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PRELIMINARY DATA REPORT

PRESSURE TRANSDUCERS EXPERIMENT NO. 23/W506,
IRRADIATED AT PLUM BROOK REACTOR FACILITY,
PBRF CYCLE 22P (PB NO. 8W), 35

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1.0 INTRODUCTION

Description of the preliminary results of experiment 23/W506, irradiated during PBR Cycle 22P, is presented in this report. In this experiment, two Wianko variable reluctance absolute pressure transducers, Model No. 54726, and two Wianko variable reluctance differential pressure transducers, Model No. 54727 were dynamically tested during irradiation in the PBR HT-1 facility on July 29 and 30, 1964. Experiment 23/W506 was designed to evaluate the performance of the Wianko pressure transducers under dose rate conditions approaching and exceeding those to be experienced in both NRX-A2 and NRX-A3 applications. Since these transducers in application are to be utilized in fields of different radiation levels, this irradiation experiment was exposed to various radiation dose rates. In an effort to obtain comparable data, the pressure transducers of this experiment were pressure cycled before, during, and after irradiation.

Design and hazards information for the W-2 loop is described in WANL-TNR-119⁽¹⁾, and for this experiment, in WANL-REP-2012⁽²⁾. Final test specifications for this experiment are described in WANL-TME-800⁽³⁾.

2.0 TEST HISTORY

Irradiation of pressure transducer experiment 23/W506 was initiated at about 2144 hours on July 29, 1964 in the Plum Brook Reactor and was completed at approximately 1622 hours on July 30, 1964. In order that various radiation dose rates might be experienced, the reactor power was increased to levels of 1 MW, 5 MW, and increasing 5 MW increments up to 40 MW. Each of these power levels was held for approximately two hours to permit temperature stabilization. Two complete pressure cycles of data were taken during each of these periods. Due to indications of malfunction in two of the transducers, one absolute and one differential type, this irradiation experiment was terminated at the conclusion of the 40 MW period. A total exposure of about 363 MW-hours was accumulated during irradiation. Figure 1 illustrates the reactor power profile during this experiment as indicated by the PBRF water power computer. During the above described operating conditions, the outer surface of the pressure transducers experienced temperatures ranging from 85°F to 125°F and was exposed to an average water pressure of 132 psig.

Figure 1. Reactor Power Profile PBR Cycle 22P

3.0 DESCRIPTION OF TEST

3.1 Description of Test Specimens

The four pressure transducers irradiated in this experiment are listed in Table 1. These transducers were clamped to the inside edge of the test fixture cage at 90° intervals. During irradiation, the transducers were directly actuated from a helium gas supply incorporated in the system.

Table 1

Variable Reluctance Pressure Transducers Irradiated in Experiment 23/W506

<u>Quantity</u>	<u>Manufacturers</u>	<u>Model No.</u>	<u>Type</u>	<u>Range</u>	<u>Instrumentation Data Book Code Number</u>
2	Wiancko	54726	Absolute	0 to 800 psia	Pr-18
2	Wiancko	54727	Differential	0 to 150 psid	DPr-16

3.2 Description of Test Fixture

The test fixture for experiment 23/W506 was designed with an aluminum cage into which four Wiancko pressure transducers were clamped and welded, (Figures 2 and 3.) This cage also contained a manifold and tubing system which permitted transfer of gas from the pressurized helium supply to each transducer (Figure 4). During irradiation the applied gas pressure to the transducers was manually regulated from a pneumatic system positioned near the helium bottle supply. The cage of the test fixture was enclosed with an aluminum shroud to direct flow of coolant water and the entire fixture was attached to the unitrace holder as described in WANL-TNR-119⁽¹⁾.

Four stainless steel sheathed copper-constantan thermocouples were pressure fitted between each of the pressure transducers and the aluminum cage. In this manner the outer surface temperature of each transducer was continually monitored during irradiation. The radiation exposure of each transducer was monitored by a dosimeter package mounted on the test fixture near to each transducer. Each dosimeter package contained aluminum-cobalt wires, bare and cadmium covered for thermal and epi-thermal flux measurements, and sulfur for fast flux measurements. One 0.090-inch diameter, 13 foot long, stainless steel-sheathed cable with MgO insulation was provided from each transducer to the conax fittings in the back plate

Figure 2. Side View of the Aluminum Cage of
Pressure Transducer Experiment 23/W506

Figure 3. End View of the Aluminum Cage of
Pressure Transducer Experiment 23/W506

- NOTES.
- 1 MFD BY WIANCKO ENGINEERING PASADENA, CALIF OR EQUAL
 - 2 MFD BY PARKER-HANNIFIN CORP. CHICAGO ILL OR EQUAL
 - 3 DOSIMETER PACKAGES TO BE WIRED TO CAGE AT BOTH ENDS OF PACKAGES. SCREWS RETAINING ITEM 3 TO BE WIRED TOGETHER. SCREWS ATTACHING SHROUD TO BE WIRED TOGETHER

Figure 4. Design of the Test Fixture for Experiment 23/W506

of the sample holder to provide read-out capabilities. Extension wires from the test holder backplate to the read-out instrumentation were enclosed in Tygon tubing to prevent exposure to moisture.

3.3 Test Procedure

To determine the effects of irradiation on the Wiancko pressure transducers of this experiment, a helium gas actuating system and data read-out equipment were required. A diagram of the He gas supply and reference vent system for this experiment is shown in Figure 5. The data read-out equipment for this experiment, included in Table 2, was mounted to an instrument control panel from which the test procedures were regulated. Since evaluation of the Wiancko pressure transducers will be performed from resistance measurements of the transducer electric circuit and voltage output levels during irradiation, the instrumentation was designed to provide these capabilities.

