.
2/10	2/10	1.0	Investigation of by-pass indications in the safety circuit.
2/11	2/11	.2	Unexplained Panellit trip.
2/11	2/12	33.0	Removal of an I&E regular metal rupture from tube 3661.
2/13	2/13	3.8	Removal of a stuck I&E regular metal rupture from tube 0884.
2/13	2/13	.3	Panellit trip due to a rear pigtail failure.
2/16	2/17	32.6	Removal of an I&E regular metal rupture from tube 2978. Charge-discharge. (Further inspection of the metal discharged from tube 0770 (due to a suspected rupture) on 2/8/60 confirmed the presence of an I&E regular metal rupture.
2/17	2/17	1.6	Low pressure Panellit trip due to a rear cap leak on tube 2370.
2/17	2/17	2.8	Low pressure Panellit trip due to a rear cap leak on tube 2675.
2/22	2/24	34.3	Removal of a stuck I&E regular metal rupture from tube 2673. Charge-discharge.

KE REACTOR

1/31	2/2	35.3	Tripped due to a faulty dump valve on KER Loop 2, and miscellaneous maintenance.
2/7	2/9	32.7	Tripped due to a suspected cluster fuel element failure in Loop 1. Charge-discharge.

Extracted from Plum 1961, February, pages 2-5.

KE REACTOR (cont.)

2/21	2/22	33.1	Removal of a solid regular metal rupture from tube 5556. Charge-discharge.
2/22	2/23	7 1	Removal of a solid regular metal rupture from tube 4645.
2/23	2/25	37.9	Water leak testing.
2/25	2/25	10.9	Indications of a water leak on the near side. Tube 4651 was found to be leaking and was replaced.
2/25	2/25	.7	Unexplained Panellit trip.
2/26	2/26	.7	Removal of an I&E E-metal rupture from tube 1151.

KW REACTOR

2/5	2/6	34.5	Removal of an I&E regular metal rupture from tube 3890 and charge-discharge.
2/23	2/25	60.2	Removal of an I&E regular metal rupture from tube 2459 and charge-discharge.
2/26	2/26	22.6	Removal of a stuck I&E regular metal rupture from channel 2483.
2/27	2/27	4.7	Poison discharge.

Extracted from Plum 1961, February, pages 2-5.

URANIUM IN TONS
1960

	REACTORS						SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	March	April	March	April	March	April	March	April		March	April
Normal U	455	540	2,085	2,089	461	540	2,239	2,037	**Normal U**		
Solid	59	53	497	496	68	55					
I&E	396	487	1,588	1,593	393	485			Purex	284	739
									94 Metal		
94 Metal	71.5	73.5	217.8	219.4	68.8	72.1	330.8	326.8	Redox	99.8	75.2
Solid	0	0	4.1	3.3	0.6	0.7					
I&E	71.5	73.5	213.7	216.1	68.2	71.4					
Depleted U	0	0	0	0	0	0	8.5	8.5			

MWD AND SPECIAL MATERIALS
1960

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	March	April	March	April	March	April	March	April	March	April
MWD	426,276	423,137							Dissolved	
Normal	369,776	369,081	740,972	743,931	296,671	366,122	1,464,060	1,320,663	203,925	506,583
94 Metal	56,500	54,056	92,355	91,048	52,505	55,363	254,921	247,094	28,544	61,228
Depleted							2,728	2,728		

Extracted from Travis 1960d, pages 4 and 6.

COMPARATIVE FIELD PERFORMANCE — MAR 1960

	B	C	D	DR	F	H	KE	KW	TOTAL 1960 (1)
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,830	1,825	1,890	3,800	3,810	18,720
Maximum Power Level During Month, MW	1,720	2,025	1,765	1,830	1,780	1,855	3,625	3,815	11,405
Average Power Level While Operating, MW	1,524	1,783	1,632	1,733	1,590	1,761	3,289	3,540	16,872
Maximum Tube Power, KW	1,178	1,195	1,129	1,160	1,205	1,138	1,115	1,175	
Effective Central Tubes	1,130	1,670	1,490	1,590	1,559	1,625	2,500	2,175	
Time Operated Efficiency, %	80.1	81.6	79.2	84.6	78.8	79.2	85.2	82.3	80.9
Operational Limitation	1175MW	1200MW	1175MW	93.5°C	1225MW	1150KW	2400KW	2400KW	
MWD Produced During Month, total	38,362	45,083	40,092	46,435	36,849	43,215	86,884	90,376	426,276
Normal Solid	3,850	4,292	6,585	9,381	3,256	3,208	6,823	11,815	49,070
Normal I&E	31,060	31,326	30,709	29,587	30,769	32,909	62,488	65,860	320,706
9% Metal	3,452	9,465	2,798	6,527	2,824	7,098	11,573	12,701	56,500
Plutonium Produced, grams	32,909	37,372	33,080	38,807	30,454	35,373	77,832	81,557	366,155
Uranium In Reactor At Month End, tons	238.8	236.2	246.9	239.2	240.7	222.2	442.4	445.7	2,302.3
Normal Solid	69.6	61.2	73.5	75.2	64.5	32.9	70.5	109.2	496.6
Normal I&E	172.4	151.3	163.3	148.3	132.9	158.7	306.8	292.2	1,587.9
9% Metal	26.8	33.7	20.1	23.7	23.3	30.6	65.1	44.5	217.8
Uranium Discharged During Month, tons	31.0	106.8	69.5	28.2	28.1	33.4	143.9	89.2	530.1
Normal Solid	2.5	9.7	24.7	13.9	1.7	2.3	10.9	12.4	68.1
Normal I&E	25.6	71.1	50.5	7.5	25.6	23.9	121.6	68.4	393.2
9% Metal	3.9	26.0	4.3	6.8	0.8	7.2	11.4	8.4	68.8
Average Discharge Concentration									
Normal Solid	753	664	735	660	705	712	531	729	675
Normal I&E	701	601	720	727	649	522	630	621	638
9% Metal	728	750	826	836	725	925	713	662	763

(1) new record

Extracted from Travis 1961c, page 7.

Reactor Outages 1960

Reactor outages for the month of March are as follows:

B Reactor

Date Down	Date Up	Outage Hours	Remarks
3/3	3/6	74.2	Leak testing.
3/13	3/14	37.7	Removal of a stuck I&E regular metal rupture in tube 2184. Charge-discharge.
3/22	3/23	36.0	Panellit trip when rear pigtail broke off of tube 3667. Charge-discharge and miscellaneous maintenance.

C Reactor

2/29	3/2	49.7	Removal of an I&E regular metal rupture in tube 3087, and charge-discharge.
3/2	3/2	0.5	Panellit trip due to an oscillating gage.
3/2	3/2	4.0	Poison discharge.
3/4	3/5	30.5	A heat imbalance caused by VSR #35 dropping. Charge-discharge.
3/17	3/19	35.5	Removal of an I&E 94 metal rupture from tube 0566. Charge-discharge and maintenance.
3/19	3/19	2.5	Repair of two faulty thermocouples.
3/29	3/31	33.5	Removal of a stuck I&E regular metal rupture from tube 2567. Charge-discharge.

D Reactor

3/3	3/5	34.3	Removal of a suspected I&E regular metal (mixer) rupture in tube 4187 and charge-discharge. The rupture was not confirmed.
3/21	3/25	85.5	Removal of an I&E regular metal rupture in tube 3563. Charge-discharge and maintenance.
3/25	3/27	35.4	Removal of an I&E regular metal rupture in tube 1463, and maintenance.

Extracted from Plum 1961, March, pages 2-4.

DR Reactor

Date Down	Date Up	Outage Hours	Remarks
3/9	3/11	38.5	Leak testing.
3/22	3/23	44.1	Removal of an I&E regular metal rupture in tube 3877. Charge-discharge.
3/25	3/26	32.0	Removal of an I&E 94-metal rupture from tube 0859.
F Reactor			
3/1	3/3	48.3	Removal of an I&E regular metal rupture in tube 2369 and charge-discharge.
3/3	3/3	3.7	Panellit trip due to a tubular dummy in the nozzle at the rear pigtail.
3/9	3/11	52.1	Leak testing and charge-discharge.
3/28	Still Down		Removal of an I&E regular metal rupture in tube 3873 and charge-discharge.
H Reactor			
3/2	3/5	67.1	Leak testing and charge-discharge.
3/11	3/12	34.1	Power failure caused by the failure of No. 2 process pump at F. Charge-discharge and maintenance.
3/12	3/13	2.1	Panellit trip due to a Hoke valve being partially closed.
3/15	3/17	41.6	Leak testing and charge-discharge.
3/31	3/31	0.5	High pressure Panellit trip on tube 1464.
3/31	Still Down		Removal of an I&E regular metal rupture in tube 1464.

Extracted from Plum 1961, March, pages 2-4.

KE Reactor

Date Down	Date Up	Outage Hours	Remarks
3/10	3/12	49.0	Panellit trip due to the failure of a pump servicing single pass tubes 4557 and 4863. Charge-discharge.
3/19	3/21	30.0	Power loss trip. Charge-discharge.
3/23	3/24	30.9	Removal of a solid regular metal rupture in tube 2044. Charge-discharge.

KW Reactor

3/11	3/13	66.2	Removal of an I&E regular metal rupture in tube 2060 and charge-discharge.
3/13	3/14	21.2	Removal of an I&E regular metal rupture in tube 2562.
3/15	3/15	6.0	Poison discharge.
3/17	3/18	38.0	Removal of an I&E regular metal rupture in tube 3557 and charge-discharge.

Extracted from Plum 1961, March, pages 2-4.

COMPARATIVE PILE PERFORMANCE APR 1960

	B	C	D	DR	F	H	KE	KW	TOTAL
									16 765 (1)
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,835 [1]	1,825	1,890	3,800	3,840	16,735
Maximum Power Level During Month, MW	1,730	2,075	1,755	1,835	1,770	1,860	3,550	3,700	16,175
Average Power Level While Operating, MW	1,619	2,042	1,710	1,758	1,553	1,739	3,378	3,560	17,175
Maximum Tube Power, KW	1,363	1,190	1,170	1,125	1,220	1,120	1,458	1,470	
Effective Central Tubes	1,500	1,675	1,497	1,590	1,455	1,660	2,665	2,500	
Time Operated Efficiency, %	71.9	70.5	91.5	89.5	84.3	77.1	80.9	87.3	81.6
Operational Limitation	1175KW	1150KW	1175KW	1150KW	1200KW	1235KW	2450KW	2400KW	
MWD Produced During Month, total	34,938	36,966	46,959 [1]	47,111	39,277	40,674	81,996	93,230	423,137
Normal Solid	3,635	3,664	7,531	9,385	3,387	2,853	5,897	12,082	66,435
Normal I&E	25,256	27,393	36,377	31,491	32,806	31,194	64,978	62,171	320,660
9% Metal	3,039	7,909	3,051	6,234	3,084	6,627	11,121	12,977	54,056
Plutonium Produced, grams	28,470	31,760	37,918	37,989	32,573	33,173	73,354	81,902	357,158
Uranium In Reactor At Month End, tons	221.5	226.5	247.8	238.3	240.9	221.9	443.5	446.9	2302.3
Normal Solid	51.0	61.2	73.6	75.3	63.8	50.4	70.8	109.4	495.5
Normal I&E	133.3	151.6	168.9	140.3	152.2	140.4	327.3	293.4	1593.4
9% Metal	17.2	33.7	9.3	23.7	24.9	31.1	45.4	44.1	215.4
Uranium Discharged During Month, tons	68.9	44.9	36.9	9.4	85.9	73.5	236.4	275.7	611.6
Normal Solid	5.5	2.9	2.8	4.9	7.7	3.4	8.8	15.8	51.8
Normal I&E	58.9	37.5	31.9	2.7	73.3	61.9	220.0	226.5	481.7
9% Metal	3.5	4.5	2.2	2.8	4.9	8.2	17.6	25.4	72.1
Average Discharge Concentration									
Normal Solid	771	656	719	684	742	756	759	742	738
Normal I&E	646	529	733	698	668	667	682	716	679
9% Metal	795	620	838	1,080	824	909	727	734	768

(1) NEW RECORD

Extracted from Travis 1961d, page 7.

Reactor Outages 1960

Reactor outages for April, 1960 are as follows:

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
4/4	4/9	125.3	Scheduled charge-discharge, tube replacement and Ball 3X work.
4/9	4/9	3.5	High temperature indicated on tube 2180. Investigation revealed a faulty thermocouple.
4/26	4/29	73.5	Removal of a stuck I&E regular metal rupture from tube 0668 and charge-discharge.

C REACTOR

4/1	4/1	0.6	Removal of an I&E regular metal rupture from tube 2588.
4/9	4/10	32.6	Removal of an I&E regular metal rupture from tube 1275 and charge-discharge.
4/11	4/11	0.3	Panellit trip.
4/11	4/13	32.1	Panellit trip; insufficient reactivity. Miscellaneous maintenance performed.
4/19	4/25	147.7	Removal of a stuck I&E E-metal rupture from tube 1380, charge-discharge and scheduled maintenance.

D REACTOR

4/10	4/13	61.1	Water leak and charge-discharge.

Extracted from Plum 1961, April, pages 2-4.

DR REACTOR

4/1	4/2	37.1	Water leak.
4/12	4/14	37.8	Charge-discharge and miscellaneous maintenance following a trip originating with a transformer failure at 190 Building.
4/30	Still Down		Removal of an I&E E-metal rupture from tube 0774.

F REACTOR

3/28	4/1	83.6	Removal of a stuck I&E regular metal rupture from tube 3873. Charge-discharge and tube replacement.
4/3	4/4	33.8	Removal of a stuck I&E regular metal rupture from tube 1169.
4/8	4/10	38.0	Removal of a stuck I&E regular metal rupture from tube 1569 and charge-discharge.
4/26	4/28	40.8	Removal of an I&E regular metal rupture from tube 3683 and charge-discharge.

H REACTOR

3/31	4/4	83.8	Removal of an I&E regular metal rupture from tube 1464 and charge-discharge.
4/4	4/4	0.8	High pressure Panellit trip.
4/4	4/4	0.2	Panellit trip due to poison only partially flushing from a ball valve tube.
4/18	4/20	54.6	Water leak and charge-discharge.
4/23	4/24	34.9	Leak testing.

Extracted from Plum 1961, April, pages 2-4.

KE REACTOR

4/1	4/2	37.1	Tripped due to loss of No. 6 high-lift pump and charge-discharge.
4/8	4/9	31.5	Unexplained trip of HCR's and charge-discharge.
4/23	4/25	43.5	Tripped by a rupture in KER Loop 4, and charge-discharge.
4/26	4/26	0.6	Tripped due to a faulty thermocouple on Loop 4 heat exchanger.
4/27	4/29	29.8	Trip caused by a faulty grounding circuit in the Loop 3 heat exchanger temperature measuring system, and insufficient reactivity.

KW REACTOR

4/6	4/7	34.4	Removal of an I&E E-metal rupture from tube 2548 and charge-discharge.
4/28	4/30	56.9	Removal of a stuck I&E regular metal rupture from tube 1385 and charge-discharge.

Extracted from Plum 1961, April, pages 2-4.

URANIUM IN TONS
1960

	REACTORS						SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	May	June	May	June	May	June	May	June		May	June
Normal U	380	636	2,088	2,060	381	665	2,121	2,394	**Normal U**		
Solid	53	62	491	477	57	77					
I&E	327	574	1,597	1,583	324	588			Purex	302	241
									Redox		146
									94 Metal		
94 Metal	64.8	74.5	217.7	231.0	66.6	61.2	355.1[2]	403.3	Redox	38.3	13.1
Solid			1.4	1.1	2.0	0.3					
I&E	64.8	74.5	216.3	229.9	64.6	60.9					
Depleted U							8.5	8.5			

(a) Corrected figure

MWD AND SPECIAL MATERIALS
1960

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	May	June	May	June	May	June	May	June	May	June
MWD	454,863	439,918							**Dissolved**	
Normal	395,345	380,089	875,021	807,484	264,255	447,626	1,392,056	1,589,013	195,410	247,839[1]
94 Metal	59,518	59,829	98,550	111,238	52,016	47,141	269,972	306,616	29,476	10,599
Depleted							2,728	2,728		

(1) Redox dissolved 90,790 MWD of this.

Extracted from Travis 1960f, pages 4 and 6.

COMPARATIVE PILE PERFORMANCE MAY 1960

	E	C	D	DR	F	H	KE	KW	TOTAL
									19,765
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,835	1,825	1,890	3,800	3,840	~~21,775~~
Maximum Power Level During Month, MW	1,690	1,950	1,745	1,745	1,705	1,850	3,570	3,640	17,995
Average Power Level While Operating, MW	1,635	1,851	1,601	1,580	1,604	1,765	3,575	3,327	16,939
Maximum Tube Power, KW	1,146	1,138	1,159	1,096	1,191	1,120	1,430	1,453	
Effective Central Tubes	1,465	1,700	1,680	1,580	1,435	1,650	2,520	2,450	
Time Operated Efficiency, %	88.6	86.6	81.2	73.1	89.1	79.0	93.3	90.4	85.2
Operational Limitation	1152KW	1140KW	1140KW	1100KW	1210KW	93.5%	2160KW	1350KW	
MWD Produced During Month, total	44,998[1]	49,636	50,319	35,814	44,276	43,232	103,316[1]	93,222	454,863[1]
Normal Solid	4,867	4,720	6,469	6,963	3,669	2,822	7,627	12,472	49,609
Normal I&E	35,868	35,175	31,262	21,216	36,830	33,212	81,261	67,883	345,737
9% Metal	4,263	9,731	2,588	4,605	3,777	7,199	14,428	12,867	59,518
Plutonium Produced, grams	36,794	39,548	33,680	27,712	36,403	35,222	91,367	83,423	384,137
Uranium In Reactor At Month End, tons	240.9	226.9	247.6	239.3	240.2	226.5	443.7	447.0	2306.1
Normal Solid	51.2	41.2	73.3	72.2	43.2	27.6	70.8	109.4	491.1
Normal I&E	177.8	153.1	161.4	112.1	181.6	160.1	329.3	294.6	1577.0
9% Metal	11.9	32.6	9.4	23.0	15.4	32.8	43.6	43.0	217.7
Uranium Discharged During Month, tons	23.7	16.7	55.4	29.3	57.0	77.8	52.6	68.1	447.6
Normal Solid	2.9	3.1	11.1	11.3	2.6	6.5	7.3	6.6	57.4
Normal I&E	19.1	19.6	31.5	5.5	50.5	61.9	33.5	52.0	323.6
9% Metal	1.7	18.0	3.8	9.5	3.9	9.4	11.8	9.5	66.6
Average Discharge Concentration									
Normal Solid	763	638	743	687	727	780	778	729	729
Normal I&E	690	594	729	789	675	675	732	642	687
9% Metal	836	642	954	898	785	962	735	719	781

1 Raw record.

Extracted from Travis 1960e, page 8.

Reactor Outages 1960

Reactor outages for the month of May are as follows:

B Reactor

Date Down	Date Up	Outage Hours	Remarks
5/10	5/10		Trip due to faulty relay in emergency power circuit.
5/10	5/12		Maintenance completed after insufficient reactivity.
5/12	5/12	1.1	Repair of a faulty thermocouple in tube 2875.
5/12	5/12	0.3	Panellit trip due to an oscillating gauge on Row No. 17.
5/30	Still Down		Removal of a stuck I&E E-metal rupture in tube 0967.

C Reactor

5/3	5/4	32.0	Removal of an I&E E-metal rupture in tube 2287. Charge-discharge.
5/5	5/6	35.9	Removal of an I&E E-metal rupture in tube 2780.
5/14	5/14	0.4	High Panellit trip on gauge 3962.
5/20	5/21	31.8	Removal of an I&E E-metal rupture from tube 1792. Charge-discharge.

D Reactor

5/1	5/3	64.3	Removal of an I&E regular metal rupture in tube 1366. Charge-discharge.
5/13	5/14	38.3	Repairs of ruptured export water line.
5/29	5/30	36.0	Miscellaneous maintenance and charge-discharge.

Extracted from Plum 1961, May, pages 2-4.

DR Reactor

4/30	5/2	34.2	Removal of an I&E regular metal rupture from tube 0774. Charge-discharge.
5/13	5/14	41.7	Repairs on ruptured export water line.
5/20	5/21	35.8	Replacement of leaking tube 2672 and further leak testing.
5/22	5/22	0.6	Replacement of front face nozzle cap on 0764.
5/28	Still Down		Removal of an I&E E-metal rupture from tube 3858 and charge-discharge.

F Reactor

5/16	5/18	46.0	Removal of an I&E regular metal rupture from tube 2887 and charge-discharge.
5/20	5/21	36.0	Removal of tube 0977 which had a split rear Van Stone.
5/22	5/22	0.4	Tripped due to malfunction of No. 51 relay which caused a loss of No. 7 pump at the 190 Building.

H Reactor

5/11	5/11	0.2	Panellit trip.
5/11	5/13	46.5	Removal of an I&E regular metal rupture from tube 3171 and charge-discharge.
5/24	5/26	47.6	Leak testing and charge-discharge.
5/26	5/26	1.3	Panellit trip when a rear face cap came loose on 0963.
5/26	5/26	0.9	Tightened a loose rear cap on 2279.
5/28	5/28	0.2	Leaking rear pigtail on tube 0490.
5/28	5/30	34.5	Severed rear pigtail on tube 0490.
5/30	Still Down		Water leak.

Extracted from Plum 1961, May, pages 2-4.

KE Reactor

5/14	5/16	48.0	Removal of a stuck IRE regular metal rupture from tube 1661 and charge-discharge.
5/16	5/16	2.2	High activity trip on Loop 3 due to a rupture in tube 3565.

KW Reactor

5/3	5/4	18.8	Beckman trip and insufficient reactivity Removal of a solid regular metal rupture from tube 0484.
5/17	5/18	33.3	Panellit trip due to rolling gauges and charge-discharge.
5/31	Still Down		Panellit trip on tube 0280.

Extracted from Plum 1961, May, pages 2-4.

JUN 1960 COMPARATIVE PILE PERFORMANCE

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,835	1,825	1,890	3,800	3,840	18,765
Maximum Power Level During Month, MW	1,700	1,925	1,725	1,750	1,700	1,765	3,660	3,655	17,880
Average Power Level While Operating, MW	1,584	1,805	1,659	1,594	1,531	1,675	3,589	3,553	16,990
Maximum Tube Power, KW	1,154	1,086	1,121	1,089	1,186	1,105	1,436	1,460	
Effective Central Tubes	1,485	1,700	1,515	1,560	1,430	1,620	2,505	2,500	
Time Operated Efficiency, %	82.3	78.8	88.8	92.6	83.1	63.4	91.9	94.5	84.4
Operational Limitation	1157KW	1100KW	1130KW	93.5°C	1168KW	93.5°C	1450KW	1450KW	
MWD Produced During Month, total	39,095	42,658	44,181	44,278	38,168	31,856	98,950	100,732[1]	439,918
Normal Solid	4,244	4,060	7,172	7,582	3,099	1,831	7,554	13,873	49,415
Normal I&E	31,148	30,291	34,169	29,405	31,626	24,496	77,286	72,253	330,674
9% Metal	3,703	8,307	2,840	7,291	3,443	5,529	14,110	14,606	59,829
Plutonium Produced, grams	32,240	34,727	36,420	38,341	31,614	26,473	87,510	89,830	377,155
Uranium In Reactor At Month End, tons	240.5	226.8	247.5	227.3	238.9	219.7	443.5	446.7	2,290.9
Normal Solid	50.8	41.2	73.7	63.3	42.4	25.4	70.8	109.4	477.0
Normal I&E	172.0	153.0	164.3	133.2	179.6	161.2	327.3	292.3	1,582.9
9% Metal	17.7	32.6	9.5	30.8	16.9	33.1	45.4	45.0	231.0
Uranium Discharged During Month, tons	84.9	102.2	36.4	157.5	57.8	42.1	140.4	104.8	726.1
Normal Solid	8.9	10.6	3.2	21.6	6.2	3.8	8.5	13.9	76.7
Normal I&E	70.0	78.9	30.4	128.1	49.0	32.6	115.8	83.5	588.3
9% Metal	6.0	12.7	2.8	7.8	2.6	5.7	16.1	7.4	61.1
Average Discharge Concentration									
Normal Solid	757	692	723	566	778	729	786	733	692
Normal I&E	707	684	708	654	664	577	682	664	671
9% Metal	788	702	798	715	835	917	796	731	771

1 New maximum.

Extracted from Travis 1960f, page 7.

Reactor Outages 1960

Reactor outages for June, 1960 are as follows:

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
5/30	6/2	72.5	Concluded rupture removal. Charge-discharge and tube replacement.
6/2	6/2	0.8	Panellit trip.
6/7	6/7	0.2	Panellit trip.
6/7	6/9	45.4	Panellit trip. Insufficient reactivity. Charge-discharge and miscellaneous maintenance.
6/26	6/27	29.6	Panellit trip. Insufficient reactivity. Charge-discharge and maintenance.
C REACTOR			
6/3	6/5	43.8	Scheduled charge-discharge.
6/5	6/5	0.7	Panellit trip.
6/6	6/6	0.2	Panellit trip.
6/6	6/8	30.6	Panellit trip. Insufficient reactivity. Miscellaneous maintenance.
6/8	6/8	0.3	Panellit trip.
6/18	6/20	29.2	Removal of an I&E 94-metal rupture from tube 2456. Charge-discharge.
6/20	6/21	17.8	Removal of a stuck I&E regular metal rupture from tube 1889. Charge-discharge and tube replacement.
6/28	6/28	0.3	Power loss relay trip when a pump was being removed from service at 190 (due to the failure of a wear ring on the impeller assembly).
6/29	6/30	30.0	Temperature control and tube replacement.

Extracted from Plum 1961, June, pages 2-4.

D Reactor

6/9	6/11	48.7	Removal of an I&E 94-metal rupture from tube 3964. Charge-discharge.
6/12	6/13	31.7	Temperature and pressure increase on tube 1074 when a spline cap insert became unscrewed and washed downstream.

DR Reactor

5/28	6/1	101.3	Concluded rupture removal. Charge-discharge and tube replacement
6/1	6/1	0.4	Tripped by low flow on the DR-1 loop.
6/2	6/2	0.2	Panellit trip when a jumper was inadvertently removed from gauge 2973.
6/17	6/19	38.0	Removal of a solid regular metal rupture from tube 2155. Charge-discharge and maintenance.
6/30	Still down		Tripped when a wire between Panellit gauges was inadvertently removed while attempting to to remove a leaking gauge. Insufficient reactivity.

F Reactor

6/2	6/3	35.3	Removal of an I&E regular metal rupture from tube 2471. Charge-discharge.
6/20	6/21	38.7	Scheduled charge-discharge and maintenance.
6/24	6/26	48.0	Leak testing. Tube and Venturi replacements.

Extracted from Plum 1961, June, pages 2-4.

H Reactor

5/30	6/1	30.2	Completed leak testing and tube replacement.
6/1	6/1	0.8	Loose rear cap on tube 4357.
6/1	6/2	17.8	Removal of an I&E regular metal rupture from tube 1583. Charge-discharge.
6/3	6/4	29.5	Removal of a stuck solid regular metal rupture from tube 3553.
6/7	6/8	35.6	Leak testing and charge-discharge.
6/16	6/18	34.4	Removal of a stuck I&E regular metal rupture from tube 2178. Charge-discharge.
6/18	6/19	26.4	Leak testing and tube replacement.
6/26	Still down		Scheduled charge-discharge, tube replacement, and Ball 3X work.

KE Reactor

6/6	6/8	58.5	Scheduled charge-discharge.

KJ Reactor

5/31	6/2	46.7	Charge-discharge following Panellit trip.

Extracted from Plum 1961, June, pages 2-4.

URANIUM IN TONS
1960

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	July	August	July	August	July	August	July	August		July	August
Normal U	526	490	2,053	2,045	533	508	2,396	2,119	**Normal U**		
Solid	75	57	462	440	90	79					
I&E	451	443	1,591	1,605	443	429			Purex	453	745
									Redox	72	40
									94 Metal		
94 Metal	90.0	66.2	234.9	235.3	86.2	65.8	489.5	555.0	Redox	0	0
Solid			0.9	0.9	0.3	0					
I&E	90.0	66.2	234.0	234.4	85.9	65.8					
Depleted U							8.5	8.5			

MWD AND SPECIAL MATERIALS
1960

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	July	August	July	August	July	August	July	August	July	August
MWD										
Normal	409,171	418,777							Dissolved [1]	
94 Metal	351,614	360,903	795,850	812,699	363,248	344,054	1,604,628	1,406,611	343,887	542,938
Depleted	57,557	57,874	102,492	111,839	66,303	48,527	372,919	421,330	0	0
							2,728	2,728	0	0

1 Of this, Redox dissolved 27,595 MWD.

Extracted from Travis 1960h, pages 4 and 6.

COMPARATIVE PILE PERFORMANCE Jul. 1960

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,835	1,825	1,890	3,800	3,840	18,765
Maximum Power Level During Month, MW	1,665	1,875	1,700	1,690	1,675	1,725	3,590	3,650	17,570
Average Power Level While Operating, MW	1,567	1,792	1,556	1,618	1,550	1,622	3,368	3,413	16,486
Maximum Tube Power, KW	1,121	1,065	1,115	1,039	1,133	1,046	1,413	1,390	
Effective Central Tubes	1,472	1,710	1,470	1,565	1,435	1,630	2,490	2,500	
Time Operated Efficiency, %	81.5	78.5	72.8	89.8	69.9	77.3	78.6	86.2	79.3
Operational Limitation	1,141	1,085	93.5	93.5	1,133	93.5	1,431	1,430	
MWD Produced During Month, total	39,610	43,609	35,099	45,047	33,600	38,091	82,074	91,241	409,171
Normal Solid	4,236	4,124	5,327	7,188	2,685	1,954	6,044	11,534	43,092
Normal I&E	31,467	31,021	27,433	30,355	27,828	29,896	64,179	66,353	308,522
9% Metal	3,907	8,464	2,339	7,504	3,087	7,951	11,851	13,354	57,557
Plutonium Produced, grams	32,488	35,480	28,524	36,651	27,675	31,908	73,916	80,819	347,461
Uranium In Reactor At Month End, tons	246.1	227.3	247.0	226.2	241.2	216.7	443.5	445.9	2,297.9
Normal Solid	50.4	41.1	69.2	61.7	41.8	22.6	70.8	101.2	461.8
Normal I&E	170.6	153.6	167.8	133.7	183.2	159.2	326.9	295.7	1,590.7
9% Metal	25.1	32.6	10.0	30.8	16.2	34.9	46.8	46.0	235.4
Uranium Discharged During Month, tons	56.1	62.2	55.6	19.4	59.0	54.5	155.2	157.3	619.3
Normal Solid	6.6	6.0	12.7	12.2	4.9	4.8	13.4	29.6	90.2
Normal I&E	45.7	45.2	39.6	5.0	48.9	41.5	121.4	95.6	442.9
9% Metal	3.8	11.0	3.3	2.2	5.2	8.2	20.4	32.1	86.2
Average Discharge Concentration									
Normal Solid	747	660	676	644	595	714	782	752	716
Normal I&E	675	624	755	760	635	600	688	693	674
9% Metal	826	696	908	506	696	828	767	755	768

Extracted from Travis 1960g, page 7.

Reactor Outages 1960

Reactor outages for the month of July are as follows:

Date Down	Date Up	Outage Hours	Remarks
B REACTOR			
7/10	7/13	55.8	Removal of a stuck I&E regular metal rupture in tube 1265, and charge-discharge.
7/23	7/25	46.4	Removal of a stuck I&E regular metal rupture in tube 1383.
7/26	7/28	35.1	Tripped when No. 8 pump was lost due to a burned-out motor coil.
C REACTOR			
7/9	7/11	59.4	Removal of an I&E E-metal rupture from tube 2072, charge-discharge, and raw-water export line tie-in.
7/24	7/28	98.0	Scheduled charge-discharge and installation of 50 zircaloy process tubes.
7/28	7/28	2.5	Removal of a solid regular metal rupture from tube 2252.
D REACTOR			
7/9	7/15	135.5	Scheduled charge-discharge and tube replacement.
7/21	7/21	0.2	Panellit trip due to a ruptured Bourdon tube on gauge 1779.
7/21	7/22	32.3	Temperature control following a Panellit trip
7/22	7/22	0.5	Tripped by a 190 power failure while attempting to put a pump on the line.

Extracted from Plum 1961, July, pages 2-4.

7/29	7/29	0.2	Panellit trip due to a ruptured Bourdon tube on gauge 3695.
7/29	7/31	33.6	Removal of an I&E E-metal rupture from tube 3660, and miscellaneous maintenance.
7/31	7/31	0.3	Panellit trip due to a stuck toggle valve plunger.
DR REACTOR			
6/30	7/2	33.6	Charge-discharge following a Panellit trip.
7/12	7/14	45.9	Panellit trip due to a stuck I&E E-metal rupture from tube 0677, and charge-discharge.
7/31	Still down		Removal of an I&E regular metal rupture from tube 2665, and charge-discharge.
F REACTOR			
7/12	7/19	178.0	Scheduled charge-discharge, tube replacement, and maintenance.
7/20	7/22	45.6	Water leak.
H REACTOR			
6/26	7/2	155.9	Concluded scheduled charge-discharge, tube replacement and Ball 3X work.
7/2	7/2	0.3	Unexplained Panellit trip.
7/14	7/17	76.6	Removal of a stuck solid regular metal rupture from tube 2352, charge-discharge, and leak testing.
7/17	7/17	1.0	Change Venturi on tube 2456.
7/20	7/23	48.4	Leak testing and charge-discharge.
7/26	7/26	0.4	Installation of a holding plate on the front face cap of tube 4371 when one of the three lugs was found to be missing.

Extracted from Plum 1961, July, pages 2-4.

KE REACTOR

7/3	7/6	71.9	Trip due to a rupture in KER Loop 2, and charge-discharge.
7/7	7/8	24.2	Tripped due to a rupture in KER Loop 1.
7/15	7/16	32.0	Temperature trip on KER Loop 4 heat exchanger.
7/16	7/16	4.6	Tripped by malfunction of water cross-tie by-pass switch.
7/17	7/18	26.5	Panellit trip caused by loss of No. 1 low-lift pump unit due to high temperature on the motor winding.

KW REACTOR

7/4	7/7	70.4	Panellit trip due to an I&E regular metal rupture from tube 2974.
7/17	7/19	32.1	Unexplained Panellit trip. Charge-discharge and miscellaneous maintenance were performed.

Extracted from Plum 1961, July, pages 2-4.

COMPARATIVE PILE PERFORMANCE AUG 1960

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,835	1,825	1,890	3,800	3,840	18,765
Maximum Power Level During Month, MW	1,640	1,865	1,655	1,665	1,650	1,575	3,470	3,550	17,170
Average Power Level While Operating, MW	1,604	1,825	1,571	1,454	1,575	1,631	3,169	3,343	16,172
Maximum Tube Power, KW	1,108	1,083	1,109	1,058	1,150	1,015	1,396	1,408	
Effective Central Tubes	1,480	1,705	1,515	1,555	1,425	1,625	2,435	2,495	
Time Operated Efficiency, %	79.8	94.2	85.2	85.6	87.4	86.7	73.4	84.0	84.5
Operational Limitation	93.5°C	1080KW	93.5°C	93.5°C	1150KW	93.5°C	1420KW	1430KW	
MWD Produced During Month, total	39,659	53,304[1]	41,501	38,616	42,660	43,859	72,097	87,081	418,777
Normal Solid	4,237	4,912	6,159	5,877	3,276	2,055	4,998	10,247	41,761
Normal I&E	31,441	38,165	32,569	26,425	35,709	33,779	57,146	63,908	319,142
9% Metal	3,981	10,227	2,773	6,314	3,675	8,025	9,953	12,926	57,874
Plutonium Produced, grams	32,198	42,639	34,141	29,810	34,965	35,408	64,692	77,939	351,792
Uranium In Reactor At Month End, tons	240.2	227.4	246.7	225.8	240.4	212.0	442.6	445.0	2,280.1
Normal Solid	50.6	41.1	65.2	60.0	41.2	21.7	59.3	96.4	435.5
Normal I&E	170.5	153.9	167.9	135.3	182.1	155.4	339.6	300.4	1,605.1
9% Metal	19.1	32.4	9.6	30.5	17.1	34.9	43.7	48.2	235.5
Uranium Discharged During Month, tons	21.3	48.5	66.2	16.6	36.2	43.6	160.8	180.7	573.9
Normal Solid	1.9	7.5	9.2	8.8	2.6	0.9	34.6	13.6	79.1
Normal I&E	12.0	27.1	54.3	2.4	30.2	36.2	103.3	155.3	428.8
9% Metal	1.4	13.9	2.7	5.4	3.4	4.5	22.9	11.8	66.0
Average Discharge Concentration									
Normal Solid	750	686	750	664	745	732	526	749	656
Normal I&E	702	732	709	718	648	642	659	702	685
9% Metal	852	686	796	896	869	882	653	759	736

1 New record.

Extracted from Travis 1960h, page 7.

Reactor Outages 1960

Outages for the month of August are as follows:

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
8/6	8/8	42.7	Panellit trip due to a loose jumper on Row 35. Tube 3090 was replaced due to a water leak and charge-discharge work was performed.
8/27	Still Down		Scheduled charge-discharge, tube replacement and downcomer modification.

C REACTOR

8/10	8/12	42.2	Removal of an I&E E-metal rupture from tube 3578 and charge-discharge.
8/12	8/12	0.3	Unexplained Panellit trip.
8/13	8/13	0.5	Two unexplained Panellit trips.
8/24	8/24	0.2	Panellit trip on tube 3285, probably due to the spline cap insert working loose.

D REACTOR

8/1	8/1	0.7	Removal of an I&E E-metal rupture from tube 0770.
8/7	8/9	56.5	Removal of an I&E E-metal rupture from tube 2060.
8/9	8/10	18.8	Removal of an I&E E-metal rupture from tube 2262.
8/21	8/22	34.1	Tripped by power-supply loss while attempting to restore power to annunciator system. Charge-discharge work was performed.

Extracted from Plum 1961, August, pages 2-4.

DR REACTOR

Date Down	Date Up	Outage Hours	
7/31	8/2	35.2	Concluded charge-discharge and maintenance following rupture removal.
8/7	8/7	0.7	Tripped by loop 1 when the building air compressor failed, dropping the air pressure below the loop trip point.
8/7	8/8	30.7	Concluded a small charge-discharge and maintenance during period of insufficient reactivity following loop trip.
8/11	8/12	18.0	Tube 2165 was replaced due to a rear Van Stone leak.
8/12	8/13	1.5	Manual trip for temperature control on tube 4055.
8/13	8/13	1.2	Repaired a leak in the front connector on tube 0677.
8/19	8/19	0.6	Unexplained flux monitor trip while flushing poison.
8/26	8/26	0.6	Leak in inlet hose connector on No. 8 HCR.

F REACTOR

8/12	8/14	68.4	Manual trip for temperature control, leak testing, and charge-discharge.
8/14	8/14	2.0	Unexplained Panellit trip.
8/30	Still Down		Scheduled charge-discharge and high-tank flushing.

Extracted from Plum 1961, August, pages 2-4.

H REACTOR

8/11	8/15	95.5	Removal of an I&E regular metal rupture from tube 2558, charge-discharge and leak testing.
8/16	8/16	3.0	Changed Venturis on six tubes.
8/16	8/16	0.2	Tripped when PCCF tube 0386 was valved to low-flow prior to jumpering the Panellit gauge.

KE REACTOR

8/3	8/4	41.1	Removal of an I&E E-metal rupture from tube 1548 and charge-discharge.
8/4	8/4	0.3	Unexplained Panellit trip on tube 4291.
8/5	8/5	0.6	Tripped by low-flow on KER Loop 1 during a pump cha
8/5	8/5	0.4	Unexplained Panellit trip.
8/7	8/9	31.7	Removal of a rupture from KER Loop 2.
8/19	8/20	19.9	Removal of an I&E regular metal rupture from tube 3271.
8/21	8/22	28.9	Removal of a rupture from KER Loop 1.
8/23	8/23	2.1	Removal of a solid regular metal rupture from tube 4844.
8/24	8/25	30.8	Removal of a solid regular metal rupture from tube 4943 and charge-discharge.
8/27	8/28	31.4	Panellit trip on tube 5085 due to a ruptured spline cap seal.

KW REACTOR

8/9	8/11	80.0	Scheduled charge-discharge and installation of a new No. 1 low-lift pump motor and impeller of greater pumping capacity.
8/19	8/20	31.1	Removal of an I&E E-metal rupture from tube 0995.
8/23	8/24	31.6	Removal of a small bolt from No. 13 cross-header screen, detected by abnormal Panellit readings.

Extracted from Plum 1961, August, pages 2-4.

URANIUM IN TONS
1960

	REACTORS							SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling		Dissolved	
	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.
Normal U	614	559	2,042	2,038	616	563	1,968	2,107	**Normal U**	
Solid	46	14	407	378	78	42				
L&E	568	545	1,635	1,660	538	521			Purex	766 422
									Redox	0 0
Scrap									**94 Metal**	
94 Metal	87.3	83.3	235.9	244.0	86.6	75.2	620.1	620.3	Redox	21.4 75.1
Solid	0	0	0.7	0.6	0.1	0.1				
L&E	87.3	83.3	235.2	243.4	86.5	75.1				
Scrap										
Depleted U							8.5	8.5		

MWD AND SPECIAL MATERIALS
1960

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.
MWD	425,472	420,617							Dissolved	
Normal	366,408	361,855	750,292	723,004	428,815	389,143	1,327,926	1,447,920	507,153	267,953
94 Metal	59,064	58,762	102,392	103,433	68,511	57,721	475,619	477,530	14,222	55,164
Depleted							2,728	2,728		

Extracted from Travis 1960j, pages 3 and 5.