Table 2

Data Acquisition Equipment for Experiment 23/W506

1. Two digital voltmeters, Kintel, Model 473 A.
2. Two Crescent Demodulators, Model 9105 (one spare).
3. One Hewlett-Packard Oscillator, Model 650A.
4. One McIntosh Amplifier, Model M175.
5. One AC to DC converter.
6. One Megohmmeter, General Radio.
7. One Wheatstone Bridge.
8. One AC Voltage Regulator.
9. Two Heise Pressure Gages, 0-50 psi and 0-200 psi.

During irradiation a gas pressure of 100 psig was continually maintained on the pressure transducers except during the periods of data acquisition. Prior to each data acquisition operation, the read-out instrumentation was standardized according to procedure 4.2 of WANL-TNR-118⁽⁴⁾ to insure the measurement of true values. After standardization operations were completed, the voltage output of each transducer with a 100 psig gas pressure applied was measured and recorded. The gas pressure was then released to 0 psig and the voltage outputs again measured. This operation

Figure 5. Pneumatic System Used to Regulate the Gas Pressure in Experiment 23/W506

was repeated at 30 psig increments up to 150 psig and back to 0 psig. At the completion of these operations the transducer gas pressure was again regulated to 100 psig and maintained throughout irradiation. The electrical resistance across the core of each transducer was measured to indicate temperature changes resulting from irradiation. The insulation resistance of each transducer was also measured to indicate its resistance to radiation damage. The above procedure describes one complete pressure cycle of data acquisition for the pressure transducers. These operations were repeated at the beginning and end of each reactor power level period to insure that temperature stabilization had occurred. Complete data cycles were taken just prior to irradiation and immediately following irradiation to permit data comparison for the study of radiation induced changes and recovery characteristics.

3.4 Test Results

As mentioned earlier in this report, the irradiation of this experiment was conducted at 5 MW increments up to 40 MW at which point the experiment was terminated. Termination was requested as the result of malfunction indicated by the output voltages of two of the transducers. A review of the data in Tables 3 through 10 shows the following results:

1. Pressure transducer number 69953 (variable reluctance differential type) experienced an increase in the DC output voltage of approximately 0.11 volts with increased reactor power level to 40 MW. This increase was fairly constant over the 150 psig pressure range applied to the transducer. At each reactor power level an approximate 1.0 volt increase was experienced with each 30 psig increase or about 0.033 volts per pound. On this basis the 0.11 volt increase of the DC output experienced during irradiation would be equivalent to an approximate 3 psi or 2% increase in pressure for each of the 30 psig increments. The coil resistance of this transducer increased at an average rate of 0.4 ohms per MW and upon reactor shutdown exhibited a total recovery behavior. (Figure 6.) It is therefore believed that resistance increases during irradiation were due only to coil temperature increases. The insulation of this transducer appeared to have experienced a decrease in resistance with increased reactor power (although somewhat erratic up to 15 MW); however, total recovery was experienced with reactor shutdown. This transducer was located in the test fixture at a position farthest from the reactor core and should therefore have experienced a minimum radiation exposure.

2. Pressure transducer number 69952 (variable reluctance differential type) experienced a DC voltage output increase of only about 0.034 volts with increased reactor power level up to 20 MW. This increase was constant over the 150 psig pressure range applied to the transducer. At each power level up to 20 MW an approximate 1.1 volt increase was experienced with each 30 psig increase of about 0.036 volts per pound. On this

Figure 6. Coil Resistance vs. Reactor Power - Transducer No. 69953

basis the 0.034 volt increase of the DC output would be equivalent to an approximate 1 psi or less than 1% increase in pressure for each 30 psig increment during irradiation to 20 MW. Upon going to the 25 MW power level the DC voltage output at each 30 psig pressure increment was noted to decrease by about 0.1 volts as compared to the output at 20 MW. At 30 MW the DC voltage outputs were noted to increase considerably over those at the 25 MW level. Also the DC voltage changes for each 30 psig increment were non-uniform indicating that the sensitivity of this transducer had become erratic. DC output voltages throughout the remainder of the irradiation were erratic and decreases in the AC output voltage was noted during the latter period of irradiation. Data obtained after reactor shutdown failed to show any indications of recovery. The coil resistance of this transducer increased fairly uniformly up to 20 MW. On going from 20 to 25 MW a slightly greater increase in resistance was experienced than was anticipated under normal behavior. (Figure 7.) Upon reactor shutdown the coil resistance returned to near normal values for 0 MW. The insulation of this transducer experienced a decrease in resistance with increased reactor power, however, total recovery was experienced with reactor shutdown. This transducer was located in the test fixture at a position closest to the reactor core and should therefore have experienced a maximum radiation exposure.

3. Pressure transducer number 70639 (variable reluctance absolute type) experienced a decrease in the DC voltage output with increased reactor power up to 20 MW. This decrease was not uniform for each additional 5 MW of power. A DC voltage increase for each 30 psig increase in pressure at a given power level was fairly constant indicating that the transducer sensitivity had been maintained. Upon increasing the reactor power from 20 MW to 25 MW an approximate 2.1 volt increase in the DC output was observed for each 30 psig pressure increase. Also the AC voltage output was noted to decrease. Voltage output measurements for this transducer throughout the remainder of the irradiation to 40 MW was considered to be erratic. No indication of recovery was noted after reactor shutdown, thereby suggesting that permanent damage had occurred. The coil resistance of this transducer was noted to increase at a fairly uniform rate up to about 20 MW (Figure 8). From 20 MW to 40 MW the coil resistance became quite erratic and upon reactor shutdown the resistance decreased to values lower than those measured prior to irradiation. The insulation of this transducer experienced a rapid decrease in resistance upon reactor power increase to 5 MW after which further decreases in resistance were less severe. After reactor shutdown the insulation resistance of this transducer was noted to return to pre-irradiation levels. This transducer was located in the test fixture at a position closest to the reactor core and should therefore have experienced a maximum radiation exposure.