COMPARATIVE PILE PERFORMANCE SEP 1960

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,835	1,825	1,890	3,800	3,840	18,765
Maximum Power Level During Month, MW	1,675	1,880	1,655	1,660	1,675	1,675	3,605	3,590	17,405
Average Power Level While Operating, MW	1,508	1,809	1,577	1,569	1,613	1,596	3,515	3,493	16,600
Maximum Tube Power, KW	1,105	1,094	1,095	1,092	1,138	1,030	1,114	1,120	
Effective Central Tubes	1,485	1,700	1,500	1,520	1,440	1,600	2,505	2,520	
Time Operated Efficiency, %	78.6	79.5	67.7	77.7	90.6	87.0	94.5	88.7	83.0
Operational Limitation	93.5°C	1100KW	93.5°C	95.0°C	93.5°C	93.5°C	1120KW	1130KW	
MWD Produced During Month, total	35,570	43,156	32,038	36,563	43,841	41,658	99,658	92,988	425,472
Normal Solid	3,704	4,076	4,485	5,375	3,313	1,785	5,924	10,191	38,813
Normal I&E	28,486	30,693	25,442	25,399	36,567	32,260	80,104	68,660	327,545
9% Metal	3,380	8,367	2,111	5,789	3,961	7,669	13,630	14,137	59,064
Plutonium Produced, grams	29,577	35,496	26,633	30,454	36,203	32,262	88,657	82,665	361,947
Uranium In Reactor At Month End, tons	241.3	227.4	246.2	224.6	239.6	211.9	442.9	443.9	2,277.8
Normal Solid	48.9	41.1	61.7	53.2	39.2	19.3	59.5	84.0	406.9
Normal I&E	173.7	153.8	175.1	144.2	183.0	156.7	340.3	311.2	1,635.0
9% Metal	18.7	32.5	9.4	30.2	17.4	35.9	43.1	48.7	235.9
Uranium Discharged During Month, tons	76.0	110.4	57.0	147.5	53.9	16.2	78.2	163.4	702.6
Normal Solid	9.1	7.4	10.0	14.2	3.5	7.0	2.1	24.9	78.2
Normal I&E	59.6	86.3	43.6	119.1	46.6	3.9	69.3	107.2	537.6
9% Metal	7.3	16.7	3.4	14.2	1.8	5.3	6.8	31.3	86.8
Average Discharge Concentration	760	682	610	695	775	717	795	745	715
Normal Solid	694	650	645	725	669	952	720	698	694
Normal I&E	901	616	846	1,022	988	952	653	734	789
9% Metal									

Extracted from Travis 1960i, page 7.

Reactor Outages 1960

Reactor outages for September are as follows:

Date Down	Date Up	Outage Hours	Remarks
B REACTOR			
8/27	9/3	177.8	Charge-discharge, tube replacement, high tank flushing, rear face decontamination and downcomer modification.
9/4	9/4	1.2	Tripped due to insufficient control rod to achieve turnaround.
9/11	9/12	42.8	Water leak.
9/18	9/20	38.2	Water leak.
9/20	9/20	1.7	Replaced two front connectors leaking at fittings.
C REACTOR			
9/4	9/8	99.1	Scheduled charge-discharge, leak testing and miscellaneous maintenance.
9/23	9/25	48.6	Removal of an I&E regular metal rupture from tube 1486 and charge-discharge.
D REACTOR			
9/4	9/5	38.6	Water leak and charge-discharge.
9/12	9/18	157.7	Scheduled charge-discharge, tube replacement, ball 3X modifications and downcomer modification.
9/24	9/25	36.2	Removal of an I&E regular metal rupture from tube 1960 and charge-discharge.

Extracted from Plum 1961, September, pages 2 and 3.

DR REACTOR

9/8	9/11	84.5	Charge-discharge and tube replacement
9/19	9/20	35.6	Water leak.
9/25	9/27	40.6	Removal of an I&E E-metal rupture from tube 0684, and charge-discharge.

F REACTOR

8/30	9/3	93.2	Charge-discharge, high tank flushing, and leak testing.

H REACTOR

9/6	9/9	57.3	Charge-discharge and high tank flushing.
9/13	9/14	35.8	Water leak.
9/15	9/15	0.2	Panellit trip.
9/29	9/29	0.2	Panellit trip.

KE REACTOR

9/9	9/11	39.7	Leak on front header of KER Loop 3, charge-discharge, and the installation of the foundation cooling system.

KW REACTOR

9/6	9/8	35.7	Panellit trip and charge-discharge.
9/29	9/30	45.6	Scheduled charge-discharge.

Extracted from Plum 1961, September, pages 2 and 3.

COMPARATIVE PILE PERFORMANCE OCT 1960

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,730	2,080	1,765	1,835	1,825	1,890	3,800	3,840	18,765
Maximum Power Level During Month, MW	1,725	1,950	1,690	1,720	1,725	1,690	3,735	3,700	17,935
Average Power Level While Operating, MW	1,587	1,835	1,652	1,665	1,605	1,564	3,620	3,447	16,975
Maximum Tube Power, KW	1,137	1,135	1,124	1,082	1,171	966	1,438	1,460	
Effective Central Tubes	1,518	1,720	1,500	1,580	1,455	1,550	2,475	2,590	
Time Operated Efficiency, %	75.7	80.2	89.5	65.3	67.4	72.5	86.1	86.9	78.0
Operational Limitation	1139KW	1135KW	93.5°C	95.0°C	HE	93.5°C	1450KW	1460KW	
MWD Produced During Month, total	37,251	45,667	45,836	33,688	33,561	35,134	96,580	92,900	420,617
Normal Solid	3,736	4,307	5,325	4,507	2,051	1,351	5,963	8,752	36,592
Normal I&E	29,963	32,414	37,113	23,757	28,266	27,012	76,637	70,066	325,263
9% Metal	3,552	8,946	2,393	5,424	3,244	6,771	13,980	14,082	58,762
Plutonium Produced, grams	30,830	36,460	37,605	28,231	28,105	28,944	86,883	82,826	359,684
Uranium In Reactor At Month End, tons	241.0	227.3	215.2	224.6	238.6	219.6	442.4	443.4	2252.1
Normal Solid	47.4	41.1	50.1	53.2	30.0	17.4	59.5	79.6	378.3
Normal I&E	174.9	153.3	186.0	141.2	189.9	162.6	336.5	315.4	1659.8
9% Metal	18.7	32.9	9.1	30.2	18.7	39.6	46.4	48.4	244.0
Uranium Discharged During Month, tons	55.8	15.9	54.6	1.3	88.2	119.2	225.5	47.6	638.1
Normal Solid	5.7	0	11.2	0	9.7	3.2	5.7	6.3	42.4
Normal I&E	47.2	6.2	39.1	0.2	73.3	135.5	187.4	31.7	520.5
9% Metal	2.9	9.8	3.7	1.1	5.2	10.5	32.4	9.6	75.2
Average Discharge Concentration									
Normal Solid	722	-	796	-	730	783	796	721	744
Normal I&E	654	643	756	160	639	721	690	611	687
9% Metal	805	649	870	509	787	949	736	691	768

Extracted from Travis 1960j, page 6.

Reactor Outages 1960

Reactor outages for the month of October, 1960, are as follows:

Date Down	Date Up	Outage Hours	Remarks
B REACTOR			
10/4	10/7	76.8	Leak testing, tube replacement, and charge-discharge completed.
10/17	10/19	59.6	Leak testing and tube replacement.
10/22	10/23	4.7	Leak testing. A delay of about 5 hours was experienced when one hopper of 3-X balls was inadvertently dropped.
C REACTOR			
10/9	10/9	0.4	Panellit trip
10/9	10/11	39.9	Removal of an I&E-E metal rupture from tube 1656, charge-discharge and leak testing.
10/12	10/12	0.4	Panellit trip due to pressure increase on spline cap tube 0890.
10/17	10/22	106.6	Scheduled charge-discharge and miscellaneous maintenance.
D REACTOR			
10/19	10/22	62.1	Scheduled charge-discharge and tube replacement.
10/22	10/22	2.2	Panellit trip.
10/31	Still down		Water leak. Charge-discharge in progress.

Extracted from Plum 1961, October, pages 2-4.

DR REACTOR

10/3	10/5	38.4	Completed leak testing and maintenance work during a period for cooling over-heated bearings in gas loop compressor.
10/5	10/5	.5	Unexplained trip.
10/6	10/7	32.2	Removal of an I&E-E metal rupture from tube 0681.
10/24	Still down		Chute liner replacement and Ball 3-X modification. Five tubes were successfully overbored.

F REACTOR

10/1	10/7	157.9	Scheduled charge-discharge and tube replacement and maintenance.
10/9	10/11	32.8	Panellit trip due to a ruptured rear pigtail. Miscellaneous maintenance performed.
10/23	10/25	51.4	Removal of an I&E-E metal rupture from tube 0778. Concluded rupture removal and charge-discharge and miscellaneous maintenance.

H REACTOR

10/10	10/16	164.6	Scheduled charge-discharge and tube replacement.
10/16	10/16	1.6	Repair of a broken wire which prevented the movement of two top rows of HCR's.
10/17	10/17	0.7	Correct rear cap leaks.
10/22	10/24	37.8	Removal of an I&E-E metal rupture from tube 3292 and an I&E regular metal from tube 1260.

Extracted from Plum 1961, October, pages 2-4.

KE REACTOR

10/4	10/7	55.2	Scheduled charge-discharge.
10/26	10/28	47.8	Charge-discharge following a Panellit trip.
10/28	10/28	0.7	Unexplained Panellit trip.

KW REACTOR

10/13	10/15	3.5	Removal of an I&E-E metal rupture from tube 4585 and charge-discharge.
10/15	10/16	22.6	Removal of an I&E regular metal rupture from tube 2864.
10/19	10/20	39.3	Tripped by overload relay on #6 low lift pump motor.

Extracted from Plum 1961, October, pages 2-4.

URANIUM IN TONS

1960

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.		Nov.	Dec.
Normal U											
Solid											
I&E	476	530	2,088	2,033	478	535	1,873	1,815	**Normal U**		
	28	22	347	305	60	64					
Scrap	448	508	1,691	1,728	418	471			Purex	710	589
94 Metal									**94 Metal**		
Solid											
I&E	74.0	88.5	242.3	241.3	75.5	89.4	602.0	617.4	Redox	94.5	76.8
			0.6	0.6	0	0					
Scrap			241.7	240.7	75.5	89.4					
Depleted U											
							8.5	8.5			

MWD AND SPECIAL MATERIALS

1960

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
									Dissolved	
MWD	456,165	471,436								
Normal	392,004	405,537	777,348	818,803	337,660	364,082	1,294,724	1,254,417	488,854	402,056
94 Metal	64,161	65,899	110,076	105,802	57,518	70,168	462,704	476,656	71,754	58,786
Depleted							2,728	2,728		

Extracted from Travis 1961a, pages 4 and 6.

COMPARATIVE PILE PERFORMANCE NOV 1960

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,775	2,080	1,785	1,835	1,825	1,890	3,855	3,910	18,955
Maximum Power Level During Month, MW	1,775[1]	1,990	1,785[1]	1,760	1,825	1,820	3,855[1]	3,910[1]	18,720
Average Power Level While Operating, MW	1,677	1,929	1,718	1,574	1,723	1,673	3,742	3,701	17,737
Maximum Tube Power, KW	1,161	1,160	1,189	1,135	1,213	1,100	1,496	1,445	
Effective Central Tubes	1,515	1,688	1,525	1,550	1,470	1,655	2,570	2,535	
Time Operated Efficiency, %	86.3	87.7	86.1	82.4	84.6	81.4	83.6	90.4	85.3
Operational Limitation	1,161	1,160	93.5	610	1,275	93.5	1,500	1,520	
MWD Produced During Month, total	43,392	50,741	44,395	38,898	43,717	40,868	93,815	100,339	456,165[1]
Normal Solid	4,155	4,718	4,483	4,599	2,207	1,433	5,875	8,797	36,257
Normal I&E	31,999	36,190	37,095	28,228	37,284	31,118	74,295	76,498	355,707
9% Metal	4,198	9,833	2,817	6,071	4,226	8,317	13,645	15,054	64,161
Plutonium Produced, grams	35,510	41,697	36,635	31,158	35,333	34,472	83,683	89,296	388,284
Uranium In Reactor At Month End, tons	211.0	227.1	215.7	221.1	237.9	219.2	442.2	443.3	2,280.5
Normal Solid	66.3	61.1	65.5	42.7	24.3	16.4	52.8	71.8	346.9
Normal I&E	175.6	153.4	190.8	151.9	194.6	163.5	337.3	324.1	1,691.2
9% Metal	19.1	32.6	9.4	29.5	19.0	35.3	45.1	47.4	242.4
Uranium Discharged During Month, tons	42.3	67.6	44.8	25.3	52.8	19.1	128.3	172.7	552.9
Normal Solid	4.2	9.1	4.6	10.5	5.7	2.5	7.8	15.3	59.7
Normal I&E	35.7	48.0	39.1	8.5	43.1	4.7	103.1	135.5	417.7
9% Metal	2.4	10.5	1.1	6.3	4.0	11.9	17.4	21.9	75.5
Average Discharge Concentration									
Normal Solid	737	716	726	667	740	786	777	732	727
Normal I&E	680	768	693	779	668	731	693	707	704
9% Metal	861	682	881	916	906	942	711	655	762

1 New record.

Extracted from Travis 1960k, page 7.

Reactor Outages 1960

Outages for the month of November are as follows:

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
11/6	11/8	46.3	Charge-discharge and rupture removal.
11/8	11/8	3.2	Panellit trip due to plugging of cone screen in tube 3992.
11/14	11/16	36.6	I&E regular metal rupture in Tube 1166.
11/30	Still down		An I&E regular metal rupture in tube 3566.

C REACTOR

Date Down	Date Up	Outage Hours	Remarks
11/6	11/10	88.3	Charge-discharge and rupture removal. Two channels were successfully over-bored 0.550" from the front flange to the graphite.
11/11	11/11	0.4	Panellit trip due to a faulty gauge.

D REACTOR

Date Down	Date Up	Outage Hours	Remarks
Down 10/31-11/1	11/2	53.5	Charge-discharge and leak testing.
11/12	11/15	60.0	Charge-discharge and rupture removal.

DR REACTOR

Date Down	Date Up	Outage Hours	Remarks
Down 10/24-11/1	11/3	236.9	Scheduled ball 3X revisions and chute liner and mattress plate replacement.
11/17	11/18	35.3	Leak testing.
11/18	11/18	1.0	Change venturi on tube 0757.
11/19	11/18	1.6	Panellit trip due to heat shift.
11/20	11/21	36.2	Solid regular metal rupture in tube 1192.

Extracted from Plum 1961, November, pages 2-4.

[illegible]/21	11/22	1.9	Manual trip due to insufficient rods for control.
11/22	11/22	1.1	Solid regular metal rupture in tube 2455.

F REACTOR

11/13	11/16	70.1	Rupture removal and charge-discharge.
11/16	11/16	1.0	Adjustment of shielding on air channel 2083.
11/19	11/21	39.1	Leak Testing.
11/30	Still down		I&E regular metal rupture in tube 1677.

H REACTOR

Date Down	Date Up	Outage Hours	Remarks
11/7	11/8	31.5	Charge-discharge following a Panellit trip.
11/8	11/8	0.5	Unexplained Panellit trip.
11/8	11/8	0.2	Unexplained Panellit trip on row [illegible].
11/9	11/9	0.2	Unexplained Panellit trip on row [illegible].
11/9	11/9	0.2	" " " " " "
11/10	11/11	32.1	Leak testing following a Panellit trip.
11/19	11/19	0.2	Unexplained Panellit trip.
11/19	11/30	32.3	Miscellaneous maintenance following a Panellit trip.
11/27	11/27	0.2	Unexplained Panellit trip on Gauge 3956.
11/28	11/29	33.1	Leak testing.

Extracted from Plum 1961, November, pages 2-4.

KE REACTOR

11/11	11/12	46.6	Charge-discharge and rupture removal.
11/27	11/30	71.6	Rupture removal. A rewound motor was installed on #2 low lift pump and three 1706 single-pass tubes were installed.

KW REACTOR

11/11	11/14	68.8	Charge-discharge following rupture removal.
11/14	11/14	0.6	Open two Gamma monitor sample lines.

Extracted from Plum 1961, November, pages 2-4.

COMPARATIVE PILE PERFORMANCE DEC. 1960

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,845	2,090	1,810	1,835	1,835	1,900	3,855	4,000	19,170
Maximum Power Level During Month, MW	1,845	2,090	1,810	1,785	1,835	1,900	3,825	4,000	19,090
Average Power Level While Operating, MW	1,719	1,922	1,773	1,715	1,760	1,834	3,497	3,872	18,092
Maximum Tube Power, KW	1,203	1,221	1,209	1,171	1,233	1,158	1,525	1,530	
Effective Central Tubes	1,525	1,720	1,495	1,550	1,480	1,640	2,500	2,570	
Time Operated Efficiency, %	82.2	77.8	92.6	89.4	83.4	92.5	76.9	86.3	84.9
Operational Limitation	1218KW	1210KW	1210KW	1175KW	1275KW	93.5°C	1510KW	1540KW	
MWD Produced During Month, total	43,788	46,321	50,876	47,533	45,524	52,555	81,233	103,606	471,436
Normal Solid	4,045	4,338	4,441	3,795	1,960	1,802	4,989	7,689	33,060
Normal I&E	35,429	32,521	42,958	36,350	39,106	40,122	65,138	80,853	372,477
9% Metal	4,313	9,462	3,477	7,388	4,458	10,631	11,106	15,064	65,899
Plutonium Produced, grams	36,143	38,716	41,704	36,697	37,521	41,243	72,806	91,793	396,823
Uranium In Reactor At Month End, tons	241.1	226.8	248.0	222.6	237.9	217.1	442.6	442.5	2271.6
Normal Solid	44.7	41.1	36.5	25.6	21.9	16.1	58.7	60.3	304.9
Normal I&E	177.0	151.2	196.8	167.7	197.0	162.6	340.6	335.2	1728.3
9% Metal	19.4	34.5	10.7	29.3	19.0	36.4	43.3	46.8	238.4
Uranium Discharged During Month, tons	69.1	115.6	73.9	35.5	63.3	17.1	86.0	163.7	624.8
Normal Solid	6.2	6.4	9.2	17.1	2.4	0.2	1.7	21.2	64.4
Normal I&E	58.0	88.2	60.8	8.3	56.8	6.5	71.4	121.0	471.0
9% Metal	5.5	21.0	3.9	10.1	4.1	10.4	12.9	21.5	89.4
Average Discharge Concentration	736	668	764	710	800	1,090	792	757	735
Normal Solid	666	665	768	833	667	854	569	686	672
Normal I&E	859	753	995	884	805	978	624	711	785
9% Metal									

Extracted from Travis 1961a, page 7.

Reactor Outages 1960

Outages for the month of December are as follows:

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
11/30	12/3	65.3	Removal of an I&E regular metal rupture from tube 3566 and miscellaneous maintenance.
12/18	12/19	35.9	Removal of an I&E regular metal rupture from tube 1559.
12/21	12/23	44.1	Leak testing and replacement of tubes 1276 and 2379.

C REACTOR

12/4	12/8	89.4	Scheduled charge-discharge and maintenance. Two channels were successfully overbored.
12/14	12/15	33.7	Removal of an I&E E metal rupture from tube 0957.
12/25	12/27	41.8	Removal of an I&E E metal rupture from tube 2276.
12/29	12/29	0.4	Leaking front pigtail.
12/30	12/30	0.3	An unexplained Beckman trip.

D REACTOR

12/12	12/15	55.2	Scheduled charge-discharge.

DR REACTOR

12/11	12/13	41.8	Removal of a solid regular metal rupture from tube 4090 and charge-discharge.
12/22	12/23	36.9	Leaking tube 3275 was replaced.

Extracted from Plum 1961, December, pages 3-5.

F REACTOR

Date Down	Date Up	Outage Hours	Remarks
11/30	12/2	47.4	Removal of an I&E regular metal rupture from tube 1677 and charge-discharge.
12/3	12/3	1.5	Open gamma monitor sample line.
12/3	12/4	21.9	Water leak - a gasket leak on tube 0854 was corrected and a new Van Stone was formed on tube 0964.
12/17	12/19	54.6	Removal of an I&E regular metal rupture from tube 2861 and charge-discharge and maintenance.

H REACTOR

12/26	12/29	55.8	Removal of a stuck I&E regular metal rupture in tube 1472 and charge-discharge.
12/29	12/29	0.3	Unexplained Panellit trip.

KE REACTOR

12/7	12/8	42.8	Removal of an I&E E metal rupture from tube 5369. Installed two single pass tubes for 1706 system.
12/8	12/9	3.0	Replaced venturis in two tubes.
12/9	12/9	6.2	Tripped due to a rupture in loop 3. (PT-IP-309A).
12/10	12/12	36.4	Removal of an I&E regular metal rupture from tube 3476.
12/15	12/17	34.7	Removal of an I&E regular metal rupture from tube 4351, charge-discharge and miscellaneous maintenance.
12/18	12/18	0.5	Tripped due to a ruptured spline cap seal on tube 4588.

Extracted from Plum 1961, December, pages 3-5.

KE REACTOR cont.

Date Down	Date UP	Outage Hours	Remarks
12/18	12/19	31.6	Miscellaneous maintenance following a high pressure Panellit trip.
12/20	12/20	0.4	Adjusted shielding in two vertical rod channels.
12/21	12/22	31.0	Removal of an I&E regular metal rupture from tube 5055.

KW REACTOR

12/4	12/5	41.1	Removal of an I&E E metal rupture from tube 5359. Charge-discharge.
12/21	12/23	60.6	Removal of an I&E E metal rupture from tube 5261.

Extracted from Plum 1961, December, pages 3-5.

APPENDIX B

OPERATING DATA FOR 1961

URANIUM IN TONS
1961

	REACTORS						SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.		Jan.	Feb.
Normal U	596	636	2,015	2,002	615	649	1,982	2,236	**Normal U**		
Solid	13	13	271	240	48	44					
I&E	583	623	1,744	1,762	567	605			Purex	445	404
									94 Metal		
94 Metal	88.5	86.4	254.1	261.2	75.9	79.3	627.2	625.5	Redox	65.9	80.8
Solid	0	0	0.4	0	0.3	0.4					
I&E	88.5	86.4	253.7	261.2	75.6	78.9					

MWD AND SPECIAL MATERIALS
1961

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
MWD	466,169	433,924							Dissolved	
Normal	399,619	370,270	775,530	684,594	442,892	461,206	1,391,276	1,583,266	305,226	277,231
94 Metal	66,550	63,654	109,733	112,998	62,624	60,389	489,447	487,115	49,832	62,619
Depleted	0	0	0	0	0	0	2,728	2,728	0	0

Extracted from Travis 1961c, pages 3 and 5.

COMPARATIVE PILE PERFORMANCE - JAN 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,860	2,135	1,840	1,855	1,850	1,900	4,030	4,000	19,470
Maximum Power Level During Month, MW	1,860	2,135	1,840	1,855	1,850	1,855	4,030	4,000	19,425
Average Power Level While Operating, MW	1,758	2,111	1,750	1,746	1,775	1,709	3,802	3,900	18,451
Maximum Tube Power, KW	1,226	1,221	1,240	1,168	1,257	1,180	1,580	1,560	
Effective Central Tubes	1,515	1,735	1,520	1,590	1,460	1,583	2,545	2,560	
Time Operated Efficiency, %	78.1	87.5	75.3	73.6	80.3	65.5	85.2	90.3	79.5
Operational Limitation	1230KW	1220KW	1210KW	1150KW	1275KW	93.5°C	1580KW	1580KW	
MWD Produced During Month, total	42,541	54,527	40,873	39,849	44,174	34,711	100,384	109,112	466,169
Normal Solid	3,842	5,114	2,718	2,052	1,573	1,192	5,899	7,156	29,544
Normal I&E	34,428	38,204	35,219	31,184	38,208	26,545	79,931	86,356	370,075
9% Metal	4,271	11,209	2,936	6,613	4,393	6,974	14,554	15,600	66,550
Plutonium Produced, grams	34,865	43,423	33,638	33,573	36,501	26,024	88,348	94,148	390,520
Uranium In Reactor At Month End, tons	240.8	227.4	243.6	221.7	237.5	215.1	441.2	441.0	2269.3
Normal Solid	40.1	41.1	25.7	21.0	18.7	16.0	54.3	53.8	270.7
Normal I&E	180.9	152.3	206.8	169.7	199.0	161.7	336.3	337.7	1744.4
9% Metal	19.8	34.3	11.1	31.0	19.8	38.4	50.6	49.5	254.2
Uranium Discharged During Month, tons	84.3	15.7	79.1	126.5	56.3	13.5	141.4	173.5	690.8
Normal Solid	6.5	-	11.7	4.6	3.2	1.4	8.9	11.3	47.6
Normal I&E	71.9	7.5	62.3	115.5	50.0	5.8	119.7	135.6	567.3
9% Metal	5.9	8.2	5.1	6.4	3.6	6.3	13.8	26.6	75.9
Average Discharge Concentration									
Normal Solid	728	-	747	728	776	761	749	810	760
Normal I&E	675	633	708	792	665	745	706	711	717
9% Metal	880	798	827	949	891	807	757	820	825

Extracted from Travis 1961b, page 7.

B REACTOR - JAN 1961

Date Down	Date Up	Outage Hours	Remarks
1/8	1/13	120.6	Scheduled charge-discharge, tube replacement, and miscellaneous maintenance.
1/26	1/28	42.2	Probologging and miscellaneous maintenance following the repair of a pigtail leak.
1/29	1/29	0.5	Repaired front pigtail leak on tube 4092.
C REACTOR			
1/9	1/9	0.2	Unexplained Panellit trip.
1/17	1/21	81.1	Scheduled charge-discharge and overboring of three process tube channels.
D REACTOR			
1/13	1/17	101.7	Removal of an I&E regular metal rupture from tube 1366. Charge-discharge, tube replacement and installation of 200 reamed front face nozzles.
1/21	1/22	38.1	Removal of an I&E regular metal (Bumper) rupture from tube 2676.
1/26	1/28	43.9	Removal of I&E regular metal (Bumper) rupture from tube 2878. Installed 184 overbored front nozzles.

Extracted from Plum 1962, January 1961, pages 2-4.

DR REACTOR

1/5	1/8	69.5	Scheduled charge-discharge.
1/8	1/8	0.7	Panellit trip
1/10	1/12	38.9	Low pressure water trip due to improper valving at 190 Building. Leak testing and miscellaneous maintenance.
1/12	1/12	1.2	Tripped due to a faulty vertical rod relay.
1/16	1/18	39.0	Leak testing. Replaced leaking tube 3973 and installed 63 reamed nozzles.
1/28	1/30	46.9	Removal of and I&E E-metal rupture from tube 2657.

F REACTOR

1/2	1/4	35.1	Low pressure Panellit trip on gauge 0955. Removal of an I&E regular metal rupture from tube 0868 and charge-discharge.
1/13	1/15	56.6	Leak testing.
1/29	Still down		Scheduled charge-discharge and tube replacement.

Extracted from Plum 1962, January 1961, pages 2-4.

II REACTOR

1/9	1/15	117.4	Removal of an I&E regular metal rupture from tube 3781. One to two tubes of irradiated metal (I&E-E) were discharged onto the rear face elevator when the elevator moved from the "up" to "down" position during the discharge operation. A total of 59 I&E E-metal pieces were removed from discharge elevator. Installed 195 reamed front face nozzles.
1/16	1/18	36.0	Corrected Parker fitting leak on tube 1377.
1/18	1/18	0.5	Installed bayonet in air channel 1463.
1/18	1/19	1.2	Repair broken lug ring on front nozzle 4386.
1/19	1/20	25.0	A period of insufficient reactivity.
1/23	1/25	34.5	Removal of an I&E regular metal rupture from tube 0982. Charge-discharge and miscellaneous maintenance.
1/31	Still down		Removal of an I&E regular metal rupture from tube 3379. Charge-discharge and miscellaneous maintenance.

KE REACTOR

1/13	1/17	76.5	Removal of an I&E regular metal rupture from tube 3167. Charge-discharge and maintenance.
1/19	1/21	33.9	Charge-discharge and maintenance following a loop trip. Four partial HCR's were installed and No. 4 low-lift motor was replaced with a rewound upgraded motor.

KW REACTOR

1/23	1/26	72.5	Removal of an I&E E metal rupture from tube 3090 and scheduled charge-discharge. A suspected I&E regular metal rupture discharged from tube 5384 on 1/23 was confirmed.

Extracted from Plum 1962, January 1961, pages 2-4.

COMPARATIVE PILE PERFORMANCE - FEB 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,870[1]	2,180[1]	1,915[1]	1,925[1]	1,850	1,900	4,030	4,080[1]	19,750
Maximum Power Level During Month, MW	1,870	2,180	1,915	1,925	1,845	1,900	4,030	4,080	19,745
Average Power Level While Operating, MW	1,783	2,072	1,864	1,871	1,755	1,659	3,505	3,930	18,439
Maximum Tube Power, KW	1,235	1,258	1,255	1,220	1,253	1,184	1,380	1,580	
Effective Central Tubes	1,529	1,733	1,523	1,551	1,452	1,605	2,550	2,560	
Time Operated Efficiency, %	85.3	81.0	83.9	94.3	72.1	63.4	84.6	93.8	82.3
Operational Limitation	1,230	1,236	1,265	1,240	1,275	[illegible]	1,580	1,580	
MWD Produced During Month, total	42,580	47,017	43,761	49,426[1]	35,410	29,455	83,027	103,248	433,924
Normal Solid	3,309	3,301	1,942	2,258	1,023	681	4,637	6,154	24,005
Normal I&E	34,975	33,716	38,496	38,912	30,757	21,510	66,174	81,734	346,265
9% Metal	4,296	9,500	3,323	8,256	3,630	7,073	12,216	15,360	63,654
Plutonium Produced, grams	34,606	38,162	36,434	40,015	29,328	24,883	72,310	92,205	367,943
Uranium In Reactor At Month End, tons	236.0	225.9	242.7	221.8	239.4	216.8	440.9	440.6	2263.1
Normal Solid	33.4	36.5	19.7	21.0	14.3	14.4	49.0	51.1	239.5
Normal I&E	182.5	154.1	211.7	169.7	204.2	155.4	344.1	340.7	1762.4
9% Metal	20.1	35.3	11.3	31.1	19.9	47.0	47.7	48.8	261.2
Uranium Discharged During Month, tons	70.0	161.9	42.7	0.2	76.2	142.4	147.5	87.0	727.9
Normal Solid	6.8	14.0	6.0	0	4.3	1.7	5.1	6.0	43.9
Normal I&E	57.0	128.1	32.8	0.1	65.0	136.1	116.9	68.7	604.7
9% Metal	6.2	19.8	3.9	0.1	6.9	4.6	25.5	12.3	79.3
Average Discharge Concentration	722	708	733	210	651	757	685	710	711
Normal Solid	746	761	755	-	749	788	788	787	764
Normal I&E	719	702	729	210	645	756	681	704	707
9% Metal	1,036	724	712	210	835	865	735	674	761

1 New record.

Extracted from Travis 1961c, page 6

REACTOR OUTAGES - FEB 1961

Date Down	Date Up	Outage Hours	Remarks
B REACTOR			
2/21	2/25	98.9	Removal of an I&E regular metal rupture from tube 1686. Charge-discharge and miscellaneous maintenance.
C REACTOR			
2/2	2/4	49.1	Removal of an I&E regular metal rupture from tube 3275. Charge-discharge and miscellaneous maintenance.
2/25	2/28	78.5	Removal of an I&E regular metal rupture from tube 2361. Charge-discharge and miscellaneous maintenance.
D REACTOR			
2/12	2/17	108.4	Removal of an I&E E-metal rupture from tube 4072. Charge-discharge and miscellaneous maintenance.
DR REACTOR			
2/2	2/4	38.1	Tripped by the gas loop when cooling water pressure to the heat exchanger was lost. Miscellaneous maintenance performed.
F REACTOR			
1/29	2/1	75.9	Scheduled charge-discharge and tube replacement.
2/15	2/18	87.0	Leak testing, charge-discharge and tube replacement.
2/19	2/22	62.2	Leak testing.
2/28	Still down		Water leak. Charge-discharge and miscellaneous maintenance.

Extracted from Plum 1962, February 1961, pages 3 and 4.

H REACTOR

1/31	2/1	37.9	Charge-discharge and leak testing following rupture removal.
2/5	2/10	117.5	Water leak, charge-discharge and maintenance. Installed 171 overbored nozzles.
2/11	2/11	0.3	Repositioned front cap on tube 1155 that was not fully engaged on lug rings.
2/12	2/14	41.9	Removal of an I&E E-metal rupture from tube 4173. Tube replacement and miscellaneous maintenance.
2/20	2/22	66.2	Leak testing.

KE REACTOR

2/1	2/3	47.8	Repair of No. 1 high-lift pump (wearing ring became displaced, causing some internal damage to the pump) and charge-discharge.
2/23	2/25	53.0	Scheduled charge-discharge. A 1500 h.p. motor was installed for #5 low-lift pump.
2/25	2/25	2.2	Low pressure Panellit trip on tube 4665.
2/25	2/25	0.3	Panellit trip.

KW REACTOR

2/11	2/13	41.5	Removal of an I&E E-metal rupture from tube 1686. Charge-discharge and maintenance.

Extracted from Plum 1962, February 1961, pages 3 and 4.

URANIUM IN TONS
1961

	REACTORS						SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.		Mar.	Apr.
Normal U	422	603	1,976	1,926	448	652	2,051	2,375	Normal U		
									Purex	635	324
									94 Metal		
94 Metal	108.8	106.4	271.8	297.0	98.3	81.0	622.9	595.4	Redox	99.4	108.1

MWD AND SPECIAL MATERIALS
1961

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.
MWD	434,947	452,835							Dissolved	
Normal	368,743	380,994	739,004	665,867	314,333	454,131	1,460,426	1,680,780	439,321	230,860
94 Metal	66,204	71,841	103,021	113,064	76,181	61,793	485,830	457,712	77,303	89,646

Extracted from Travis 1961e, pages 4 and 6.

COMPARATIVE PILE PERFORMANCE - MAR 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,180	1,945	1,925	1,935	1,955	4,085	4,115	20,035
Maximum Power Level During Month, MW	1,895	2,160	1,945	1,925	1,935	1,955	4,085	4,115	20,015
Average Power Level While Operating, MW	1,733	1,971	1,871	1,764	1,800	1,836	3,818	3,810	18,603
Maximum Tube Power, KW	1,263	1,240	1,265	1,230	1,299	1,138	1,560	1,550	
Effective Central Tubes	1,510	1,710	1,510	1,490	1,465	1,615	2,545	2,585	
Time Operated Efficiency, %	72.8	76.0	83.0	77.7	68.5	82.3	72.6	74.0	75.9
Operational Limitation	1,265	1,236	1,265	1,240	1,300	1,200	1,580	1,580	
MWD Produced During Month, total	39,176	46,511	48,080	42,679	38,164	46,817	85,599	87,621	434,947
Normal Solid	2,405	3,304	1,471	1,169	824	1,185	4,167	4,771	19,297
Normal I&E	32,586	33,309	42,878	34,626	33,537	33,581	69,144	69,785	349,446
94 Metal	4,185	9,898	3,731	6,884	3,803	12,050	12,588	13,065	66,204
Plutonium Produced, grams	32,329	39,304	39,297	33,316	31,755	38,670	76,962	77,400	369,033
Uranium In Reactor At Month End, tons	233.2	226.9	241.5	221.0	237.1	208.8	439.9	439.4	2247.8
Normal Solid	29.6	29.6	11.7	9.8	11.3	8.5	41.6	42.9	185.0
Normal I&E	183.3	162.1	218.1	180.6	205.9	142.0	350.6	348.4	1791.0
94 Metal	20.3	35.2	11.7	30.6	19.9	58.3	47.7	48.1	271.8
Uranium Discharged During Month, tons	43.0	22.1	77.0	53.5	73.9	32.7	104.1	140.4	546.8
Normal Solid	4.0	7.1	8.0	11.3	3.0	5.8	7.6	13.7	60.5
Normal I&E	35.2	6.2	65.5	23.1	64.5	13.4	76.1	104.0	388.0
94 Metal	3.8	8.8	3.5	19.2	6.4	13.5	20.4	22.7	98.3
Average Discharge Concentration									
Normal Solid	783	711	790	784	759	730	757	771	763
Normal I&E	670	761	705	857	604	776	662	713	691
94 Metal	905	709	815	938	872	853	611	701	774

Extracted from Travis 1961d, page 7.

REACTOR OUTAGES - MAR 1961

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
3/1	3/3	41.2	Leak testing and tube replacement.
3/13	3/15	38.6	Administrative.
3/20	3/24	79.3	Removal of an I&E regular metal rupture from tube 3764. Tube replacement and charge-discharge.
3/28	3/30	43.4	Removal of an I&E regular metal rupture from tube 3362.
C Reactor			
3/6	3/10	103.5	Scheduled overboring of 13 channels.
3/13	3/15	37.9	Administrative.
3/16	3/16	1.7	Panellit trip due to a faulty rear connector elbow on tube 1955.
3/17	3/17	0.2	Unexplained trip on No. 1 Beckman while setting trip on No. 4 Beckman.
3/23	3/23	0.5	Manual trip to repair a rear pigtail leak on tube 1935.
3/23	3/25	35.8	Manual trip due to flux imbalance caused by insufficient reactivity. Charge-discharge.
D Reactor			
3/12	3/16	84.9	Scheduled charge-discharge.
3/16	3/16	1.7	Front cap leak on tube 2969.
3/28	3/30	40.0	Electrical trip caused by a construction crane coming in contact with the 13.8 KV line.

Extracted from Plum 1962, March 1961, pages 3-6.

DR Reactor

3/5	3/8	69.3	Removal of an I&E E-metal rupture from tube 1467. Charge-discharge and leak testing.
3/13	3/15	38.9	Administrative.
3/28	3/30	38.3	Tripped when a construction crane at N Area came in contact with the 13.8 KV line.
3/31	Still down		Water leak.

F Reactor

2/28	3/4	103.8	Leak testing, tube replacement & charge-discharge.
3/11	3/13	37.3	Charge-discharge and maintenance following a Panellit trip.
3/13	3/14	26.5	Administrative.
3/18	3/20	36.5	Charge-discharge following a Panellit trip.
3/28	3/30	47.1	Charge-discharge and leak testing.

H Reactor

3/8	3/11	58.5	Removal of I&E E-metal ruptures from tubes 2892 and 0571 and charge-discharge.
3/13	3/15	32.3	Administrative.
3/15	3/15	0.2	Low pressure Panellit trip on gauge 1484
3/15	3/15	1.3	Rear pigtail adapter leak on tube 1484.
3/17	3/17	0.2	Unexplained Panellit trip on row 23.
3/28	3/30	40.4	Removal of an I&E E-metal rupture from tubes 2991 and 0572, and charge-discharge.

Extracted from Plum 1962, March 1961, pages 3-6.

KE Reactor

3/8	3/11	72.3	Removal of an I&E regular metal rupture from tube 2776 and charge-discharge.
3/11	3/11	0.5	Panellit trip on tube 4666 due to a plugged crossheader screen. Pieces of O ring were found on the screen.
3/13	3/15	34.3	Administrative.
3/19	3/21	34.9	Removal of an I&E regular metal rupture from tube 5684 and charge-discharge.
3/21	3/21	0.5	Unexplained Panellit trip on row 56.
3/22	3/23	40.0	Tripped due to a leak on the heat exchanger outlet of loop. Replaced the shaft in No. 1 low-lift pump.
3/25	3/26	32.0	Panellit trip due to a faulty gauge on tube 5657.
3/26	3/26	1.5	Unexplained Panellit trip on Row 56.

KW Reactor

3/5	3/7	69.3	Removal of an I&E regular metal rupture from tube 4177 and charge-discharge.
3/8	3/8	0.5	Tightened loose orifice on tube 5655.
3/8	3/9	32.8	Insufficient reactivity. Concluded tightening of loose orifice assembly and miscellaneous maintenance.
3/10	3/11	33.9	Removal of an I&E E-metal rupture from tube 2178 and charge-discharge.
3/13	3/15	33.5	Administrative.
3/27	3/29	34.7	Removal of an I&E E-metal rupture from tube 3183. Charge-discharge.
3/29	3/29	1.0	Unexplained Panellit trip.

Extracted from Plum 1962, March 1961, pages 3-6.

COMPARATIVE PILE PERFORMANCE - APR 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,180	1,945	1,925	1,935	1,955	4,085	4,115	20,035
Maximum Power Level During Month, MW	1,870	2,120	1,915	1,820	1,905	1,845	3,975	4,000	19,450
Average Power Level While Operating, MW	1,787	2,006	1,799	1,628	1,860	1,752	3,793	3,867	18,492
Maximum Tube Power, KW	1,267	1,241	1,260	1,204	1,298	1,193	1,560	1,575	
Effective Central Tubes	1,478	1,700	1,510	1,507	1,480	1,525	2,500	2,594	
Time Operated Efficiency, %	84.3	81.8	78.7	65.6	87.6	83.5	80.7	85.6	81.0
Operational Limitation	1,259	1,250	93.5	1,240	1,300	1,195	1,560	1,560	
MWD Produced During Month, total	45,180	49,256	42,477	32,027	48,889	43,897	91,800	99,300	452,835
Normal Solid	2,382	3,015	830	547	835	93	2,729	4,272	14,708
Normal I&E	37,929	36,100	38,211	26,352	43,087	29,883	74,380	80,344	366,286
9% Metal	4,869	10,141	3,436	5,128	4,967	13,916	14,691	14,693	71,841
Plutonium Produced, grams	37,412	39,598	35,039	24,392	40,572	34,068	81,533	87,748	380,362
Uranium In Reactor At Month End, tons	229.6	227.4	240.3	220.7	233.8	198.9	435.4	437.6	2223.7
Normal Solid	26.4	22.0	6.5	9.0	8.4	-	8.9	31.7	112.9
Normal I&E	182.7	171.8	222.3	179.8	204.9	126.0	372.4	353.6	1813.5
9% Metal	20.5	33.6	11.5	31.9	20.5	72.9	54.1	52.3	297.3
Uranium Discharged During Month, tons	68.2	34.7	62.9	115.3	54.7	41.2	168.5	188.0	733.5
Normal Solid	5.8	7.6	5.2	0.8	3.0	8.5	32.7	11.2	74.8
Normal I&E	57.5	14.6	54.0	112.3	46.5	17.7	119.1	156.0	577.7
9% Metal	4.9	12.5	3.7	2.2	5.2	15.0	16.7	20.8	81.0
Average Discharge Concentration									
Normal Solid	770	736	766	719	788	478	638	727	667
Normal I&E	682	783	702	795	654	470	673	690	700
9% Metal	866	774	893	630	843	829	661	736	763

Extracted from Travis 1961e, page 7.

REACTOR OUTAGES - APR 1961

B Reactor

Date Down	Date Up	Outage Hours	Remarks
4/6	4/8	37.5	Removal of an I&E regular metal rupture from tube 3272 and charge-discharge.
4/22	4/25	75.4	Removal of an I&E regular metal rupture from tube 1065 and charge-discharge.

C Reactor

4/9	4/11	40.8	Scheduled charge-discharge and overboring of channels.
4/17	4/19	36.6	Replacement of 24 cross-threaded front pigtails.
4/19	4/19	1.0	Panellit trip.
4/21	4/23	34.2	Removal of an I&E regular metal rupture from tube 2269.
4/23	4/23	1.3	Leaking rear pigtail on tube 2264.
4/30	Still down		Removal of an I&E regular metal rupture from tube 2270.

D Reactor

4/6	4/6	0.2	Panellit trip; #1 pump at 190 burned out a coil.
4/7	4/9	48.2	Removal of an I&E regular metal rupture from tube 0893 and charge-discharge.
4/9	4/9	0.5	Stuck ball valve on a poison tube.
4/12	4/14	46.4	Leak testing. Replaced tubes 3477 and 3261 due to internal leaks and seven additional process tubes. Miscellaneous maintenance.
4/28	4/30	57.8	Removal of an I&E regular metal rupture from tube 0460, changed 103 front nozzles, and charge-discharge.

Extracted from Plum 1962, April 1961 pages 3-5.

DR Reactor

3/31	4/2	42.6	Leak testing.
4/4	4/6	52.2	Leak testing and tube replacement.
4/14	4/15	38.9	Panellit trip due to a leaking Bourdon tube, small charge-discharge and maintenance.
4/24	4/29	103.2	Water leak in tube 2682. Block charge-discharge
4/30	4/30	1.6	Manually tripped for thermocouple repair.

F Reactor

4/17	4/19	51.5	Water leak and charge-discharge. Number 4 pump motor burned out.
4/19	4/20	30	Leak testing. Tube 2875 was replaced.
4/30	Still down		Repair rear pigtail leaks. Charge-discharge.

H Reactor

4/4	4/6	49.4	Removal of an I&E regular metal rupture from tube 2486 and charge-discharge.
4/6	4/7	18.1	Leak testing. Tube 2390 removed due to a leak, and channel blanked.
4/24	4/25	44.1	Removal of an I&E regular metal rupture from tube 1989. Charge-discharge and installation of 165 rear pigtails and 178 broached front nozzles.
4/26	4/26	6.7	Removal of an I&E regular metal rupture from tube 2857.

Extracted from Plum 1962, April 1961 pages 3-5.

KE Reactor

4/8	4/10	46.8	Charge-discharge following removal of a NIN-1 rupture from KER loop 4.
4/10	4/11	22.4	Removal of an I&E E-metal rupture from tube 2461.
4/11	4/11	0.3	Panellit trip.
4/19	4/20	34.1	Removal of a solid regular metal rupture from tube 5653 and charge-discharge.
4/26	4/27	35.3	Charge-discharge and loop work following a Panellit trip.

KW Reactor

4/16	4/19	69.8	Scheduled charge-discharge and maintenance.
4/25	4/27	34.6	Removal of an I&E regular metal rupture from tube 5045.

Extracted from Plum 1962, April 1961 pages 3-5.

URANIUM IN TONS
1961

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	May	June	May	June	May	June	May	June		May	June
Normal U	558	326	1,794	1,783	690	336	2,322	2,143	Normal U		
									Purex	751	510
94 Metal	204.7	72.6	410.8	412.3	91.1	71.1	599.9	503.0	94 Metal		
									Redox	86.2	167.4

MWD AND SPECIAL MATERIALS
1961

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	May	June	May	June	May	June	May	June	May	June
MWD	453,041	434,651							Dissolved	
Normal	375,081	338,213	585,783	696,110	455,160	227,891	1,600,484	1,466,090	542,651	358,873
94 Metal	77,960	96,438	123,699	166,321	67,325	53,816	467,680	389,830	55,399	131,517

Extracted from Travis 1961g, pages 4 and 6.

COMPARATIVE PILE PERFORMANCE - MAY 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	~~1,895~~	~~2,180~~	~~1,945~~	~~1,925~~	~~1,935~~	~~1,955~~	~~4,089~~	~~4,115~~	~~20,035~~
Maximum Power Level During Month, MW	1,360	2,130	1,885	1,895	1,875	1,785	3,960	3,940	19,330
Average Power Level While Operating, MW	1,336	1,971	1,834	1,803	1,759	1,516	3,851	3,321	18,381
Maximum Tube Power, KW	1,308	1,250	1,247	1,220	1,273	1,168	1,555	1,555	
Effective Central Tubes	1,522	1,685	1,500	1,530	1,475	1,530	2,530	2,571	
Time Operated Efficiency, %	73.3	80.0	83.6	79.8	70.4	55.6	86.2	87.7	77.0
Operational Limitation	93.50	1,250	93.50	1,250	700°C	1,185	1,560	1,560	
MWD Produced During Month, total	39,206	48,855	47,547	44,513	38,371	27,847	102,775	103,827	453,041
Normal Solid	33,195	36,708	43,405	36,661	33,892	12,775	85,251	83,760	365,647
Normal I&E	1,773	2,099	466	594	415	0	653	3,444	9,434
9% Metal	4,238	10,048	3,686	7,358	4,064	15,072	16,871	16,623	77,960
Plutonium Produced, grams	32,766	40,190	38,699	38,355	32,092	21,104	88,188	89,925	381,119
Uranium In Reactor At Month End, tons	228.7	226.4	238.0	220.5	228.2	191.1	435.0	437.1	2205.0
Normal Solid	24.0	18.4	5.3	4.6	4.7	0	6.2	24.8	88.0
Normal I&E	184.3	173.2	220.9	185.6	202.3	3.0	376.6	360.0	1705.9
9% Metal	20.4	34.3	11.8	30.3	21.2	188.1	52.2	52.3	411.1
Uranium Discharged During Month, tons	61.5	85.0	33.9	30.9	96.4	131.6	199.8	142.2	781.3
Normal Solid	3.0	3.6	1.2	4.3	3.7	0	2.8	6.9	25.5
Normal I&E	55.2	66.9	30.5	17.1	88.1	126.0	165.5	115.3	664.6
9% Metal	3.3	14.5	2.2	9.5	4.5	5.6	31.5	20.0	91.2
Average Discharge Concentration	764	698	812	770	786	0	554	782	743
Normal Solid	604	641	750	735	588	675	647	700	656
Normal I&E	885	749	1,087	845	841	695	650	739	737

Extracted from Travis 1961f, page 7.

REACTOR OUTAGES - MAY 1961

Date Down	Date UP	Outage Hours	Remarks
B REACTOR			
5/1	5/2	40.3	Removal of an I&E regular metal rupture from tube 2370. Leaking tube 2257 and the rupture tube were replaced.
5/2	5/3	24.9	Removal of an I&E regular metal rupture from tube 1959.
5/16	5/19	58.9	Leak testing and removal of leaking tube 1881 (ribless). Replacement of 12 process tubes.
5/22	5/24	43.8	Leak testing. Replaced 12 ribless aluminum tubes due to thin walls.
5/24	5/26	31.1	Correction of a front pigtail leak on tube 1173. Replacement of 78 rear pigtails and 40 thermocouples.
C REACTOR			
4/30	5/1	40.8	Removal of I&E regular metal rupture from tube 2270. Charge-discharge.
5/4	5/4	0.5	Trip when a VSR dropped due to low voltage on instrument power.
5/14	5/19	22.5	Scheduled charge-discharge and maintenance.
5/19	5/19	4.8	Replacement of two rear face thermocouple wells.
D REACTOR			
5/20	5/25	118.2	Scheduled charge-discharge and maintenance.
5/25	5/25	2.7	Repair rear thermocouple.
5/31	Still down		Correction of a front face cap not fully rotated on the lug ring. Charge-discharge.

Extracted from Plum 1962, May 1961, pages 7-9.

DR REACTOR

5/4	5/6	54.8	Water leak. Replacement of 17 tubes, including three leakers.
5/17	5/19	39.8	Removal of I&E E metal rupture from tube 2657 and charge-discharge.
5/28	5/30	55.5	Leak testing. Removal and replacement of 12 tubes.

F REACTOR

4/30	5/3	62.6	Rear pigtail leaks. Charge-discharge and maintenance.
5/4	5/5	32.8	Panellit trip on gauge 3557. Miscellaneous maintenance.
5/8	5/11	63.5	Panellit trip. Replacement of 33 process tubes.
5/25	5/28	69.0	Trip due to a leaking rear pigtail. Charge-discharge and tube replacement.

H REACTOR

5/3	5/3	0.2	Tripped due to a power surge on the BPA system.
5/3	5/8	115.7	Failure of a rear pigtail on tube 1279. Charge-discharge and maintenance.
5/14	5/14	0.2	Trip due to the failure of a "Y" adapter fitting on tube 2791.
5/14	5/15	32.7	Leak testing.
5/16	5/16	0.2	Unexplained Panellit trip.
5/21	5/28	168.5	Scheduled charge-discharge and maintenance.
5/28	5/29	3.7	High pressure on two tubes.

Extracted from Plum 1962, May 1961, pages 7-9.

KE REACTOR

5/10	5/12	40.8	KER Loop 3 trip. Charge-discharge.
5/12	5/13	2.6	Removal of a rupture from KER Loop 1.
5/26	5/29	56.5	Repair of nine front gunbarrel flanges, (tru-arc) rings and charge-discharge.
5/29	5/29	3.5	Suspected rupture in Loop 3 (PT-IP-377-A).

KW REACTOR

5/1	5/2	34.6	Tripped by oscillating Panellit gauge 0873. Charge-discharge.
5/3	5/3	0.3	Unexplained Panellit trip.
5/25	5/27	56.2	Scheduled charge-discharge and maintenance.
5/27	5/27	0.7	Panellit trip due to an oscillating guage.

Extracted from Plum 1962, May 1961, pages 7-9.

COMPARATIVE PILE PERFORMANCE - JUN 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,180	1,945	1,925	1,935	1,955	4,085	4,115	20,035
Maximum Power Level During Month, MW	1,840	2,115	1,825	1,850	1,860	1,800	3,930	3,955	19,175
Average Power Level While Operating, MW	1,760	1,908	1,732	1,769	1,742	1,655	3,804	3,807	18,178
Maximum Tube Power, KW	1,179	1,225	1,200	1,180	1,266	1,138	1,500	1,505	
Effective Central Tubes	1,520	1,695	1,500	1,540	1470	1,540	2,550	2,565	
Time Operated Efficiency, %	78.3	70.6	68.6	82.8	77.5	77.9	86.6	83.5	78.2
Operational Limitation	93.5	95.0	93.5	95.0	93.5	93.5	95.0	95.0	
MWD Produced During Month, total	41,324	40,308	35,642	43,923	40,501	38,717	98,785	95,351	434,651
Normal Solid	1,614	1,216	219	333	270	0	506	2,339	6,497
Normal IAE	35,218	30,249	32,656	36,624	35,799	586	82,515	78,069	331,716
9% Metal	4,492	8,923	2,767	6,976	4,432	38,131	15,764	14,953	96,438
Plutonium Produced, grams	33,145	33,222	27,743	34,760	32,868	28,128	84,874	79,364	354,104
Uranium in Reactor at Month End, tons	226.7	225.3	234.4	220.8	227.6	189.7	434.5	436.6	2195.6
Normal Solid	18.1	11.2	3.1	4.6	4.6	0	4.2	21.0	66.8
Normal IAE	186.9	177.2	219.9	185.2	202.4	3.0	377.7	363.9	1716.2
9% Metal	21.7	36.9	11.4	30.0	21.6	186.7	52.6	51.7	412.6
Uranium Discharged During Month, tons	75.7	79.4	66.2	26.5	25.2	13.2	79.4	42.0	407.6
Normal Solid	5.9	7.2	2.2	-	0.1	-	2.0	3.8	21.2
Normal IAE	61.7	60.1	59.7	22.1	20.4	0.2	66.4	24.7	315.3
9% Metal	8.1	12.1	4.3	4.4	4.7	13.0	11.0	13.5	71.1
Average Discharge Concentration									
Normal Solid	733	627	794	-	1,070	-	604	714	695
Normal IAE	674	727	777	324	617	265	661	724	676
9% Metal	1,097	832	1,063	847	724	459	723	685	757

Extracted from Travis 1961g, page 7.

REACTOR OUTAGES - JUN 1961

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
6/17	6/22	116.7	Removal of an I&E regular metal rupture from tube 0967, charge-discharge and tube replacement.
6/22	6/22	2.4	Rear face cap leak.
6/26	6/28	37.2	High pressure Panellit trip on tube 2683. Miscellaneous maintenance and a small charge-discharge.
C Reactor			
6/5	6/8	61.1	Removal of an I&E regular metal rupture from tube 3766. Miscellaneous maintenance and charge-discharge.
6/8	6/8	2.1	Panellit trip due to the pigtail coming loose from rear nozzle 1557.
6/8	6/8	0.4	Manual trip for temperature control.
6/9	6/11	31.3	Removal of a solid regular metal rupture from tube 2352.
6/16	6/17	36.7	Leak testing. Leaking tube 4170 replaced.
6/20	6/22	37.7	Leak testing.
6/26	6/28	42.7	Leak testing. Tube 2566 replaced.
D Reactor			
5/31	6/3	68.9	Correction of a front face cap not fully rotated on the lug ring. Charge-discharge and tube replacement.
6/3	6/4	3.6	High pressure Panellit trip on tube 3882.
6/11	6/13	44.8	Leak testing; charge-discharge and tube replacement.
6/25	6/30	107.7	Scheduled charge-discharge and tube replacement.

Extracted from Plum 1962, June 1961, pages 2-5.

DR Reactor

6/6	6/8	62.4	Leak testing and tube replacement.
6/9	6/10	26.4	Removal of an I&E regular metal rupture from tube 2986.
6/12	6/14	35.3	Repair of broken lug ring on front nozzle 1563. Charge-discharge.

F Reactor

6/12	6/16	82.9	Removal of a stuck I&E-E metal rupture from tube 3457. Charge-discharge and miscellaneous maintenance.
6/19	6/21	38.0	Tripped due to a faulty circuit breaker at Midway. Leak testing and charge-discharge.
6/24	6/25	41.6	Removal of an I&E regular metal rupture from tube 2264.
6/28	6/28	0.2	Panellit trip due to a ruptured rear pigtail on tube 4370.

H Reactor

6/6	6/6	0.2	Panellit trip due to a rear pigtail failure on tube 3691.
6/6	6/6	0.1	Unexplained trip on Nos. 2, 3 and 4 Beckmanns.
6/7	6/8	32.4	Leak testing.
6/18	6/20	47.5	Removal of stuck I&E-E metal rupture from tube 2867. Leak testing.
6/21	6/21	0.4	Tripped when flow to PCCF tube 2079 was reduced prior to bypassing the Panellit gauge.
6/21	6/22	22.9	Tripped due to a rear connector leak on tube 0678. Leak testing.
6/27	6/29	53.4	Leak testing.
6/29	6/30	1.8	Correction of two leaking front face caps.

Extracted from Plum 1962, June 1961, pages 2-5.

KE Reactor

6/7	6/9	35.7	Trip by KER loop 1. Charge-discharge.
6/20	6/23	61.1	Faulty tru-arc ring. Charge-discharge and miscellaneous maintenance.

KW Reactor

6/9	6/11	35.0	Unexplained Panellit trip. Charge-discharge.
6/27	Still down		Scheduled charge-discharge and maintenance.

Extracted from Plum 1962, June 1961, pages 2-5.

URANIUM IN TONS
1961

	REACTORS						SEPARATIONS	
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	July	Aug.	July	Aug.	July	Aug.	July	Aug.		July	Aug.
Normal U	470	346	1,743	1,744	505	350	2,136	1,891	Normal U		
									Purex	509	589
94 Metal	93.6	104.7	434.9	434.3	70.9	105.1	429.7	409.5	94 Metal		
									Redox	143.9	126.0

MWD AND SPECIAL MATERIALS
1961

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	July	August	July	August	July	August	July	August	July	August
									Dissolved	
MWD	427,204	396,648								
Normal	320,325	302,409	679,572	733,594	337,363	248,387	1,450,642	1,302,780	351,232	392,733
94 Metal	106,379	94,239	217,038	225,492	55,662	85,785	332,387	317,267	113,993	100,605

Extracted from Travis 1961i, pages 4 and 6.

COMPARATIVE PILE PERFORMANCE - JUL 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,180	1,945	1,925	1,935	1,955	4,085	4,115	20,035
Maximum Power Level During Month, MW	1,755	2,080	1,755	1,810	1,910	1,725	3,830	3,915	18,580
Average Power Level While Operating, MW	1,709	1,990	1,656	1,129	1,657	1,645	3,647	3,641	17,074
Maximum Tube Power, KW	1,114	1,163	1,145	1,160	1,244	1,085	1,397	1,437	
Effective Central Tubes	1,520	1,695	1,500	1,530	1,479	1,502	2,590	2,550	
Time Operated Efficiency, %	79.3	94.9	71.9	42.2	51.6	93.7	87.3	90.1	76.4
Operational Limitation	93.5	95.0	93.5	AL	93.5	93.5	95.0	95.0	
MWD Produced During Month, total	42,293	58,506[1]	36,895	14,766	26,495	47,758	98,728	101,763	427,204
Normal Solid	1,293	1,429	158	111	146	0	302	1,880	5,319
Normal I&E	36,048	44,002	33,752	12,223	23,362	742	82,019	83,359	315,506
94 Metal	4,952	13,075	2,985	2,432	2,987	47,016	16,408	16,524	106,379
Plutonium Produced, grams	34,160	46,175	29,691	11,705	21,521	33,049	84,729	89,713	350,743
Uranium In Reactor At Month End, tons	225.8	225.3	230.3	218.9	223.5	189.6	433.5	435.9	2182.8
Normal Solid	14.1	11.2	2.8	4.6	3.0	C	2.4	14.7	52.8
Normal I&E	189.7	177.2	214.6	177.0	191.0	3.1	373.7	368.5	1694.8
94 Metal	22.0	36.9	12.9	37.3	29.5	186.5	57.4	52.7	435.2
Uranium Discharged During Month, tons	64.7	4.0	39.8	37.0	87.4	5.1	147.8	190.2	576.0
Normal Solid	3.9		0.3		1.6		1.8	6.4	14.0
Normal I&E	55.1	3.3	37.7	29.8	80.9		118.8	165.5	491.1
94 Metal	5.7	0.7	1.8	7.2	4.9	5.1	27.2	18.3	70.9
Average Discharge Concentration									
Normal Solid	810		660		825		685	750	764
Normal I&E	682	545	757	630	569		711	661	665
94 Metal	929	527	492	807	840	963	757	748	785

1 New record.

Extracted from Travis 1961h, page 7.

REACTOR OUTAGES - JUL 1961

Date Down	Date Up	Outage Hours	Remarks
D REACTOR			
7/24	7/30	150.2	Scheduled charge-discharge and tube replacement.
C REACTOR			
7/6	7/7	38.6	Leak testing.
D REACTOR			
7/4	7/6	40.3	Leak testing. Replacement of four leaking tubes.
7/11	7/13	47.1	Power failure trip. Tube replacement.
7/20	7/24	86.3	Water leak. Charge-discharge and miscellaneous maintenance.
7/24	7/26	40.1	Improperly positioned front face cap. Replacement of 20 tubes.
DR REACTOR			
7/1	7/2	47.2	Leak testing. Replaced five process tubes.
7/5	7/8	55.5	Leak testing. Replaced twenty seven process tubes.
7/11	7/21	237.8	Power failure when a relay at 151 substation was shorted out during testing. A 50 psi drop in water pressure following trip resulted in the 3X system balls dropping into the VSR channels. The [illegible] drop was caused by an improper pressure trip setting resulting from the group identification of mercoids. Ball recovery.
7/21	7/22	27.7	Lack of reactivity. Charged enrichment and completed leak testing.
7/27	7/30	61.5	Enrichment adjustment, removal of balls from channels with electromagnet and tube replacement.
7/30	7/30	0.4	Panellit trip.

Extracted from Plum 1962, July 1961, pages 3-5.

F REACTOR

7/1	7/3	52.9	Removal of an I&E regular metal rupture from tube 2485 and charge-discharge.
7/10	7/14	95.9	Scheduled charge-discharge, tube replacement and maintenance.
7/17	7/20	73.2	Leak testing.
7/20	7/20	1.8	Repair leak on spline cap 1168.
7/21	7/23	52.5	Leak testing.
7/27	7/30	62.0	Low pressure Panellit trip on tube 3063 due to a leak - tube removed. Charge-discharge and probologging of 97 process tubes.
7/30	7/31	10.0	Charge enrichment in wet zone.
7/31	Still down		Charge additional enrichment.

H REACTOR

7/7	7/9	45.4	Leak testing.
7/10	7/10	1.3	Repair leaks on two front crosshead caps.
7/18	7/18	0.3	Tripped due to a rear pigtail failure on 0778.

KE REACTOR

7/17	7/20	83.2	Scheduled charge-discharge and maintenance.
7/31	Still down		Panellit trip. Charge-discharge is in progress.

KW REACTOR

6/27	7/1	87.4	Scheduled charge-discharge and maintenance.
7/1	7/1	1.1	Replace orifices and pigtails on three tubes due to high pressure.
7/11	7/12	35.3	Panellit trip. Charge-discharge.
7/14	7/15	33.5	Unexplained Panellit trip.

Extracted from Plum 1962, July 1961, pages 3-5.

COMPARATIVE PILE PERFORMANCE - Aug 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,180	1,945	1,925	1,935	1,955	4,085	4,115	20,035
Maximum Power Level During Month, MW	1,675	2,000	1,680	1,615	1,715	1,630	3,635	3,675	17,625
Average Power Level While Operating, MW	1,596	1,863	1,607	1,369	1,401	1,554	3,558	3,506	16,454
Maximum Tube Power, KW	1,098	1,168	1,120	1,143	1,178	1,066	1,433	1,417	
Effective Central Tubes	1,540	1,680	1,480	1,400	1,450	1,490	2,520	2,520	
Time Operated Efficiency, %	75.8	60.8	70.8	81.4	89.4	73.7	85.0	79.3	77.0
Operational Limitation	93.5[1]	95.0[1]	93.5[1]	[2]	93.5[1]	93.5[1]	95.0[1]	95.0[1]	
MWD Produced During Month, total	37,492	35,105	35,276	34,548	38,816	35,482	93,751	86,178	396,648
Normal Solid	862	319	67	61	158	0	188	1,020	2,675
Normal I&E	3,210	26,597	32,250	26,656	31,402	613	78,697	71,419	299,734
9Li Metal	4,530	8,189	2,959	7,831	7,256	34,869	14,866	13,739	94,239
Plutonium Produced, grams	30,940	29,017	28,340	26,676	31,569	23,921	80,905	74,033	325,401
Uranium In Reactor At Month End, tons	224.2	223.8	229.0	217.8	223.3	190.5	434.5	435.5	2178.6
Normal Solid	12.2	4.7			2.7		2.4	6.7	28.7
Normal I&E	189.6	180.4	217.1	174.7	193.6	3.5	380.1	376.1	1715.1
9Li Metal	22.4	38.7	11.9	43.1	27.0	187.0	52.0	52.7	434.8
Uranium Discharged During Month, tons	27.9	115.0	33.9	22.5	28.4	24.4	53.7	149.0	454.8
Normal Solid	1.9	6.5	2.8	4.6	0.3			8.0	24.1
Normal I&E	23.7	83.5	28.1	14.5	21.0	0.1	43.2	111.5	325.6
9Li Metal	2.3	25.0	3.0	3.4	7.1	24.3	10.5	29.5	105.1
Average Discharge Concentration									
Normal Solid	755	768	778	789	757	0	0	749	766
Normal I&E	670	717	798	591	662	270	663	723	706
9Li Metal	836	827	750	1,157	399	979	687	785	816

1 Bulk outlet temperature.
2 Administrative limit for lack of reactivity.

Extracted from Travis 1961i, page 7.

REACTOR OUTAGES - AUG 1961

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
8/14	8/15	0.3	Tripped by a power surge on the BPA system due to lightning.
8/15	8/16	42.2	Tripped when a VSR dropped to the lower position. Charge-discharge and miscellaneous maintenance.
8/17	8/19	34.0	Leak testing and miscellaneous maintenance.
8/21	8/23	57.1	Leak testing and miscellaneous maintenance. Three leaking tubes replaced. Seven pumps in use due to the motor on No. 3 burning out.
8/28	8/30	37.9	Leak testing and miscellaneous maintenance.
C Reactor			
8/1	8/4	88.4	Scheduled charge-discharge and maintenance.
8/14	8/15	0.2	Tripped by a power surge on the BPA system due to lightning.
8/19	8/25	159.8	Scheduled overboring.
8/30	8/31	43.4	Abnormally high pressure on overbored tube 3165.
D Reactor			
8/6	8/10	99.1	Water leak. Charge-discharge and tube replacement.
8/18	8/20	51.8	Water leak. Charge-discharge.
8/24	8/24	0.4	Unexplained Panellit trip.
8/29	Still down		Removal of an I&E regular metal (bumper) rupture from tube 1163. Charge-discharge and tube replacement.

Extracted from Plum 1962, August 1961, pages 4-6.

DR Reactor

8/9	8/11	47.7	Panellit trip. Charge-discharge and miscellaneous maintenance.
8/14	8/16	38.1	Charging of additional enrichment and replacement of 7 process tubes.
8/23	8/25	40.5	Gas loop trip. Miscellaneous maintenance.
8/31	Still down		Removal of I&E regular metal ruptures from tubes 2470 and 2478.

F Reactor

7/31	8/1	17.4	Charging of additional enrichment.
8/23	8/26	73.4	Leak testing and charge-discharge.

H Reactor

8/3	8/6	93.4	Leak testing and tube replacement.
8/6	8/7	2.3	Repair of leaking front pigtails on tubes 2290 and 2655.
8/7	8/7	0.7	Low pressure Panellit trip on tube 2391.
8/7	8/7	3.0	High pressure Panellit trip on tube 2391. Discharged metal and replaced Venturi and front pigtail.
8/7	8/8	21.6	Removal of an I&E E-metal rupture from tube 2476.
8/15	8/16	38.2	Leak testing.
8/30	9/1	35.7	Removal of an I&E E-metal rupture (bumper) from tube 1379. Charge-discharge and miscellaneous maintenance.

Extracted from Plum 1962, August 1961, pages 4-6.

KE Reactor

7/31	8/2	40.9	Panellit trip. Charge-discharge and miscellaneous maintenance.
8/8	8/10	41.3	Panellit trip. Miscellaneous maintenance.
8/30	Still down		Scheduled charge-discharge.

KW Reactor

8/14	8/17	79.9	Scheduled charge-discharge and miscellaneous maintenance.
8/24	8/26	40.7	Removal of an I&E E-metal rupture from tube 1363 and leak testing.
8/26	8/27	39.5	Leak testing.

Extracted from Plum 1962, August 1961, pages 4-6.

URANIUM IN TONS
1961

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.		Sept.	Oct.
Normal U	592	413	1,749	1,746	588	425	1,909	1,990	Normal U		
									Purex	576	347
94 Metal	194.7	110.0	429.5	434.3	200.0	108.0	540.2	535.9	94 Metal		
									Redox	69.0	111.8

MWD AND SPECIAL MATERIALS
1961

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.
MWD	382,596	427,418							Dissolved	
Normal	300,987	325,177	612,037	631,129	422,544	306,085	1,358,063	1,444,709	372,751	216,030
94 Metal	81,609	102,241	147,383	165,437	159,718	84,187	425,314	422,562	51,570	85,494

Extracted from Travis 1961k, pages 4 and 6.

COMPARATIVE PILE PERFORMANCE - SEPT 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,180	1,945	1,925	1,935	1,955	4,085	4,115	20,035
Maximum Power Level During Month, MW	1,735	2,060	1,705	1,740	1,760	1,610	3,800	3,770	18,180
Average Power Level While Operating, MW	1,669	1,933	1,541	1,614	1,663	1,442	3,508	3,629	16,999
Maximum Tube Power, KW	1,140	1,232	1,150	1,140	1,179	1,061	1,448	1,482	
Effective Central Tubes	1,520	1,650	1,445	1,500	1,440	1,510	2,570	2,520	
Time Operated Efficiency, %	68.4	85.4	61.7	65.0	67.7	51.5	82.8	87.9	71.3
Operational Limitation	93.5	95.0	93.5	93.5	93.5	93.5	95.0	95.0	
MWD Produced During Month, total	34,252	49,491	28,533	31,468	33,757	22,287	87,106	95,702	382,596
Normal Solid	678	339	0	0	115	0	2	554	1,688
Normal I&E	29,365	37,443	26,283	22,786	29,195	401	73,932	79,894	299,299
9% Metal	4,209	11,709	2,250	8,682	4,447	21,886	13,172	15,254	81,609
Plutonium Produced, grams	27,707	40,253	23,001	25,761	27,455	15,389	76,566	82,300	318,432
Uranium In Reactor At Month End, tons	223.9	224.0	229.4	216.6	224.0	191.7	435.3	433.9	2178.8
Normal Solid	9.5	2.0	0	0	2.2	0	0	3.3	17.0
Normal I&E	192.0	182.6	217.9	170.0	198.5	3.6	390.1	377.5	1732.2
9% Metal	22.4	39.4	11.5	46.6	23.3	188.1	45.2	53.1	429.6
Uranium Discharged During Month, tons	62.7	77.7	42.5	112.3	55.6	120.3	165.5	150.0	786.6
Normal Solid	2.7	2.7	0	0	0.6	0	2.4	3.3	11.7
Normal I&E	54.5	67.0	37.1	105.7	46.7	2.9	132.5	128.5	574.9
9% Metal	5.5	8.0	5.4	6.6	8.3	117.4	30.6	18.2	200.0
Average Discharge Concentration									
Normal Solid	795	742	-	-	757	-	755	790	771
Normal I&E	704	766	730	723	721	709	710	704	719
9% Metal	849	864	742	778	673	829	689	823	799

Extracted from Travis 1961j, page 6.

REACTOR OUTAGES - SEP 1961

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
9/8	9/14	120.9	Water leak. Tube replacement.
9/14	9/14	1.6	Leak testing and tube replacement.
9/24	9/28	104.1	Repair faulty thermocouple on tube 0274.
C Reactor			
9/15	9/15	0.2	Panellit trip.
9/16	9/21	105.4	Scheduled charge-discharge.
D Reactor			
8/29	9/2	94.6	Charge-discharge and tube replacement following rupture removal.
9/3	9/4	39.4	Removal of an I&E regular metal rupture from tube 1465.
9/4	9/5	4.9	Removed pieces of broken spline from tube 3860.
9/8	9/10	39.5	Tripped due to an improper switching procedure at 151 building. Leak testing & miscellaneous maintenance.
9/11	9/11	0.4	Tripped due to the loss of #7 pump resulting from an improper procedure at 151 building.
9/15	9/18	36.9	Removal of an I&E E-metal rupture from tube 4072. Charge-discharge & tube replacement.
9/21	9/23	52.9	Panellit trip due to internal leak in tube 4180. Tube Replacement.
9/25	9/26	41.2	Water leak. Charge-discharge and tube replacement.
9/30	Still down		Leak testing.

Extracted from Plum 1962, September 1961, pages 3-6.

DR Reactor

8/31	9/2	40.5	Miscellaneous maintenance following rupture removal.
9/2	9/2	0.6	Panellit trip due to a stub being pulled from spline cap on tube 0779.
9/5	9/11	136.0	Scheduled charge-discharge, tube replacement on Ball 3X work.
9/18	9/20	41.5	Removal of I&E E-metal rupture from tube 2561. Miscellaneous maintenance and charge-discharge.
9/20	9/20	0.3	Panellit trip due to oscillating gauge.
9/26	9/28	46.8	Removal of an I&E E-metal rupture from tube 0766. Charge-discharge and miscellaneous maintenance.

F Reactor

9/5	9/6	38.5	Removal of an I&E E-metal rupture from tube 2178.
9/12	9/14	61.9	Leak testing. Charge-Discharge.
9/15	9/16	30.6	Removal of an I&E E-metal rupture from tube 2384.
9/19	9/21	54.8	Removal of an I&E E-metal rupture from tube 2795. Tube replacement.
9/21	9/21	0.6	Remove poison piece stuck in PCCF machine.
9/26	9/28	44.8	Leak testing and miscellaneous maintenance.

Extracted from Plum 1962, September 1961, pages 3-6.

II Reactor

8/30	9/1	35.7	Removal of an L&E E-metal rupture (bu[illegible] from tube 1379. Charge-Discharge.
9/2	9/3	32.1	Removal of L&E E-metal rupture from tube 2667.
9/3	9/3	1.2	Replaced faulty ball valve on tube 0860.
9/6	9/7	28.5	Removal of an L&E E-metal rupture from tube 1581. Leak testing.
9/10	9/15	128.4	Scheduled charge-discharge, tube replacement and leak testing.
9/19	9/19	0.2	Panellit trip due to faulty bourdon tube.
9/19	9/19	0.1	Unexplained Panellit trip.
9/19	9/21	33.2	Panellit trip when spline cap failed while pulling spline. Charge-discharge and miscellaneous maintenance.
9/21	9/21	0.2	Unexplained low Panellit trip on gauge 1974.
9/24	9/29	114.4	Scheduled EN charge-discharge. Tube replacement and miscellaneous maintenance.
9/30	Still down		Leak testing and tube replacement.

Extracted from Plum 1962, September 1961, pages 3-6.

KE Reactor

8/30	9/1	58.6	Scheduled charge-discharge.
9/3	9/4	31.3	Panellit trip.
9/17	9/19	37.0	Unexplained Panellit trip. Miscellaneous maintenance & charge-discharge.
9/24	9/26	35.9	Tripped due to an unexplained instrument failure on KER loop 1 neutron monitor. Charge-discharge.

KW Reactor

9/19	9/23	85.8	Scheduled charge-discharge. Internal rupture of HCR #3 cooling water line.
9/23	9/23	1.4	Repair rear cap leak on tube 1447.

Extracted from Plum 1962, September 1961, pages 3-6.

COMPARATIVE PILE PERFORMANCE - OCT 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,180	1,945	1,925	1,935	1,955	4,085	4,115	20,035
Maximum Power Level During Month, MW	1,800	2,130	1,775	1,770	1,835	1,740	3,885	3,930	18,865
Average Power Level While Operating, MW	1,612	1,970	1,618	1,591	1,738	1,605	3,745	3,752	17,631
Maximum Tube Power, KW	1,190	1,276	1,203	1,203	1,193	1,120	1,582	1,532	
Effective Central Tubes	1,485	1,660	1,460	1,470	1,470	1,515	2,460	2,470	
Time Operated Efficiency, %	70.1	80.1	76.9	59.3	68.5	81.9	81.2	89.2	75.9
Operational Limitation	93.5	95.0	93.5	95.0	93.5	93.5	95.0	95.0	
MWD Produced During Month, total	35,032	48,952	38,577	29,228	36,896	40,767	94,266	103,700	427,418
Normal Solid	452	167	0	0	89	0	0	265	973
Normal I&E	29,921	37,379	34,771	21,654	32,282	780	80,761	86,656	324,204
94 Metal	4,659	11,406	3,806	7,574	4,525	39,987	13,505	16,779	102,241
Plutonium Produced, grams	28,895	39,688	31,412	23,905	30,171	30,140	80,989	89,415	354,615
Uranium In Reactor At Month End, tons	221.6	225.7	226.9	219.0	224.6	191.8	435.7	434.6	2179.9
Normal Solid	7.2	1.8			1.6				10.6
Normal I&E	189.3	187.1	212.9	176.4	200.1	3.6	387.0	378.6	1735.0
94 Metal	25.1	36.8	14.0	42.6	22.9	188.2	48.7	56.0	434.3
Uranium Discharged During Month, tons	28.5	34.7	59.5	21.8	62.5	17.1	170.3	138.2	532.6
Normal Solid	2.3	0.3			0.5			3.3	6.4
Normal I&E	24.8	18.6	56.5	6.1	51.8	0.1	150.8	109.5	418.2
94 Metal	1.4	15.8	3.0	15.7	10.2	17.0	19.5	25.4	108.0
Average Discharge Concentration									
Normal Solid	758	620			886			772	769
Normal I&E	628	643	776	688	658	540	721	756	720
94 Metal	847	747	920	652	915	875	756	758	780

Extracted from Travis 1961k, page 7.

REACTOR OUTAGES - OCT 1961

Date Down	Date Up	Outage Hours	Remarks
B REACTOR			
10/2	10/4	39.2	Leak testing.
10/4	10/6	33.7	Leak testing.
10/10	10/12	53.3	Leak testing. Replaced four tubes due to tube leaks and one tube due to a rear Van Stone leak.
10/17	10/19	55.1	Leak testing.
10/24	10/26	39.0	Leak testing.
10/26	10/26	0.2	Unexplained Beckman trip.
C REACTOR			
10/12	10/15	68.3	Removal of an I&E-E metal rupture from tube 2576 and charge-discharge.
10/23	10/25	54.1	Charge-discharge and maintenance following a trip when a rear pigtail and elbow came off.
10/25	10/25	0.6	Unexplained Panellit trip.
10/26	10/27	24.2	Removal of an I&E-E metal rupture from tube 2271.
10/27	10/27	0.6	Panellit trip due to an oscillating gauge.
D REACTOR			
9/30	10/3	76.9	Charge-discharge and tube replacement following leak testing.
10/5	10/5	0.2	Unexplained Panellit trip.
10/10	10/13	53.5	Removal of an I&E regular metal rupture from tube 2762. Charge-discharge and leak testing.
10/24	10/27	55.1	Charge-discharge and leak testing.
10/27	10/27	1.7	Removal of bumper metal from tube 1892 due to high Panellit pressure.

Extracted from Plum 1962, October 1961, pages 2-5.

DR REACTOR

10/2	10/4	43.2	Tripped due to failure of gas loop compressor. Miscellaneous maintenance.
10/6	10/8	44.7	Removal of ruptured production test capsule piece from tube 0574 (PT-IP-402A).
10/10	10/12	40.6	Removal of an I&E-E metal rupture from tube 3985 and tube replacement.
10/15	10/17	44.5	Removal of an I&E-E metal rupture from tube 1460 and miscellaneous maintenance.
10/17	10/17	1.2	Panellit trip due to fluctuation of gauge 1481.
10/20	10/22	44.3	Removal of a stuck I&E-E metal rupture from tube 2658. Charge-discharge.
10/22	10/22	0.4	Unexplained Panellit trip on gauge 0670.
10/23	10/25	42.0	Removal of an I&E-E metal rupture from tube 4173. Charge-discharge and maintenance.
10/25	10/25	0.3	Two Beckmans inadvertently reached trip points.
10/27	10/28	42.1	Removal of an I&E-E metal rupture from tube 2987.

F. REACTOR

10/3	10/8	123.0	Charge-discharge and scheduled tube replacement.
10/24	10/26	63.4	Charge-discharge and leak testing.
10/29	10/31	38.4	Removal of an I&E regular metal rupture from tube 2377. Miscellaneous maintenance.
10/31	still down	-	Removal of an I&E regular metal rupture from tube 2369.

Extracted from Plum 1962, October 1961, pages 2-5.

H REACTOR

9/30	10/1	26.0	Leak testing and tube removal.
10/5	10/6	37.2	Removal of an I&E-E metal rupture from tube 1978. Miscellaneous maintenance.
10/14	10/15	25.5	Low pressure trip on tube 1383. Leak testing.
10/23	10/24	29.0	Leak testing.
10/28	10/29	28.3	Leak testing.

KE REACTOR

10/16	10/19	76.7	Scheduled charge-discharge and miscellaneous maintenance.
10/19	10/19	0.4	Panellit trip due to an oscillating gauge.
10/28	10/31	64.4	Miscellaneous maintenance following a Panellit trip. Installed N-type tube in channel 3074 as authorized by project CG-839.

KW REACTOR

10/22	10/26	79.5	Heat cycle 5 hours prior to scheduled charge-discharge.
10/26	10/26	1.2	Panellit trip due to an oscillating gauge.