4. Pressure transducer number 69955 (variable reluctance absolute type) experienced an initial decrease in the DC output voltage with increased reactor power to 10 MW after which a fairly uniform increase was experienced

Figure 7. Coil Resistance vs. Reactor Power - Transducer No. 69952

Figure 8. Coil Resistance vs. Reactor Power - Transducer No. 70639

up to 40 MW. The overall average increase in the DC output during irradiation was about 0.43 volts. With reactor shutdown some decrease in DC voltage output was noted; however, recovery to the pre-irradiation values was not observed. At each reactor power it was noted that the increase in DC voltage output with each 30 psig increase in pressure was fairly uniform indicating that the sensitivity of the transducer had been maintained. The coil resistance of this transducer increased at an average rate of about 0.53 ohms per MW. (Figure 9.) With reactor shutdown, the coil resistance of this transducer returned to pre-irradiation values, thereby suggesting that the increases during irradiation were due to temperature alone. The insulation of this transducer appeared to have a continual decrease in resistance with increased reactor power; however, resistances appeared to return to normal with reactor shutdown. This transducer was located in the test fixture at a position farthest from the reactor core and should therefore have experienced a minimum radiation exposure.

Throughout this irradiation experiment, the temperature of each transducer was continually monitored, along with the inlet and outlet coolant water. Although the transducer temperature deviated somewhat with operation of the primary coolant pumps it was found that the temperature ranged from 85°F to 124°F.

3.5 Raw Data

The AC and DC voltage outputs measured prior to irradiation, during irradiation and after reactor shutdown are presented in Tables 3 through 6 along with the time and reactor power. The coil resistances and insulation resistances of each transducer are presented in Tables 7 through 10.

Figure 9. Coil Resistance vs. Reactor Power - Transducer No. 69955

Table 3 Output Voltages, Model 54 727 Diff. No. 69953 (No Load Excitation Voltage 5.089)

DATE	TIME	REACTOR POWER	TYPE OF VOLTAGE	NOMINAL PRESSURE												
				100	0	30	60	90	120	150	120	90	60	30	0	100
7/28/64	1300	0	DC AC		-0.131	0.953	1.981	2.999	3.985	4.959	3.985	2.995	1.989	0.954	-0.132	
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	
7/28/64	1350	0	DC AC		-0.132	0.943	1.977	2.990	3.990	4.952	3.989	2.999	1.989	0.951	-0.132	
					5.000	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	
7/29/64	0345	0	DC AC		-0.194	0.867	1.921	2.919	3.909	4.885	3.909	2.929	1.913	0.880	-0.181	
					5.000	5.001	5.001	5.001	5.000	4.999	5.003	5.003	5.002	5.002	5.000	
7/29/64	1147	0	DC AC		-0.1779	0.8829	1.9115	2.919	3.901	4.869	3.900	2.920	1.9199	0.894	-0.1699	
					5.000	5.000	4.999	4.999	4.999	4.999	4.999	4.999	4.995	4.997	4.993	
7/29/64	2035	0	DC AC		-0.169	0.890	1.918	2.919	3.919	4.892	3.929	2.931	1.926	0.897	-0.160	+3.259
					5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001
7/29/64	2150	100 KV	DC AC	3.259	-0.160	0.903	1.925	2.930	3.921	4.899	3.929	2.939	1.930	0.906	-0.152	3.261
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/29/64	2230	1 MI	DC AC	3.279	-0.170	0.892	1.923	2.939	3.939	4.906	3.929	2.934	1.931	0.896	-0.168	3.269
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/29/64	2350	1 MI	DC AC	3.260	-0.163	0.890	1.929	2.929	3.929	4.891	3.939	2.949	1.938	0.908	-0.157	3.282
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0035	5 MI	DC AC	3.289	-0.161	0.903	1.947	2.959	3.949	4.926	3.959	2.969	1.953	0.904	-0.161	3.288
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0200	5 MI	DC AC	3.309	-0.151	0.913	1.953	2.959	3.959	4.939	3.959	2.971	1.965	0.929	-0.150	3.299
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0230	10 MI	DC AC	3.329	-0.158	0.917	1.965	2.989	3.979	4.961	3.979	2.989	1.971	0.927	-0.159	3.317
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0350	10 MI	DC AC	3.329	-0.159	0.915	1.962	2.989	3.989	4.969	4.000	2.989	1.973	0.934	-0.152	3.319
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0430	15 MI	DC AC	3.339	-0.159	0.924	1.974	2.989	4.006	4.993	4.019	3.003	1.980	0.933	-0.156	3.329
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0600	15 MI	DC AC	3.320	-0.148	0.930	1.976	3.000	4.009	4.983	4.011	3.009	1.985	0.934	-0.149	3.329
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000