Extracted from Plum 1962, October 1961, pages 2-5.

URANIUM IN TONS
1961

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.		Nov.	Dec.
Normal U	436	445	1,732	1,735	450	452	2,284	1,953	Normal U		
									Purex	256	669
94 Metal	83.1	85	443.9	449	73.6	80	472.4	487	94 Metal		
									Redox	136.7	66.3

MWD AND SPECIAL MATERIALS
1961

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
MWD	432,763	431,495							Dissolved	
Normal	335,150	325,740	644,908	665,557	321,371	305,091	1,585,084	1,367,777	81,105	516,985
94 Metal	97,613	105,755	204,267	245,395	58,783	64,627	375,682	386,766	105,803	54,744

Extracted from Travis 1962a, pages 7 and 9.

COMPARATIVE PILE PERFORMANCE - Nov 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,265	1,945	1,925	1,935	1,955	4,085	4,160	20,165
Maximum Power Level During Month, MW	1,880	2,265[1]	1,850	1,835	1,905	1,770	4,035	4,150[1]	19,700
Average Power Level While Operating, MW	1,717	2,081	1,687	1,756	1,799	1,570	3,816	3,973	18,399
Maximum Tube Power, KW	1,253	1,367	1,272	1,248	1,262	1,178	1,601	1,665	
Effective Central Tubes	1,500	1,657	1,454	1,470	1,466	1,490	2,436	2,515	
Time Operated Efficiency, %	47.2	84.7	63.5	83.1	71.6	65.3	89.4	90.6	74.4
Operational Limitation	NE	95.5°C	93.5°C	1320KW	93.5°C	93.5°C	750°C	1650KW	
MWD Produced During Month, total	24,332	52,845	32,084	43,780	38,610	30,762	102,351	107,599	432,763
Normal Solid	292	42	0	0	62	0	0	0	396
Normal I&E	20,575	40,951	28,939	33,185	33,897	591	86,923	89,693	334,754
9h Metal	3,465	11,852	3,145	10,595	4,651	30,171	15,428	18,306	97,613
Plutonium Produced, grams	19,719	43,018	25,525	34,445	31,605	21,671	88,779	94,132	358,895
Uranium In Reactor At Month End, tons	221.4	225.4	226.2	218.8	224.4	192.5	433.5	433.7	2175.9
Normal Solid	6.7	0	0	0	0	0	0	0	6.7
Normal I&E	189.9	187.8	212.4	175.9	200.6	3.6	378.3	376.8	1725.3
9h Metal	24.8	37.6	13.8	42.9	23.8	188.9	55.2	56.9	443.9
Uranium Discharged During Month, ton	35.6	70.6	37.6	19.8	65.9	15.5	161.6	116.9	523.5
Normal Solid	0.5	1.8	0	0	1.6	0	0	0	3.9
Normal I&E	30.7	56.7	34.9	11.0	60.6	0.3	146.5	105.3	446.0
9h Metal	4.4	12.1	2.7	8.8	3.7	15.2	15.1	11.6	73.6
Average Discharge Concentration									
Normal Solid	826	784	-	-	790	-	-	-	792
Normal I&E	631	728	807	741	678	577	728	698	714
9h Metal	868	752	1,061	922	928	723	829	689	799

1 New record.

Extracted from Travis 1961e, page 11.

REACTOR OUTAGES - Nov 1961

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
11/1	11/6	105.0	Water leak. Charge-discharge and replacement of process tubes.
11/6	11/6	3.6	Loss of building ventilation due to excessive water in tunnel. *
11/12	11/16	87.1	Low pressure Panellit trip on 2882 due to a tube leak. Process tube replacement.
11/18	11/21	64.6	Water leak. Process tube replacement.
11/21	11/21	.3	Unexplained trip on No. 1 Safety Circuit caused by seismoscope.
11/26	Still down		Water leak. Tube replacement and miscellaneous maintenance.
C Reactor			
11/1	11/1	0.3	Panellit trip due to a flux imbalance.
11/7	11/12	100.4	Scheduled charge-discharge and maintenance.
11/12	11/12	3.5	Correct neutron leak on tube 4484.
11/30	Still down		Electrical ground in safety circuit. Charge-discharge.
D Reactor			
11/4	11/7	64.8	Water leak. Tube replacement.
11/12	11/14	50.6	Water leak. Charge-discharge and replacement of tubes.
11/20	11/23	55.9	Water leak. Leak testing and tube replacement.
11/24	11/26	41.4	Water leak. Leak testing and tube replacement.
11/27	11/29	50.5	Removal of an I&E-E metal rupture from tube 0774. Tube replacement.
11/29	11/29	.3	Panellit trip due to a faulty gauge.

Extracted from Plum 1962, November 1961, pages 4-6.

DR Reactor

11/14	11/17	86.0	Water leak. Charge-discharge and tube replacement.
11/29	Still down		Water leak. Charge-discharge and tube replacement.

F Reactor

10/31	11/1	31.6	Rupture removal concluded.
11/17	11/21	88.2	Water leak. Charge-discharge and tube replacement.
11/22	11/23	37.3	Water leak.
11/28	11/30	46.5	Water leak. Tube replacement.
11/30	11/30	.6	Panellit trip due to loose rear cap.
11/30	Still down		Water leak.

H Reactor

11/1	11/2	26.1	Water leak. Tube replacement.
11/6	11/8	35.4	Water leak. Tube replacement.
11/14	11/18	100.7	Scheduled tube replacement and miscellaneous maintenance.
11/18	11/18	.3	Tripped due to failure of rear pigtail at the nozzle connector.
11/18	11/19	2.7	Unexplained trip.
11/19	11/19	.8	Unexplained Panellit trip.
11/20	11/20	1.3	Unexplained Panellit trip.

Extracted from Plum 1962, November 1961, pages 4-6.

11/23	11/24	28.9	Panellit trip on tube 2767. The Hoke valve was partially closed with a rusty substance. Charge-discharge.
11/26	11/27	27.9	Water leak. Rear gasket leaks corrected and tube replacement.
11/29	11/30	27.0	Low pressure Panellit trip on tube 0180. Charge-discharge and leak testing.
11/30	11/30	.2	Unexplained Panellit trip on Row 43.

KE Reactor

11/20	11/23	76.2	Scheduled charge-discharge and miscellaneous maintenance.

KW Reactor

11/14	11/17	67.6	Scheduled charge-discharge and maintenance.

(*) Resulted from effluent water backing up in one C-reactor effluent line when the other was taken out of service for repair, together with concurrent failure to start a sump pump in the B pipe tunnel.

Extracted from Plum 1962, November 1961, pages 4-6.

COMPARATIVE PILE PERFORMANCE - DEC 1961

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,275	1,945	1,925	1,935	1,955	4,215	4,160	20,305
Maximum Power Level During Month, MW	1,840	2,275[1]	1,935	1,895	1,910	1,850	4,215[1]	4,160	20,080
Average Power Level While Operating, MW	1,648	1,965	1,924	1,746	1,822	1,710	3,870	4,023	19,578
Maximum Tube Power, KW	1,215	1,359	1,337	1,258	1,291	1,246	1,697	1,653	
Effective Central Tubes	1,483	1,674	1,447	1,472	1,464	1,477	2,484	2,480	
Time Operated Efficiency, %	65.1	47.6	63.4	80.0	75.3	75.7	78.0	91.9	72.1
Operational Limitation	93.5°C[2]	95.0°C[2]	93.5°C[2]	1320KW[3]	115°C[3]	93.5°C[2]	1709KW[3]	1650KW[3]	
MWD Produced During Month, total	33,253	29,014	35,287	43,298	42,548	40,106	93,599	114,390[1]	431,495
Normal Solid	234	0	0	0	0	0	0	0	234
Normal I&E	28,359	22,127	31,946	32,935	36,868	879	78,195	94,127	325,506
9% Metal	4,660	6,887	3,341	10,363	5,680	39,227	15,404	20,193	105,755
Plutonium Produced, grams	27,379	23,794	28,100	32,855	35,170	27,366	81,557	98,703	354,924
Uranium In Reactor At Month End, tons	220.4	225.4	227.3	218.4	223.3	191.9	434.0	433.4	2174.1
Normal Solid	3.8	0	0	0	0	0	0	0	3.8
Normal I&E	191.9	184.8	214.0	175.9	197.6	4.6	377.7	374.8	1721.3
9% Metal	24.7	40.6	13.3	42.5	25.7	187.3	56.3	58.6	449.0
Uranium Discharged During Month, tons	56.4	76.0	34.6	28.7	75.1	10.3	149.7	100.7	531.5
Normal Solid	2.9	0	0	0	0	0	0	0	2.9
Normal I&E	47.9	65.0	29.7	18.4	71.9	0.2	129.3	86.7	449.1
9% Metal	5.6	11.0	4.9	10.3	3.2	10.1	20.4	14.0	79.5
Average Discharge Concentration									
Normal Solid	754	0	0	0	0	0	0	0	754
Normal I&E	689	661	782	765	628	715	661	679	674
9% Metal	850	791	772	1,021	838	956	720	701	813

1 New record.
2 Bulk outlet water temperature limit.
3 Tube corrosion limit.

Extracted from Travis 1962a, page 10.

REACTOR OUTAGES - DEC 1961

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
11/26	12/2	150.4	Leak testing, tube replacement, and miscellaneous maintenance.
12/2	12/2	1.6	Failure of loop header back-up water supply.
12/5	12/7	42.0	Leak testing and tube replacement.
12/9	12/11	39.7	Leak testing and tube replacement.
12/14	12/18	101.2	Scheduled charge-discharge and tube replacement.
12/26	12/27	42.5	Leak testing.
C Reactor			
11/30	12/2	34.7	Charge-discharge. Corrected a ground in the DC circuit of the upper limit switch on #40 VSR.
12/8	12/21	313.2	Removal of an I&E-E metal rupture from tube 3762. Scheduled overboring, charge-discharge, replacement of front pigtails and miscellaneous maintenance.
12/21	12/21	0.8	Panellit trip.
12/21	12/21	10.9	Thermocouple repair on tube 2764.
12/23	12/23	0.4	Panellit trip.
12/26	12/28	35.9	Miscellaneous maintenance work after a manual trip due to a loose front pigtail connector.

Extracted from Plum 1962, December 1961, pages 4-6.

D Reactor

12/1	12/2	42.0	Low pressure Panellit trip on tube 1086. Miscellaneous maintenance.
12/12	12/14	41.5	Leak testing, tube replacement and charge-discharge.
12/14	12/14	0.2	Unexplained Panellit trip.
12/16	12/22	150.1	Scheduled charge-discharge. Tube replacement and miscellaneous maintenance.
12/25	12/27	41.5	Leak testing and tube replacement.

DR Reactor

11/29	12/2	65.8	Charge-discharge and tube replacement.
12/3	12/3	0.3	Manual trip due to a reactivity change while flushing a ball valve tube.
12/14	12/16	46.0	Removal of a stuck I&E regular metal rupture from tube 3264. Charge-discharge.
12/27	12/29	53.0	Removal of a stuck I&E regular metal rupture from tube 0867. Leak testing.
12/31	Still down		Scheduled charge-discharge and tube replacement.

F Reactor

11/30	12/1	26.8	Leak testing and tube replacement.
12/6	12/9	68.3	Leak testing, tube replacement and charge-discharge.
12/9	12/9	0.9	Panellit trip due to improperly installed rear cap on tube 1677.
12/23	12/27	92.7	Panellit trip due to a leak in tube 3971. Scheduled charge-discharge and leak testing.

Extracted from Plum 1962, December 1961, pages 4-6.

H Reactor

12/4	12/5	29.8	Leak testing and tube replacement.
12/8	12/9	25.7	Leak testing.
12/13	12/14	32.1	Removal of an I&E-E metal rupture from tube 2864.
12/15	12/16	28.5	Panellit trip on tube 1469 due to a water leak. Leak testing and tube removal.
12/21	12/22	28.9	Leak testing and tube replacement.
12/23	12/23	1.8	Removal of an I&E-E metal rupture from tube 4177.
12/28	12/29	27.8	Removal of an I&E-E metal rupture from tube 2872. Helium leak testing.
12/31	Still down		Removal of an I&E-E metal rupture from tube 2667. Charge-discharge.

KE Reactor

12/3	12/5	42.3	Charge-discharge and miscellaneous maintenance following a Loop 2 trip.
12/14	12/16	59.7	Panellit trip due to a grounded gauge. Charge-discharge and miscellaneous maintenance.
12/27	12/30	61.3	Scheduled charge-discharge and miscellaneous maintenance.
12/31	12/31	0.4	Panellit trip due to the inadvertent opening of a toggle valve.

KW Reactor

12/4	12/7	61.1	Scheduled charge-discharge.
12/7	12/7	0.4	Panellit trip due to an oscillating gauge 0370.

Extracted from Plum 1962, December 1961, pages 4-6.

APPENDIX C

OPERATING DATA FOR 1962

URANIUM IN TONS
1962

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.		Jan.	Feb.
Normal U	582	545	1,732	1,830	575	447	2,158	2,447	Normal U		
									Purex	385	144
94 Metal	133	69	446	357	136	158	456	501	94 Metal		
									Redox	168	112

C.1

MWD AND SPECIAL MATERIALS

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
MWD	404,174	394,752							Dissolved	
Normal	309,858	313,774	588,915	604,239	386,500	298,450	1,503,836	1,696,111	262,209	98,141
94 Metal	94,316	80,978	231,630	181,858	108,081	130,750	359,203	403,528	136,209	86,432

Extracted from Travis 1962c, pages 5 and 7.

COMPARATIVE PILE PERFORMANCE – JAN 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,895	2,295[1]	1,945	1,925	1,935	1,955	4,400[1]	4,400[1]	20,750
Maximum Power Level During Month, MW	1,840	2,295	1,920	1,875	1,890	1,825	4,400	4,400	20,445
Average Power Level While Operating, MW	1,631	2,082	1,610	1,734	1,756	1,613	4,248	3,977	18,651
Maximum Tube Power, KW	1,245	1,370		1,250	1,253	1,170	1,722	1,679	
Effective Central Tubes	1,470	1,670	1,480	1,455	1,485	1,480	2,520	2,500	
Time Operated Efficiency, %	35.2	74.1	65.7	50.6	86.9	54.7	86.2	73.4	65.8
Operational Limitation	110°C[2]	1375KW[3]	100°C[2]	110°C[2]	115°C[2]	1190KW[3]	4400MW[4]	4400MW[4]	
MWD Produced During Month, total	17,796	47,805	32,809	27,189	47,312	27,367	113,447[1]	90,449	404,174
Normal Solid	101	0	0	0	0	0	0	0	101
Normal I&E	15,204	36,179	29,619	19,142	40,818	1,538	93,749	73,508	309,757
9h Metal	2,491	11,626	3,190	8,047	6,494	25,829	19,698	16,941	94,316
Plutonium Produced, grams	14,338	38,602	25,629	22,062	38,114	18,100	97,613	78,412	332,870
Uranium In Reactor At Month End, tons	224.6	225.3	225.9	217.0	223.5	193.0	434.1	434.4	2177.8
Normal Solid	3.0	0	0	0	0	0	0	0	3.0
Normal I&E	197.3	185.0	211.2	167.8	198.2	26.5	370.7	372.4	1729.1
9h Metal	24.3	40.3	14.7	49.2	25.3	166.5	63.4	62.0	445.7
Uranium Discharged During Month, tons	90.8	56.2	14.1	93.4	3.0	32.9	192.1	229.4	711.9
Normal Solid	0.8	0	0	0	0	0	0	0	0.8
Normal I&E	81.1	43.4	12.9	88.8	2.4	0.6	159.6	185.9	574.7
9h Metal	8.9	12.8	1.2	4.6	0.6	32.3	32.5	43.5	136.4
Average Discharge Concentration									
Normal Solid	730	0	0	0	0	0	0	0	730
Normal I&E	563	666	812	738	553	841	681	671	671
9h Metal	730	774	1,052	768	508	894	787	738	792

1 New record.
2 Tube temperature limit for control of tube corrosion.
3 Tube power limit for rupture control.
4 Administrative reactor power limit.

Extracted from Travis 1962b, page 25

REACTOR OUTAGES JAN 1962

Date Down	Date Up	Outage Hours	Remarks
D REACTOR			
1/2	1/4	44.5	Leak testing and tube replacement.
1/7	1/10	57.8	Removal of an I-7 regular metal rupture from tube 2088. Tube replacement.
1/13	1/29	383.1	Scheduled charge-discharge and replacement of 340 tubes. Miscellaneous maintenance.
1/29	1/29	0.7	Panellit trip due to fluctuation in water pressure while adjusting gauges.
C REACTOR			
1/5	1/6	40.7	Removal of an I-E-E metal rupture from tube 3271.
1/16	1/19	72.9	Removal of an oversize I-E natural metal rupture from tube 4463. Probologging and miscellaneous maintenance.
1/23	1/25	42.8	Leak testing and tube replacement.
1/28	1/29	26.6	Leak testing and tube replacement.

Extracted from Plum 1963, January 1962, pages 3-6.

D REACTOR

1/1	1/4	68.3	Charge-discharge following leak testing.
1/7	1/9	46.2	Leak testing.
1/9	1/10	28.1	Removal of an IME regular metal rupture from tube 2773.
1/14	1/16	42.6	Leak testing and tube replacement.
1/20	1/20	0.2	Power surge due to the grounding of a power line.
1/24	1/26	42.1	Leak testing and tube replacement..
1/27	1/27	3.4	Two Panellit trips due to oscillating gauges.
1/30	Still Down		Removal of an IME regular metal rupture from tube 2371.

DR REACTOR

12/31	1/14	344.0	Scheduled charge-discharge and replacement of 180 tubes.
1/16	1/18	47.2	Leak testing and tube replacement.
1/19	1/19	0.5	Gas loop trip due to a voltage drop on the loop compressor when wind blew power lines together.

F REACTOR

1/10	1/12	55.8	Water leak and tube replacement.
1/18	1/20	41.6	Leak testing and tube replacement.

Extracted from Plum 1963, January 1962, pages 3-6.

II REACTOR

12/31	1/2	32.1	Removal of an I&E-E metal rupture from tube 2667. Charge-discharge.
1/4	1/5	30.5	Leak testing and tube replacement.
1/7	1/8	28.2	Removal of an I&E-E metal rupture from tube 2580. Tube replacement.
1/9	1/9	1.0	Successful quick discharge of an I&E-E metal rupture from tube 2576.
1/11	1/13	51.6	Leak testing and tube replacement.
1/13	1/13	1.8	Three unexplained Panellit trips.
1/16	1/18	32.5	Removal of an I&E-E metal rupture from tube 1968. Tube replacement.
1/21	1/22	32.0	Removal of an I&E-E metal rupture from tube 2669. Tube replacement.
1/25	1/26	29.3	Removal of an I&E-E metal rupture from tube 3174.
1/27	Still Down		Scheduled tube replacement.

1/23	1/27	102.5	Removal of an I&E regular metal rupture from tube 4667. Scheduled charge-discharge and maintenance.
1/27	1/27	0.5	Tripped by loop 1 when the control valve packing failed.

Extracted from Plum 1963, January 1962, pages 3-6.

KW REACTOR

1/3	1/6	70.6	Scheduled charge-discharge and miscellaneous maintenance.
1/6	1/6	1.1	Manual trip due to insufficient control rod.
1/8	1/9	33.5	Miscellaneous maintenance work following a dual Beckman trip. (No. 2 Beckman circuit was caused to be bypassed by an electrical identification tab which dropped into a relay).
1/21	1/23	44.5	Removal of an I&E-E metal rupture from tube 2779. Charge-discharge and miscellaneous maintenance.
1/23	1/23	5.3	Unexplained Panellit trip.
1/23	1/23	0.7	Unexplained Panellit trip.
1/23	1/23	1.2	Unexplained Panellit trip.
1/23	1/24	4.3	Unexplained Panellit trip.
1/24	1/24	1.7	Removal of an I&E-E metal rupture from tube 2571.
1/27	1/28	33.0	Tripped by the crosstie system when the #3 high-lift discharge line check valve malfunctioned at (70).

Extracted from Plum 1963, January 1962, pages 3-6.

COMPARATIVE PILE PERFORMANCE - FEB 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,935[1]	2,310[1]	1,945	1,925	1,935	1,955	4,400	4,400	20,805
Maximum Power Level During Month, MW	1,935	2,310	1,750	1,850	1,700	1,810	4,400	4,400	20,155
Average Power Level While Operating, MW	1,769	2,173	1,631	1,825	1,611	1,723	4,326	3,917	18,975
Maximum Tube Power, KW	1,270	1,370	1,170	1,225	1,140	1,210	1,715	1,620	
Effective Central Tubes	1,520	1,685	1,550	1,500	1,500	1,500	2,570	2,560	
Time Operated Efficiency, %	67.1	69.1	62.3	91.1	36.1	54.7	91.5	82.9	69.4
Operational Limitation	105°C[2]	2310MW[4]	100°C[2]	110°C[2]	105°C[2]	105°C[3]	4400MW[4]	4400MW[4]	
MWD Produced During Month, total	33,249	42,058	28,457	46,565	16,285	26,410	110,798	90,930	394,752
Normal	28,879	31,560	25,564	33,292	14,069	16,947	89,794	73,669	313,774
9% Metal	4,370	10,498	2,893	13,273	2,216	9,463	21,004	17,261	80,978
Plutonium Produced, grams	27,983	34,078	21,979	36,785	12,758	22,150	97,112	79,469	332,314
Uranium In Reactor At Month End, tons	224.1	223.7	225.7	217.0	224.3	202.4	434.8	435.0	2187.0
Normal	200.8	180.3	211.0	169.3	199.0	124.1	374.6	370.8	1829.9
9% Metal	23.3	43.4	14.7	47.7	25.3	78.3	60.2	64.2	357.1
Uranium Discharged During Month, tons	20.4	97.6	26.4	26.3	96.2	96.6	83.3	158.0	604.8
Normal	18.6	77.9	24.6	18.9	88.9	2.7	73.6	141.6	446.8
9% Metal	1.8	19.7	1.8	7.4	7.3	93.9	9.7	16.4	158.0
Average Discharge Concentration									
Normal	649	646	875	782	649	686	652	651	668
9% Metal	738	826	1,136	1,048	998	813	769	747	828

1 New power level record.
2 Tube temperature limit for control of tube corrosion.
3 Tube temperature limit for rupture control.
4 Administrative reactor power limit.

Extracted from Travis 1962c, page 25.

REACTOR OUTAGES

B REACTOR FEB 1962

Date Down	Date Up	Outage Hours	Remarks
2/11	2/12	29.7	Leak testing and tube replacement.
2/13	2/13	0.5	Adjust water flow on three gamma monitoring sample lines.
2/14	2/16	45.4	Leak testing and tube replacement.
2/22	2/25	67.4	Leak testing, tube replacement and charge-discharge.
2/25	2/25	6.0	Correct faulty thermocouples.
2/26	Still Down		Removal of an I&E E-metal rupture from tube 2163, leak testing and tube replacement.

C REACTOR

2/3	2/5	39.6	Removal of an I&E regular metal rupture from tube 2289, charge-discharge and maintenance.
2/5	2/5	1.5	Panellit trip due to loose spline cap on tube 0670.
2/15	2/22	142.4	Front pigtail leak at crossheader adaptor on tube 3456. Scheduled charge-discharge and maintenance.

Extracted from Plum 1963, February 1962, pages 2-4.

D REACTOR

1/30	2/2	51.0	Charge-discharge following rupture removal.
2/7	2/9	43.0	Leak testing and tube replacement.
2/9	2/9	0.3	Replacement of faulty front-face cap.
2/16	2/18	40.9	Leak testing and tube replacement following a Panellit trip.
2/18	2/19	14.0	Removal of a stuck I&E regular metal rupture from tube 3775 and tube replacement.
2/21	2/21	0.1	Unexplained Panellit trip.
2/23	Still Down		Scheduled charge-discharge, maintenance and replacement of approximately 400 tubes.

DR REACTOR

2/6	2/8	59.5	Scheduled charge-discharge following leak testing.

F REACTOR

2/7	2/9	35.6	Miscellaneous maintenance following a Panellit trip.
2/10	2/26	411.4	Scheduled tube replacement.
2/27	2/27	6.3	Adjust radiation shielding on "A" test hole.

H REACTOR

1/27	2/13	407.6	Replacement of 300 tubes, charge-discharge and miscellaneous maintenance.
2/13	2/13	2.7	Correction of abnormal water pressure on tube 3478.

Extracted from Plum 1963, February 1962, pages 2-4.

KE REACTOR

2/16	2/18	56.5	Charge-discharge following a Panellit trip.
2/19	2/19	0.7	Unexplained Panellit trip.

KW REACTOR

2/13	2/16	72.0	Scheduled charge-discharge and miscellaneous maintenance.
2/16	2/16	8.0	Adjustment of Panellit gauges for 5 pump operation.
2/24	2/25	34.8	Unexplained Panellit trip and miscellaneous maintenance.

Extracted from Plum 1963, February 1962, pages 2-4.

URANIUM IN TONS
1962

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.		Mar.	Apr.
Normal U	463	617	1,828	1,830	465	615	2,640	2,901	Normal U		
									Purex	259	346
94 Metal	126	92	357	357	126	91	554	642	94 Metal		
									Redox	76	4

MWD AND SPECIAL MATERIALS
1962

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.
									Dissolved	
MWD	461,139	409,827								
Normal	371,561	325,528	671,450	623,943	304,350	373,035	1,774,676	1,909,696	217,878	233,861
94 Metal	89,578	84,299	163,827	175,990	107,609	72,136	453,658	523,226	55,038[6]	3,296

Extracted from Travis 1962e, pages 3 and 5.

COMPARATIVE PILE PERFORMANCE
MAR 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940[1]	2,310	1,975[1]	1,925	1,935	1,955	4,400	4,400	20,840
Maximum Power Level During Month, MW	1,940	2,310	1,975	1,840	1,840	1,830	4,400	4,400	20,535
Average Power Level While Operating, MW	1,730	2,216	1,930	1,728	1,749	1,746	4,298	4,222	19,619
Maximum Tube Power, KW	1,257	1,395	1,325	1,223	1,225	1,183	1,710	1,709	
Effective Central Tubes	1,480	1,650	1,485	1,490	1,470	1,530	2,555	2,560	
Time Operated Efficiency, %	82.9	63.9	64.9	35.7	88.1	81.5	78.4	90.5	73.2
Operational Limitation	670°C[2]	2310KW[3]	93.5°C[4]	110°C[5]	95°C[5]	105°C[5]	1752KW[6]	1700KW[6]	
MWD Produced During Month, total	44,470	43,918 ✓	38,857	19,133	47,759	44,112	104,456	118,434	461,139
Normal	38,055	32,489	35,220	13,868	41,167	28,648	86,066	96,048	371,561
94 Metal	6,415	11,429	3,637	5,265	6,592	15,464	18,390	22,386	89,578
Plutonium Produced, grams	36,135	36,351	31,829	14,621	39,713	34,991	89,862	102,310	385,812
Uranium In Reactor At Month End, tons	224.1	223.8	228.5	215.7	223.0	199.8	434.6	435.4	2184.9
Normal	197.3	182.2	214.7	170.1	197.4	123.8	367.8	374.7	1828.0
94 Metal	26.8	41.6	13.8	45.6	25.6	76.0	66.8	60.7	356.9
Uranium Discharged During Month, tons	22.3	62.6	74.5	15.1	55.2	28.5	241.1	92.1	591.4
Normal	20.5	46.8	69.0	3.5	49.3	10.5	200.0	65.6	465.2
94 Metal	1.8	15.8	5.5	11.6	5.9	18.0	41.1	26.5	126.2
Average Discharge Concentration									
Normal	566	604	806	932	645	370	646	620	654
94 Metal	788	762	918	1,150	1,084	1,051	776	687	851

1 New record.
2 Graphite temperature limit.
3 Administrative reactor power limit.
4 Bulk outlet water temperature limit.
5 Tube outlet water temperature limit for control of tube corrosion.
6 Tube power limit for rupture control.

Extracted from Travis 1962d, page 23.

REACTOR OUTAGES MAR 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
2/26	3/31	79.9	Leak testing following rupture removal.
3/9	3/11	39.7	Removal of an I&E regular metal rupture from tube 2378. Charge-discharge and leak testing.
3/12	3/13	19.2	Correction of a spline-cap leak.
3/19	3/20	26.9	Leak testing and tube replacement.
3/31	Still down		Water leak. Charge-discharge.
C Reactor			
3/10	3/18	192.1	Scheduled charge-discharge and tube replacement; miscellaneous maintenance.
3/18	3/18	0.3	Unexplained Panellit trip.
3/27	3/30	75.9	Leak testing.
D Reactor			
2/23	3/11	388.8	Scheduled replacement of tubes. Charge-discharge and miscellaneous maintenance. 2 + 5 1/2 hr
DR Reactor			
3/2	3/3	44.1	Water leak. Charge-discharge & miscellaneous maintenance.
3/11	3/13	39.4	I&E regular metal rupture in tube 1078.
3/15	Still down		I&E regular metal rupture in tube 1584, and tube replacement.

Extracted from Plum 1963, March 1962, pages 2-4.

F Reactor

3/1	3/2	42.9	Leak testing.
3/26	3/27	43.1	Scheduled charge-discharge.
3/27	3/28	2.7	Low pressure Panellit trip due to rear cap leak on tube 3984.

H Reactor

3/12	3/14	53.6	I&E regular metal rupture in tube 1372. Charge-discharge.
3/15	3/15	0.7	Two unexplained Panellit trips.
3/15	3/16	16.4	Leak testing.
3/18	3/20	32.9	Leak testing.
3/29	3/30	32.3	Removal of an I&E-E metal rupture from tube 4169.
3/31	Still down		Tube replacement.

KE Reactor

3/5	3/8	77.4	Scheduled charge-discharge.
3/28	3/31	83.3	I&E-E metal rupture in tube 2091. Charge-discharge.

KW Reactor

3/12	3/14	34.6	Manual trip due to a production test (PT-397-A) rupture in tube 3446. Charge-discharge.
3/16	3/17	36.1	Tripped due to a heat cycle. Charge-discharge.

Extracted from Plum 1963, March 1962, pages 2-4.

COMPARATIVE PILE PERFORMANCE
APR 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,840
Maximum Power Level During Month, MW	1,930	2,310	1,960	1,820	1,825	1,870	4,300	4,375	20,390
Average Power Level While Operating, MW	1,684	2,140	1,762	1,648	1,790	1,698	4,155	4,085	18,962
Maximum Tube Power, KW	1,280	1,393	1,330	1,215	1,243	1,120	1,686	1,648	
Effective Central Tubes	1,500	1,684	1,390	1,498	1,470	1,620	2,550	2,550	
Time Operated Efficiency, %	33.3	77.2	70.9	69.2	81.3	48.9	81.9	82.5	68.2
Operational Limitation	670°C[1]	95.0°C[2]	93.5°C[2]	110°C[3]	110°C[3]	93.5°C[2]	95°C[2]	95°C[2]	
MWD Produced During Month, total	16,832	49,585	37,503	34,196	43,623	24,933	102,051	101,104	409,827
Normal	14,269	36,989	33,483	24,421	37,629	16,429	81,466	80,842	325,528
9% Metal	2,563	12,596	4,020	9,775	5,994	8,504	20,585	20,262	84,299
Plutonium Produced, grams	13,400	40,318	31,354	28,768	35,384	19,599	89,098	88,952	346,873
Uranium In Reactor At Month End, tons	224.1	223.7	227.6	217.4	223.0	200.8	436.2	434.3	2187.1
Normal	197.2	182.1	211.9	169.5	197.5	123.8	377.9	369.7	1929.6
9% Metal	26.9	41.6	15.7	47.9	25.5	77.0	58.3	64.6	357.5
Uranium Discharged During Month, tons	22.2	18.5	90.9	149.3	11.8	29.9	122.8	261.5	706.9
Normal	20.0	13.7	85.7	138.8	10.8	20.4	96.7	229.4	615.4
9% Metal	2.2	4.8	5.2	10.5	1.0	9.5	26.1	32.1	91.4
Average Discharge Concentration									
Normal	638	567	669	532	576	395	657	526	606
9% Metal	1,040	398	1,034	750	1,117	1,122	713	757	789

1 Graphite temperature limit.
2 Bulk outlet water temperature limit.
3 Tube outlet water temperature limit for control of tube corrosion.

Extracted from Travis 1962e, page 22.

REACTOR OUTAGES APR 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
3/31	4/1	38.2	Leak testing.
4/6	4/7	30.3	Power failure trip.
4/8	4/9	25.6	Leak testing.
4/13	Still down		Scheduled tube replacement. A total of 353 tubes was installed.
C Reactor			
4/5	4/5	0.3	Unexplained Panellit trip.
4/5	4/7	48.7	Removal of an overbore size I&E regular metal rupture from tube 2969; removal of two I&E-E metal ruptures from tube 2955.
4/12	4/14	56.6	Leak testing. Inspection of the overbore size fuel elements discharged from tube 2969 on 4/5 failed to confirm the presence of a rupture. Leaking tube 1468 was replaced.
4/16	4/16	0.6	Correct rear connector leak.
4/16	4/18	57.6	Removal of three overbore size ruptures from tube 3062.

Extracted from Plum 1963, April 1962, pages 2-5.

D Reactor

4/2	4/5	82.4	Scheduled charge-discharge.
4/6	4/8	34.2	Miscellaneous maintenance following a power failure trip.
4/14	4/16	42.2	Removal of an I&E natural metal rupture from tube 2281 and replacement of three leaking tubes.
4/16	4/16	2.0	Removal of an I&E natural metal rupture from tube 1684.
4/21	4/23	48.1	Removal of an I&E natural metal rupture from tube 1962. Charge-discharge and tube replacement.

DR Reactor

3/15	4/3	450.9	Completed the replacement of 218 process tubes.
4/4	4/4	0.4	Manual trip due to indications of high temperature, caused by faulty thermocouple.
4/6	4/8	36.2	Miscellaneous maintenance following a power failure trip.
4/8	4/8	0.3	Panellit trip when spline stub was removed from tube 0885.
4/15	4/18	76.4	Charge-discharge and leak testing following a Panellit trip.
4/20	4/21	37.5	Removal of an I&E natural metal rupture from tube 1064. Tube replacement.
4/22	4/22	0.2	Panellit trip due to a non-seated charge.
4/26	4/27	38.6	Panellit trip. Removal of an I&E natural metal rupture from tube 3879.

Extracted from Plum 1963, April 1962, pages 2-5.

F Reactor

4/6	4/8	41.8	Charge-discharge following a power failure trip.
4/27	Still down		Scheduled tube replacement.

H Reactor

3/31	4/14	354.0	Tube replacement - 192 removed, 189 installed.
4/14	4/14	2.5	Two scrams for thermocouple repairs.
4/15	4/15	0.2	Panellit trip caused by valving of PCFF before Panellit gauge was jumpered.
4/15	4/15	0.3	Panellit trip due to faulty Panellit jumper.
4/21	4/23	35.9	Leak testing and tube replacement.
4/24	4/24	0.2	Unexplained Panellit trip.

KE Reactor

4/1	4/1	1.2	Correction of two rear cap leaks unsuccessful when discharge platform failed to operate.
4/4	4/6	38.8	Charge-discharge and maintenance following PT rupture removal from Loop 1.
4/6	4/6	0.7	Tripped due to a power failure.
4/26	4/29	88.7	Charge-discharge and maintenance following a Panellit trip. Replaced No. 3 low lift pump set on Project CG-883.
4/30	4/30	0.9	Two unexplained Panellit trips.

KW Reactor

4/6	4/10	92.7	Scheduled charge-discharge following a power failure trip.
4/25	4/26	33.0	Charge-discharge following a Panellit trip.

Extracted from Plum 1963, April 1962, pages 2-5.

URANIUM IN TONS
1962

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	May	June	May	June	May	June	May	June		May	June
Normal U	492	567	1,842	1,836	480	576	2,750	2,775	Normal U		
									Purex	626	559
94 Metal	97	106	350	356	105	99	708	717	94 Metal		
									Redox	40	89

C.19

MWD AND SPECIAL MATERIALS
1962

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	May	June	May	June	May	June	May	June	May	June
MWD	435,311	407,287							Dissolved	
Normal	352,579	330,943	687,996	646,111	288,526	372,828	1,781,780	1,794,056	413,541	360,883
94 Metal	83,232	76,344	167,849	160,201	91,373	83,992	582,195	593,346	32,399	72,777

Extracted from Travis 1962g, pages 2 and 4.

COMPARATIVE PILE PERFORMANCE
MAY 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,240
Maximum Power Level During Month, MW	1,865	2,310	1,910	1,785	1,855	1,855	4,335	4,285	20,200
Average Power Level While Operating, MW	1,761	2,074	1,813	1,734	1,762	1,693	3,988	4,051	18,876
Maximum Tube Power, KW	1,196	1,400	1,215	1,184	1,253	1,196	1,664	1,640	
Effective Central Tubes	1,505	1,675	1,510	1,485	1,471	1,540	2,572	2,560	
Time Operated Efficiency, %	84.9	52.2	83.7	89.3	50.1	41.1	83.4	86.6	71.4
Operational Limitation	93.5°C[1]	95.0°C[1]	93.5°C[1]	110°C[2]	93.5°C[1]	93.5°C[1]	95.0°C[1]	95.0°C[1]	
MWD Produced During Month, total	46,377[3]	33,570	47,038	48,019	27,375	21,568	103,160	108,704	435,311
Normal	39,057	25,087	42,289	34,853	23,582	14,232	85,444	88,035	352,579
94 Metal	7,320	8,483	4,749	13,166	3,793	7,336	17,716	20,669	83,232
Plutonium Produced, grams	39,062	26,516	37,336	38,900	22,395	16,750	90,307	94,080	365,346
Uranium In Reactor At Month End, tons	225.2	222.8	228.3	217.5	224.8	202.1	436.6	434.5	2191.8
Normal	197.2	181.3	215.3	170.8	198.9	125.7	381.0	371.6	1841.8
94 Metal	28.0	41.5	13.0	46.7	25.9	76.4	55.6	62.9	350.0
Uranium Discharged During Month, tons	110.5	78.1	45.7	29.1	60.7	93.8	94.6	72.7	585.2
Normal	98.1	62.7	36.7	17.4	49.8	75.2	88.6	51.7	480.2
94 Metal	12.4	15.4	9.0	11.7	10.9	18.6	6.0	21.0	105.0
Average Discharge Concentration									
Normal	578.3	618.8	638.4	214.2	597.1	560.5	666.2	675.6	600.8
94 Metal	847.7	800.1	825.6	1049.3	930.2	1017.4	677.0	748.0	870.2

1 Bulk outlet water temperature limit.
2 Tube outlet water temperature limit for control of tube corrosion.
3 New record.

Extracted from Travis 1962f, page 22.

REACTOR OUTAGES MAY 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
4/13	5/1	421.0	Tube replacement.
5/1	5/1	2.8	Unexplained Panellit trip.
5/2	5/2	0.9	Repair ball valve oil line leak in order to discharge poison.
5/2	5/2	0.1	VSR's 16 and 25 dropped out of upper limit switch.
5/12	5/14	44.0	Removal of an I&E natural metal rupture from tube 1068. Tube replacement.
5/15	5/17	52.0	PCCF malfunction, charge-discharge and maintenance.
C Reactor			
5/5	5/9	103.6	Removal of an I&E natural metal rupture from tube 1384. Charge-discharge and maintenance.
5/10	5/10	0.2	Repair faulty thermocouple.
5/10	5/10	1.7	Four unexplained Panellit trips.
5/11	5/12	41.8	Removal of an I&E natural metal rupture from tube 1159.
5/20	5/23	56.2	Charge-discharge and maintenance following a trip when leads to the No. 4 pump motor burned out.
5/25	Still down		Tube replacement.

Extracted from Plum 1963, May 1962, pages 2-5.

D Reactor

5/2	5/4	40.4	Leak testing and tube replacement.
5/4	5/4	0.5	Remove stuck perf from PCCF machine.
5/27	5/29	59.2	Removal of an I&E natural metal rupture; charge-discharge.
5/29	5/30	20.9	Leak testing and tube replacement.
5/30	5/30	0.4	Faulty ball valve on tube 3564.

DR Reactor

5/1	5/3	44.5	Removal of an I&E natural metal rupture from tube 1265.
5/8	5/9	35.1	Removal of an I&E natural metal rupture from tube 3072. Maintenance.

F Reactor

4/27	5/15	437.6	Replacement of 355 tubes.
5/31	Still down		Scheduled charge-discharge.

H Reactor

5/6	5/8	36.1	Removal of an I&E-E metal rupture from tube 0576, charge-discharge and maintenance.
5/8	5/9	14.7	Water leak. Tube replacement.
5/12	5/27	358.6	Replacement of 249 tubes.
5/27	5/27	0.4	Unexplained instrumentation trip.
5/28	5/28	0.3	Unexplained high pressure Pannelit trip.
5/28	5/30	28.1	Miscellaneous maintenance following the correction of a water leak.

Extracted from Plum 1963, May 1962, pages 2-5.

KE Reactor

5/14	5/16	49.2	Trip due to a leak in Panellit gauge 2483. Charge-discharge and miscellaneous maintenance.
5/16	5/16	1.0	Correction of two rear-face cap leaks.
5/18	5/19	36.3	Repair of valve in cross-tie system.
5/19	5/19	0.4	Unexplained Panellit trip.
5/19	5/19	0.4	Improper switching while by-passing KER Loop 4.
5/19	5/19	0.2	Manual trip due to insufficient control rods.
5/23	5/24	33.7	Trip due to the failure of a small transformer in loop instrumentation.

KW Reactor

5/4	5/5	38.0	Front-face pigtail leak. Charge-discharge.
5/17	5/20	55.3	V-73 cross-tie valve repair and charge-discharge.
5/20	5/20	6.6	Unexplained Panellit trip.