Table 3 Output Voltages, Model 54 727 Diff. No. 69953 (No Load Excitation Voltage 5.089)																
Date	Time	Reactor Power	Type of Voltage	Nominal Pressure												
				100	0	30	60	90	120	150	120	90	60	30	0	100
7/30/64	0625	20 MW	DC	3.332	-0.170	0.908	1.950	2.979	3.986	4.990	4.005	2.994	1.965	0.926	-0.171	3.319
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0655	20 MW	DC	3.329	-0.155	0.917	1.969	2.989	3.989	4.979	4.000	3.000	1.969	0.924	-0.156	3.319
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0800	20 MW	DC	3.318	-0.171	0.903	1.958	2.980	3.980	4.949	3.982	2.989	1.967	0.916	-0.171	3.309
			AC													
7/30/64	0815	20 MW	DC	ONLY RESISTANCE MEASUREMENT TAKEN												
			AC													
7/30/64	0842	25 MW	DC	3.322	-1.469	1.9112	1.961	2.989	3.989	4.962	4.005	3.007	1.991	1.9325	-1.389	3.329
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	1000	25 MW	DC		-1.405	1.9186	1.964	2.979	3.979	4.948	3.999	3.000	1.982	1.9403	-1.309	3.312
			AC													
7/30/64	1035	30 MW	DC	3.302	-1.347	1.9093	1.955	2.969	3.969	4.939	3.989	3.003	1.988	1.9445	-1.259	3.299
			AC	5.000	5.000	5.000	5.000	5.000	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.986
7/30/64	1205	30 MW	DC	3.340	1.0799	1.9537	1.998	2.999	3.999	4.979	4.010	3.029	2.020	1.9925	-0.0768	3.331
			AC	5.000	5.000	5.000	5.000	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989
7/30/64	1230	35 MW	DC		-1.216	1.9317	1.976	2.989	3.991	4.979	4.014	3.029	2.020	1.966	-0.0925	3.339
			AC		5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	1335	35 MW	DC		-1.1197	1.9299	1.963	2.979	3.970	4.961	4.012	3.019	2.002	1.9735	-0.0999	3.321
			AC		4.990	4.990	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.990	4.990
7/30/64	1415	40 MW	DC		-1.1374	1.9308	1.970	3.000	4.009	4.982	4.029	3.049	2.029	1.9820	-0.0999	3.389
			AC		5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	1530	40 MW	DC		-0.0616	0.9910	2.029	3.039	4.030	5.019	4.079	3.090	2.079	1.036	-0.0339	3.389
			AC		4.989	4.991	4.999	4.992	4.999	4.999	4.999	4.999	4.999	4.990	4.991	4.989
7/30/64	1625	0	DC	ONLY RESISTANCE MEASUREMENT TAKEN												
			AC													
7/30/64	1655	0	DC	3.339	0.069	1.077	2.051	3.019	3.969	4.909	3.976	3.019	2.069	1.079	0.073	3.338
			AC	5.000	5.009	5.009	5.009	5.009	5.009	5.009	5.009	5.009	5.009	5.009	5.009	5.009

Table 4 Output Voltages, Model 54 727 Diff. No. 69952 (No Load Excitation Voltage 5.089)

DATE	TIME	REACTOR POWER	TYPE OF VOLTAGE	NOMINAL PRESSURE												
				100	0	30	60	90	120	150	120	90	60	30	0	100
7/28/64	1300	0	DC AC		-0.204	0.930	2.019	3.099	4.159	5.204	4.159	3.099	2.029	0.934	-0.201	
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	
7/28/64	1350	0	DC AC		-0.202	0.922	2.009	3.099	4.159	5.209	4.169	3.099	2.023	0.930	-0.201	
					5.000	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	
7/29/64	0345	0	DC AC		-0.192	0.899	1.983	3.059	4.119	5.172	4.119	3.060	1.987	0.899	-0.207	
					5.000	5.001	5.001	4.999	4.999	4.999	5.003	5.003	5.002	5.002	5.000	
7/29/64	1147	0	DC AC		+2.321	+1.8728	1.960	3.029	4.072	5.119	4.072	3.029	1.963	0.8830	+2.269	
					5.000	4.999	4.999	4.999	4.999	4.999	4.999	4.999	4.997	4.997	4.993	
7/29/64	2035	0	DC AC		-0.223	0.880	1.965	3.029	4.099	5.149	4.107	3.040	1.972	0.888	-0.215	+3.389
					5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001
7/29/64	2150	100 KW	DC AC	3.379	-0.224	0.885	1.962	3.029	4.089	5.139	4.099	3.049	1.970	0.890	-0.214	3.389
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/29/64	2230	1 MW	DC AC	3.419	-0.214	0.894	6.982	3.059	4.129	5.171	4.119	3.050	1.985	0.895	-0.216	3.409
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	4.999	5.000	5.000	5.000	5.000	5.000
7/29/64	2350	1 MW	DC AC	3.389	-0.226	0.884	1.971	3.029	4.099	5.139	4.109	3.049	1.976	0.891	-0.222	3.409
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0035	5 MW	DC AC	3.419	-0.228	0.885	1.989	3.069	4.129	5.189	4.139	3.079	2.001	0.886	-0.229	3.429
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0200	5 MW	DC AC	3.431	-0.225	0.891	1.992	3.061	4.131	5.189	4.139	3.079	2.001	0.908	-0.223	3.429
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0230	10 MW	DC AC	3.471	-0.217	0.912	2.029	3.119	4.179	5.250	4.189	3.119	2.029	0.926	-0.212	3.479
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0350	10 MW	DC AC	3.530	-0.138	0.983	2.089	3.175	4.239	5.299	4.259	3.179	2.099	1.007	-0.127	3.529
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0430	15 MW	DC AC	3.509	-0.168	0.960	2.059	3.139	4.220	5.279	4.231	3.169	2.079	0.982	-0.153	3.499
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0600	15 MW	DC AC	3.459	-0.148	0.961	2.049	3.119	4.179	5.210	4.180	3.129	2.059	0.966	-0.149	3.459
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000

Table 4 Output Voltages, Model 54 727 Diff. No. 69952 (No Load Excitation Voltage 5.089)