Extracted from Plum 1963, May 1962, pages 2-5.

COMPARATIVE PILE PERFORMANCE

JUN 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,240
Maximum Power Level During Month, MW	1,365	2,140	1,955	1,760	1,845	1,795	4,210	4,155	19,525
Average Power Level While Operating, MW	1,761	1,909	1,745	1,619	1,724	1,689	4,087	3,983	18,517
Maximum Tube Power, KW	1,183	1,350	1,191	1,168	1,222	1,130	1,623	1,538	
Effective Central Tubes	1,534	1,665	1,524	1,490	1,477	1,535	2,545	2,590	
Time Operated Efficiency, %	80.1	44.6	82.3	38.3	68.1	59.6	96.8	88.6	68.6
Operational Limitation[1]	93.5°C	95°C	93.5°C	93.5°C	93.5°C	93.5°C	95°C	95°C	
MWD Produced During Month, total	42,305	25,590	43,090	18,509	35,205	30,211	106,452	105,825	407,287
Normal	35,604	19,349	39,330	13,553	30,415	20,111	88,031	84,550	330,943
9% Metal	6,701	6,241	3,760	5,056	4,790	10,100	18,421	21,275	76,344
Plutonium Produced, grams	34,276	21,447	34,156	14,624	29,346	24,810	90,996	90,663	340,319
Uranium In Reactor At Month End, tons	225.8	223.9	229.0	218.3	225.6	202.7	433.7	433.3	2192.3
Normal	198.3	184.1	216.2	172.1	200.3	127.9	371.9	365.1	1835.9
9% Metal	27.5	39.8	12.8	46.2	25.3	74.8	61.8	68.2	356.4
Uranium Discharged During Month, tons	56.0	59.8	36.0	49.7	115.0	17.0	176.6	165.1	675.2
Normal	50.7	44.8	34.7	35.9	105.4	15.4	145.6	143.4	575.9
9% Metal	53.0	15.0	1.3	13.8	9.6	1.6	31.0	21.7	99.3
Average Discharge Concentration									
Normal	652	567	713	480	640	623	702	649	647
9% Metal	892	753	841	828	862	884	906	815	846

1 All reactors were limited by bulk outlet water temperatures.

Extracted from Travis 1962g, page 21.

REACTOR OUTAGES JUN 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
6/13	6/17	106.8	Scheduled charge-discharge. Miscellaneous maintenance.
6/18	6/18	.6	Unexplained Panellit trip.
6/23	6/25	35.9	Miscellaneous maintenance following a Panellit trip due to a faulty spline cap seal on tube 3479.
C Reactor			
5/25	6/11	395.3	Replacement of 399 tubes.
6/11	6/12	37.0	Leak testing and tube replacement following a Panellit trip.
6/13	6/13	1.7	Thermocouple repair.
6/20	6/25	115.1	Leak testing, tube replacement and miscellaneous maintenance.
6/25	6/25	1.9	Investigation of excessive steam formation in the rear face revealed that one of the two exhaust fans normally used was not on.
D Reactor			
6/11	6/13	41.7	Leak testing and tube replacement.
6/13	6/13	.3	Panellit trip due to a faulty gauge on PCCF tube 1475.
6/14	6/16	47.7	Removal of an I&E natural metal rupture from tube 3065. Charge-discharge.
6/18	6/20	37.6	Removal of an I&E natural metal rupture from tube 3378 and replacement of the tube.

Extracted from Plum 1963, June 1962, pages 2-4.

DR Reactor

6/5	6/6	38.5	Charge-discharge, leak testing and the correction of two faulty lug rings.
6/9	6/25	403.0	Replacement of 296 tubes.
6/26	6/26	.4	Unexplained Panellit trip.
6/26	6/26	2.1	Removal of an I&E natural metal rupture from tube 1268.

F Reactor

5/31	6/2	63.3	Scheduled charge-discharge. Miscellaneous maintenance.
6/3	6/3	1.8	Replace leaking front connector on tube 1585.
6/12	6/15	68.3	High pressure on tube 4167 due to a broken thermocouple well. Leak testing and miscellaneous maintenance.
6/25	6/29	112.8	Removal of an I&E natural metal rupture from tube 2272. Charge-discharge and miscellaneous maintenance.
6/30	6/30	1.2	Trip due to a loose spline cap on tube 3172.

H Reactor

6/1	6/1	.2	Panellit trip due to faulty gauge circuitry.
6/1	6/2	34.8	Beckman trip during recovery due to ultra-sensitive trip setting. Tube replacement.
6/7	6/9	45.7	Leak testing and tube replacement.
6/10	6/12	42.6	Leak testing and tube removal.
6/19	6/19	.3	Trip due to a faulty rear connector on tube 0682.
6/24	Still down		Scheduled tube replacement.

Extracted from Plum 1963, June 1962, pages 2-4.

KE Reactor

6/18	6/21	92.4	Scheduled charge-discharge.
6/21	6/21	1.3	Three Panellit trips apparently due to metal charges washing down stream.
6/22	6/22	.9	Manual trip to correct leaking rear face cap.
6/22	6/22	.2	Beckman trip during range change.

KW Reactor

6/11	6/14	82.3	Scheduled charge-discharge.

Extracted from Plum 1963, June 1962, pages 2-4.

URANIUM IN TONS
1962

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	July	Aug.	July	Aug.	July	Aug.	July	Aug.		July	Aug.
Normal U	498	336	1,855	1,848	499	323	2,491	2,507	Normal U		
									Purex	784	222
94 Metal	83	65	354	337	86	81	762	715	94 Metal		
									Redox	41	128

MWD AND SPECIAL MATERIALS
1962

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	July	August	July	August	July	August	July	August	July	August
MWD	394,228	426,847							Dissolved	
Normal	309,024	345,124	621,256	759,534	332,879	206,846	1,639,737	1,689,350	501,408	150,314
94 Metal	76,204	81,723	168,378	181,037	68,027	69,064	623,361	589,727	37,324	102,618

Extracted from Travis 1962i, pages 2 and 4

COMPARATIVE PILE PERFORMANCE

Jul 1962

	B	C	D	CR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,840
Maximum Power Level During Month, MW	1,785	2,100	1,795	1,740	1,775	1,715	4,140	4,000	19,050
Average Power Level While Operating, MW	1,679	1,698	1,714	1,633	1,647	1,652	3,800	3,620	17,343
Maximum Tube Power, KW	1,139	1,225	1,123	1,128	1,157	1,057	1,584	1,573	
Effective Central Tubes	1,520	1,660	1,495	1,490	1,500	1,550	2,335	2,495	
Time Operated Efficiency, %	76.0	69.7	84.0	73.3	78.9	84.3	63.1	57.2	73.3
Operational Limitation[1]	93.5°C	95.0°C	93.5°C	93.5°C	93.5°C	93.5°C	95.0°C	95.0°C	
MWD Produced During Month, total	39,543	40,999	44,606	37,034	40,279	43,186	74,324	64,207	384,228
Normal	33,187	30,905	40,708	27,340	34,946	29,520	60,107	51,311	308,024
9h Metal	6,356	10,094	3,898	9,744	5,333	13,666	14,217	12,896	76,204
Plutonium Produced, grams	32,568	33,600	38,316	30,125	33,392	34,601	67,834	57,347	327,783
Uranium In Reactor At Month End, tons	225.2	221.4	228.3	218.6	226.4	204.1	431.9	432.1	2188.5
Normal	196.7	181.5	216.0	172.7	201.7	130.6	368.9	366.9	1834.9
9h Metal	28.5	39.9	12.3	45.9	24.7	73.5	63.1	65.2	353.6
Uranium Discharged During Month, tons	73.4	47.9	61.3	87.1	1.2	32.6	120.4	161.0	584.9
Normal	69.0	38.3	57.8	74.4	0.5	15.3	108.7	134.7	498.7
9h Metal	4.4	9.6	3.5	12.7	0.7	17.3	11.7	26.3	86.2
Average Discharge Concentration									
Normal	570	673	917	622	500	657	637	661	667
9h Metal	836	791	960	896	567	704	842	745	789

1 All reactors were limited by bulk outlet water temperature.

Extracted from Travis 1962h, page 21.

REACTOR OUTAGES Jul 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
7/8	7/13	126.7	Scheduled charge-discharge and maintenance.
7/13	7/13	.7	Unexplained high pressure Panellit trip on tube 2561.
7/14	7/15	23.3	Repair of front nozzle pigtail adapter leak on tube 1794.
7/23	7/24	27.4	Removal of an I&E-E metal rupture from tube 4078.
7/24	7/24	.5	Beckman trip due to operational error.
C Reactor			
7/2	7/4	48.7	Leak testing.
7/4	7/4	.7	Tightening of rear caps on overbore tubes.
7/8	7/10	62.0	Tripped when #14 HCR cooling water hose came loose from a connector. Charge-discharge and maintenance.
7/11	7/13	33.5	Manually tripped when No. 14 HCR cooling water hose came loose from connector. Miscellaneous maintenance.
7/19	7/20	44.0	Removal of an I&E-E metal rupture from tube 1692. Miscellaneous maintenance.
7/27	7/29	36.3	Removal of an I&E-E metal rupture from tube 3962.
7/29	7/29	.3	Panellit trip while removing a spline stub from tube 2776.

Extracted from Plum 1963, July 1962, pages 3-6.

D Reactor

7/10	7/13	74.1	Tripped by a heavy power surge on the BPA system when a transformer faulted on the Priest Rapids #1 Line at Midway. Charge-discharge, maintenance, and tube replacement.
7/13	7/15	37.7	Leak testing and tube replacement.
7/31	Still down		Water leak.

DR Reactor

7/5	7/6	35.1	Panellit trip due to the failure of a rear pigtail adaptor on tube 2086. Charge-discharge.
7/10	7/11	35.1	Tripped by a heavy power surge on the BPA system when a transformer faulted on the Priest Rapids #1 Line at Midway. Miscellaneous maintenance.
7/16	7/20	93.1	Partially engaged front cap on tube 1793. Charge-discharge and miscellaneous maintenance.
7/20	7/20	.2	Unexplained Panellit trip.
7/23	7/24	33.9	Panellit trip due to non-seated charge in tube 3982. Miscellaneous maintenance.
7/24	7/24	1.5	Repair a flange leak on tube 3293.

F Reactor

7/1	7/2	33.6	Removal of an I&E-E metal rupture from tube 3958.
7/5	7/6	39.2	Panellit trip due to a broken rear pigtail on tube 3684. Miscellaneous maintenance and leak testing.
7/7	7/7	11.8	Removal of an I&E-E metal rupture from tube 2059.
7/10	7/11	34.1	Tripped by a heavy power surge on the BPA system. Retubed five air channels; decontamination and leak testing.
7/23	7/24	37.2	High pressure Panellit trip on tube 3371. Miscellaneous maintenance.

Extracted from Plum 1963, July 1962, pages 3-6.

H Reactor			
6/24	7/4	317.8	Scheduled tube replacement.
7/10	7/11	37.9	Trip by a heavy power surge on the BPA system. Miscellaneous maintenance.
KE Reactor			
7/10	7/12	51.5	Tripped by a heavy power surge on the BPA system. Charge-discharge.
7/16	7/22	167.3	Scheduled project work CG-844 and miscellaneous maintenance.
7/23	7/23	1.1	Tripped when VSR #70 dropped due to a faulty holding coil on the solenoid seal.
7/23	7/24	23.5	Flushing of high-pressure cross tie system piping through V-71 and V-74 valves.
7/28	7/29	31.9	Unexplained Panellit trip.
7/29	7/29	.4	Panellit trip due to an oscillating gauge.
KW Reactor			
7/1	7/4	72.9	Scheduled charge-discharge.
7/6	7/8	34.7	Unexplained Panellit trip. Replaced two sections of VSR #43.
7/8	7/8	2.6	Install one additional section of VSR #43.
7/10	7/11	42.6	Tripped by heavy power surge on the BPA system. Rear-face decontamination and maintenance.
7/16	7/21	134.7	Scheduled project work CG-844
7/23	7/24	31.8	Panellit trip due to a faulty jumper on gauge 4462. Miscellaneous maintenance.

Extracted from Plum 1963, July 1962, pages 3-6.

COMPARATIVE PILE PERFORMANCE
AUG 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,340
Maximum Power Level During Month, MW	1,745	2,050	1,725	1,690	1,735	1,650	4,085	4,040	18,720
Average Power Level While Operating, MW	1,573	1,766	1,646	1,654	1,656	1,573	4,007	3,934	17,809
Maximum Tube Power, KW	1,147	1,230	1,142	1,127	1,133	1,101	1,519	1,520	
Effective Central Tubes	1,520	1,640	1,500	1,490	1,500	1,490	2,495	2,495	
Time Operated Efficiency, %	80.3	28.0	75.5	91.6	65.7	75.9	85.1	88.5	73.9
Operational Limitation[1]	93.5	95.0	93.5	93.5	93.5	93.5	95.0	95.0	
MWD Produced During Month, total	41,656	15,307	38,502	46,958	33,725	37,012	105,745	107,242	426,847
Normal	34,913	11,519	34,867	34,659	29,368	25,872	87,025	86,901	345,124
9% Metal	6,743	3,788	3,635	12,299	4,357	11,140	18,720	21,041	81,723
Plutonium Produced, grams	34,300*	12,295*	30,655*	37,827*	27,463*	28,029	89,304	91,847*	351,719*
Uranium In Reactor At Month End, tons	224.2	223.9	227.1	217.9	226.4	202.0	432.5	431.4	2185.4
Normal	196.3	183.9	213.3	174.6	201.9	131.8	374.6	371.5	1847.9
9% Metal	27.9	40.0	13.8	43.3	24.5	70.2	57.9	59.9	337.5
Uranium Discharged During Month, tons	54.6	64.7	55.2	25.5	52.7	11.6	10.5	129.7	404.5
Normal	45.1	49.7	50.2	16.9	50.1	3.2	0.3	107.8	323.3
9% Metal	9.5	15.0	5.0	8.6	2.6	8.4	10.2	21.9	81.2
Average Discharge Concentration									
Normal	620	483	847	723	608	646	367	626	640
9% Metal	1,051	708	936	930	927	928	636	872	851

1 All reactors were limited by bulk outlet water temperature.
* Corrected figure.
Extracted from Travis 1962i, page 21 (Rev.).

REACTOR OUTAGES AUG 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
8/7	8/10	80.4	Scheduled charge-discharge and maintenance.
8/13	8/15	29.7	Removal of an I&E natural metal rupture from tube 3868.
8/22	8/24	36.2	Removal of an I&E E-metal rupture from tube 0989.
C Reactor			
8/1	8/3	40.2	Trip caused by a burned out transformer for the instrument air compressor. Miscellaneous maintenance.
8/3	8/3	2.1	Change Venturis on two tubes.
8/9	8/28	454.4	Scheduled replacement of 302 tubes.
8/29	8/29	3.1	Manual trip due to loss of cooling water to HCR No. 14.
8/29	8/30	36.1	Removal of an overbore-size I&E natural metal rupture from tube 3162.

Extracted from Plum 1963, August 1962, pages 2-4.

D Reactor

7/31	8/2	54.3	Leak testing and charge-discharge. Corrected 68 rear-face gas leaks.
8/5	8/6	38.0	Repair of a weld leak at a crossheader nipple for the pigtail.
8/11	8/13	42.0	Tripped due to a short in the brake coil on No. 7 HCR. Miscellaneous maintenance.
8/13	8/13	0.4	Additional rod comparison tests authorized by PT-IP-447C.
8/27	8/28	43.4	Removal of an I&E natural metal rupture from tube 2583. Leak testing and tube replacement.

DR Reactor

8/17	8/18	26.5	Removal of an I&E E-metal rupture from tube 1285.
8/19	8/20	23.5	Unexplained Panellit trip.
8/20	8/20	0.5	Tripped due to a defective spline cap seal.

F Reactor

8/6	8/7	38.8	Scheduled charge-discharge.
8/7	8/7	3.6	Repair two broken sample lines in near riser room.
8/9	8/10	33.0	Leak testing. Removed and replaced ball valve tube 3665 due to rear Van Stone leak.
8/10	8/10	1.5	Manual trip when the PCCF machine came loose from the ball valve while charging poison.
8/24	Still down		Tube replacement.

Extracted from Plum 1963, August 1962, pages 2-4.

H Reactor

8/1	8/4	73.9	Leak testing and charge-discharge.
8/7	8/8	35.3	Leak testing.
8/15	8/17	33.8	Removal of an I&E E-metal rupture from tube 0359.
8/27	8/28	36.2	Leak testing.

KE Reactor

8/3	8/5	39.0	Tripped due to a high-pressure surge while testing the backup coolant system. Miscellaneous maintenance and charge-discharge.
8/29	Still down		Scheduled charge-discharge.

KW Reactor

8/24	8/27	85.5	Loss of #2 emergency generator when the main exciter failed. Charge-discharge and miscellaneous maintenance.

Extracted from Plum 1963, August 1962, pages 2-4.

URANIUM IN TONS
1962

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.		Sep.	Oct.
Normal U	611	555	1,843	1,835	616	562	2,648	2,506	Normal U		
Scrap									Purex	552	707
94 Metal	104	106	339	348	103	96	704	694	94 Metal		
									Redox	113	109

MWD AND SPECIAL MATERIALS
1962

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.
MWD	391,232	393,857							Dissolved	
Normal	320,048	319,991	675,000	620,071	404,582	374,920	1,695,969	1,621,464	391,553	452,259
94 Metal	71,384	73,866	166,053	153,602	86,868	86,317	592,708	593,435	83,778	87,719

Extracted from Travis 1962k, pages 2 and 4.

COMPARATIVE PILE PERFORMANCE

SEP 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,840
Maximum Power Level During Month, MW	1,740	2,045	1,695	1,670	1,755	1,640	4,170	4,110	18,825
Average Power Level While Operating, MW	1,642	1,928	1,569	1,587	1,715	1,562	3,917	3,909	17,829
Maximum Tube Power, KW	1,127	1,240	1,158	1,121	1,153	1,103	1,670	1,618	
Effective Central Tubes	1,525	1,625	1,450	1,470	1,495	1,490	2,445	2,520	
Time Operated Efficiency, %	81.1	71.7	23.8	75.2	92.7	47.5	81.1	83.7	69.6
Operational Limitation[1]	93.5	95.0	93.5	95.0	93.5	93.5	95.0	95.0	
MWD Produced During Month, total	39,952	41,482	11,206	35,819	47,701	22,246	95,349	98,177	391,932
Normal	33,524	31,395	9,981	27,213	41,757	15,782	80,470	79,926	320,048
9% Metal	6,428	10,087	1,225	8,606	5,944	6,464	14,879	18,251	71,884
Plutonium Produced, grams	32,341	34,002	9,322	27,861	39,314	16,085	82,946	84,659	326,530
Uranium In Reactor At Month End, tons	223.6	224.2	226.4	219.0	226.0	201.5	430.7	430.3	2181.7
Normal	195.8	185.0	208.8	179.4	202.0	131.3	371.5	369.0	1842.3
9% Metal	27.8	39.2	17.6	39.6	24.0	70.2	59.2	61.3	338.9
Uranium Discharged During Month, tons	43.0	79.2	50.1	31.9	64.4	0.5	309.2	140.4	718.7
Normal	37.4	69.1	44.5	20.6	57.4	0.5	267.2	119.4	616.1
9% Metal	5.6	10.1	5.6	11.3	7.0	0	42.0	21.0	102.6
Average Discharge Concentration									
Normal	545	618	585	746	561	594	699	676	657
9% Metal	944	783	654	870	860	-	812	954	847

1 All reactors were limited by bulk outlet water temperature.

Extracted from Travis 1962j, page 21.

REACTOR OUTAGES SEP 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
9/5	9/7	47.6	Removal of an I&E natural metal rupture from tube 1175 and leak testing.
9/8	9/10	40.9	Removal of an I&E natural metal rupture from tube 2068.
9/11	9/11	.3	Unexplained Panellit trip.
9/17	9/17	.2	Tripped when a VSR switch was accidentally bumped.
9/29	Still down		Removal of an I&E E-metal rupture from tube 3768. Charge-discharge.
C Reactor			
9/3	9/5	60.3	Removal of an overbore size I&E natural metal rupture from tube 1491. Leak testing.
9/5	9/5	1.6	Installed shield bayonet in channel 0572.
9/6	9/7	32.7	Removal of an overbore size I&E natural metal rupture from tube 2969.
9/23	9/28	108.6	Removal of an I&E natural metal production test (IP-490A) rupture from tube 3680. Charge-discharge and miscellaneous maintenance.
9/28	9/28	.5	Unexplained Panellit trip.

Extracted from Plum 1963, September 1962, pages 2-4.

D Reactor

8/31	9/18	424.9	Water leak. Scheduled tube replacement: 347 tubes replaced.
9/23	9/24	31.3	Leak testing.
9/25	9/27	52.2	Leak testing.
9/29	Still down		Water leak.

DR Reactor

9/10	9/12	35.2	Tripped when an injection fitting came loose from a nozzle while injecting test material (IP-471-AE) for the control of a water leak. Leak testing and tube replacement.
9/16	9/17	34.6	Removal of an I&E E-metal rupture from tube 2989.
9/22	9/23	37.3	Water leak.
9/25	9/26	36.6	Water leak.
9/28	9/30	34.9	Removal of an I&E metal rupture from tube 3086 and miscellaneous maintenance.

F Reactor

8/24	9/3	230.8	Tube replacement (185 tubes).

Extracted from Plum 1963, September 1962, pages 2-4.

KE Reactor

8/29	9/1	85.6	Scheduled charge-discharge.
9/6	9/8	33.9	Charge-discharge following a trip due to the failure of #3 transformer.
9/25	9/28	74.9	Scheduled charge-discharge.
9/28	9/28	.3	Unexplained low pressure Panellit trip.
9/28	9/28	.9	Unexplained low pressure Panellit trip.
9/28	9/28	.7	Tripped when VSR #22 dropped due to a defective latch.
9/28	9/29	.7	Tripped when VSR #22 dropped. Rod was tied out of service.

KW Reactor

9/3	9/4	35.8	Panellit trip when a spline cap insert flushed downstream.
9/17	9/20	79.9	Scheduled charge-discharge.
9/20	9/20	1.2	Unexplained Panellit trip while adjusting gauges for six pumps.
9/20	9/20	.4	Panellit trip due to bypassing the wrong gauge while making adjustments for six pumps.

H Reactor

9/6	9/7	30.6	Miscellaneous maintenance following a Panellit trip.
9/10	9/11	34.1	Leak testing.
9/11	9/11	1.4	Repair fitting leaks on five front-face pigtails.
9/13	9/14	33.4	Removal of an I&E natural metal rupture from tube 2890.
9/19	Still down		Tripped due to the failure of a spline cap seal while removing a spline. Tube replacement is in progress.

Extracted from Plum 1963, September 1962, pages 2-4.

COMPARATIVE PILE PERFORMANCE
OCT 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,840
Maximum Power Level During Month, MW	1,820	2,125	1,770	1,720	1,805	1,685	4,350	4,250	19,525
Average Power Level While Operating, MW	1,686	1,878	1,626	1,472	1,713	1,612	4,269	3,997	18,253
Maximum Tube Power, KW	1,188	1,300	1,186	*	1,203	1,152	1,709	1,702	
Effective Central Tubes	1,515	1,630	1,475	*	1,485	1,440	2,510	2,455	
Time Operated Efficiency, %	67.4	68.2	67.8	41.1	74.8	51.9	94.5	60.3	65.8
Operational Limitation	93.5C**	95.0C**	93.5C**	95.0C**	93.5C**	615°C***	95.0C**	95.0C**	
MWD Produced During Month, total	35,242	39,691	34,158	18,745	39,728	25,923	125,025#	75,345	393,857
Normal	29,814	30,063	30,234	14,532	34,691	16,967	102,295	61,395	319,991
94 Metal	5,428	9,628	3,924	4,213	5,037	8,956	22,730	13,950	73,866
Plutonium Produced, grams	28,805	32,068	27,754	15,112	32,904	22,269	106,644	64,475	330,031
Uranium In Reactor At Month End, tons	222.8	223.4	226.4	219.5	225.7	205.0	430.7	429.9	2183.4
Normal	196.6	184.4	208.8	177.3	201.4	127.7	371.5	367.4	1835.1
94 Metal	26.2	39.0	17.6	42.2	24.3	77.3	59.2	62.5	348.3
Uranium Discharged During Month, tons	67.5	15.8	42.2	110.8	82.8	164.3	0	175.3	658.7
Normal	58.7	11.2	41.3	94.2	73.8	131.1	0	152.1	562.4
94 Metal	8.8	4.6	0.9	16.6	9.0	33.2	0	23.2	96.3
Average Discharge Concentration									
Normal	614	659	810	604	661	707	-	656	667
94 Metal	930	766	688	801	982	930	-	905	896

* Reactor not at equilibrium long enough to calculate meaning full data.
** Bulk outlet water temperature limit.
*** Graphite temperature limit.
# New record.

Extracted from Travis 1962k, page 19.

REACTOR OUTAGES - OCT 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
9/29	10/1	60.2	Removal of an I&E E-metal rupture from tube 3768 (reported last month).
10/10	10/11	29.0	Removal of an I&E E-metal rupture from tube 3063.
10/12	10/12	0.6	Tripped while flushing a ball valve tube.
10/17	10/19	43.0	Leak testing and tube removal.
10/24	10/25	29.1	Panellit trip due to leak in tube 1686; tube removed.
10/26	Still down		Scheduled tube replacement.
C Reactor			
10/5	10/7	35.5	Removal of an I&E E-metal rupture from tube 2970.
10/8	10/10	39.1	Leak testing and tube removal.
10/13	10/14	40.3	Removal of an I&E E-metal rupture from tube 2879.
10/18	10/20	28.6	Removal of an I&E natural metal rupture from tube 3677. Charge-discharge.
10/20	10/20	1.4	Three unexplained Panellit trips.
10/20	10/21	10.5	Removal of an I&E E-metal rupture from tube 3857.
10/21	10/21	2.1	Removal of an I&E E-metal rupture from tube 3856. (Rupture not confirmed)
10/27	10/29	79.3	Removal of an I&E natural metal rupture from tube 3959.

Extracted from Plum 1963, October 1962, pages 2-5.

D Reactor

9/29	10/1	55.5	Leak testing and tube replacement.
10/2	10/2	0.5	Repair faulty ball valve.
10/4	10/6	57.0	Leak testing.
10/7	10/7	0.1	Tripped due to a faulty spline cap seal.
10/15	10/17	40.6	Removal of an I&E natural metal rupture from tube 2166. Leak testing and tube replacement.
10/19	10/21	38.5	Removal of an I&E natural metal rupture from tube 3284. Charge-discharge and leak testing.
10/22	10/23	34.5	Tripped when the No. 9 HCR brake solenoid failed. Charge-discharge and miscellaneous maintenance.
10/23	10/23	0.4	Unexplained Panellit trip.
10/27	10/29	70.2	Removal of an I&E natural metal rupture from tube 3180. Charge-discharge, leak testing and tube replacement.
10/29	10/29	0.8	Tripped by the power failure relay when No. 1 motor lost synchronization.
10/29	10/30	8.2	Tripped by the power failure relay.
10/30	10/30	0.6	Unexplained Panellit trip.

Extracted from Plum 1963, October 1962, pages 2-5.

DR Reactor

10/2	10/4	38.4	Removal of an I&E E-metal rupture from tube 3885.
10/4	10/4	2.3	Unexplained Panellit trip.
10/7	10/9	39.2	Removal of an I&E E-metal rupture from tube 3967.
10/12	10/24	293.7	Scheduled tube replacement and charge-discharge; 166 tubes replaced.
10/24	10/24	0.5	Unexplained Panellit trip.
10/26	10/26	0.2	Unexplained Panellit trip.
10/26	10/27	30.4	Manual trip due to temperature and pressure variation on tube 2663.
10/29	10/30	39.2	Leak testing and tube replacement.

F Reactor

10/1	10/4	88.5	Scheduled charge-discharge, tube replacement and miscellaneous maintenance.
10/8	10/9	34.4	Correction of a rear-face water leak.
10/24	10/25	38.0	Removal of an I&E natural metal rupture from tube 1677.
10/30	Still down		Water leak.

H Reactor

9/19	10/14	593.5	Replacement of 514 tubes.
10/26	10/27	38.6	Leak testing.

Extracted from Plum 1963, October 1962, pages 2-5.

KE Reactor

10/30	Still down		Tripped by a momentary loss of flow on a KER single pass tube while switching water supply. Charge-discharge and miscellaneous maintenance.

KW Reactor

10/12	10/13	44.5	Removal of an I&E E-metal rupture from tube 2260.
10/14	10/14	1.7	Unexplained Panellit trip.
10/19	10/29	244.7	Replacement of 99 tubes.
10/29	10/29	0.6	Unexplained Panellit trip.

Extracted from Plum 1963, October 1962, pages 2-5.

URANIUM IN TONS
1962

	REACTORS								SEPARATIONS		
	Charged		Inventory In Reactor		Discharged		Inventory In Cooling			Dissolved	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.		Nov.	Dec.
Normal U	402	429	1,348	1,349	389	426	2,137[1]	1,841	Normal U		
									Purex	754	713
94 Metal	80	90	338	335	90	93	728	771	94 Metal		
									Redox	56	47

C.47

MWD AND SPECIAL MATERIALS
1962

	REACTORS									
	Charged or Produced		Inventory In Reactor		Discharged		Inventory In Cooling			
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
MWD	386,416	440,029							Dissolved	
Normal	310,727	359,822	665,730	732,370	265,063	292,682	1,430,104	1,276,713	455,427	442,630
94 Metal	75,689	80,207	155,595	159,573	73,696	76,229	620,515	656,252	46,622	38,032

Extracted from Travis 1963a, pages 2 and 4.

COMPARATIVE PILE PERFORMANCE
NOV 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,840
Maximum Power Level During Month, MW	1,820	2,155	1,850	1,820	1,855	1,780	4,400	4,400	20,280
Average Power Level While Operating, MW	1,609	2,003	1,721	1,726	1,695	1,692	3,367	4,297	18,610
Maximum Tube Power, KW	1,263	1,300	1,205	1,151	1,199	1,161	1,760	1,759	
Effective Central Tubes	1,440	1,620	1,470	1,520	1,500	1,535	2,470	2,500	
Time Operated Efficiency, %	42.1	73.9	72.1	84.7	76.2	74.7	41.5	69.7	69.4
Operational Limitation[1]	93.5C	95.0C	93.5C	95.0C	93.5C	93.5C	44COMM	44COMM	
MWD Produced During Month, total	20,330	44,438	37,238	43,881	38,750	37,911	48,189	115,679	386,416
Normal	17,175	34,062	33,127	33,449	33,966	25,100	40,707	93,141	310,727
94 Metal	3,155	10,376	4,111	10,432	4,784	12,811	7,482	22,538	75,689
Plutonium Produced, grams	17,126	36,140	30,722	36,326	31,885	30,811	41,512	99,678	324,200
Uranium In Reactor At Month End, tons	225.0	222.8	228.2	220.2	225.4	204.5	430.4	429.9	2186.4
Normal	198.0	184.3	213.2	180.7	202.0	127.8	374.8	367.4	1848.2
94 Metal	27.0	38.5	15.0	39.5	33.4	76.7	55.6	62.5	338.2
Uranium Discharged During Month, tons	78.0	24.9	37.6	27.2	90.7	10.6	199.4	10.7	479.1
Normal	71.3	10.8	32.8	16.7	84.9	0.1	171.6	0.7	388.9
94 Metal	6.7	14.1	4.8	10.5	5.8	10.5	27.8	10.0	90.2
Average Discharge Concentration									
Normal	602	619	694	803	637	370	728	444	682
94 Metal	691	732	695	816	794	930	883	790	817

1 All reactors were limited by bulk outlet water temperature except KE and KW.

Extracted from Travis 1962l, page 19.

REACTOR OUTAGES - Nov 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
10/26	11/14	447.3	Replacement of 417 tubes.
11/14	11/14	3.7	Thermocouple repair.
11/20	11/21	28.6	Water leak. Tube replacement.
11/21	11/21	4.4	Correct front pigtail leak.
11/26	11/28	47.4	Leak testing.
11/28	11/29	12.9	Panellit trip due to a faulty rear pigtail on tube 1272.
C Reactor			
11/4	11/5	39.2	Removal of an I&E E-metal rupture from tube 1888. Charge-discharge.
11/6	11/6	0.8	Panellit trip.
11/6	11/6	1.5	Replaced the rear nozzle adapter on tube 3966 which was causing a rear-face leak.
11/14	11/17	96.0	Removal of an I&E natural metal rupture from tube 1282.
11/26	11/27	34.2	Removal of an I&E E-metal rupture from tube 1458. Tube removed and channel blanked.
11/29	Still down		Scheduled tube replacement.

Extracted from Plum 1963, November 1962, pages 2-4.

D Reactor

11/2	11/3	35.0	Removal of an I&E natural metal rupture from tube 3266.
11/9	11/11	39.8	Leak testing and tube replacement.
11/11	11/11	0.6	Manual trip due to a short in "A" hole which gave a false period.
11/12	11/14	47.0	Water leak. Leak testing.
11/19	11/21	49.9	Water leak. Leak testing.
11/27	11/28	37.4	Removal of an I&E natural metal rupture from tube 2777. Leak testing and charge-discharge.

DR Reactor

11/13	11/15	36.0	Removal of an I&E E-metal rupture from tube 1675.
11/15	11/15	1.9	Correct front cap leak on tube 2565.
11/17	11/18	34.5	Panellit trip.
11/28	11/30	36.5	Panellit trip due to a faulty sensing line on 1164.
11/30	11/30	0.3	Tripped when wrong toggle valve was opened while checking gauge response time.

F Reactor

10/30	11/1	39.0	Leak testing.
11/3	11/5	49.7	Removal of an I&E E-metal rupture from tube 4167.
11/14	11/16	41.1	Removal of an I&E natural metal rupture from tube 1364.
11/22	11/25	66.3	Removal of an I&E natural metal rupture from tube 3867. Charge-discharge.
11/25	11/25	1.7	Repair broken sample line on crossheader 9½.

Extracted from Plum 1963, November 1962, pages 2-4.

H Reactor

11/17	11/19	38.7	Water leak. Leak testing.
11/21	11/21	0.3	Tripped due to a rear pigtail failure.
11/25	Still down		Scheduled tube replacement.

KE Reactor

10/30	11/2	70.1	Concluded charge-discharge and maintenance following a trip.
11/9	11/23	367.4	Scheduled tube replacement.
11/27	11/29	38.9	Investigate high temperature on tube 0570.
11/29	11/29	0.3	Replace a front leaking pigtail on tube 0958.
11/29	11/29	0.8	Low pressure trip on single pass tube 4456 while making a flow adjustment.
11/30	11/30	0.5	Tripped by loop 4 while making manual adjustments.
11/30	Still down		Manual trip for temperature control.

KW Reactor

11/11	11/13	37.1	Removal of an I&E natural metal rupture from tube 3648.
11/14	11/16	36.8	Investigation of partial flow restriction in bottom thermal shield coolant piping.

Extracted from Plum 1963, November 1962, pages 2-4.

COMPARATIVE PILE PERFORMANCE DEC 1962

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,840
Maximum Power Level During Month, MW	1,820	2,060	1,885	1,725	1,810	1,780	4,400	4,400	19,880
Average Power Level While Operating, MW	1,727	1,780	1,791	1,676	1,763	1,635	4,188	4,297	18,857
Maximum Tube Power, KW	1,185	1,270	1,244	1,139	1,183	1,170	1,867	1,731	
Effective Central Tubes	1,495	1,615	1,510	1,500	1,490	1,520	2,355	2,542	
Time Operated Efficiency, %	85.3	10.6	76.1	92.8	86.6	79.4	78.8	81.2	73.8
Operational Limitation	108°C[1]	105°C[1]	93.5°C[2]	108°C[1]	108°C[1]	93.5°C[2]	4400 MW[3]	4400 MW[3]	
MWD Produced During Month, total	45,647	5,821	42,244	48,220	47,327	40,275	102,366	108,129	440,029
Normal	39,039	4,448	38,364	37,456	41,621	27,028	84,733	87,079	359,822
9k Metal	6,554	1,373	3,880	10,764	5,706	13,247	17,633	21,050	80,207
Plutonium Produced, grams	37,851	5,075	34,366	37,987	38,579	31,434	88,678	93,089	367,059
Uranium In Reactor At Month End, tons	223.4	223.3	227.8	219.7	224.9	~~176.5~~ 204.5	429.9	429.7	2183.2
Normal	198.9	184.8	215.0	180.2	201.5	129.0	371.8	367.4	1848.6
9k Metal	24.5	38.5	12.8	39.5	23.4	~~45.5~~ 75.5	58.1	62.3	334.6
Uranium Discharged During Month, tons	44.9	81.7	43.5	0	1.7	21.9	170.8	154.8	519.3
Normal	37.1	67.6	35.6	0	0	3.8	144.7	137.3	426.1
9k Metal	7.8	14.1	7.9	0	1.7	18.1	26.1	17.5	93.2
Average Discharge Concentration									
Normal	615	621	750	-	-	392	720	696	687
9k Metal	960	730	781	-	885	792	833	840	818

1 Tube corrosion.
2 Bulk outlet.
3 Administrative.

Extracted from Travis 1963a, page 28.

REACTOR OUTAGES DEC 1962

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
12/13	12/16	74.5	Removal of an I&E natural metal rupture from tube 3465. Charge-discharge.
12/23	12/25	35.0	Leak testing. Tube 1077 was removed due to an internal leak. An I&E natural metal rupture was removed from tube 3162.
C Reactor			
11/29	12/28	680.6	Replacement of 251 tubes and maintenance work.
12/28	12/28	11.0	Thermocouple repairs.
D Reactor			
12/7	12/9	47.2	Removal of an I&E E-metal rupture from tube 1478. Charge-discharge.
12/14	12/15	39.2	Water leaks. Replacement of tubes 2169 and 0673.
12/15	12/15	0.5	Unexplained Panellit trip.
12/22	12/23	38.8	Removal of I&E natural metal ruptures from tubes 1064 and 3265.
12/27	12/29	28.2	Removal of an I&E natural metal rupture from tube 1077.
DR Reactor			
12/24	12/24	0.3	Panellit trip when a stub ejected from a spline cap.
12/29	Still down		Scheduled charge-discharge.

Extracted from Plum 1963, December 1962, pages 2-4.

F Reactor

12/7	12/10	72.6	Removal of an I&E E-metal rupture from tube 0674 and charge-discharge.
12/30	Still down		Removal of an I&E E-metal rupture from tube 0658 and charge-discharge.

H Reactor

11/25	12/2	171.2	Replacement of 156 tubes.
12/2	12/2	4.3	Correction of a loose rear-face cap.
12/6	12/6	0.3	Correction of a partially engaged front-face cap.
12/6	12/7	29.3	Tripped by low pressure on Loop 1 caused by the unexplained loss of power. Maintenance.
12/8	12/8	0.2	Manual trip due to malfunction of rate of rise instrumentation.
12/18	12/19	39.4	Unexplained Panellit trip.
12/22	12/23	30.9	Panellit trip due to a small piece of gasket-like material on the orifice cross wire. Charge-discharge and leak testing.
12/27	12/27	0.1	Panellit trip due to faulty rear pigtail fitting on tube 1864.
12/31	Still down		Water leak.

Extracted from Plum 1963, December 1962, pages 2-4.

KE Reactor

11/30	12/1	31.5	Manual trip for temperature control.
12/2	12/2	3.7	Repair leaking flapper cap.
12/2	12/2	0.4	Tripped while making flow adjustment on single pass tube 4355.
12/2	12/2	2.9	Insufficient control rod for turn around.
12/12	12/14	50.5	Inspection of a damaged front-face connector. Charge-discharge.
12/15	12/15	2.2	Unexplained Panellit trip.
12/26	12/30	72.1	Scheduled charge-discharge.
12/30	12/30	1.1	Tripped by Loop 2 due to failure to bypass the No. 1 safety circuit during functional checks.

KW Reactor

12/3	12/6	89.7	Scheduled charge-discharge and maintenance.
12/10	12/12	50.5	Panellit trip caused by leaking Bourdon tube. Miscellaneous maintenance.

Extracted from Plum 1963, December 1962, pages 2-4.