Date	Time	Reactor Power	Type of Voltage	Nominal Pressure											
				100	C	30	60	90	120	150	120	90	60	30	0
7/30/64	0625	20 MW	DC	3.444	-0.204	0.904	1.987	3.069	4.129	5.188	4.146	3.089	2.006	0.930	-0.206
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0655	20 MW	DC	3.433	-0.187	0.915	2.001	3.069	4.129	5.179	4.141	3.099	2.012	0.928	-0.187
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0800	20 MW	DC	3.419	-0.181	0.912	2.001	3.069	4.114	5.142	4.129	3.079	2.019	0.932	-0.187
			AC												
7/30/64	0815	20 MW	DC	ONLY RESISTANCE MEASUREMENTS TAKEN											
			AC												
7/30/64	0842	25 MW	DC	3.339	-0.3039	+0.7899	1.885	2.969	4.039	5.089	4.069	3.009	1.926	+0.8080	-0.3230
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	1000	25 MW	DC		-0.3727	+0.7300	1.830	2.904	3.980	5.031	4.010	2.949	1.868	+0.7690	-0.3694
			AC												
7/30/64	1035	30 MW	DC	5.549	2.006	2.999	3.750	4.779	5.660	6.713	5.550	4.889	4.019	2.784	1.500
			AC	4.989	5.000	5.000	5.000	5.000	4.989	4.989	4.989	4.989	4.989	4.989	4.989
7/30/64	1205	30 MW	DC	5.659	1.999	3.551	4.309	5.659	6.599	7.409	6.380	5.278	4.249	3.042	1.827
			AC	4.989	4.990	4.990	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989
7/30/64	1230	35 MW	DC		-0.0270	1.2516	2.499	3.701	4.891	6.064	4.943	3.769	2.569	1.338	0.0909
			AC	4.989	4.989	4.989	4.990	4.990	4.989	4.989	4.989	4.989	4.989	4.989	4.989
7/30/64	1335	35 MW	DC		+0.058	1.281	2.499	3.692	4.870	6.049	4.939	3.779	2.579	1.351	0.0959
			AC		.980	4.979	4.980	4.980	4.979	4.979	4.979	4.979	4.979	4.900	4.979
7/30/64	1415	40 MW	DC		8.309	10.590	10.849	10.919	10.969	11.029	10.949	10.939	10.889	10.849	10.799
			AC		4.979	4.969	4.969	4.959	4.969	4.959	4.969	4.959	4.959	4.959	4.959
7/30/64	1530	40 MW	DC		10.500	10.580	10.650	10.700	10.73	10.78	10.730	10.70	10.65	10.57	10.47
			AC		4.939	4.939	4.940	4.940	4.949	4.949	4.949	4.939	4.940	4.940	4.939
7/30/64	1625	0	DC	ONLY RESISTANCE MEASUREMENTS TAKEN											
			AC												
7/30/64	1655	0	DC	9.389	9.039	9.149	9.269	9.369	9.449	9.539	9.449	9.369	9.259	9.149	8.669
			AC	4.949	4.949	4.949	4.949	4.949	4.949	4.949	4.949	4.949	4.949	4.949	4.949

Table 4 Output Voltages, Model 54 727 Diff. No. 69952 (No Load Excitation Voltage 5.089)

[illegible]

Table 5 Output Voltages Model 54 726 Absolute No. 70639 (No Load Excitation Voltage 5.089)

DATE	TIME	REACTOR POWER	TYPE OF VOLTAGE	NOMINAL PRESSURE													
				100	0	30	60	90	120	150	120	90	60	30	0	100	
7/28/64	1300	0	DC AC		0.185	0.383	0.577	0.772	0.964	1.158	0.965	0.772	0.579	0.384	0.185		
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	
7/28/64	1350	0	DC AC		0.185	0.383	0.577	0.772	0.965	1.157	0.965	0.772	0.579	0.384	0.185		
					5.000	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	
7/29/64	0345	0	DC AC		0.162	0.356	0.550	0.742	0.936	1.130	0.936	0.744	0.550	0.356	0.162		
					5.000	5.001	5.001	4.999	4.999	4.999	5.003	5.003	5.002	5.002	5.000		
7/29/64	1147	0	DC AC		+ .1629	.3563	.5499	.7412	.9311	1.1222	.9309	.7410	.5499	.3572	.1619		
					5.000	5.000	4.999	4.999	4.999	4.999	4.999	4.999	4.997	4.997	4.994		
7/29/64	2035	0	DC AC		+ .176	0.369	0.562	0.753	0.946	1.138	0.947	0.754	0.562	0.369	+ .175		
					5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	
7/29/64	2150	100 MW	DC AC		0.818	0.176	0.370	0.562	0.755	0.946	1.138	0.946	0.755	0.562	0.369	0.175	0.816
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/29/64	2230	1 MW	DC AC		0.782	0.133	0.328	0.521	0.715	0.910	1.101	0.906	0.713	0.521	0.326	0.131	0.777
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	4.999	5.000	5.000	5.000	5.000	5.000
7/29/64	2350	1 MW	DC AC		0.773	0.129	0.325	0.518	0.708	0.901	1.092	0.904	0.712	0.519	0.324	0.130	0.777
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0035	5 MW	DC AC		0.750	0.101	0.298	0.495	0.688	0.881	1.075	0.882	0.689	0.494	0.295	0.098	0.751
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0200	5 MW	DC AC		0.752	0.098	0.294	0.491	0.683	0.887	1.071	0.877	0.685	0.492	0.296	0.096	0.747
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0230	10 MW	DC AC		0.808	0.150	0.351	0.549	0.744	0.936	1.132	0.935	0.740	0.544	0.345	0.144	0.800
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0350	10 MW	DC AC		0.765	0.115	0.316	0.514	0.711	0.905	1.100	0.908	0.711	0.517	0.321	0.122	0.771
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0430	15 MW	DC AC		0.730	0.074	0.274	0.471	0.665	0.864	1.060	0.864	0.666	0.469	0.271	0.069	0.721
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0600	15 MW	DC AC		0.696	0.049	0.247	0.443	0.639	0.835	1.026	0.833	0.638	0.443	0.245	0.046	0.695
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000

Table 5 Output Voltages, Model 54 726 Absolute No. 70639 (No Load Excitation Voltage 5.089)