APPENDIX D

OPERATING DATA FOR 1963

REACTORS
1963

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
Normal U (tons)	388	532			1,732	1,721	504	544	2,351	2,399
MWD			357,793	262,397	762,333	652,613	328,330	372,117	1,610,452	1,615,365
Pu (kg)			305	224	671	575	281	320	1,380	1,389
9½ Metal (tons)	210	74			440	450	105	64	657	642
MWD			78,258	100,726	145,687	194,847	92,144	51,566	564,177	552,682
Pu (kg)			57	74	109	145	67	38	407	399

SEPARATIONS
1963
PUREX AND REDOX

	Dissolved	
	Jan.	Feb.
Normal U (tons)	0	510
MWD	0	375,959
Pu (kg)	0	318.9
9½ Metal (tons)	219	78
MWD	184,315	63,569
Pu (kg)	133.4	47.1

Extracted from Travis 1963c, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE
JAN 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	1,975	1,925	1,935	1,955	4,400	4,400	20,840
Maximum Power Level During Month, MW	1,890	2,205	1,945	1,725	1,860	1,755	4,400	4,400	20,180
Average Power Level While Operating, MW	1,841	2,021	1,790	1,546	1,726	1,489	4,162	4,348	19,024
Maximum Tube Power, KW	1,239	1,279	1,172	1,137	1,260	*	1,678	1,761	
Effective Central Tubes	1,525	1,550	1,515	1,485	1,465	*	2,625	2,500	
Time Operated Efficiency, %	70.2	82.0	79.4	81.0	50.6	28.0	84.0	82.3	69.7
Operational Limitation	108°C[1]	105°C[1]	93.5°C[2]	108°C[1]	108°C[1]	*	4,400[3]	4,400[3]	
MWD Produced During Month, total	40,055	51,380	44,080	41,322	27,050	12,927	108,326	110,911	436,051
Normal	34,743	39,549	40,513	33,386	23,311	7,674	89,194	89,423	357,793
9h Metal	5,312	11,831	3,567	7,936	3,739	5,253	19,132	21,488	78,258
Plutonium Produced, grams	32,494	41,901	35,028	32,425	22,643	9,699	93,438	94,872	362,500
Uranium In Reactor At Month End, tons	222.8	223.6	227.8	219.2	223.6	194.9	430.9	429.3	2172.1
Normal	198.9	185.6	215.2	183.6	197.2	3.5	381.0	367.4	1732.4
9h Metal	23.9	38.0	12.6	35.6	26.4	191.4	49.9	61.9	439.7
Uranium Discharged During Month, tons	26.9	24.4	31.4	85.1	97.8	143.1	20.7	180.0	609.4
Normal	24.5	20.4	26.7	67.3	86.7	128.7	2.1	147.7	504.1
9h Metal	2.4	4.0	4.7	17.8	11.1	14.4	18.6	32.3	105.3
Average Discharge Concentration									
Normal	618	593	743	667	586	585	447	739	651
9h Metal	733	765	864	892	839	833	800	965	875

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* This reactor did not reach equilibrium during the month.
1 Tube corrosion.
2 Bulk outlet water temperature limit.
3 Administrative limit.
Extracted from Travis 1963b, page 29.

REACTOR OUTAGES JAN 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
1/1	1/2	41.5	Scheduled charge-discharge.
1/24	Still down		Tube replacement.
C Reactor			
1/2	1/4	46.7	Leak testing and miscellaneous maintenance.
1/6	1/6	0.3	Unexplained Panellit trip.
1/14	1/16	49.9	Leak testing and thermocouple well cap repairs.
1/19	1/21	37.2	Unexplained Panellit trip.
D Reactor			
1/2	1/4	39.7	Removal of an I&E natural metal rupture from tube 3786 and replacement of 4 process tubes.
1/17	1/20	81.4	Removal of an I&E natural metal rupture from tube 4075 and an I&E natural metal rupture from tube 1167. Charge-discharge.
1/21	1/22	31.4	Leak testing and replacement of tube 3273 due to a rear Van Stone leak.
1/23	1/23	1.2	Tripped from unknown cause.

Extracted from Plum 1964, January 1963, pages 2-4.

DR Reactor

12/29	1/1	53.2	Scheduled charge-discharge.
1/14	1/17	47.6	High temperature on tube 0969. An I&E E-metal rupture was removed from tube 1987. Charge-discharge and maintenance.
1/17	1/18	3.8	Unexplained Panellit trip on tube 1386.
1/18	1/18	1.0	Low pressure trip on tube 0963 during spline removal.
1/28	1/30	40.5	Removal of an I&E natural metal rupture from tube 1468.
1/30	1/30	1.1	Panellit trip while pulling a spline from tube 2679. The spline seal failed.
1/30	1/31	21.1	Removal of an I&E natural metal rupture from tube 2473.
1/31	1/31	0.7	Panellit trip due to a faulty spline cap.

F Reactor

12/30	1/1	27.2	Concluded rupture removal.
1/3	1/16	312.4	Replacement of 191 tubes.
1/16	1/16	6.3	Tripped due to a spline cap leak.
1/16	1/16	0.8	Tripped when VSR No. 25 dropped out of the upper limit switch.
1/29	1/31	38.5	Removal of an I&E natural metal rupture from tube 1362.

H. Reactor

12/31	1/1	20.2	Leak testing.
1/6	1/7	36.6	Removal of an I&E E-metal rupture from tube 1180. Leak testing.
1/9	1/10	30.8	Removal of an I&E natural metal rupture from tube 1975.
1/11	1/30	456.5	Replacement of 346 tubes.

Extracted from Plum 1964, January 1963, pages 2-4.

KE Reactor

1/7	1/8	36.3	Correction of a front pigtail leak.
1/11	1/12	36.5	Panellit trip due to a broken spline in tube 4946.
1/12	1/13	9.3	Panellit trip due to a broken front nozzle on tube 1162.
1/13	1/13	1.1	Unexplained Panellit trip on tube 4946.
1/26	1/27	36.1	Panellit trip on gauge 1875 due to a broken Bourdon tube.

KW Reactor

1/9	1/13	113.4	Scheduled charge-discharge and maintenance.
1/31	Still down		Unexplained Panellit trip on tube 3770. Charge-discharge.

Extracted from Plum 1964, January 1963, pages 2-4.

COMPARATIVE PILE PERFORMANCE
FEB 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	2,005[1]	1,225	1,935	1,955	4,400	4,400	20,870
Maximum Power Level During Month, MW	1,910	2,220	2,005[1]	1,809	1,900	1,910	4,400	4,400	20,554
Average Power Level While Operating, MW	1,679	2,069	1,893	1,721	1,843	1,805	3,989	4,253	19,252
Maximum Tube Power, KW	1,256	1,310	1,297	1,196	1,238	1,263	1,849	1,720	
Effective Central Tubes	1,512	1,655	1,530	1,507	1,520	1,520	2,380	2,558	
Time Operated Efficiency, %	52.5	71.2	76.7	44.0	89.9	96.2	62.2	59.5	69.0
Operational Limitation	108°C[2]	105°C[2]	93.5°C[3]	107°C[2]	106°C[2]	83.5°C[3]	4400 MW[4]	4400 MW[4]	
MWD Produced During Month, total	24,662	41,231	40,647	21,195	46,417	48,591	69,485	70,895	363,123
Normal	20,403	31,725	37,275	17,061	39,920	662	58,181	57,170	262,397
94 Metal	4,259	9,506	3,372	4,134	6,497	47,929	11,304	13,725	100,726
Plutonium Produced, grams	20,652	33,933	31,778	16,247	37,239	35,890	60,026	61,834	297,599
Uranium In Reactor At Month End, tons	223.4	222.9	226.3	219.2	223.9	194.9	430.3	430.0	2170.9
Normal	193.8	184.8	212.7	183.6	198.5	3.5	375.7	368.0	1720.6
94 Metal	29.6	38.1	13.6	35.6	25.4	191.4	54.6	62.0	450.3
Uranium Discharged During Month, tons	99.3	77.9	55.6	0.1	60.5	0.2	160.5	153.8	607.9
Normal	90.1	62.6	52.6		54.6	0.1	149.3	135.1	544.4
94 Metal	9.2	15.3	3.0	0.1	5.9	0.1	11.2	18.7	63.5
Average Discharge Concentration									
Normal	546	746	825	679	709	0	710	664	684
94 Metal	814	782	819	860	873	900	796	829	812

1 New record.
2 Tube corrosion.
3 Bulk outlet water temperature limit.
4 Administrative limit.

Extracted from Travis 1963c, page 29.

REACTOR OUTAGES FEB 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
1/24	2/12	450.6	Replacement of 408 tubes.
2/20	2/22	48.9	Leak testing. Tube replacement.
C Reactor			
2/4	2/8	86.0	Scheduled charge-discharge. Tube replacement.
2/10	2/10	0.3	Panellit trip.
2/10	2/12	34.2	Removal of an I&E natural metal rupture from tube 3584. Tube replacement.
2/24	2/25	35.8	Removal of an I&E E-metal rupture from tube 4272.
2/27	2/28	57.1	Leak testing.
2/28	2/28	4.4	Repair thermocouple well leak on tube 4167.
D Reactor			
2/3	2/6	69.6	Removal of an I&E natural metal rupture from tube 2466. Charge-discharge and leak testing.
2/19	2/21	45.2	Removal of an I&E natural metal rupture from tube 0682. Miscellaneous maintenance.
2/26	2/28	41.8	Removal of I&E natural metal ruptures from tubes 2759 and 1374 (latter one not confirmed). Miscellaneous maintenance.

Extracted from Plum 1964, February 1963, pages 3-5.

DR Reactor

2/2	2/4	38.7	Removal of an I&E natural metal rupture from tube 1475 and an I&E E-metal rupture from tube 1362. Miscellaneous maintenance.
2/14	Still down		Removal of an I&E natural rupture from tube 2079. Charge-discharge, flushing and decontamination in preparation for tube replacement. Tube replacement.

F Reactor

2/19	2/22	77.7	Scheduled charge-discharge.

H Reactor

2/9	2/10	25.0	Removal of an I&E E-metal rupture from tube 3457.
2/10	2/10	0.7	Trip due to electrical power fluctuation.

Extracted from Plum 1964, February 1963, pages 3-5.

KE Reactor

2/2	2/3	37.7	Panellit trip due to a faulty spline cap seal on tube 4993.
2/6	2/7	38.0	Removal of an I&E E-metal rupture from tube 4065.
2/7	2/8	5.5	Manual trip due to insufficient control rods for turn around.
2/8	2/9	29.8	Trip due to VSR's dropping when a holding latch failed.
2/9	2/9	0.5	Panellit trip due to a faulty spline cap seal.
2/13	2/16	93.3	Tripped by loop 4 due to an instrument power failure caused by a loose terminal connection in the main instrument power disconnect box. Scheduled charge-discharge.
2/16	2/17	2.0	RTD repair on tube 2947.
2/17	2/17	2.0	Investigate high pressure on tube 0752.
2/20	2/22	47.1	Panellit trip due to a broken spline washing downstream in tube 1188. Miscellaneous maintenance.

KW Reactor

1/31	2/1	61.0	Panellit trip. Charge-discharge.
2/8	2/19	310.5	Replacement of 56 tubes.
2/19	2/19	2.0	RTD repair.

Extracted from Plum 1964, February 1963, pages 3-5.

REACTORS
1963

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.
Normal U (tons)	312	567			1,723	1,729	310	561	1,948	2,382
MWD			365,368	378,369	787,611	751,305	230,370	414,675	1,349,479	1,676,686
Pu (kg)			311	323	690	663	196	349	1,157	1,417
94 Metal (tons)	70	112			452	447	69	117	660	594
MWD			128,998	124,168	262,721	286,832	61,124	100,057	568,940	518,536
Pu (kg)			91	86	191	206	44	72	411	374

SEPARATIONS
1963

PUREX AND REDOX

	Dissolved	
	Mar.	Apr.
Normal U (tons)	764	119
MWD	497,763	81,170
Pu (kg)	429.0	68.6
94 Metal (tons)	49	182
MWD	44,843	149,586
Pu (kg)	35.1	110.4

Extracted from Travis 1963e, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE
MARCH 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	2,005	1,825	1,935	1,855	4,400	4,400	20,670
Maximum Power Level During Month, MW	1,915	2,170	1,960	1,840	1,870	1,800	4,400	4,400	20,455
Average Power Level While Operating, MW	1,864	2,146	1,879	1,658	1,835	1,861	4,215	4,253	19,811
Maximum Tube Power, KW	1,221	1,320	1,275	1,153	1,232	1,220	1,779	1,752	
Effective Central Tubes	1,565	1,625	1,515	1,535	1,427	1,525	2,475	2,512	
Time Operated Efficiency, %	90.1	62.8	45.1	72.6	82.6	82.2	82.4	84.2	78.1
Operational Limitation	109°C[1]	105°C[1]	93.5°C[2]	107°C[1]	106°C[1]	93.5°C[2]	440CFM[3]	440CFM[3]	
MWD Produced During Month, total	52,047[4]	41,772	26,257	37,348	47,526	53,619[4]	107,714	129,033[4]	494,366[4]
Normal	43,252	32,177	23,662	29,544	41,088	744	90,064	104,837	365,369
9h Metal	8,795	9,595	2,595	7,804	6,438	52,875	17,650	23,246	128,998
Plutonium Produced, grams	41,989	32,841	21,448	31,098	37,464	36,691	92,092	107,933	401,556
Uranium In Reactor At Month End, tons	223.4	222.9	227.5	220.5	224.0	195.4	430.0	430.5	2174.2
Normal	194.7	184.8	212.3	183.0	198.6	3.6	373.2	372.4	1722.6
9h Metal	28.7	38.1	15.2	37.5	25.4	191.8	56.8	58.1	451.6
Uranium Discharged During Month, tons	35.9	0	45.7	91.0	0.1	14.4	160.2	32.2	379.5
Normal	32.2	0	44.3	77.7	0.1	0.1	138.7	17.2	310.3
9h Metal	3.7	0	1.4	13.3	0	14.3	21.5	15.0	69.2
Average Discharge Concentration									
Normal	653	-	665	801	480	730	738	882	742
9h Metal	848	-	769	881	961	845	866	883	893

1 Tube corrosion.
2 Bulk outlet water temperature limit.
3 Administrative limit.
4 New record.
Extracted from Travis 1963d, page 27.

REACTOR OUTAGES MAR 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
3/11	3/13	44.5	Removal of an I&E E-metal rupture from tube 2476.
3/23	3/24	18.0	Removal of an I&E E-metal rupture from tube 3660.
C Reactor			
3/20	Still down		Leak testing. Tube replacement. Charge-discharge and miscellaneous maintenance.
D Reactor			
3/2	3/19	408.7	Replacement of 350 tubes.
DR Reactor			
2/14	3/4	429.1	Replacement of 307 tubes.
3/6	3/6	0.2	Panellit trip due to a faulty spline cap seal.
3/7	3/8	35.4	Correction of partially engaged front-face cap on tube 2474.
3/12	3/12	0.2	Panellit trip when the wrong Panellit gauge was by-passed during a base check.
3/14	3/16	34.6	Water leak. Replaced tube 0579 due to a rear Van Stone leak.
3/26	3/28	41.5	Removal of an I&E natural metal rupture from tube 3976.

Extracted from Plum 1964, March 1963, pages 2-4.

F Reactor

3/4	3/6	38.9	Removal of an I&E natural metal rupture from tube 1275.
3/28	Still down		Scheduled charge-discharge.

H Reactor

3/11	3/12	34.6	Water leak. Tube 0473 was replaced due to an internal leak. Inspection of the metal discharged from this tube revealed an I&E enriched metal rupture.
3/31	Still down		Removal of an I&E E-metal rupture from tube 0678.

KE Reactor

3/4	3/6	37.3	Investigation of flow valve vibration on Loop 4. Valve plug was found separated from the stem.
3/6	3/6	1.5	Unexplained low pressure trip on single pass tube 3050.
3/14	3/16	37.0	Panellit trip due to a broken spline in tube 1967. Charge-discharge and miscellaneous maintenance.
3/26	3/28	55.0	Scheduled charge-discharge.
3/29	3/29	0.4	At the associated test facility instrument power was switched to BPA power because of indications of trouble.

KW Reactor

3/7	3/8	36.1	Removal of an I&E E-metal rupture from tube 3868.
3/9	3/9	1.1	Unexplained Panellit trip on tube 1186.
3/9	3/9	0.6	Unexplained Panellit trip on tube 3286.

Extracted from Plum 1964, March 1963, pages 2-4.

COMPARATIVE PILE PERFORMANCE

APR 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,870
Maximum Power Level During Month, MW	1,390	2,215	1,955	1,360	1,945	1,375	4,400	4,400	20,440
Average Power Level While Operating, MW	1,805	2,062	1,867	1,810	1,792	1,827	4,336	4,206	19,705
Maximum Tube Power, KW	1,215	1,330	1,241	1,195	1,182	1,210	1,728	1,756	
Effective Central Tubes	1,555	1,630	1,551	1,556	1,537	1,520	2,545	2,500	
Time Operated Efficiency, %	78.0	76.5	84.5	87.7	94.2	86.8	93.0	78.4	84.9
Operational Limitation	108°C[1]	105°C[1]	93.5°C[2]	107°C[1]	105°C[1]	93.5°C[2]	4400MW[3]	4400MW[3]	
MWD Produced During Month, total	42,225	47,300	47,324	47,633	50,654[4]	47,573	120,965	98,863	502,537[4]
Normal	36,024	36,001	42,764	37,719	44,258	658	100,404	80,541	378,369
94 Metal	6,201	11,299	4,560	9,914	6,396	46,915	20,561	18,322	124,168
Plutonium Produced, grams	34,325	39,738	37,682	37,721	41,212	31,035	102,910	84,305	408,928
Uranium In Reactor At Month End, tons	224.0	223.3	226.9	220.0	224.8	196.0	430.0	430.3	2175.3
Normal	200.1	182.7	212.6	182.3	201.0	3.6	375.7	370.6	1728.6
94 Metal	23.9	40.6	14.3	37.7	23.8	192.4	54.3	59.7	446.7
Uranium Discharged During Month, tons	89.1	144.8	56.8	93.1	85.2	5.3	40.7	163.3	678.3
Normal	74.4	117.5	50.9	82.9	73.7	0.1	24.5	137.4	561.4
94 Metal	14.7	27.3	5.9	10.2	11.5	5.2	16.2	25.9	116.9
Average Discharge Concentration									
Normal	667	669	926	677	764	390	908	760	739
94 Metal	751	797	951	990	888	912	834	891	856

1 Tube corrosion.
2 Bulk outlet water temperature limit.
3 Administrative limit.
4 Record monthly production figure.
Extracted from Travis 1963e, page 27.

REACTOR OUTAGES APR 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
4/1	4/3	58.5	Removal of an I&E E-metal rupture from tube 2774. Charge-discharge
4/16	4/19	80.6	Removal of an I&E E-metal rupture from tube 2681. Charge-discharge and maintenance.
4/20	4/21	29.3	Removal of an I&E E-metal rupture from tube 2490. Tube was removed and channel left blank.
C Reactor			
3/20	4/3	331.7	Tube replacement.
4/5	4/7	38.3	Manual trip for temperature control. Leak testing.
4/18	4/18	0.3	Unexplained Panellit trip.
4/18	4/21	75.8	Manually tripped to control tube temperature. Charge-discharge and leak testing.
D reactor			
4/14	4/16	68.1	Removal of an I&E natural metal rupture from tube 0661. Charge-discharge.
4/24	4/25	43.0	Water leak. Replaced 7 tubes.
4/30	Still down		Panellit trip due to a faulty gauge on 2668.
DR Reactor			
4/21	4/25	64.0	Scheduled charge-discharge. Miscellaneous maintenance.
4/25	4/25	0.3	Panellit trip when gauge was accidentally rolled beyond the high trip point.

Extracted from Plum 1964, April 1963, pages 2-4.

F Reactor

3/28	4/1	84.5	Scheduled charge-discharge.
4/1	4/1	2.2	Unexplained Panellit trip.
4/16	4/18	38.4	Tripped due to a spline cap seal leak.

H Reactor

3/31	4/1	26.7	Removal of I&E E-metal rupture from tube 0578.
4/27	Still down		Scheduled charge-discharge and maintenance.

KE Reactor

4/10	4/12	77.8	Panellit trip on gauge 3568 caused by a short circuit. Charge-discharge.
4/12	4/12	0.6	Unexplained Panellit trip.
4/12	4/12	6.0	Unexplained Panellit trip.

KW Reactor

4/1	4/4	77.8	Scheduled charge-discharge and maintenance.
4/4	4/4	2.7	Unexplained Panellit trip.
4/7	4/9	38.2	Leak testing. Remove aluminum tube from test hole 3A, channel blanked off.
4/16	4/17	36.9	Replacement of No. 3 low lift pump motor.

Extracted from Plum 1964, April 1963, pages 2-4.

REACTORS
1963

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	May	June	May	June	May	June	May	June	May	June
Normal U (tons)	303	549			1,728	1,730	304	547	2,027	1,899
MWD			290,523	335,526	837,731	758,985	204,097	414,272	1,461,870	1,380,702
Pu (kg)			241	287	728	668	176	348	1,246	1,171
9% Metal (tons)	198	106			458	464	186	100	762	733
MWD			94,473	127,388	216,788	257,427	164,517	86,749	667,583	646,066
Pu (kg)			68	91	159	188	115	62	478	461

SEPARATIONS
1963

PUREX AND REDOX

	Dissolved	
	May	June
Normal U (tons)	664	673
MWD	424,217	494,040
Pu (kg)	364.6	421.6
9% Metal (tons)	24	128
MWD	19,722	108,283
Pu (kg)	14.8	79.3

Extracted from Travis 1963g, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE - MAY 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,870
Maximum Power Level During Month, MW	1,825	2,280	1,900	1,775	1,830	1,780	4,400	4,400	20,190
Average Power Level While Operating, MW	1,785	2,181	1,823	1,749	1,791	1,687	4,399	3,804	19,219
Maximum Tube Power, KW	1,181	1,317	1,227	1,176	1,175	1,182	1,762	1,693	
Effective Central Tubes	1,540	1,680	1,532	1,513	1,534	1,476	2,500	2,511	
Time Operated Efficiency, %	87.3	95.1	94.7	90.3	87.2	70.7	35.7	30.4	73.9
Operational Limitation	108°C[1]	95.0°C[2]	93.5°C[2]	107°C[1]	106°C[1]	93.5°C[2]	44COMM[3]	44COMM[3]	
MWD Produced During Month, total	48,290	64,320[4]	53,509[4]	48,966	48,415	36,990	48,702	35,804	384,996
Normal	41,755	48,589	48,507	39,298	42,643	504	40,671	28,556	290,523
9% Metal	6,535	15,731	5,002	9,668	5,772	36,486	8,031	7,248	94,473
Plutonium Produced, grams	39,523	50,976	41,112	39,279	39,743	27,401	38,966	31,949	308,943
Uranium In Reactor At Month End, tons	224.7	223.3	227.2	220.7	226.0	199.1	430.0	435.0	2186.0
Normal	199.5	182.7	212.9	184.9	203.0	3.6	375.7	365.6	1727.9
9% Metal	25.2	40.6	14.3	35.8	23.0	195.5	54.3	69.4	458.1
Uranium Discharged During Month, tons	61.1	11.9	0.5	5.7	88.8	137.8	0	184.8	490.6
Normal	53.2	6.1	0.5	0.3	80.6	3.1	0	160.3	304.1
9% Metal	7.9	5.8	0	5.4	8.2	134.7	0	24.5	186.5
Average Discharge Concentration									
Normal	623	720	354	467	749	623	-	648	671
9% Metal	883	866	-	802	949	891	-	832	882

1 Tube corrosion
2 Bulk outlet water temperature limit.
3 Administrative limit.
4 New record.

Extracted from Travis 1963f, page 27.

REACTOR OUTAGES MAY 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
5/14	5/17	60.8	Scheduled charge-discharge. Removed tube 3390 due to a rear Van Stone leak.
5/22	5/23	16.8	Removal of an I&E natural metal rupture from tube 2080. Retubed 9 air channels.
C Reactor			
5/7	5/9	35.1	Removal of an I&E-E metal rupture from tube 2077.
D Reactor			
4/30	5/2	39.0	Panellit trip due to faulty gauge on tube 2668. Miscellaneous maintenance.
5/2	5/2	1.1	Removed an orifice from tube 1490 and installed a Venturi to correct high tube temperature.
DR Reactor			
5/1	5/3	36.0	Leak testing. Two rear Van Stone leaks were corrected; tube 0677 was replaced and a new Van Stone was formed on tube 0664.
5/10	5/12	36.0	Removal of an I&E E-metal rupture from tube 3960. Charge-discharge and leak testing.

Extracted from Plum 1964, May 1963, pages 2-4.

H Reactor

4/27	5/6	227.3	Scheduled charge-discharge and maintenance. Expansion joint work completed. Replacement of eleven process tubes.
5/7	5/7	0.9	Manually discharged poison from PCFF tube 3974 due to a stuck valve.
5/14	5/15	29.2	Leak testing.
5/16	5/16	0.3	Tripped when a VSR dropped out of the upper limit switch.
5/17	5/19	46.8	Leak testing. Replaced tube 2874 due to an internal leak.

KE Reactor

5/12	Still down		Removal of a production test rupture from front-to-rear test hole 3565. Scheduled tube replacement.

KW Reactor

5/2	5/23	515.7	Scheduled tube replacement.
5/23	5/23	1.6	Unexplained low pressure Panellit trip on 1247.
5/23	5/23	1.0	Unexplained low pressure Panellit trip on 5278.

Extracted from Plum 1964, May 1963, pages 2-4.

COMPARATIVE PILE PERFORMANCE - JUN 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Maximum Power Level To Date, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,870
Maximum Power Level During Month, MW	1,835	2,150	1,805	1,775	1,815	1,755	4,360	4,400	19,895
Average Power Level While Operating, MW	1,740	2,039	1,737	1,737	1,751	1,719	4,201	4,337	15,261
Maximum Tube Power, KW	1,174	1,247	1,213	1,139	1,198	1,125	1,722	1,790	
Effective Central Tubes	1,550	1,667	1,510	1,549	1,511	1,514	2,500	2,405	
Time Operated Efficiency, %	54.4	80.5	46.8	86.0	73.9	100.0	75.8	100.0	77.2
Operational Limitation	95.0°C[1]	95.0°C[1]	95.0°C[1]	95.0°C[1]	106°C[2]	95.0°C[1]	95.0°C[1]	95.0°C[1]	
MWD Produced During Month, total	28,388	49,259	24,371	44,804	38,840	51,571	95,584	130,097	462,914
Normal	24,556	37,115	22,094	36,213	34,383	704	77,242	103,219	335,526
94 Metal	3,832	12,144	2,277	8,591	4,457	50,867	18,342	26,878	127,388
Plutonium Produced, grams	22,972	40,627	17,770	36,373	31,965	35,756	83,341	109,680	378,484
Uranium In Reactor At Month End, tons	225.6	223.2	227.7	220.8	226.5	199.1	436.1	435.0	2194.0
Normal	201.5	182.6	214.1	185.7	203.9	3.6	372.9	365.6	1729.9
94 Metal	24.1	40.6	13.6	35.1	22.6	195.5	63.2	69.4	464.1
Uranium Discharged During Month, tons	22.5	132.0	103.7	87.6	90.0		211.9		647.7
Normal	14.8	106.3	93.8	71.4	82.7		178.3		547.3
94 Metal	7.7	25.7	9.9	16.2	7.3		33.6		100.4
Average Discharge Concentration									
Normal	657	679	963	707	683		758		757
94 Metal	579	797	1,082	984	791		874		864

1 Bulk outlet water temperature limit.
2 Tube corrosion limit.
Extracted from Travis 1963g, page 27.

REACTOR OUTAGES JUN 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
6/6	6/18	297.2	Removal of an I&E E-metal rupture from tube 0773. Scheduled charge-discharge and maintenance work - bellows foaming, thermocouple and Venturi work.
6/20	6/20	0.3	Panellit trip due to a blown thermocouple well on tube 1679.
6/20	6/21	39.9	Removal of an I&E E-metal rupture from tube 1762.
C Reactor			
6/1	6/4	72.8	Scheduled charge-discharge.
6/18	6/21	66.3	Removal of an I&E E-metal rupture from tube 2458. Charge-discharge.
6/21	6/21	1.5	Unexplained Panellit trip.
6/22	6/22	0.3	Unexplained Panellit trip.
D Reactor			
6/14	6/29	381.7	Scheduled charge-discharge and maintenance. Replacement of 241 tubes. Foaming of rear-face bellows.
6/30	6/30	1.5	Corrected a rear-face cap leak on tube 3765.
DR Reactor			
6/3	6/5	60.5	Scheduled charge-discharge. Probologged 205 tubes and installed 200 Van Stone inserts.
6/5	6/5	1.5	Repaired front-pigtail fitting leak on tube 3661.
6/24	6/25	39.1	Removal of an I&E natural water mixer rupture from tube 3689. Charge-discharge.

Extracted from Plum 1964, June 1963, pages 3 and 4.

F Reactor

6/5	6/8	73.3	Leak testing, charge-discharge and miscellaneous maintenance. Replaced 5 process tubes.
6/9	6/11	38.6	Leak testing. Rear Van Stone leaks were corrected on tubes 3794 and 3188.
6/11	6/11	0.7	Panellit trip due to a spline cap leak while inserting a spline.
6/19	6/22	75.0	Scheduled charge-discharge. Maintenance and tube replacement.

H Reactor

No outages.

KE Reactor

5/12	6/8	651.5	Scheduled replacement of 591 tubes, charge-discharge and miscellaneous maintenance.
6/8	6/8	0.7	Unexplained high pressure Panellit trip on tube 2044.

KW Reactor

No outages.

Extracted from Plum 1964, June 1963, pages 3 and 4.

REACTORS
1963

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	July	Aug.	July	Aug.	July	Aug.	July	Aug.	July	Aug.
Normal U (tons)	459	514			1,731	1,741	457	505	2,354	2,531
MWD			346,249	283,762	747,366	690,856	357,868	340,272	1,734,435	1,852,463
Pu (kg)			296	238	660	606	304	292	1,472	1,585
94 Metal (tons)	119	75			461	459	122	77	703	681
MWD			117,125	99,038	260,679	296,297	113,873	63,420	628,862	574,280
Pu (kg)			82	67	189	210	80	45	445	409

SEPARATIONS
1963
PUREX AND REDOX

	Dissolved	
	July	Aug.
Normal U (tons)	0	325
MWD	0	201,687
Pu (kg)	0	177.2
94 Metal (tons)	153	118
MWD	133,793	108,708
Pu (kg)	97.0	75.7

Extracted from Travis 1963i, pages 3 and 4.

SECRET

COMPARATIVE PILE PERFORMANCE - Jul 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,870
Max. Power Level During Month, MW	1,835	2,090	1,735	1,755	1,830	1,700	4,290	4,305	19,540
Avg Power Level While Operating, MW	1,718	1,978	1,672	1,691	1,778	1,652	3,991	3,957	18,437
Max. Tot Power, KW	1,213	1,232	1,169	1.115	1,133	1,089	1,641	1,707	
Effective Central Tubes	1,500	1,655	1,495	1,560	1,565	1,520	2,535	2,460	
Time-Operated Efficiency, %	79.9	89.7	82.1	82.2	92.9	87.7	76.1	73.3	83.0
Operational Limitation[1]	95.0°C	95.0°C	93.5°C	95.0°C	93.5°C	95.0°C	95.0°C	95.0°C	
MWD Produced During Month, total	42,575	55,030	42,530	43,097	51,216	44,901	94,129	89,896	463,374
Normal	36,931	41,456	38,229	34,877	45,291	612	77,019	71,834	346,249
9% Metal	5,644	13,574	4,301	8,220	5,925	44,289	17,110	18,062	117,125
Plutonium Produced, gm	34,831	44,474	35,537	34,978	41,266	29,601	82,616	74,173	377,476
U in Reactor at Month End, tons	224.0	223.4	226.7	220.9	226.8	198.1	437.0	435.6	2192.5
Normal	198.0	182.9	209.9	185.6	204.2	3.6	378.1	369.1	1731.4
9% Metal	26.0	40.5	16.8	35.3	22.6	194.5	58.9	66.5	461.1
U Discharged During Month, tons	93.1	43.5	38.0	63.7	7.2	43.3	155.5	134.7	579.0
Normal	87.1	36.4	37.6	57.2	3.1	0.5	134.2	101.2	457.3
9% Metal	6.0	7.1	0.4	6.5	4.1	42.8	21.3	33.5	121.7
Avg Discharge Concentration									
Normal	710	743	890	626	816	630	806	877	783
9% Metal	782	899	175	871	784	1,065	734	982	936

1 Bulk outlet water temperature limit.

Extracted from Travis 1963h, page 31.

REACTOR OUTAGES Jul 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
7/3	7/5	39.7	Panellit trip caused by a blown thermocouple well.
7/15	7/18	86.6	Scheduled charge-discharge.
7/20	7/21	33.1	Unexplained Panellit trip.
C Reactor			
7/1	7/1	0.2	Unexplained Panellit trip on Row 38.
7/1	7/3	42.2	Manual trip for temperature control. Charge-discharge and VSR work performed.
7/3	7/3	0.2	Low Beckman trip while bringing gas purity within standards.
7/27	7/28	33.7	Correction of cavitation in front pigtail on tube 3551.

Extracted from Plum 1964, July 1963, pages 3-5.

D Reactor

7/1	7/3	34.5	Removal of an I&E E-metal rupture from tube 1958.
7/3	7/3	1.0	Unexplained Panellit trip on tube 1695.
7/3	7/3	5.1	Unexplained Panellit trip on tube 1686.
7/3	7/3	3.1	Panellit trip due to a portion of a spline cap assembly washing down stream.
7/12	7/14	52.0	Removal of an I&E natural metal rupture from tube 2468. Charge-discharge.
7/17	7/19	35.8	Tripped by an electrical power failure when lightning struck a line near Midway.
7/19	7/19	1.9	Panellit trip caused by a spline cap leak while inserting a spline.
7/19	7/19	0.7	Unexplained Panellit trip.

DR Reactor

7/10	7/14	97.8	Scheduled charge-discharge and repair of damaged front crossheader.
7/17	7/18	34.7	Correction of a front-face cap which was not fully rotated on the lug ring.

F Reactor

7/15	7/17	52.8	Leak testing. Replaced tube 1275 to correct an internal leak.

Extracted from Plum 1964, July 1963, pages 3-5.

H Reactor

7/19	7/21	58.5	Charge-discharge and leak testing.. Replaced tube 1589 due to an internal leak.
7/21	7/21	0.5	Manually opened a ball valve which failed to operate automatically..
7/22	7/22	0.4	Panellit trip caused by a spline seal leak.
7/28	7/29	29.7	Leak testing. Tube 2590 replaced due to an internal leak. Three thin-wall tubes were replaced.
7/29	7/29	2.6	Panellit trip on tube 3983 due to a faulty gauge.

KE Reactor

7/1	7/3	69.9.	Scheduled charge-discharge and maintenance.
7/3	7/4	0.6	Unexplained Panellit trip.
7/10	7/12	36.2	Tripped by Loop 2 when the diaphragms in the dump valve failed.
7/14	7/16	46.3	Tripped by Loop 4 when a diaphragm ruptured in a 3-way valve.
7/22	7/23	34.0	Removal of an I&E E-metal rupture from tube 4050.

Extracted from Plum 1964, July 1963, pages 3-5.

EW Reactor

7/8	7/12	106.0	Scheduled charge-discharge.
7/13	7/13	1.4	Panellit trip due to a broken spline in tube 5370.
7/13	7/13	0.4	Unexplained Panellit trip on tube 3151.
7/13	7/13	14.7	Unexplained Panellit trip on tube 3151. The tube was recharged and the hardware and Panellit gauge replaced.
7/15	7/17	37.2	Panellit trip due to a broken spline in tube 1585.
7/17	7/17	1.2	Manual trip for temperature control.
7/30	Still down		Removal of an I&E E-metal rupture from tube 3868. Charge-discharge in preparation for tube replacement.

Extracted from Plum 1964, July 1963, pages 3-5.

COMPARATIVE PILE PERFORMANCE - AUG 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,370
Max. Power Level During Month, MW	1,770	2,025	1,725	1,715	1,770	1,840	4,125	4,125	18,365
Avg Power Level While Operating, MW	1,698	1,815	1,574	1,657	1,727	1,573	3,623	3,555	17,322
Max. Tube Power, KW	1,227	1,126	1,103	1,063	1,120	1,075	1,676	1,630	
Effective Central Tubes	1,436	1,674	1,526	1,571	1,563	1,517	2,458	2,517	
Time-Operated Efficiency, %	85.4	81.8	99.9	86.7	89.9	88.7	64.4	19.3	77.0
Operational Limitation[1]	95.0°C	95.0°C	95.0°C	95.0°C	93.5°C	95.0°C	95.0°C	95.0°C	
MWD Produced During Month, total	44,964	48,536	51,878	44,545	48,099	43,258	80,276	21,244	392,800
Normal	38,881	36,589	46,082	36,020	42,475	583	65,280	17,172	283,762
94 Metal	6,083	11,947	5,796	8,525	5,624	42,675	14,316	4,072	99,038
Plutonium Produced, gm	36,958	39,164	40,615	35,265	39,069	27,392	66,413	19,341	305,217
U in Reactor at Month End, tons	224.4	223.4	226.7	221.0	226.7	198.0	437.0	442.8	2200.0
Normal	198.5	182.9	209.9	196.1	203.9	3.6	373.1	377.6	1740.6
94 Metal	25.9	40.5	16.8	24.9	22.8	194.4	58.9	65.2	459.4
U Discharged During Month, tons	79.3	98.5		78.5	80.0	0.2	14.9	230.3	581.7
Normal	70.0	77.1		70.7	73.8		14.9	198.3	504.8
94 Metal	9.3	21.4		7.8	6.2	0.2		32.0	76.9
Avg Discharge Concentration									
Normal	636	662		680	720		569	681	674
94 Metal	853	928		930	951	780		697	825

1 Bulk outlet water temperature limit.

Extracted from Travis 1963i, page 31.

REACTOR OUTAGES Aug 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
8/2	8/4	34.9	Panellit trip due to a blown thermocouple well on tube 2087. Replaced five thin wall tubes.
8/19	8/22	71.9	Scheduled charge-discharge.
8/22	8/22	1.7	Unexplained Panellit trip.
C Reactor			
8/12	8/15	92.3	Scheduled charge-discharge and maintenance.
8/20	8/20	0.3	Tripped when cooling water hose came loose from No. 14 HCR.
8/24	8/24	0.3	Manually tripped when HCR cooling water annunciator tab dropped; probably caused when Midway-Grand Coulee line relayed out and immediately reset.
8/25	8/26	38.3	Removal of an I&E oversize rupture from tube 3062.
8/31	still down		Removal of tube 2374 due to an internal water leak.
D Reactor			
8/5	8/5	0.2	Panellit trip due to a procedure error while inserting a spline.
DR Reactor			
8/7	8/8	34.1	Panellit trip on 1494 because of a ground.
8/27	8/29	63.7	Scheduled charge-discharge.

Extracted from Plum 1964, August 1963, pages 2-4.

F Reactor

8/5	8/8	75.5	Scheduled charge-discharge.

H Reactor

8/5	8/6	27.9	Leak testing.
8/16	8/17	27.7	Tripped when a VSR slipped from the upper limit switch.
8/24	8/24	0.3	Low pressure Panellit trip during spline insertion.
8/24	8/26	26.5	Manual trip for temperature control and miscellaneous maintenance.

KE Reactor

8/5	8/6	31.9	Removal of an KE natural metal rupture from tube 3977.
8/22	still down		Scheduled tube replacement and charge-discharge.

KW Reactor

7/30	8/23	577.5	Replacement of 648 tubes (600 zirconium and 48 aluminum).
8/24	8/26	36.6	Investigation of excessive water collection. Some nozzles of recently replaced tubes were found loose.
	8/26	8/26	0.5	Tripped due to a faulty spline cap seal.
	8/26	8/27	22.6	Correction of a grounded circuit.

Extracted from Plum 1964, August 1963, pages 2-4.

REACTORS
1963

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.
Normal U (tons)	397	249			1,751	1,747	387	253	2,334	2,122
MWD			314,823	304,538	725,835	828,552	279,844	201,821	1,764,716	1,572,949
Pu (kg)			271	256	640	729	237	167	1,486	1,324
94 Metal (tons)	207	61			457	459	210	60	779	792
MWD			90,781	108,863	173,699	227,245	213,379	55,317	713,981	729,526
Pu (kg)			64	78	128	167	147	39	506	517

SEPARATIONS
1963

PUREX AND REDOX

	Dissolved	
	Sept.	Oct.
Normal U (tons)	591	462
MWD	392,296	390,992
Pu (kg)	340.3	326.7
94 Metal (tons)	92	42
MWD	80,534	37,066
Pu (kg)	55.7	27.8

Extracted from Travis 1963k, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE - SEP 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,870
Max. Power Level During Month, MW	1,760	2,030	1,700	1,690	1,755	1,635	4,125	4,165	18,860
Avg Power Level While Operating, MW	1,725	1,968	1,627	1,651	1,666	1,554	3,982	4,144	17,913
Max. Tube Power, KW	1,184	1,206	1,135	1,047	1,128	1,048	1,685	1,710	
Effective Central Tubes	1,487	1,677	1,505	1,590	1,560	1,557	2,441	2,457	
Time-Operated Efficiency, %	98.7	61.6	82.3	91.0	72.8	58.3	47.2	100.0	75.2
Operational Limitation[1]	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	
MWD Produced During Month, total	45,890	34,446	40,164	45,064	36,377	27,173	52,185	124,305	405,604
Normal	39,691	26,027	36,040	36,555	32,046	369	43,874	100,221	314,823
94 Metal	6,199	8,419	4,124	8,509	4,331	26,804	8,311	24,084	90,781
Plutonium Produced, gm	37,528	27,502	31,195	35,744	29,862	18,387	46,209	108,570	334,997
U in Reactor at Month End, tons	224.6	223.1	227.7	221.0	224.0	199.8	444.7	442.7	2207.6
Normal	199.6	181.4	214.4	186.1	197.3	3.6	390.5	377.6	1750.5
94 Metal	25.0	41.7	13.3	34.9	26.7	196.2	54.2	65.1	457.1
U Discharged During Month, tons	53.3	70.4	53.5	0.3	93.5	139.6	186.3	-	596.9
Normal	47.9	57.0	43.8	0.3	86.1	3.3	148.8	-	387.2
94 Metal	5.4	13.4	9.7	-	7.4	136.3	37.5	-	209.7
Avg Discharge Concentration									
Normal	607	728	1,031	443	690	707	687	-	723
94 Metal	936	882	1,022	922	-	1,083	857	-	1,018

1 Bulk outlet water temperature limit.
Extracted from Travis 1963j, page 31.

REACTOR OUTAGES SEP 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
9/20	9/23	81.7	Removal of an I&E natural metal rupture from tube 3562. Charge-discharge.
C Reactor			
8/31	9/2	37.1	Leak testing. Removal of tube 2374 due to an internal leak.
9/4	9/4	0.2	Manual trip due to a spline cap seal leak.
9/13	9/14	33.7	Removal of an I&E E-metal rupture from tube 3778.
9/21	9/30	207.9	Scheduled charge-discharge and maintenance, including mass foaming. Replaced 20 process tubes.
D Reactor			
9/5	9/9	55.1	Removal of an I&E natural metal rupture from tube 2761. Charge-discharge and maintenance.
9/21	9/23	45.4	Removal of an I&E natural metal rupture from tube 3366. Replaced tube 1566 due to a rear Van Stone leak. Also replaced three other tubes.
DR Reactor			
9/2	9/4	65.1	Leak testing following a Panellit trip. A piece of foreign material was found on the orifice screen of tube 0388 which probably caused the Panellit trip.

Extracted from Plum 1964, September 1963, pages 2-4.

F Reactor

9/9	9/12	99.2	Scheduled charge-discharge and maintenance.
9/13	9/13	2.3	Unexplained Panellit trip.
9/21	9/24	64.4	Penellit trip on tube 3082 caused by an internal leak. Leak testing and replacement of three tubes.
9/28	9/29	39.2	Tripped by an operating error while attempting to clear an annunciator signal for a 4500 h.p. motor.

H Reactor

9/3	9/5	29.7	Leak testing. Replaced tube 3562 due to an internal leak.
9/5	9/5	1.3	Panellit trip caused by a spline cap seal leak.
9/13	9/24	269.3	Scheduled tube replacement and block charge-discharge.

KE Reactor

8/22	9/11	483.7	Scheduled tube replacement - 597 zirconium and 22 aluminum tubes were replaced.
9/12	9/13	27.1	Miscellaneous maintenance and the adjustment of control.
9/15	9/16	30.1	Miscellaneous maintenance following an unexplained Panellit trip.
9/18	9/20	31.1	Removal of an I&E natural metal rupture from tube 3965.
9/28	9/29	39.6	Correction of a water leak. Several nozzles were tightened.

KW Reactor - No outages during September.

Extracted from Plum 1964, September 1963, pages 2-4.

COMPARATIVE PILE PERFORMANCE - OCT 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,870
Max. Power Level During Month, MW	1,870	2,085	1,820	1,805	1,870	1,765	4,150	4,360	19,725
Avg Power Level While Operating, MW	1,748	2,020	1,675	1,707	1,755	1,663	4,111	3,957	18,636
Max. Tube Power, KW	1,254	1,236	1,154	1,160	1,232	1,124	1,673	1,743	
Effective Central Tubes	1,490	1,655	1,500	1,535	1,537	1,557	2,460	2,499	
Time-Operated Efficiency, %	86.3	93.0	75.8	83.1	87.7	93.5	23.6	80.7	78.0
Operational Limitation[1]	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	
MWD Produced During Month, total	46,796	58,275	39,339	43,987	47,697	48,201	30,106	99,000	413,401
Normal	40,738	43,510	35,664	35,709	41,648	645	25,262	81,362	304,538
9% Metal	6,058	14,765	3,675	8,278	6,049	47,556	4,844	17,638	108,863
Plutonium Produced, gm	37,832	46,676	31,637	36,377	38,421	34,895	25,686	82,307	333,831
U in Reactor at Month End, tons	223.8	223.1	225.6	221.0	224.2	199.8	444.7	443.3	2205.5
Normal	197.3	181.4	207.5	186.3	197.5	3.6	390.5	382.6	1746.7
9% Metal	26.5	41.7	18.1	34.7	26.7	196.2	54.2	60.7	458.8
U Discharged During Month, tons	40.0	0	92.9	99.3	14.4	0	0	65.9	312.5
Normal	34.0	0	86.7	80.9	10.1	0	0	41.3	253.0
9% Metal	6.0	0	6.2	18.4	4.3	0	0	24.6	59.5
Avg Discharge Concentration									
Normal	730	-	826	714	805	-	-	956	798
9% Metal	821	-	935	1,046	849	-	-	882	930

1 Bulk outlet water temperature limit.

Extracted from Travis 1963k, page 38.

REACTOR OUTAGES OCT 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
10/8	10/10	39.7	Removal of an I&E E-metal rupture from tube 3359. Charge-discharge.
10/10	10/10	0.5	Panellit trip caused by a faulty spline cap seal on tube 3181.
10/11	10/11	0.4	Panellit trip due to a faulty spline cap seal on tube 2683.
10/23	10/25	50.1	Removal of an I&E E-metal rupture from tube 3784. Replaced three tubes because of rear Van Stone leaks.
10/25	10/26	10.8	Removal of an I&E natural metal rupture from tube 2178.
10/27	10/27	0.2	Tripped during the removal of a spline from tube 3564 due to the malfunction of the spline coiler.
C Reactor			
10/1	10/1	0.3	Unexplained Panellit trip.
10/22	10/22	0.3	Tripped when the No. 8 pump set dropped off the line because of a motor fault to ground.
10/29	still down		Removal of an oversized I&E natural metal rupture from tube 1464. Charge-discharge and miscellaneous maintenance.

Extracted from Plum 1964, October 1963, pages 2-4.

DR Reactor

10/1	10/5	91.0	Removal of an I&E E-metal rupture from tube 1489. Block charge-discharge.
10/8	10/9	34.8	Panellit trip due to improper jumpering procedure.

F Reactor

10/8	10/10	57.8	Leak testing. Replaced tubes 0678 and 2179 due to a rear Van Stone leak and internal tube leak, respectively.
10/13	10/14	34.0	Removal of an I&E natural metal rupture from tube 2787.

H Reactor

10/7	10/8	26.5	Panellit trip when a rear connector adapter failed on tube 1569.
10/9	10/10	.4	Trip caused by VSR No. 24 dropping from the upper limit switch.
10/10	10/10	21.5	Same as above, both trips caused by an improperly adjusted clutch.
10/11	10/11	.2	Unexplained low pressure Panellit trip on tube 1395.

Extracted from Plum 1964, October 1963, pages 2-4.

KE Reactor

10/8	still down		Scheduled tube replacement.

KW Reactor

10/1	10/3	60.9	Scheduled charge-discharge.
10/16	10/17	32.8	Removal of an I&E E-metal rupture from tube 3670.
10/18	10/18	1.0	Panellit trip caused by a faulty spline cap seal on tube 1991.
10/29	still down		Questionable integrity of a front-face pigtail when 18 wire strands were found broken. Tube replacement scheduled for 10/31/63 is being completed.

Extracted from Plum 1964, October 1963, pages 2-4.

REACTORS
1963

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Normal U (tons)	627	620			1,757	1,782	616	594	1,866	1,889
MWD			325,089	376,646	732,170	658,569	421,471	450,247	1,420,412	1,376,154
Pu (kg)			281	317	646	584	364	379	1,202	1,167
94 Metal (tons)	84	207[1]			462	556[1]	81	113	857	913
MWD			115,222	115,480	274,424	296,524	68,043	93,380	782,794	826,276
Pu (kg)			81	79	198	210	49	68	556	589

SEPARATIONS
1963
PUREX AND REDOX

	Dissolved	
	Nov.	Dec.
Normal U (tons)	777	660
MWD	579,146	490,160
Pu (kg)	490.1	415.6
94 Metal (tons)	17	51
MWD	14,832	44,496
Pu (kg)	10.4	31.3

Extracted from Travis 1964a, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE - NOV 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,870
Max. Power Level During Month, MW	1,940	2,150	1,875	1,855	1,920	1,915	4,400	4,400	20,355
Avg Power Level While Operating, MW	1,895	2,018	1,321	1,781	1,778	1,782	4,304	3,370	19,249
Max. Tube Power, KW	1,299	1,257	1,242	1,152	1,249	1,150	1,812	1,798	
Effective Central Tubes	1,489	1,671	1,526	1,563	1,499	1,565	2,432	2,447	
Time-Operated Efficiency, %	92.6	77.6	95.0	83.5	76.3	100.0	92.0	26.9	80.5
Operational Limitation	1940 MW[2]	95°C[1]	95°C[1]	95°C[1]	95°C[1]	95°C[1]	4400 MW[2]	4400 MW[2]	
MWD Produced During Month, total	52,651[3]	46,960	51,930	44,618	40,678	53,457	118,817	31,200	440,311
Normal	46,085	36,130	45,936	36,220	35,612	718	98,630	25,758	325,089
9% Metal	6,566	10,830	5,994	8,398	5,066	52,739	20,187	5,442	115,222
Plutonium Produced, gm	42,807	38,241	41,651	35,729	33,356	35,984	106,320	27,763	361,851
U in Reactor at Month End, tons	223.9	223.8	225.3	220.0	224.1	199.9	451.6	450.6	2219.2
Normal	197.6	185.7	206.5	182.6	197.5	3.7	393.8	390.0	1757.4
9% Metal	26.3	38.1	18.8	37.4	26.6	196.2	57.8	60.6	461.8
U Discharged During Month, tons	63.1	95.8	14.4	85.7	84.1	0	176.3	177.9	697.3
Normal	59.9	76.6	14.4	77.3	79.4	0	155.7	152.9	616.2
9% Metal	3.2	19.2	0	8.4	4.7	0	20.6	25.0	81.1
Avg Discharge Concentration									
Normal	601	676	885	663	701	-	711	676	684
9% Metal	819	857	-	1,040	891	-	745	828	839

1 Bulk outlet water temperature limit.
2 Administrative limit.
3 New record.
Extracted from Travis 1963I, page 38.

REACTOR OUTAGES Nov 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
11/4	11/6	53.0	Correction of a spline cap leak, charge-discharge and miscellaneous maintenance.
C Reactor			
10/29	11/2	93.7	Rupture removal, charge-discharge, and miscellaneous maintenance.
11/10	11/12	53.2	Scheduled charge-discharge. Replaced tube 2574 because of a rear Van Stone leak and tube 2470 because of a thin wall.
11/18	11/18	0.3	Manual trip when a front-face cap was found partially engaged.
11/18	11/20	33.5	Manual trip for tube temperature control.
11/21	11/22	31.7	Removal of an I&E natural metal rupture from tube 1979.
D Reactor			
11/4	11/5	35.5	Removal of an I&E natural metal (bumper mixer) rupture from tube 3272.
11/27	11/27	0.1	Panellit trip caused by a rear pigtail failure on tube 3282.
DR Reactor			
11/16	11/19	80.6	Malfunction of ball valve on tube 2167 and scheduled charge-discharge.
11/26	11/28	37.9	Removal of an I&E-EB metal rupture from tube 1558. Miscellaneous maintenance. Replaced two process tubes.

Extracted from Plum 1964, November 1963, pages 2-4.

F Reactor

11/4	11/7	91.7	Scheduled charge-discharge, leak testing and tube replacement.
11/9	11/11	47.7	Water leak. Replaced two leaking tubes and corrected gasket leaks.
11/11	11/11	2.2	Trip due to a spline seal leak.
11/11	11/11	2.0	Trip due to a spline seal leak.
11/19	11/21	37.2	Removal of a stuck I&E-E metal rupture from tube 3890.

H Reactor - No outages

KE Reactor

10/8	11/3	624.9	Scheduled tube replacement.
11/3	11/3	0.5	Unexplained Panellit trip on tube 4477.

KW Reactor

10/29	11/21	527.1	Scheduled tube replacement.
11/21	11/22	1.9	Replacement of two faulty RTD's.
11/22	11/22	2.4	Unexplained Panellit trip.
11/22	11/22	1.0	Unexplained Panellit trip.
11/22	11/23	21.0	Trip caused by a VSR drop caused by a faulty latching mechanism.

Extracted from Plum 1964, November 1963, pages 2-4.

COMPARATIVE PILE PERFORMANCE - DEC 1963

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	1,940	2,310	2,005	1,925	1,965[4]	1,955	4,400	4,400	20,990
Max. Power Level During Month, MW	1,940	2,285	1,990	1,925	1,965[4]	1,885	4,400	4,400	20,790
Avg Power Level While Operating, MW	1,894	2,134	1,914	1,913	1,805	1,771	4,148	4,194	19,673
Max. Tube Power, KW	1,297	1,366	1,366	1,258	1,261	1,224	1,752	1,393	
Effective Central Tubes	1,496	1,673	1,485	1,523	1,504	1,535	2,512	2,324	
Time-Operated Efficiency, %	84.7	75.1	90.7	77.8	77.0	85.4	76.0	82.6	81.2
Operational Limitation	1940MW[2]	95°C[1]	95°C[1]	1925MW[2]	1935MW[2]	95°C[1]	4400MW[2]	4400MW[2]	
MWD Produced During Month, total	49,712	49,696	53,813[3]	43,714	43,105	46,893	97,767	107,426	492,126
Normal	43,457	38,740	47,854	35,372	37,219	627	83,994	89,383	376,646
9% Metal	6,255	10,956	5,959	8,342	5,886	46,266	13,773	18,043	115,480
Plutonium Produced, gm	39,776	40,435	41,726	35,073	35,919	29,652	82,274	91,635	396,490
U in Reactor at Month End, tons	223.7	223.3	224.0	219.2	221.0	199.0	454.5	452.1	2216.8
Normal	197.3	185.9	203.8	179.6	192.5	3.6	416.3	403.2	1782.2
9% Metal	26.4	37.4	20.2	39.6	28.5	195.4	38.2	48.9	434.6
U Discharged During Month, tons	104.8	90.7	59.8	114.3	83.6	1.1	125.1	127.4	706.8
Normal	96.3	75.0	49.9	99.9	75.4	< 0.1	96.0	101.4	593.9
9% Metal	8.5	15.7	9.9	14.4	8.2	1.1	29.1	26.0	112.9
Avg Discharge Concentration									
Normal	773	765	922	657	628		708	903	758
9% Metal	1,017	873	845	884	865	1,300	771	731	827

1 Bulk outlet water temperature limit.
2 Administrative limit.
3 New record.
4 Operation momentarily exceeded established limit until revised by management.

Extracted from Travis 1964a, page 6.

REACTOR OUTAGES DEC 1963

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
12/9	12/11	64.8	Scheduled charge-discharge.
12/27	12/29	59.1	Removal of an I&E natural metal rupture from tube 2490.
C Reactor			
12/4	12/6	57.9	Charge-discharge and leak testing following a Panellit trip.
12/17	12/19	53.0	Scheduled charge-discharge.
12/20	12/20	0.4	Unexplained Panellit trip.
12/23	12/23	0.3	Manual trip when hose came off the No. 7 HCR reel.
12/23	12/24	34.9	Insufficient reactivity. Replaced tube 2371 due to a rear Van Stone leak.
12/30	12/31	37.6	Removal of an I&E natural metal (overbore size) rupture from tube 2969.
D Reactor			
12/11	12/14	69.2	Scheduled charge-discharge.

Extracted from Plum 1964, December 1963, pages 2-5.

DR Reactor

12/3	12/3	0.3	Unexplained Panellit trip.
12/4	12/5	30.6	Insufficient reactivity following a Panellit trip. Charge-discharge.
12/5	12/5	2.0	Panellit trip on tube 0592 caused by a partially plugged orifice screen.
12/13	12/15	36.3	Panellit trip when the Panellit panel was accidentally jarred. Charge-discharge and maintenance.
12/26	12/28	58.6	Removal of an I&E natural metal rupture from tube 2088. Charge-discharge.
12/30	12/31	30.0	Water leak in tube 0576. Charge-discharge and leak testing. Tube 0576 was replaced due to a rear Van Stone leak and tube 4681 was replaced because of an internal leak.

F Reactor

12/4	12/6	56.9	Scheduled charge-discharge
12/9	12/11	36.2	Leak testing. Corrected a rear Van Stone leak on tube 2073.
12/12	12/13	34.3	Water leak. Tube 2073 was replaced due to a rear Van Stone leak.
12/21	12/23	43.6	Removal of an I&E enriched metal rupture from tube 2676.

H Reactor

12/4	12/6	38.4	Removal of an I&E E-metal rupture from tube 2886.
12/15	12/17	31.2	Scheduled maintenance. Reworked nozzles installed on two horizontal rows.
12/24	12/25	29.8	Removal of suspected I&E E-metal ruptures from tubes 3381 and 3481. Inspection revealed one natural I&E (water mix) rupture in tube 3481.
12/31	Still down		Scheduled maintenance, charge-discharge and tube replacement.

Extracted from Plum 1964, December 1963, pages 2-5.

KE Reactor

12/6	12/8	33.8	Tripped by loop 2. Charge-discharge and RTD repair.
12/13	12/14	31.4	Tripped when loop 4 was inadvertently depressurized.
12/21	12/24	79.0	Scheduled charge-discharge.
12/28	12/29	33.9	Tripped because of a short in the connector of No. 2 flux monitor.

KW Reactor

12/2	12/3	33.8	Panellit trip on tube 4182 caused by a broken spline. Miscellaneous maintenance.
12/18	12/20	13.4	Panellit trip caused by a broken spline in tube 1155. Charge-discharge.
12/20	12/20	0.8	Unexplained Panellit trip on tube 0555 during spline work.
12/29	12/31	60.0	Scheduled charge-discharge and maintenance.

Extracted from Plum 1964, December 1963, pages 2-5.

APPENDIX E

OPERATING DATA FOR 1964

REACTORS
1964

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
Normal U (tons)	367	484			1,764	1,764	385	485	2,112	2,522
MWD			390,951	292,233	786,473	737,944	263,047	340,762	1,536,224	1,829,041
Pu (kg)			330	254	696	655	218	292	1,297	1,549
94 Metal (tons)	300[3]	276[5]			607[4]	825[6]	248	57	971	856
MWD			87,191	109,906	147,897	210,596	235,818	47,207	901,460	805,796
Pu (kg)			65	79	109	155	166	32	634	567

3 Includes 34 tons from N reactor.
4 Includes 155 tons from N reactor.
5 Includes 214 tons from N reactor.
6 Includes 368 tons from N reactor.

SEPARATIONS
1964

	PUREX AND REDOX							
	Dissolved		Inventory in Process		Separated		Inventory of Product	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
Normal U (tons)	168	73	37	103	235	3	25	30
MWD	108,186	47,430						
Pu (kg)	93.3	39.6	14.9	44.6	178.9	0	77.4	20.0
94 Metal (tons)	184	178	40	38	185	180	167	187
MWD	159,879	149,880						
Pu (kg)	113.0	107.4	41.2	41.4	128.3	107.6	81.2	46.9

Extracted from Travis 1964c, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE
JAN 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	1,940	2,310	2,005	1,925	1,965	1,955	4,400	4,400	20,900
Max. Power Level During Month, MW	1,940	2,310	2,005	1,925	1,935	1,955	4,400	4,400	20,870
Avg Power Level While Operating, MW	1,353	2,201	1,949	1,873	1,906	1,840	4,351	4,393	20,366
Max. Tube Power, KW	1,359	1,398	1,317	1,244	1,289	1,241	1,837	1,254	
Effective Central Tubes	1,428	1,652	1,522	1,548	1,496	1,544	2,395	2,509	
Time-Operated Efficiency, %	83.1	77.0	79.9	88.9	51.9	34.0	68.1	100.0	72.9
Operational Limitation	1940MW	2310MW	2005MW	1925MW	1935MW	1955MW	4400MW	4400MW	
MWD Produced During Month, total	47,706	52,408	48,298	51,605[1]	30,633	19,395	91,917	136,180[1]	478,142
Normal	41,362	40,853	42,394	41,065	26,308	231	81,641	117,097	390,951
94 Metal	6,344	11,555	5,904	10,540	4,325	19,164	10,276	19,083	87,191
Plutonium Produced, gm	39,976	42,847	37,892	42,315	24,597	18,670	74,723	114,078	395,098
U in Reactor at Month End, tons	222.6	222.6	222.8	219.4	221.0	201.5	454.4	452.1	2216.4
Normal	193.7	183.7	196.7	179.8	188.0	3.1	416.1	403.2	1764.3
94 Metal	28.9	38.9	26.1	39.6	33.0	198.4	38.3	48.9	452.1
U Discharged During Month, tons	85.0	105.8	121.8	0.2	104.6	199.0	17.2	0	633.6
Normal	77.2	89.4	116.3	0.2	97.1	3.6	1.4	0	385.2
94 Metal	7.8	16.4	5.5	0	7.5	195.4	15.8	0	248.4
Avg Discharge Concentration									
Normal	587	623	879	455	582	611	673		683
94 Metal	900	900	1,054		841	955	962		949

1 New record.

Extracted from Travis 1964b, page 6.

REACTOR OUTAGES JAN 1964

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
1/7	1/10	88.0	Scheduled charge-discharge.
1/21	1/23	39.9	Removal of an I&E natural metal rupture from tube 2181. Replacement of tubes 2054 and 1169 due to rear Van Stone leaks.
C Reactor			
1/10	1/10	0.2	Unexplained Panellit trip.
1/10	1/12	42.8	Manual trip for temperature control; charge-discharge and maintenance.
1/18	1/22	93.2	Manual trip to remove an oversize I&E natural metal rupture from tube 3366; charge-discharge; problem tube 2473 was split and removed.
1/23	1/23	0.2	Unexplained Panellit trip.
1/24	1/25	34.5	Removal of a I&E-E metal rupture from tube 1888.
1/26	1/26	0.2	Unexplained Panellit trip.
D Reactor			
1/12	1/16	80.0	Scheduled charge-discharge and maintenance.
1/25	1/28	69.4	Charge-discharge and leak testing. Replaced tube 1279 due to an internal leak.

Extracted from Plum 1965, January 1964, pages 4-6.

DR Reactor

1/6	1/7	36.9	Removal of an I&E natural metal rupture from tube 1265.
1/10	1/12	37.0	Removal of an I&E natural metal rupture from tube 3663.
1/31	still down		Panellit trip due to a I&E natural metal rupture in tube 2263.

F Reactor

1/14	1/29	358.2	Removal of I&E E-metal rupture from tube 0678. Scheduled tube replacement, charge-discharge and maintenance.

H Reactor

12/31	1/20	486.7	Scheduled maintenance, charge-discharge and tube replacement.
1/20	1/20	0.2	Tripped when one flux monitor stuck at a high trip and another flux monitor was adjusted to a low trip.
1/21	1/21	12.0	Manual trip for temperature control.
1/22	1/22	0.9	Repair of a faulty ball valve on tube 2788.

KE Reactor

1/17	1/19	36.9	Questionable integrity of a front-face pigtail. Eight pigtails were replaced due to broken wire strands.
1/23	still down		Scheduled tube replacement.

KW Reactor

No outages

Extracted from Plum 1965, January 1964, pages 4-6.

COMPARATIVE PILE PERFORMANCE
FEB 1964.

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,075[1]	2,310	2,040[1]	2,015[1]	2,000[1]	2,090[1]	4,400	4,400	21,330
Max. Power Level During Month, MW	2,075	2,310	2,040	2,015	2,000	2,090	4,400	4,400	21,330
Avg Power Level While Operating, MW	1,895	2,262	1,999	1,928	1,900	1,967	4,102	4,096	20,149
Max. Tube Power, KW	1,446	1,408	1,343	1,261	1,312	1,324	1,775	1,796	
Effective Central Tubes	1,412	1,640	1,500	1,570	1,497	1,578	2,479	2,444	
Time-Operated Efficiency, %	81.5	79.5	87.3	86.9	86.7	93.8	43.1	41.5	75.0
Operational Limitation	95°C	95°C	95°C	95°C	95°C	2090MW	4400MW	4400MW	
MWD Produced During Month, total	44,781	52,134	50,609	48,567	47,760	53,519	51,923	52,846	402,139
Normal	38,330	40,272	42,990	38,640	40,743	641	45,126	45,491	292,233
9% Metal	6,451	11,862	7,619	9,927	7,017	52,878	6,797	7,355	109,906
Plutonium Produced, gm	36,379	42,258	41,216	39,506	39,044	39,846	48,616	46,062	333,426
U in Reactor at Month End, tons	222.5	222.7	222.6	219.2	221.3	201.4	459.9	452.1	2221.7
Normal	193.6	184.1	196.2	179.7	189.2	3.1	414.9	403.2	1764.0
9% Metal	28.9	38.6	26.4	39.5	32.1	198.3	45.0	48.9	457.7
U Discharged During Month, tons	82.4	90.6	71.3	66.4	8.8	0.2	221.7		541.4
Normal	77.0	71.1	62.8	58.9	6.7	<0.1	208.2		484.7
9% Metal	5.4	19.5	8.5	7.5	2.1	0.2	13.5		56.7
Avg Discharge Concentration									
Normal	636	624	745	584	685		776		703
9% Metal	886	788	905	1,002	664	375	769		833

1 New record.
Extracted from Travis 1964c, page 6.

REACTOR OUTAGES FEB 1964

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
2/16	2/20	93.7	Scheduled charge-discharge.
2/22	2/24	35.2	Correction of a front-face cap leak (faulty O-ring). Replaced tube 3693 due to an internal leak.
C Reactor			
2/9	2/11	44.9	Removal of an I&E E-metal rupture from tube 3465.
2/25	2/29	98.0	Scheduled charge-discharge.
D Reactor			
2/20	2/24	88.4	Removal of an I&E natural metal rupture from tube 3473. Replacement of tube 3473. Charge-discharge.
DR Reactor			
1/31	2/3	62.0	Charge-discharge and rupture removal.
2/4	2/6	36.3	Leak testing. Tube 1857 was replaced due to a leaking Van Stone flange.
2/6	2/6	1.8	Correction of a front nozzle adapter leak on tube 3590.

Extracted from Plum 1965, February 1964, pages 3-4.

F Reactor

2/7	2/8	36.5	Removal of an I&E E-metal rupture from tube 3781.
2/24	2/26	55.0	Removal of an I&E E-metal rupture from tube 2257. Leak testing; replaced 4 tubes due to rear Van Stone flange leaks.
2/26	2/26	0.2	Panellit trip due to a faulty relay on Row 27.

H Reactor

2/22	2/23	30.1	Removal of an I&E E-metal rupture from tube 1377.
2/23	2/24	12.7	Removal of an I&E E-metal rupture from tube 1987.

KE Reactor

1/23	2/15	559.8	Scheduled tube replacement; 575 zirconium and 53 aluminum tubes were installed.
2/16	2/16	0.5	Panellit trip caused by a broken spline in tube 2546.
2/24	2/26	35.4	Tripped when a power operator interrupted the electrical service to the KER loop pumps. Miscellaneous maintenance.

KW Reactor

2/12	Still down	Schedule tube replacement.

Extracted from Plum 1965, February 1964, pages 3-4.

REACTORS
1964

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.
Normal U (tons)	458	857			1,765	1,762	456	860	2,154	2,703
MWD			389,423	334,435	790,419	503,784	336,948	621,070	1,604,894	1,964,695
Pu (kg)			335	293	702	457	288	537	1,357	1,677
94 Metal (tons)	91	291			829[2]	831[2]	87	288	942	1,108
MWD			129,500	84,983	257,791	132,644	82,350	210,130	885,806	989,142
Pu (kg)			91	62	188	99	58	152	624	700

1 Includes 2 pieces unenriched at KER loops.
2 Includes 368 tons from N reactor.

SEPARATIONS
1964

	PUREX AND REDOX							
	Dissolved		Inventory in Process		Separated		Inventory of Product	
	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.
Normal U (tons)	817	305	113	119	805	298	234	124
MWD	558,322	257,052						
Pu (kg)	479.4	204.5	96.8	61.6	425.5	240.5	156.8	18.7
94 Metal (tons)	0	120	5	36	29	89	59	68
MWD	414[1]	106,090						
Pu (kg)	2.0[1]	75.2	5.7[2]	32.0	27.0	52.8[3]	45.4	92.2

1 PRTR.
2 3.7 kg Regular and 2.0 kg PRTR.
3 Includes 6.3 kg from PRTR.

Extracted from Travis 1964e, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE
MAR 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,075	2,310	2,040	2,015	2,000	2,090	4,400	4,400	21,330
Max. Power Level During Month, MW	2,090[1]	2,365[1]	2,055[1]	2,015	2,015[1]	2,110[1]	4,400	4,400	21,450
Avg Power Level While Operating, MW	2,030	2,237	1,996	1,943	1,954	2,042	4,402	4,314	20,918
Max. Tube Power, KW	1,392	1,453	1,348	1,263	1,328	1,343	1,729	1,949	
Effective Central Tubes	1,487	1,608	1,506	1,576	1,464	1,545	2,545	2,380	
Time-Operated Efficiency, %	51.7	85.7	91.5	66.9	66.3	93.1	100.0	70.7	78.2
Operational Limitation	95°C	95°C	95°C	95°C	95°C	95°C	4400MW	4400MW	
MWD Produced During Month, total	32,532	59,446	56,596[1]	40,304	40,163	58,907[1]	136,462[1]	94,513	518,923[1]
Normal	27,818	45,668	48,286	32,100	32,096	698	118,866	83,891	389,423
94 Metal	4,714	13,778	8,310	8,204	8.067	58,209	17,596	10,622	129,500
Plutonium Produced, gm	26,344	48,866	45,314	32,248	33,324	40,716	113,337	84,203	424,352
U in Reactor at Month End, tons	222.6	222.2	222.9	219.2	217.5	201.5	459.8	460.5	2226.2
Normal	193.5	181.5	197.6	179.7	174.7	3.1	414.9	420.4	1765.4
94 Metal	29.1	40.7	25.3	39.5	42.8	198.4	44.9	40.1	460.8
U Discharged During Month, tons	9.4	78.8	15.3	85.3	89.9	0.2	0	264.5	543.4
Normal	4.6	64.6	14.2	68.3	81.2	<0.1	0	223.1	456.0
94 Metal	4.8	14.2	11.0	17.0	8.7	0.2	0	41.4	87.4
Avg Discharge Concentration									
Normal	580	625	594	635	570	-	-	878	739
94 Metal	927	874	618	985	805	525	-	988	942

1 New record.
Extracted from Travis 1964d, page 6.

REACTOR OUTAGES MAR 1964

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
3/11	3/13	54.6	Removal of an I&E natural metal rupture from tube 2181. Tubes 0984 and 3251 were replaced due to internal leaks.
3/19	still down		Scheduled charge-discharge and tube replacement.
C Reactor			
3/2	3/2	0.2	Trip due to the malfunction of the temperature control system on No. 1 loop.
3/5	3/5	0.2	Manual trip due to high pressure surge on HCR cooling water.
3/5	3/6	35.1	Removal of an I&E-E metal rupture from tube 2876.
3/7	3/7	0.3	Manual trip due to indicated high tube temperature. Instrumentation was found in error.
3/25	3/27	70.4	Scheduled charge-discharge.
D Reactor			
3/7	3/9	57.3	Repair of a leak in the fire and sanitary water line; charge-discharge and leak testing. New flanges were formed on tubes 3164 and 3184.
3/31	still down		Panellit trip due to the failure of a rear Parker fitting on tube 3261. Will remain down for scheduled tube replacement.

Extracted from Plum 1965, March 1964, pages 2-4.

DR Reactor

3/9	3/11	35.8	High pressure Panellit trip; removal of an I&E natural metal rupture from tube 3975.
3/11	3/20	210.3	Removal of an I&E-E metal (bumpered) rupture from tube 2464. Charge-discharge and replacement of 149 tubes.

F Reactor

3/4	3/15	247.6	Removal of an I&E-E metal rupture from tube 2167. Charge-discharge and replacement of 152 process tubes.
3/31	still down		Scheduled charge-discharge.

H Reactor

3/1	3/2	24.8	Removal of an I&E-E metal rupture from tube 2888.
3/14	3/15	26.7	Removal of an I&E-E metal rupture from tube 3773.

KE Reactor

No outages

KW Reactor

2/13	3/10	520.0	Replacement of 672 tubes.
3/10	3/10	1.7	RTD repair.

Extracted from Plum 1965, March 1964, pages 2-4.

COMPARATIVE PILE PERFORMANCE
APR 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,075	2,310	2,040	2,015	2,000	2,090	4,400	4,400	21,330
Max. Power Level During Month, MW	1,995	2,260	1,950	1,965	1,950	2,080	4,400	4,400	21,000
Avg Power Level While Operating, MW	1,853	2,178	1,823	1,880	1,749	1,709	4,189	4,362	19,743
Max. Tube Power, KW	1,347	1,297	1,337	1,245	1,295	1,322	1,778	1,812	
Effective Central Tubes	1,477	1,705	1,459	1,564	1,428	1,500	2,475	2,435	
Time-Operated Efficiency, %	77.1	83.6	38.5	68.4	71.5	43.4	68.4	89.1	67.5
Operational Limitation	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	4400MW	4400MW	
MWD Produced During Month, total	42,874	54,646	21,039	38,590	37,527	22,237	85,959	116,546	419,418
Normal	36,425	41,344	18,065	30,674	30,000	277	75,181	102,469	334,435
9% Metal	6,449	13,302	2,974	7,916	7,527	21,960	10,778	14,077	84,983
Plutonium Produced, gm	36,058	44,228	18,061	31,020	30,731	16,945	75,288	102,462	354,793
U in Reactor at Month End, tons	222.8	221.8	223.1	219.2	218.5	200.4	459.3	460.0	2225.1
Normal	192.3	181.1	197.7	180.6	180.3	3.1	409.7	417.2	1762.0
9% Metal	30.5	40.7	25.4	38.6	38.2	197.3	49.6	42.8	463.1
U Discharged During Month, tons	115.8	9.9	104.3	90.5	85.4	184.5	371.0	187.1	1148.5
Normal	99.8	1.3	92.3	82.0	70.8	3.6	331.9	178.6	860.3
9% Metal	16.0	8.6	12.0	8.5	14.6	180.9	39.1	8.5	288.2
Avg Discharge Concentration									
Normal	550	593	634	635	578	455	778	861	722
9% Metal	739	791	802	945	591	676	882	986	729

Extracted from Travis 1964e, page 6.

REACTOR OUTAGES APR 1964

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
3/19	4/4	395.3	Replacement of 454 tubes. Charge-discharge and miscellaneous maintenance.
4/8	4/9	36.6	Tripped when a front face cap O-ring failed on tube 3189.
4/23	4/25	37.6	Removal of an I&E natural metal rupture from tube 2772. Miscellaneous maintenance.

C REACTOR

4/13	4/15	51.1	Removal of an I&E enriched metal rupture from tube 1681. Charge-discharge.
4/15	4/15	8.7	Removal of an I&E enriched metal rupture in tube 3960.
4/28	still down		Removal of an I&E enriched metal rupture in tube 3181. Charge-discharge and maintenance.

D REACTOR

3/31	4/16	379.5	Panellit trip due to the failure of a rear Parker fitting on tube 3261. Replacement of 263 tubes, charge-discharge and maintenance.
4/16	4/17	22.5	Removal of an I&E enriched metal rupture in tube 1958.
4/22	4/24	42.8	I&E natural metal rupture was removed by pushing tube (2361) and metal. Miscellaneous maintenance.

Extracted from Plum 1965, April 1964, pages 4-6.

DR REACTOR

4/15	4/22	154.5	Removal of an I&E enriched metal rupture from tube 3257. Charge-discharge and replacement of 61 process tubes.
4/22	4/22	1.6	Removal of an I&E enriched metal rupture from tube 2058.
4/23	4/25	34.8	Removal of an I&E enriched metal rupture from tube 3357.
4/25	4/25	2.1	Manually tripped due to 3 front pigtail leaks.
4/29	still down		Removal of an I&E enriched metal rupture from tube 3788.

F REACTOR

3/31	4/2	46.4	Scheduled charge-discharge. Replaced 3 tubes due to rear Van Stone leaks.
4/6	4/7	38.3	Removal of an I&E enriched metal rupture from tube 0678.
4/15	4/19	86.5	Removal of an I&E natural metal rupture from tube 1189. Charge-discharge.
4/19	4/19	0.2	Low pressure Panellit trip on tube 4388.
4/19	4/19	0.2	Thermocouple repair.
4/23	4/24	34.7	High pressure Panellit trip on tube 3464 when a spline was being withdrawn.

Extracted from Plum 1965, April 1964, pages 4-6.

H REACTOR

4/3	4/4	29.0	Removal of an I&E enriched metal rupture from tube 3486.
4/4	4/5	9.6	Removal of an I&E enriched metal rupture from tubes 3059, 2962 and 2057.
4/5	4/18	343.0	Removal of I&E enriched metal ruptures from tubes 2056 and 1785, and I&E natural (mixer) from tube 2058. Charge-discharge of E-N block and replacement of 146 tubes.
4/19	4/19	7.8	Poison discharge.
4/23	4/24	41.6	Investigation of abnormal flux distribution. 172 tubes in the E-N load were recharged.

KE REACTOR

4/1	4/5	45.5	Scheduled charge-discharge.
4/5	4/5	2.2	RTD repair.
4/6	4/6	0.3	Tripped when a broken spline in tube 0967 washed down stream.
4/7	4/8	26.7	Tripped when a broken spline in tube 4458 washed down stream.
4/26	4/30	81.4	Tripped by KER 3 due to faulty instrumentation on the heat exchanger exit temperature. Charge-discharge.
4/30	4/30	0.4	Panellit trip caused by a faulty gauge.
4/30	4/30	0.6	Unexplained Panellit trip on 4861.

KW REACTOR

4/13	4/16	78.6	Scheduled charge-discharge.

Extracted from Plum 1965, April 1964, pages 4-6.

REACTORS
1964

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	May	June	May	June	May	June	May	June	May	June
Normal U (tons)	462	713			1,777	1,784	447	704	2,679	1,795
MWD			409,813	379,924	631,307	579,026	282,290	432,205	1,951,890	1,790,730
Pu (kg)			363	332	574	525	246	381	1,664	1,549
94 Metal (tons)	80	70			819[2]	811[2]	92	79	1,020	1,018
MWD			132,288	128,372[4]	201,791	269,196[4]	63,141	62,907	899,827	892,814
Pu (kg)			97	93[4]	151	200[4]	45	45	635	633

1 Includes 2 pieces unenriched at KER loops.
2 Includes 368 tons from N reactor.
3 Includes 2 pieces at 8 units unenriched KER loop and 3 cold pieces received and returned to cold storage.
4 Includes NPR.

SEPARATIONS
1964

	PUREX AND REDOX							
	Dissolved		Inventory in Process		Separated		Inventory of Product	
	May	June	May	June	May	June	May	June
Normal U (tons)	478	707	117	95	471	727	64	203
MWD	299,325	588,507						
Pu (kg)	253.9	502.6	59.9	89.1	252.2	472.0	39.8	168.6
94 Metal (tons)	181	79	42	37	175	86	103	91
MWD	153,587	68,759						
Pu (kg)	111.3	49.2	35.5	25.2	107.4	59.3	40.1	23.5

Extracted from Travis 1964g, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE
MAY 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,075	2,310	2,040	2,015	2,000	2,090	4,400	4,400	21,330
Max. Power Level During Month, MW	1,975	2,240	1,955	1,910	1,910	1,985	4,400	4,400	20,775
Avg Power Level While Operating, MW	1,808	2,101	1,892	1,835	1,843	1,949	4,330	4,369	20,127
Max. Tube Power, KW	1,283	1,396	1,294	1,212	1,277	1,324	1,759	1,835	
Effective Central Tubes	1,512	1,586	1,484	1,548	1,494	1,500	2,500	2,398	
Time-Operated Efficiency, %	75.6	80.8	89.0	85.2	80.8	96.5	98.8	84.8	85.9
Operational Limitation	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	1310KW	4400MW	4400MW	
MWD Produced During Month, total	42,362	52,624	52,162	48,460	46,156	58,294	127,244	114,799	542,101
Normal	36,228	40,195	44,387	39,030	38,851	738	109,233	101,151	409,813
9% Metal	6,134	12,429	7,775	9,430	7,305	57,556	18,011	13,648	132,288
Plutonium Produced, gm	34,990	42,943	43,251	39,546	37,935	43,458	114,578	103,272	459,973
U in Reactor at Month End, tons	223.4	220.9	222.8	219.5	220.2	200.3	459.8	460.9	2227.8
Normal	194.9	181.6	195.7	181.2	187.1	3.1	412.2	420.9	1776.7
9% Metal	28.5	39.3	27.1	38.3	33.1	197.2	47.6	40.0	451.1
U Discharged During Month, tons	79.0	96.8	55.3	20.9	85.1	0.2	21.0	180.7	539.0
Normal	68.4	74.4	49.6	6.2	69.2	<0.1	15.4	163.6	446.8
9% Metal	10.6	22.4	5.7	14.7	15.9	0.2	5.6	17.1	92.2
Avg Discharge Concentration									
Normal	612	618	611	407	608	-	999	637	637
9% Metal	630	693	817	461	679	445	913	790	685

Extracted from Travis 1964f, page 6.

REACTOR OUTAGES MAY 1964

B REACTOR

Date Down	Date Up	Outages Hours	Remarks
5/4	5/6	38.1	Power failure trip caused by a faulty voltage regulator at 190-B Annex, and other miscellanceous maintenance.
5/13	5/16	50.9	Scheduled charge-discharge.
5/19	5/20	34.5	Removal of an I&E enriched metal rupture from tube 3688.
5/27	5/29	56.4	Removal of an I&E enriched metal rupture from tube 4071.

C REACTOR

4/28	5/2	98.2	Removal of an I&E enriched metal rupture from tube 3181.
5/4	5/5	33.7	Removal of an I&E enriched metal rupture from tube 3173. Miscellaneous maintenance.
5/10	5/12	35.7	Removal of an I&E enriched metal rupture from tube 3960.
5/13	5/13	0.3	Scrammed when instrument air to C-1 loop was inadvertently shut off.
5/20	5/21	35.1	Removal of an I&E natural metal rupture from tube 3361.