Date	Time	Reactor Power	Type of Voltage	Nominal Pressure												
				100	0	30	60	90	120	150	120	90	60	30	0	100
7/30/64	0625	20 MW	DC	0.524	-0.152	0.042	0.236	0.426	0.618	0.814	0.623	0.425	0.224	0.018	-0.189	0.464
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0655	20 MW	DC	0.571	-0.086	0.112	0.301	0.511	0.683	0.915	0.718	0.522	0.317	0.118	-0.077	0.572
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0800	20 MW	DC	0.940	0.074	0.460	0.626	0.905	1.127	1.144	0.900	0.706	0.515	0.318	0.220	1.130
7/30/64	0815	20 MW	DC	ONLY RESISTANCE MEASUREMENTS TAKEN												
7/30/64	0842	25 MW	DC	.5220	-.2184	+.0001	.2228	.4434	.630	1.983	1.880	1.717	1.555	1.378	1.253	1.984
				5.000	5.000	4.979	4.979	4.979	4.979	4.980	4.979	4.979	4.979	4.979	4.979	4.979
7/30/64	1000	25 MW	DC		2.329	2.529	2.729	2.929	3.139	3.339	3.159	2.969	2.799	2.609	2.419	3.059
					4.989	4.989	4.970	4.969	4.969	4.970	4.970	4.979	4.979	4.979	4.969	4.979
7/30/64	1035	30 MW	DC	9.519	9.399	9.260	9.907	9.840	10.19	10.06	10.23	9.504	9.440	9.469	9.599	9.360
				4.900	4.899	4.889	4.908	4.908	4.920	4.920	4.920	4.920	4.990	4.990	4.990	4.989
7/30/64	1205	30 MW	DC	11.25	11.25	11.139	11.26									
				4.889	4.880	4.869	4.869									
7/30/64	1230	35 MW	DC		8.002	7.953	7.980	8.021	8.576	8.599	8.369	8.630	8.869	8.698	8.814	8.909
					4.639	4.639	4.639	4.639	4.629	4.629	4.629	4.620	4.620	4.622	4.619	4.610
7/30/64	1335	35 MW	DC		9.089	9.039	9.039	9.039	9.029	9.019	9.019	9.029	9.009	9.003	8.989	8.999
					4.581	4.589	4.589	4.589	4.589	4.589	4.589	4.589	4.589	4.589	4.589	4.589
7/30/64	1415	40 MW	DC		9.129	9.165	9.175	9.239	9.250	9.259	9.129	9.269	9.270	9.259	9.259	9.229
					4.569	4.569	4.569	4.570	4.569	4.569	4.569	4.569	4.569	4.570	4.570	4.569
7/30/64	1530	40 MW	DC		9.879	9.849	9.839	9.820	9.819	9.029	9.821	9.825	9.869	9.841	9.858	9.859
					4.549	4.549	4.549	4.549	4.550	4.550	4.549	4.549	4.549	4.549	4.559	4.559
7/30/64	1625	0	DC	ONLY RESISTANCE MEASUREMENTS TAKEN												
7/30/64	1655	0	DC	10.929	10.919	10.900	10.909	10.909	10.909	10.909	10.919	10.919	10.949	10.909	10.909	10.910
				4.819	4.819	4.819	4.819	4.819	4.819	4.819	4.819	4.819	4.819	4.819	4.819	4.819

Table 6 Output Voltage, Model 54 726 Absolute No. 69955 (No Load Excitation Voltage 5.089)

DATE	TIME	REACTOR POWER	TYPE OF VOLTAGE	NOMINAL PRESSURE												
				100	0	30	60	90	120	150	120	90	60	30	0	100
7/28/64	1300	0	DC AC		0.049	0.258	0.461	0.665	0.867	1.069	0.868	0.665	0.462	0.258	0.048	
					5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	
7/28/64	1350	0	DC AC		0.048	0.256	0.459	0.664	0.867	1.069	0.868	0.665	0.462	0.257	0.048	
					5.000	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	5.002	
7/29/64	0345	0	DC AC		0.024	0.228	0.432	0.634	0.836	1.055	0.837	0.636	0.432	0.229	0.024	
					5.000	5.001	5.001	4.999	4.999	4.999	5.003	5.003	5.002	5.000	5.000	
7/29/64	1147	0	DC AC		0.370	2.109	4.141	6.149	8.149	10.156	8.150	6.166	4.149	2.129	0.389	
					4.999	4.999	4.999	4.999	4.999	4.999	4.989	4.999	4.997	4.990	4.994	
7/29/64	2035	0	DC AC		0.46	0.250	0.453	0.654	0.856	1.058	0.858	0.656	0.454	0.251	0.47	772
					5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001	5.001
7/29/64	2150	100 KW	DC AC	0.724	0.048	0.253	0.454	0.656	0.857	1.058	0.857	0.657	0.454	0.252	0.048	0.722
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/29/64	2230	1 MW	DC AC	0.709	0.029	0.235	0.439	0.641	0.846	1.047	0.843	0.641	0.439	0.235	0.030	0.708
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	4.989	4.989	4.989	5.000	5.000	4.990
7/29/64	2350	1 MW	DC AC	0.695	0.018	0.223	0.427	0.627	0.830	1.030	0.832	0.631	0.429	0.225	0.021	0.700
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0035	5 MW	DC AC	0.687	0.003	0.211	0.417	0.621	0.824	1.027	0.824	0.622	0.418	0.210	0.004	0.688
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0200	5 MW	DC AC	0.690	0.004	0.211	0.417	0.619	0.823	1.026	0.824	0.622	0.418	0.213	0.004	0.687
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0230	10 MW	DC AC	0.710	0.019	0.227	0.435	0.641	0.844	1.051	0.845	0.641	0.435	0.228	0.017	0.708
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0350	10 MW	DC AC	0.691	0.002	0.211	0.420	0.625	0.831	1.034	0.831	0.623	0.418	0.212	0.002	0.690
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0430	15 MW	DC AC	0.721	0.030	0.239	0.447	0.652	0.861	1.067	0.861	0.654	0.447	0.239	0.029	0.718
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0600	15 MW	DC AC	0.713	0.031	0.239	0.444	0.650	0.855	1.057	0.853	0.648	0.443	0.236	0.029	0.713
				5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000

Table 6 Output Voltages, Model 54 726 Absolute No. 69955 (No Load Excitation Voltage 5.089)