D REACTOR

5/2	5/4	35.8	Removal of an I&E natural metal rupture from tube 1281.
5/17	5/18	46.3	Scheduled charge-discharge.

Extracted from Plum 1965, May 1964, page 3-4.

DR REACTOR			
4/29	5/1	39.3	Removal of an I&E enriched metal rupture from tube 3788.
5/2	5/3	33.0	Removal of an I&E enriched metal rupture from tube 2958.
5/5	5/7	28.3	Removal of an I&E natural metal rupture from tube 1179.
5/15	5/17	35.6	Removal of an I&E natural metal rupture from tube 1184.
F REACTOR			
5/2	5/4	51.4	Removal of an I&E enriched metal rupture from tube 1290.
5/5	5/6	28.3	Removal of an I&E enriched metal rupture from tube 0662.
5/23	5/26	63.2	Scheduled charge-discharge.
H REACTOR			
5/28	5/29	26.2	Removal of an I&E enriched metal rupture from tube 2676.
KE REACTOR			
5/1	5/1	0.2	Panellit trip caused by a broken spline in tube 5182.
5/17	5/19	38.9	Panellit trip and miscellaneous maintenance.
KW REACTOR			
5/11	5/15	113.4	Scheduled charge-discharge and maintenance.

Extracted from Plum 1965, May 1964, pages 3-4.

COMPARATIVE PILE PERFORMANCE
JUN 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,090	2,365	2,055	2,015	2,015	2,110	4,400	4,400	21,450
Max. Power Level During Month, MW	1,885	2,130	1,885	1,850	1,880	1,925	4,400	4,400	20,355
Avg Power Level While Operating, MW	1,855	2,035	1,860	1,807	1,841	1,864	4,305	4,329	19,896
Max. Tube Power, KW	1,225	1,324	1,240	1,190	1,195	1,268	1,770	1,782	
Effective Central Tubes	1,522	1,603	1,504	1,529	1,536	1,502	2,486	2,495	
Time-Operated Efficiency, %	91.9	80.9	83.6	88.1	86.6	96.1	75.9	81.8	85.6
Operational Limitation	95°C	95°C	95°C	95°C	95°C	1310KW	4400KW	4400KW	
MWD Produced During Month, total	51,148	49,431	46,646	47,774	47,812	53,755	98,019	106,195	500,780
Normal	44,060	37,719	39,225	38,309	40,598	679	86,655	92,679	379,924
9% Metal	7,088	11,712	7,421	9,465	7,214	53,076	11,364	13,516	120,856
Plutonium Produced, gm	42,151	41,761	36,909	38,817	38,733	36,816	87,846	94,750	417,783
U in Reactor at Month End, tons	223.1	220.1	222.0	219.2	220.2	200.3	461.7	460.4	2227.0
Normal	194.6	180.1	194.7	181.0	187.5	3.1	426.3	417.1	1784.4
9% Metal	28.5	40.0	27.3	38.2	32.7	197.2	35.4	43.3	442.6
U Discharged During Month, tons	63.6	77.6	152.1	69.5	3.8	0	202.7	213.5	782.8
Normal	59.8	70.5	132.4	64.9	0.1	0	185.1	191.3	704.1
9% Metal	3.8	7.1	19.7	4.6	3.7	0	17.6	22.2	78.7
Avg Discharge Concentration									
Normal	614	639	586	565	320	-	634	604	614
9% Metal	860	788	801	1,029	455	-	636	930	799

Extracted from Travis 1964g, page 6.

REACTOR OUTAGES JUN 1964

B REACTOR

Date Down	Date Up	Outage Hours	Remarks
6/16	6/19	58.3	Scheduled charge-discharge.
C-REACTOR			
6/3	6/6	75.9	Scheduled charge-discharge and miscellaneous maintenance.
6/6	6/6	0.3	Unexplained Panellit trip.
6/6	6/7	19.8	Shut down for the correction of a water leak. Replaced tube 2469 due to a rear Van Stone flange leak.
6/13	6/13	0.1	Unexplained Panellit trip.
6/13	6/15	23.2	Manual trip to control high tube temperature.
6/15	6/15	5.9	Removal of an overbore I&E natural metal rupture from tube 3363.
6/15	6/15	0.2	Beckman trip due to a faulty range change switch.
6/15	6/15	0.2	Manual trip due to a false indication of a fast rate of rise.
D REACTOR			
6/22	6/27	115.3	Scheduled charge-discharge.
6/27	6/27	2.9	Scrammed by an unexplained Panellit trip on tube 0282.

Extracted from Plum 1965, June 1964, pages 2-4.

DR REACTOR

6/1	6/2	41.6	Scheduled charge-discharge.
6/3	6/5	54.1	Removal of an I&E natural metal rupture from tube 3679.
6/30	still down		Scheduled charge-discharge.

F REACTOR

6/4	6/6	36.7	Shut down for the correction of a front face cap leak. The cap was not fully engaged. Miscellaneous maintenance.
6/6	6/6	0.3	Manually tripped due to insufficient control when spline insertion equipment failed.
6/28	still down		Scheduled charge-discharge.

H REACTOR

6/8	6/9	27.7	Shut down for the correction of leaking front pigtail on tube 2353.

KE REACTOR

6/7	6/11	110.3	Tripped when a broken spline washed downstream in tube 1967. Scheduled charge-discharge.
6/14	6/15	33.2	Shut down for the correction of a front pigtail leak on tube 0392.
6/17	6/18	35.0	Tripped by a broken spline in tube 3370.

KW REACTOR

6/14	6/18	79.2	Tripped by a broken Panellit sensing line fitting on tube 3351. Scheduled charge-discharge.
6/19	6/19	1.5	Panellit trip caused by a broken spline in tube 5149.
6/19	6/20	49.6	Shut down to investigate the broken spline problem.

Extracted from Plum 1965, June 1964, pages 2-4.

REACTORS
1964

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	July	Aug.	July	Aug.	July	Aug.	July	Aug.	July	Aug.
Normal U (tons)	593[1]	326			1,722	1,729[3]	646	331	3,009	2,495
MWD			370,083	344,279[3]	545,018	689,082[3]	403,991	200,315	2,001,876	1,634,619[3]
Pu (kg)			325	296[3]	496	616[3]	354	176	1,741	1,467[3]
94 Metal (tons)[8]	308	71[5]			859[2]	864[2]	260	66[6]	1,153	1,155[7]
MWD			128,741[4]	143,759[4]	191,873[4]	296,312[4]	205,403	39,370[4]	985,822	932,172[4]
Pu (kg)			99[4]	105[4]	150[4]	226[4]	148	28[4]	697	662[4]

1 Includes 8.9 tons special depleted.
2 Includes 368 tons from N reactor.
3 Includes special depleted production.
4 Includes NPR.
5 Includes 25 tons in N reactor.
6 Includes 25 tons from N reactor.
7 Includes 49 tons from N reactor.
8 Includes 1.25 metal in N reactor.

SEPARATIONS
1964

	PUREX AND REDOX							
	Dissolved		Inventory in Process		Separated		Inventory of Product	
	July	Aug.	July	Aug.	July	Aug.	July	Aug.
Normal U (tons)	317	838	124	95	289	856	191	380
MWD	200,688	524,843						
Pu (kg)	169.8	449.3	69.0	34.8	177.7	483.4	40.7	87.1
94 Metal (tons)	129	85	18	49	147	55	212	114
MWD	115,131	90,426						
Pu (kg)	83.5	62.3	19.6	53.9	88.6	28.1	26.9	46.9

Extracted from Travis 1964i, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE
Jul 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,090	2,365	2,055	2,015	2,015	2,110	4,400	4,400	21,450
Max. Power Level During Month, MW	1,855	2,125	1,845	1,825	1,825	1,905	4,400	4,400	20,180
Avg Power Level While Operating, MW	1,786	2,041	1,800	1,762	1,741	1,851	4,277	4,250	19,508
Max. Tube Power, KW	1,197	1,313	1,204	1,162	1,210	1,233	1,707	1,753	
Effective Central Tubes	1,550	1,613	1,487	1,536	1,483	1,533	2,504	2,464	
Time-Operated Efficiency, %	65.3	39.1	94.8	88.6	88.8	75.6	89.8	82.2	78.0
Operational Limitation	95°C	95°C	95°C	95°C	95°C	95°C	95°C	95°C	
MWD Produced During Month, total	36,151	24,721	52,884	48,393	47,923	43,383	119,044	108,226	480,725
Normal	30,532	18,812	43,823	39,324	40,456	543	101,375	95,218	370,083
94 Metal	5,619	5,909	9,061	9,069	7,467	42,840	17,669	13,008	110,642
Plutonium Produced, gm	28,995	19,783	44,300	39,690	39,618	32,871	104,943	95,931	406,131
U in Reactor at Month End, tons	213.7	221.7	221.9	219.7	220.0	200.7	455.0	461.0	2213.7
Normal	160.6	181.3	194.0	183.0	186.8	3.1	392.8	420.8	1722.4
94 Metal	53.1	40.4	27.9	36.7	33.2	197.6	62.2	40.2	491.3
U Discharged During Month, tons	111.5	96.6	0.9	88.8	105.2	182.8	154.6	165.5	905.9
Normal	100.6	74.2	0.8	72.8	95.1	3.1	146.7	152.9	646.2
94 Metal	10.9	22.4	0.1	16.0	10.1	179.7	7.9	12.6	259.7
Avg Discharge Concentration									
Normal	560	651	72	600	622	559	643	657	625
94 Metal	810	833	8	802	801	774	885	852	790

N REACTOR PILE PERFORMANCE

Input Production Pu (KG/D)	18.1
Input Production T (KG/D)	0
Maximum Power Level Attained (MW)	1600
Average Power Level While Operating (MW)	1140
Time-Operated Efficiency (%)	56.9
Plant Utilization (%)	

Fuel Balance (Ton)	0.94	1.25	Co-Prod	Other	Total
Fuel Charged	6.23	17.66	0	0	23.89
Fuel Discharged	23.82	0	0	0	23.82
Net Change	-17.59	+17.66	0	0	0.07
Total in Reactor at Month End	350.26	17.66	0	0	367.92

Extracted from Travis 1964h, pages 6 and 6a.

REACTOR OUTAGES Jul 1964

Date Down	Date Up	Outage Hours	Remarks
B Reactor			
7/18	7/29	257.6	Scheduled outage for charge-discharge. Miscellaneous maintenance.
7/29	7/29	0.7	Panellit trip due to a leaking toggle valve.
C Reactor			
7/9	7/28	442.4	Scheduled charge-discharge, tube replacement and foaming of rear-face bellows.
7/31	Still down		Removal of an overbore rupture from tube 1459.
D Reactor			
7/5	7/6	25.7	Unexplained Panellit trip on gauge 0969. Replaced tube 1257 due to a rear Van Stone leak.
DR Reactor			
6/30	7/2	69.5	Scheduled charge-discharge.
7/2	7/2	1.2	Corrected a faulty thermocouple on tube 2472.
7/13	7/15	36.4	Stuck I&E natural metal rupture in tube 3160.
7/31	Still down		Removal of a stuck I&E enriched rupture from tube 1858.

Extracted from Plum 1965, July 1964, pages 2-3.

F Reactor

6/28	7/1	69.5	Scheduled charge-discharge.
7/1	7/1	2.5	Correction of a rear cap leak on tube 2164.
7/4	7/5	34.1	Unexplained Panellit trip on gauge 4073.
7/18	7/19	37.3	Removal of a stuck I&E enriched metal rupture from tube 4174.

H Reactor

7/5	7/12	171.6	Scheduled (block) charge-discharge.
7/13	7/13	9.9	Poison discharge.

KE Reactor

7/12	7/15	76.1	Scheduled charge-discharge.

KW Reactor

7/2	7/4	41.5	Removal of an I&E enriched metal rupture from tube 4755.

Extracted from Plum 1965, July 1964, pages 2-3.

COMPARATIVE PILE PERFORMANCE
AUG 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,090	2,365	2,055	2,015	2,015	2,110	4,460	4,460	21,470
Max. Power Level During Month, MW	1,755	2,050	1,785	1,750	1,765	1,845	4,305	4,205	19,460
Avg Power Level While Operating, MW	1,651	1,976	1,748	1,705	1,732	1,832	4,235	4,127	19,007
Max. Tube Power, KW	1,210	1,310	1,173	1,169	1,201	1,216	1,637	1,632	
Effective Central Tubes	1,439	1,553	1,498	1,464	1,453	1,509	2,420	2,475	
Time-Operated Efficiency, %	83.1	86.0	91.0	78.1	91.5	100.0	59.7	81.2	83.9
Operational Limitation	95°C	95°C	95°C	95°C	95°C	95°C	95°C	95°C	
MWD Produced During Month, total	42,518	52,685	49,290	41,305	49,154	56,797	78,357	104,747	474,353
Normal	30,236[1]	39,965	41,209	33,774	42,045	712	64,371	91,267	343,254
9% Metal	12,282	12,720	8,081	7,531	7,109	56,085	13,986	12,780	130,574
Plutonium Produced, gm	35,704[2]	40,439	38,711	34,178	40,483	41,363	65,698	92,326	388,902
U in Reactor at Month End, tons	210.2	221.7	223.3	219.9	221.1	200.5	455.0	461.0	2212.7
Normal	147.8	181.3	197.0	184.3	189.4	3.1	392.8	421.1	716.8
9% Metal	62.4	40.4	26.3	35.6	31.7	197.4	62.2	39.9	495.9
U Discharged During Month, tons	26.9	13.3	30.3	78.2	68.3	0	0	155.4	372.4
Normal	24.5	13.3	25.3	66.9	61.6	-	-	139.7	331.3
9% Metal	2.4	-	5.0	11.3	6.7	-	-	15.7	41.1
Avg Discharge Concentration									
Normal	454	585	731	549	602	-	-	638	605
9% Metal	863	-	1,028	950	756	-	-	914	909

N REACTOR PILE PERFORMANCE
AUG 1964

Input Production Plutonium (KMWD)	13.2	Fuel Balance (Ton)	0.94	1.25	Total
Input Production T (KMWD)	0	Fuel Charged	6.23	18.77	25.0
Maximum Power Level Attained (MW)	2300	Fuel Discharged	25.10	0	25.10
Average Power Level While Operating (MW)	1560	Net Change	-18.87	+18.77	-0.10
Time-Operated Efficiency (%)	27.4	Total in Reactor			
Plant Utilization (%)	-28.7	at Month End	331.39	36.43	367.82

1 Includes 1,025 MWD from special depleted material.
2 Includes 1,954 grams from special depleted material.
Extracted from Travis 1964i, pages 6 and 6a.

REACTOR OUTAGES AUG 1964

DATE DOWN	DATE UP	OUTAGES HOURS	REMARKS
B REACTOR			
8/16	8/18	37.2	Removal of an I&E natural metal rupture from tube 0863.
8/23	8/25	53.5	Removal of an I&E natural metal rupture from tube 3976; charge-discharge and tube replacement.
8/26	8/28	35.2	Down for temperature control on two process tubes. Charge-discharge and miscellaneous maintenance.
C REACTOR			
7/31	8/2	36.4	Removal of an overbore rupture from tube 1459.
8/4	8/5	33.7	Unexplained Panellit trip on tube 1271.
8/5	8/5	2.7	Faulty thermocouple on tube 3162.
8/7	8/9	42.3	Panellit trip on overbore tube 4472. Charge-discharge and miscellaneous maintenance.
D REACTOR			
8/9	8/12	67.3	Charge-discharge and installation of 0.244 venturis.
DR REACTOR			
7/31	8/6	136.0	Removal of an I&E enriched metal rupture from tube 1858. Charge-discharge and miscellaneous maintenance.
8/11	8/13	35.6	Removal of an I&E natural metal rupture from tube 1583.

Extracted from Plum 1965, August 1964, pages 6-8.

F REACTOR

8/5	8/7	58.0	Charge-discharge.
8/31	Still down		Removal of an I&E enriched metal rupture from tube 0788.

H REACTOR

No outages

KE REACTOR

8/19	Still down		Charge-discharge and maintenance. Gamma Monitoring Systems Improvement CGI-998, and front and rear face hardware standardization.

KW REACTOR

8/14	8/15	37.8	Unexplained Panellit trip on tube 0750.
8/26	8/28	64.7	Charge-discharge.
8/30	8/31	32.4	Broken spline in tube 5358.

Extracted from Plum 1965, August 1964, pages 6-8.

REACTORS
1964

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.
Normal U (tons)	738	582			1,846	1,772	634	656	2,599	2,421
MWD			341,109	299,818	638,995	535,493	391,196	403,320	1,581,476	1,473,291
Pu (kg)			302	267	578	489	339	357	1,397	1,310
94 Metal (tons)[2]	126	172			759	801	231	130	1,153	1,236
MWD			150,854	104,094	265,614	268,448	181,352	101,260	889,168	948,121
Pu (kg)			114	78	211	215	130	73	632	679

1 Includes special depleted production.
2 Includes N reactor.

SEPARATIONS
1964

	PUREX AND REDOX							
	Dissolved		Inventory in Process		Separated		Inventory of Product	
	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.	Sep.	Oct.
Normal U (tons)	535	833	121	105	508	843	228	355
MWD	465,082	515,467						
Pu (kg)	403.7	453.2	55.6	58.2	381.2	456.3	117.7	231.8
94 Metal (tons)	223	60	38	1	234	97	196	125
MWD	223,833	45,597						
Pu (kg)	154.3	33.1	39.2	15.2	169.0	56.8	48.0	47.3

Extracted from Travis 1964k, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE

SEP 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,090	2,365	2,055	2,015	2,015	2,110	4,400	4,400	21,450
Max. Power Level During Month, MW	1,740	2,060	1,790	1,750	1,770	1,845	4,335	4,325	19,615
Avg Power Level While Operating, MW	1,636	1,985	1,743	1,696	1,681	1,756	4,102	4,270	18,969
Max. Tube Power, KW	1,231	1,315	1,163	1,206	1,239	1,198	1,798	1,719	
Effective Central Tubes	1,348	1,532	1,534	1,430	1,416	1,507	2,376	2,498	
Time-Operated Efficiency, %	79.3	80.0	87.1	84.8	86.4	76.1	62.5	95.3	81.4
Operational Limitation	TAI[1]	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	95.0°C	
MWD Produced During Month, total	37,716	47,620	45,550	43,170	43,593	40,068	75,618	122,061	455,396
Normal	24,288	35,823	37,711	35,379	38,200	3,569	56,455	107,273	341,109
9% Metal	13,488	11,797	7,839	7,791	5,393	36,449	19,163	14,788	116,758
Plutonium Produced, gm	32,502	37,793	37,698	35,470	36,314	28,024	70,589	105,977	384,367
U in Reactor at Month End, tons	222.0	222.5	221.5	220.1	223.7	218.2	457.9	461.0	2236.9
Normal	146.6	181.8	193.1	185.3	197.0	133.7	362.4	421.1	1821.0
9% Metal	63.2	40.7	28.4	34.8	26.7	74.5	82.5	39.9	390.7
U Discharged During Month, tons	55.8	81.2	119.7	97.2	91.8	130.5	288.6	-	864.8
Normal	46.6	63.8	103.3	83.7	78.0	3.1	255.3	-	633.8
9% Metal	9.2	17.4	16.4	13.5	13.8	127.4	33.3	-	231.0
Avg Discharge Concentration									
Normal	569.4	644.1	629.7	607.3	607.1	509.7	621.8	-	617.2
9% Metal	618.5	880.1	865.8	812.0	825.3	725.4	948.2	-	785.9

N REACTOR PILE PERFORMANCE

SEP 1964

34.09	Input Production Plutonium (KGM/D)				
0	Input Production T (KGM/D)				
2,800	Maximum Power Level Attained (MW)				
2,660	Average Power Level While Operating (MW)				
46.8	Time-Operated Efficiency (%)				
49.5	Plant Utilization (%)				

Fuel Balance (Ton)	0.94	1.25	Co-Prod	Other	Total
Fuel Charged	0	0	0	0	0
Fuel Discharged	0	0	0	0	0
Net Change	0	0	0	0	0
Total in Reactor at Month End	331.39	36.43	0	0	367.82

1 Trip after instability.

Extracted from Travis 1964j, pages 6 and 6a.

REACTOR OUTAGES SEP 1964

DATE DOWN	DATE UP	OUTAGES HOURS	REMARKS
B REACTOR			
9/2	9/5	76.8	Removal of an I&E natural metal rupture from tube 3880. Charge-discharge
9/18	9/21	72.1	Removal of an I&E natural metal rupture from tube 3566. Charge-discharge and miscellaneous maintenance.
C REACTOR			
9/1	9/5	96.2	Down for charge-discharge and maintenance.
9/5	9/5	2.2	Down due to faulty thermocouple on tube 0175.
9/21	9/23	48.1	Scrammed due to an unexplained Panellit trip on tube 3265. Miscellaneous maintenance.
D REACTOR			
9/7	9/10	91.7	Down for scheduled charge-discharge.
9/10	9/10	1.1	Down to correct a rear face cap leak.
DR REACTOR			
9/10	9/13	71.3	Removal of an I&E natural metal rupture from tube 2362. Charge-discharge. Replaced tube 4374 due to a sheared rear Van Stone flange.
9/13	9/13	0.4	Down due to a Panellit trip caused by faulty row relay.
9/26	9/27	36.2	Removal of an I&E enriched metal rupture from tube 0868.

Extracted from Plum 1965, September 1964, pages 2-4.

F REACTOR

8/31	9/2	35.5	Removal of an I&E enriched metal rupture from tube 0788.
9/2	9/2	3.5	Down due to an unexplained Panellit trip.
9/9	9/11	46.3	Down for scheduled charge-discharge.
9/11	9/12	3.2	Scrammed for temperature control.
9/12	9/12	13.1	Down to correct a front face cap leak on tube 3170.

H REACTOR

9/20	9/21	26.1	Reactor scrammed by a high pressure Panellit trip caused by an I&E enriched metal rupture in tube 3261.
9/21	9/21	1.4	Scram due to a Panellit trip.
9/21	9/21	2.2	Scram due to insufficient control for turnaround.
9/22	9/27	164.7	Discharge of E-N load. Removal of an I&E enriched metal rupture in tube 2378. Charge-discharge.
9/28	9/28	1.3	Down due to no flow from No. 37 cross-header to near sample room.
9/30	still down		Down due to insufficient reactivity.

KE REACTOR

8/19	9/9	505.8	Charge and maintenance, and hardware standardization work.
9/9	9/9	0.4	Down due to an unexplained Panellit trip on tube 4568.
9/11	9/12	29.3	Scram due to the rupture of the cooper sensing line to the flow orifice on a 1706 KE single pass tube.
9/15	9/17	35.2	Scram due to a ruptured Panellit sensing line on 1706 KE single pass tube no. 3050.

KW REACTOR

9/29	still down		Down due to a Panellit trip caused by a broken spline in tube 3561. Charge-discharge and maintenance.

Extracted from Plum 1965, September 1964, pages 2-4.

COMPARATIVE PILE PERFORMANCE
OCT 1964

	B	C	D	DR	F	H	KE	KW	TOTAL
Max. Power Level to Date, MW	2,000	2,365	2,035	2,015	2,015	2,110	4,400	4,400	21,330
Max. Power Level During Month, MW	1,815	2,100	1,820	1,705	1,845	1,920	4,400	4,350	20,075
Avg Power Level While Operating, MW	1,687	1,980	1,660	1,627	1,769	1,802	4,265	4,263	19,753
Max. Tube Power, KW	1,246	1,304	1,212	1,173	1,250	1,294	1,335	1,730	
Effective Central Tubes	1,445	1,485	1,498	1,443	1,485	1,494	2,398	2,330	
Time-Operated Efficiency, %	69.3	68.7	45.6	71.2	87.0	88.2	85.3	82.2	68.6
Operational Limitation	TAI*	95°C	95°C	95°C	95°C	**	95°C	95°C	
MWD Produced During Month, total	36,230	42,149	23,483	36,285	47,657	49,263	112,731	40,470	388,268
Normal and Depleted	24,004	31,783	19,353	29,895	41,608	33,069	87,538	32,568	299,818
9% Metal	12,226	10,366	4,130	6,390	6,049	16,194	25,193	7,902	88,450
Plutonium Produced, gm	29,277	33,112	18,990	29,930	39,379	41,368	102,022	37,180	331,258
U in Reactor at Month End, tons	210.0	223.8	221.5	212.2	223.5	205.2	445.5	431.6	2181.0
Normal	150.6	184.2	193.1	184.3	196.6	127.1	374.1	336.5	1747.2
9% Metal	59.4	38.2	28.4	35.6	26.2	78.1	71.4	95.1	433.2
U Discharged During Month, tons	54.2	85.5	17.8	71.2	81.2	36.4	149.1	283.7	788.3
Normal	37.6	62.7	16.2	64.2	75.2	7.6	126.0	265.2	654.2
9% Metal	16.6	22.8	0.9	7.5	5.2	28.8	23.1	18.5	124.1
Avg Discharge Concentration									
Normal	554	659	599	558	579	675	651	653	615
9% Metal	712	763	983	788	805	827	705	1,042	807

N REACTOR PILE PERFORMANCE
OCT 1964

Input production plutonium (KGWD)	15.64
Maximum power level attained (MW)	2800
Average power level while operating (MW)	2456
Time-operated efficiency (%)	23.3
Plant utilization (%)	23.3

Fuel balance (Ton)	0.94	1.25	Co-Prod	Other	Total
Fuel charged	2.23	3.31	0	0	5.54
Fuel discharged	5.87	0	0	0	5.87
Net change	-3.64	+3.31	0	0	-0.33
Total in reactor at month end	327.75	39.74	0	0	367.49

* Trip after instability.
** Graphite temperature.

Extracted from Travis 1964k, pages 6 and 6a.

REACTOR OUTAGES OCT 1964

Date Down	Date Up	Outages Hours	Remarks
B REACTOR			
10/11	10/16	118.0	Removal of an I&E natural metal rupture from tube 1374. Charge-discharge and miscellaneous maintenance.
10/16	10/16	7.9	Manual scram due to flow restriction to No. 8 HCR caused by corrosion material.
10/24	10/25	38.8	Removal of an I&E natural metal rupture from tube 0964.
10/26	10/28	37.6	Scrammed by a Panellit trip when a spline was being pulled from tube 3281. Miscellaneous maintenance was performed.
10/30	still down		Manually scrammed because of HCR water loss annunciations caused by a circuit short. Miscellaneous maintenance.
C REACTOR			
10/10	10/14	99.7	Down for scheduled charge-discharge.
10/21	10/22	36.3	Removal of an I&E enriched metal rupture from tube 2763.
10/24	10/26	40.2	Removal of a stuck I&E enriched rupture from tube 2774. The front venturi assembly on tube 2764 parted from the head adapter when water pressure was raised to 400 lbs. A complete new assembly was installed.
10/26	10/28	57.3	Down to check the integrity of the front CG-558 hardware.

Extracted from Plum 1965, October 1964, pages 2-5.

D REACTOR

10/8	10/9	42.2	Scrammed due to an I&E natural metal rupture in tube 3259. Completed a small charge-discharge.
10/13	10/15	33.3	Scrammed due to a stuck I&E enriched metal rupture in tube 0886.
10/16	10/17	26.2	Down to manually close a ball valve on tube 1182. Startup failed when No. 25 VSR cable tangled.
10/17	10/17	0.5	Down due to a trip caused by a faulty Beckman.
10/19	still down		Down for scheduled charge-discharge.

DR REACTOR

10/2	10/4	40.0	Manually scrammed due to an I&E natural metal rupture in tube 2561. Replaced tube 2561.
10/7	10/8	34.8	Scrammed due to an I&E enriched metal rupture in tube 1360.
10/10	10/12	34.7	Manually scrammed due to rupture indications. Removal of an I&E enriched metal rupture from tube 1161. Charge-discharge.
10/19	10/22	54.5	Manually scrammed due to a stuck I&E natural metal rupture in tube 1364. Charge-discharge.
10/26	10/28	45.0	Scrammed by a low pressure Panellit trip when a rear pigtail adapter failed on tube 3979. Miscellaneous maintenance.

F REACTOR

10/2	10/4	40.9	Scrammed by an unexplained Panellit trip on tube 0980. Charge-discharge.
10/16	10/18	55.1	Down for scheduled charge-discharge.
10/18	10/18	1.2	Correct two rear cap leaks.

Extracted from Plum 1965, October 1964, pages 2-5.

H REACTOR

9/30	10/2	32.4	Down due to insufficient reactivity. Charge-discharge and installation of three process tubes.
10/3	10/4	27.6	Scrammed when the wrong ball valve was bypassed.
10/14	10/15	33.2	Removal of an I&E enriched metal rupture from tube 0576.
10/15	10/15	1.0	Discharge of a stuck poison charge from ball valve tube 0874.

KE REACTOR

10/7	10/10	69.2	Scheduled charge-discharge.
10/10	10/10	0.4	Down due to an unexplained Panellit trip.
10/10	10/10	3.0	Down due to an unexplained Panellit trip.
10/17	10/19	37.1	Scrammed by an unexplained Panellit trip on tube 4365. Charge-discharge and miscellaneous maintenance.

KW REACTOR

9/29	10/20	492.1	Down due to a Panellit trip caused by a broken spline in tube 3561. Maintenance.
10/24	10/25	37.4	Down due to a water leak. Tube 3155 was confirmed as a leaker and was replaced.
10/25	10/25	1.6	Manually scrammed due to high pressure on tube 3069.
10/31	still down		Down due to a Panellit trip caused by partial plugging of the Panellit opening at the orifice cage.

Extracted from Plum 1965, October 1964, pages 2-5.

REACTORS
1964

	Charged		Produced		Inventory in Reactor		Discharged		Inventory in Basins	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Normal U (tons)[1]	384	615			1,696	1,340	461	971	2,304	3,218
MWD			377,747	366,374	635,783	417,291	277,457	584,866	1,406,369	1,956,340
Pu (kg)			327	319	581	391	235	509	1,231	1,711
94 Metal (tons)[2]	161	267			842	931	119	173	1,126	939
MWD			165,277	235,863	334,928	424,061	98,797	146,730	848,703	755,142
Pu (kg)			127	183	272	350	69	105	606	541

1 Includes special depleted production.
2 Includes N reactor 94 and 1.25 material.

SEPARATIONS
1964

	PUREX AND REDOX							
	Dissolved		Inventory in Process		Separated		Inventory of Product	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Normal U (tons)	585	43	82	11	606	118	394	36
MWD	365,915	25,829						
Pu (kg)	319.2	228	50.3	0.2	326.0	65.7	258.9	123.4
94 Metal (tons)	217	303	43	24	172	322	127	226
MWD	189,561	238,474						
Pu (kg)	137.2	168.6	33.0	11.3	109.9	189.9	66.1	67.8

Extracted from Travis 1965a, pages 3 and 4.

COMPARATIVE PILE PERFORMANCE
Nov 1964

	B	C	D	DR	F	H	KE	KW	N	TOTAL
Max. power level to date, MW	2,090	2,365	2,055	2,015	2,015	2,110	4,400	4,400	3,600	25,050
Max. power level during month, MW	1,850	2,205	1,920	1,900	1,900	1,930	4,400	4,400	3,600	24,105
Avg power level while operating, MW	1,676	2,092	1,713	1,807	1,812	1,794	4,347	4,320	2,932	22,493
Maximum tube power, KW	1,306	1,393	1,274	1,267	1,223	1,255	1,815	1,805	4,300	
Effective central tubes	1,380	1,581	1,495	1,460	1,545	1,523	2,425	2,334	832	
Time-operated efficiency, %	76.0	70.6	70.2	95.0	82.0	86.1	85.0	84.4	63.0	79.14
Operational limitation	TAI	95°C	95°C	95°C	95°C	1250MW	4400MW	4400MW	AL	
MWD produced during month, total	38,224	50,602	36,088	51,503	44,569	46,357	110,873	109,414	55,710	543,340
Normal and depleted (125 for N)	24,884	39,015	26,689	41,951	38,951	30,618	88,154	87,485	7,060	377,747[1]
9h Metal	13,340	11,587	9,399	9,552	5,618	15,739	22,719	21,929	48,650	158,533
Plutonium produced, g	31,088	40,545	28,806	42,039	36,902	35,845	96,978	93,741	48,114	454,058
U in reactor at month end, tons	195.8	223.9	205.2	219.6	223.1	201.5	444.8	432.0	367.49	2513.4
Normal and depleted (125 for N)	114.0	187.0	148.1	182.6	195.7	126.9	379.1	336.9	39.74	1670.2[1]
9h Metal	81.8	36.9	57.1	37.0	27.4	74.6	65.7	95.1	327.75	803.4
Avg in reactor concentration at month end, MWD/T										
Normal and depleted (125 for N)	319	298	405	341	262	521	325	506		374[2]
9h Metal	316	421	274	520	431	267	675	426		406[2]
U discharged during month, tons	92.2	76.7	80.3	57.1	90.6	39.5	142.9	0	0.37	579.7
Normal and depleted (125 for N)	72.1	65.2	70.0	49.6	80.2	0.3	123.2	0	0	460.6[3]
9h Metal	20.1	11.5	10.3	7.5	10.4	39.2	19.7	0	0.37	119.1
Avg discharge concentration, MWD/T										
Normal and depleted (125 for N)	545	660	625	542	582	503	631	0	-	602
9h Metal	774	806	698	702	840	822	1,035	0	449	1,280

1 Does not include 125 metal.
2 Not available for N reactor.
3 No 125 metal.
Extracted from Travis 1964l, pages 6 and 6a.

REACTOR OUTAGES Nov 1964

DATE DOWN	DATE UP	OUTAGES HOURS	REMARKS
B REACTOR			
11/30	11/1	35.8	Manually scrammed because of HCR water loss caused by a circuit short. Rod water flow was normal. Miscellaneous maintenance.
11/4	11/6	47.0	Removal of a rupture from tube 1560.
11/14	11/19	124.6	Removal of an I&E natural metal rupture from tube 0986. Charge-discharge.
C REACTOR			
11/9	11/11	36.9	Removal of an overbore rupture from tube 2868. Twelve overbore tubes were charge-discharged.
11/12	11/14	45.4	Scrammed by an unexplained Panellit trip. Charge-discharge of special material and miscellaneous maintenance work followed.
11/24	11/26	50.9	Down for scheduled charge-discharge.
11/26	11/26	6.4	Down to correct six front face cap leaks.

Extracted from Plum 1965, November 1964, pages 2-4.

D REACTOR

10/19	11/3	369.3	Down for charge-discharge, thermocouple work and replacement of the top seal on the rear face.
11/3	11/3	4.6	Scrammed by a high pressure Panellit trip caused by two pieces of gasket material on the Venturi cross wire.
11/3	11/3	0.6	Down to correct a partially engaged front face cap on tube 3396.
11/13	11/14	33.5	Scrammed due to an I&E natural metal rupture in tube 0969.
11/14	11/15	13.3	Down for removal of an I&E natural metal rupture from tube 3161.
11/18	11/20	34.5	Down due to a broken pigtail adapter on the rear of tube 3776. Charge-discharge and miscellaneous maintenance.
11/23	11/25	33.4	Down for removal of a I&E natural metal rupture from tube 3485.
11/29	11/30	38.1	Down for removal of an I&E natural rupture from tube 3674.

DR REACTOR

11/20	11/21	35.8	Down for scheduled charge-discharge
11/21	11/21	0.8	Scrammed from an unexplained low Panellit trip.

F REACTOR

11/6	11/8	42.2	Down for removal of I&E enriched metal rupture from tube 2078. Charge-discharge.
11/19	11/21	56.2	Down due to effluent water leak in the downcomer. Charge-discharge.
11/22	11/23	31.2	Scrammed from a Panellit trip while attempting to insert a plastic stub in spline cap 3662.

Extracted from Plum 1965, November 1964, pages 2-4.

H REACTOR

11/4	11/6	62.4	Scrammed by a high pressure Panellit trip on tube 2585.
11/25	11/26	37.5	Down for removal of an I&E natural metal rupture from tube 1085.

KE REACTOR

11/14	11/19	107.8	Down for scheduled charge-discharge and maintenance.

KW REACTOR

10/31	11/3	67.1	Scrammed due to a Panellit trip caused by partial plugging of the Panellit opening at the orifice cage.
11/3	11/4	0.7	Scrammed by an unexplained Panellit trip on tube 5762.
11/4	11/4	13.1	Scrammed by an unexplained Panellit trip on tube 5762.
11/29	Still down		Down for charge-discharge.

Extracted from Plum 1965, November 1964, pages 2-4.

COMPARATIVE PILE PERFORMANCE

DEC 1964

	B	C	D	DR	F	H	KE	KW	N	TOTAL
Max. power level to date, MW	2,090	2,310	2,055	2,015	2,015	2,125[1]	4,400	4,400	4,000	25,410
Max. power level during month, MW	1,885	2,300	2,030	1,960	1,975	2,125	4,400	4,400	4,000	25,075
Avg power level while operating, MW	1,754	2,204	1,901	1,837	1,955	1,934	4,331	4,167	3,476	23,501
Maximum tube power, KW	1,365	1,467	1,352	1,222	1,307	1,344	1,763	2,127	4,350	
Effective central tubes	1,374	1,552	1,506	1,510	1,469	1,414	2,496	2,057	922	
Time-operated efficiency, %	83.1	73.6	85.5	91.7	82.2	85.4	85.7	84.0	77.0	83.1
Operational limitation	TAI	95°C	95°C	95°C	95°C	95°C	4400MW	4400MW	4000MW	
MWD produced during month, total	45,193	50,273	50,373	50,504	48,282	51,202	115,105	108,535	82,720	601,237
Normal and depleted (125 for N)	27,616	37,543	37,166	40,709	42,005	33,937	93,871	53,527	[illegible] 2	[illegible]
94 Metal	17,577	12,730	13,207	9,795	6,277	17,265	21,234	55,058	[illegible] 2	[illegible]
Plutonium produced, g	36,285	41,005	41,721	39,139	39,378	42,276	102,717	90,246	67,822	500,589
U in reactor at month end, tons	195.4	204.7	206.1		222.1	204.6	444.1	407.2	367.3	2251.5
Normal and depleted (125 for N)	113.7	134.4	146.3		193.6	125.1	385.0	216.7	37.6 2	1354.4
94 Metal	81.7	70.3	59.8		28.5	79.5	59.1	190.5	327.7 2	897.1
Avg in reactor concentration at month end, MWD/T										
Normal and depleted (125 for N)	288	213	245		199	215	322	534	632 2	331
94 Metal	340	163	336		293	406	366	408	410 2	365
U discharged during month, tons	72.8	130.2	114.3	219.6	100.6	134.7	191.0	180.6	0	1143.8
Normal and depleted (125 for N)	54.1	109.4	103.2	182.6	88.6	127.8	142.1	162.8	0	970.9
94 Metal	18.7	20.8	11.1	37.0	11.7	6.9	48.9	17.8	0	172.9
Avg discharge concentration, MWD/T										
Normal and depleted (125 for N)	544	591	593	564	615	572	638	664	-	602
94 Metal	837	807	792	785	834	710	899	1,003	-	847

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1 New record.

Extracted from Travis 1965a, pages 6 and 6a.

REACTOR OUTAGES DEC 1964

DATE DOWN	DATE UP	OUTAGES HOURS	REMARKS
B REACTOR			
12-13	12-16	73.6	High pressure Panellit trip caused by an I&E natural metal rupture in Tube 3581, and charge-discharge.
12-16	12-16	8.0	Replacement of a ruptured rear expansion joint and discharge of an I&E normal uranium rupture from Tube 3686.
12-25	12-27	43.9	Removal of a stuck I&E normal uranium rupture from Tube 1961.
C REACTOR			
12-18	12-25	174.8	Scheduled charge-discharge and miscellaneous maintenance.
12-25	12-26	.5	Low Panellit trip on Tube 3387.
12-26	12-27	19.4	Correction of a faulty thermocouple connection on Tube 3676.
12-31	Still down		Removal of an I&E 94 metal rupture from Tube 3369.
D REACTOR			
12-9	12-14	102.8	Scheduled charge-discharge.
12-14	12-14	5.3	High pressure Panellit trip on Tube 4080.
DR REACTOR			
12-21	12-23	53.6	High pressure trip on Tube 2561. Removal of an I&E normal uranium rupture from Tube 2561.
12-23	12-24	6.5	Removal of an I&E normal uranium rupture from Tube 1961.
12-30	Will remain down.		Manually scrammed as first step in deactivation. Deactivation schedule being followed.

Extracted from Plum 1965, December 1964, pages 2-4.

F REACTOR

12-8	12-10	48.1	Removal of an I&E normal uranium rupture from Tube 2676. Replacement of Tubes 0781 and 0561 due to rear Van Stone leaks.
12-10	12-10	.8	Restoration of flow on Gamma monitor sample line from header No. 42.
12-27	12-30	83.5	Scheduled charge-discharge. Replacement of Tube 4468 due to cracked rear Van Stone.

H REACTOR

12-6	12-10	79.9	Scheduled block discharge.
12-12	12-13	28.8	Flexowriter failed during a period of flux change.

KE REACTOR

12-4	12-5	34.0	Removal of I&E 94-metal rupture in Tube 4189 and scheduled charge-discharge.
12-5	12-5	.5	Panellit trip apparently caused by an unseated charge in Tube 5151.
12-16	12-18	61.2	Excessive icing on incoming 230 KVA line. Charge-discharge.
12-31	Still down.		Low crossheader pressure trip on 1706 single pass Tubes 4355 and 4456.

KW REACTOR

11-29	12-5	150.2	Scheduled charge-discharge.
12-5	12-5	.7	Panellit trip caused by an oscillating gage on Tube 4271.
12-6	12-6	1.6	Panellit trips on gages 5280 and 3283, caused by oscillating gages on thoria tubes.

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