Date	Time	Reactor Power	Type of Voltage	Nominal Pressure												
				100	0	30	60	90	120	150	120	90	60	30	0	100
7/30/64	0625	20 MW	DC	0.761	0.081	0.288	0.493	0.699	0.903	1.112	0.906	0.703	0.498	0.298	0.090	0.774
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0655	20 MW	DC	0.807	0.132	0.348	0.543	0.746	0.948	1.151	0.951	0.751	0.547	0.344	0.140	0.815
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
7/30/64	0800	20 MW	DC	0.832	0.159	0.362	0.567	0.770	0.971	1.173	0.971	0.769	0.566	0.362	0.156	0.834
			AC													
7/30/64	0815	20 MW	DC	ONLY RESISTANCE MEASUREMENTS TAKEN												
			AC													
7/30/64	0842	25 MW	DC	.8814	.2103	.4120	.6159	.8185	1.019	1.219	1.023	.8230	.6235	.4199	.2153	.8874
			AC	5.000	5.000	4.989	4.989	4.989	4.989	4.989	4.990	4.989	4.989	4.989	4.989	4.989
7/30/64	1000	25 MW	DC		.3239	.4322	.6349	.8349	1.034	1.235	1.0379	.8381	.6384	.4378	.2369	.9048
			AC				4.989	4.987	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989
7/30/64	1035	30 MW	DC	.9303	.2642	.4634	.6640	.8631	1.063	1.263	1.066	.8709	.671	.4685	.2682	.9332
			AC	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.983	4.979	4.989	4.980	4.981
7/30/64	1205	30 MW	DC	.9543	.2989	.4960	.6990	.8942	1.095	1.292	1.095	.8989	.7010	.5031	.3029	.9637
			AC	4.989	4.989	4.989	4.989	4.989	4.981	4.989	4.989	4.989	4.989	4.989	4.989	4.990
7/30/64	1230	35 MW	DC		.3369	.5360	.7380	.9370	1.137	1.337	1.138	.9422	.7451	.5424	.3433	1.008
			AC		4.999	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989
7/30/64	1335	35 MW	DC		.3353	.5369	.7373	.9361	1.133	1.335	1.143	.9429	.7749	.5463	.3430	1.007
			AC		4.982	4.989	4.989	4.989	4.989	4.989	4.989	4.982	4.989	4.989	4.989	4.980
7/30/64	1415	40 MW	DC		.4119	.6181	.8261	1.034	1.239	1.441	1.243	1.043	.8440	.6410	.4385	1.108
			AC		4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989
7/30/64	1530	40 MW	DC		0.4793	0.6776	0.8819	1.079	1.278	1.703	1.283	1.086	0.8865	0.6831	0.4835	1.147
			AC		4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989
7/30/64	1625	0	DC	ONLY RESISTANCE MEASUREMENTS TAKEN												
			AC													
7/30/64	1655	0	DC	1.025	0.384	0.574	0.763	0.953	1.143	1.334	1.145	0.955	0.766	0.573	0.377	1.012
			AC	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000

Table 7 Coil and Insulation Resistances, Model 5A 727 Diff. No. 69953.

Date	Time	Reactor Power	Coil Resistance			Insulation Resistance A-Gnd		
			A-C	B-C(1)	A-B(1)	Reading No. 1	Reading No. 2(1)	Reading No. 3(1)
7/28/64	1300	0	23.82			1.8 K Meg		
7/28/64	1350	0	23.83			8 Meg		
7/29/64	0345	0	24.43			1.4 K Meg		
7/29/64	1147	0	24.84			150 Meg		
7/29/64	2035	0	24.34			35 Meg		
7/29/64	2150	100 KI	24.45			130 Meg	1.6 K Meg	
7/29/64	2230	1 MI	25.02			10 Meg	25 Meg	45 Meg
7/29/64	2350	1 MI	25.23			35 Meg		
7/30/64	0035	5 MI	27.11			10 Meg	18 Meg	
7/30/64	0200	5 MI	27.46			190 Meg		
7/30/64	0230	10 MI	29.34			200 Meg		
7/30/64	350	10 MI	29.24			230 Meg		
7/30/64	0430	15 MI	31.19			145 Meg		
7/30/64	0600	15 MI	31.54			94 Meg		
7/30/64	0625	20 MI	33.41			72 Meg		
7/30/64	0655	20 MI	33.40			70 Meg		
7/30/64	0800	20 MI	33.37			75 Meg		
7/30/64	0815	20 MI	33.08			68 Meg		
7/30/64	0842	25 MI	35.32			52 Meg		
			35.32			50 Meg		
7/30/64	1000	25 MI	35.52			45 Meg		
			35.66			43 Meg		
7/30/64	1035	30 MI	37.12			35 Meg		
			37.38			36 Meg		
7/30/64	1205	30 MI	37.38			33 Meg		
			37.31			33 Meg		
7/30/64	1230	35 MI	38.89			28 Meg		
			38.90			28 Meg		

Table 7 Coil and Insulation Resistances, Model 54-727 Diff. No. 69953

[illegible]

Table 8 Coil and Insulation Resistances, Model 54 727 Diff. No. 69952.

Date	Time	Reactor Power	Coil Resistance			Insulation Resistance		
			A-C	B-C (1)	A-B (1)	Reading No. 1	Reading No. 2 (1)	Reading No. 3 (1)
7/28/64	1300	0	23.66			8 Meg		
7/28/64	1350	0	23.68			8 Meg		
7/29/64	0345	0	24.40			10 Meg		
7/29/64	1147	0	24.74			140 Meg		
7/29/64	2035	0	24.23			100 Meg		
7/29/64	2150	100 KW	24.38			105 Meg	115 Meg	
7/29/64	2230	1 MI	25.21			110 Meg	130 Meg	150 Meg
7/29/64	2350	1 MI	25.44			400 Meg		
7/30/64	0035	5 MW	28.65			140 Meg	240 Meg	
7/30/64	0200	5 MI	28.99			320 Meg		
7/30/64	0230	10 MI	32.52			150 Meg		
7/30/64	0350	10 MI	32.90			100 Meg		
7/30/64	0430	15 MI	36.47			70 Meg		
7/30/64	0600	15 MI	36.47			70 Meg		
7/30/64	0625	20 MW	39.54			55 Meg		
7/30/64	0655	20 MI	39.70			54 Meg		
7/30/64	0800	20 MI	39.72			50 Meg		
7/30/64	0815	20 MW	39.58			50 Meg		
7/30/64	0842	25 MI	43.22			35 Meg		
			43.90			35 Meg		
7/30/64	1000	25 MI	44.42			33 Meg		
			44.52			31 Meg		
7/30/64	1035	30 MI	47.20			27 Meg		
			47.28			25 Meg		
7/30/64	1205	30 MW	47.29			20 Meg		
			47.31			18 Meg		
7/30/64	1230	35 MI	49.90			15 Meg		
			49.82			13 Meg		

Table 8 Coil and Insulation Resistances, Model 54 727 Diff. No. 69952

[illegible]

Table 9 Coil and Insulation Resistances, Model 54 726 Absolute No. 70639.

Date	Time	Reactor Power	Coil Resistance			Insulation Resistance A-Gnd		
			A-C	B-C ⁽¹⁾	A-B ⁽¹⁾	Reading No. 1	Reading No. 2 ⁽¹⁾	Reading No. 3 ⁽¹⁾
7/28/64	1300	0	24.41			8 K Meg		
7/28/64	1350	0	24.41			8 K Meg		
7/29/64	0345	0	25.16			1.8 K Meg		
7/29/64	1147	0	25.60			1.5 K Meg		
7/29/64	2035	0	25.06			1.6 K Meg		
7/29/64	2150	100 KW	25.29			600 Meg	540 Meg	
7/29/64	2230	1 MW	26.88			84 Meg	84 Meg	84 Meg
7/29/64	2350	1 MW	27.07			80 Meg		
7/30/64	0035	5 MW	32.95			15 Meg	15 Meg	
7/30/64	0200	5 MW	33.07			17 Meg		
7/30/64	0230	10 MW	38.79			9.6 Meg		
7/30/64	0350	10 MW	38.22			11 Meg		
7/30/64	0430	15 MW	43.06			7.4 Meg		
7/30/64	0600	15 MW	43.14			6.0 Meg		
7/30/64	0625	20 MW	47.91			4.4 Meg		
7/30/64	0655	20 MW	48.30			4.0 Meg		
7/30/64	0800	20 MW	48.53			3.4 Meg		
7/30/64	0815	20 MW						
7/30/64	0842	25 MW	52.82			2.5 Meg		
			51.80			2.4 Meg		
7/30/64	1000	25 MW	51.81			2.3 Meg		
			51.46			2 Meg		
7/30/64	1035	30 MW	54.20			1.9 Meg		
			51.98			1.8 Meg		
7/30/64	1205	30 MW	48.59			1.65 Meg		
			47.90			1.6 Meg		
7/30/64	1230	35 MW	49.70			1.4 Meg		
			44.92			1.35 Meg		

Table 9 Coil and Insulation Resistances, Model 54 726 Absolute No. 70639

[illegible]

Table 10 Coil and Insulation Resistances, Model 54 726 Absolute No. 69955

Date	Time	Reactor Power	Coil Resistance			Insulation Resistance		A-Gnd
			A-C	B-C (1)	A-B (1)	Reading No. 1	Reading No. 2 (1)	Reading No. 3 (1)
7/28/64	1300	0	23.60			270 Meg		
7/28/64	1350	0	23.55			270 Meg		
7/29/64	0345	0	24.12			240 Meg		
7/29/64	1147	0	24.62			160 Meg		
7/29/64	2035	0	24.10			350 Meg		
7/29/64	2150	100 KI	24.29			300 Meg		
7/29/64	2230	1 MI	25.09			200 Meg	200 Meg	200 Meg
7/29/64	2350	1 MI	25.28			200 Meg		
7/30/64	0035	5 MI	28.25			100 Meg	95 Meg	
7/30/64	0200	5 MI	28.43			120 Meg		
7/30/64	0220	10 MI	31.29			74 Meg		
7/30/64	0350	10 MI	31.19			52 Meg		
7/30/64	0430	15 MI	33.90			30 Meg		
7/30/64	0600	15 MI	33.30			28 Meg		
7/30/64	0625	20 MI	35.50			23 Meg		
7/30/64	0655	20 MI	35.72			22 Meg		
7/30/64	0700	20 MI	35.52			22 Meg		
7/30/64	0715	20 MI	35.38			22 Meg		
7/30/64	0742	25 MI	37.92			17 Meg		
			37.90			17 Meg		
7/30/64	1000	25 MI	37.95			16.8 Meg		
			38.11			15 Meg		
7/30/64	1035	30 MI	39.99			13.5 Meg		
			40.01			13.0 Meg		
7/30/64	1200	30 MI	40.21			11.5 Meg		
			40.23			11 Meg		
7/30/64	1230	35 MI	42.10			10 Meg		
			42.40			9.4 Meg		

Table 10 Coil and Insulation Resistances, Model 54 726 Absolute No. 69955

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4.0 REFERENCES

1. WANL-TNR-119, "Experiment Design Manual and Hazards Analysis, Plum Brook Reactor Facility, Exp. No. 63-05", Westinghouse Astronuclear Laboratory.
2. WANL-REP-2012, "Final Report Design Manual and Hazards Analysis for Experiment No. 23/W506 - Pressure Transducers (RFI, 63-05)", Westinghouse Astronuclear Laboratory.
3. WANL-TME-800, "Final Test Specifications for NRX-A Candidate Pressure Transducers to be Irradiated at the Plum Brook Reactor (23/W506)", Westinghouse Astronuclear Laboratory.
4. WANL-TNR-118, "Operations Manual, Plum Brook Reactor Facility Experiment 63-05", Westinghouse Astronuclear Laboratory.