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EG&G NERVA TEST OPERATIONS PROGRESS REPORT FOR FEBRUARY 1966

Purchase Order Number
SNPN-66-2

Approved by:

H. Lietz

MASTER

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SECTION 1

INTRODUCTION

This report describes EG&G activities in support of the NTO Test Cell A Program for February 1966. Details with respect to the various tasks included in our scope of work are discussed in succeeding sections and appendices.

At Test Cell A, the NRX/EST test series continued with the performance of Experimental Plans IIA, IIB, and IIC. EG&G personnel maintained the test cell instrumentation and controls systems in a run condition and added new channels for the next experimental plan.

This will be the last publication of the monthly EG&G/NTO progress report. The contractual agreements of the EG&G Electronics Support Services contract require a monthly technical and fiscal report. Reporting shall be in the following categories:

1. TCC
2. TCA
3. ETS-1
4. R&E MAD Buildings
5. Common Operational Support
6. Miscellaneous
7. Central Support Shops

In addition EG&G will submit a weekly highlight report to SNPO-N with distribution to the users.

Figure 1.1 Total FY 66 Test Cell A Operating Budget

Figure 1.2 Test Cell A Installation and Operations

Figure 1.3 Engineering - Test Cell A

Figure 1.4 Quality Control

SECTION 2

TEST CELL A

2.1 OPERATIONS

The NRX/EST test series continued throughout February with the performance of Experimental Plans IIA, IIB, and IIC. During the IIB run the reactor and engine system equipment functioned as a combined unit for the first time, representing the first operation of a nuclear rocket engine. EG&G personnel maintained the test cell instrumentation and controls systems in a run condition and added new channels in preparation for the next experimental plan.

2.1.1 Operations Support

The necessary changes to the control chassis were determined to accommodate the new turbine power control valve (TPCV) actuator and amplifier installed by NTO.

Drum charts, CEC and Sanborn records, and Cal-comp charts for the NRX/EST test data were microfilmed and Kalvar copies reproduced.

Calibration library tapes and documents tapes were produced for reduction of data obtained from NRX/EST Experimental Plans IIA and IIB.

A special 101-point calibration table for flow rates was prepared for NRX/EST-A4 data reduction.

Calibration tables and plots, and signal conditioner setup data were produced for NRX-A5 channels.

2.2 INSTALLATION, MODIFICATION, AND CHECKOUT

2.2.1 Facility Support System

Two voltmeters and two recorders were installed in the distribution building to monitor the resistance of the Dewar A capacity probe during the next experimental plan. Capabilities for remote ON/OFF commands

from the control point were provided. This channel was installed because of anomalies occurring in the capacity indications during periods of high radiation.

2. 2. 2 Controls System

Control system activity during February was limited to maintaining the equipment in an operational condition. Control room personnel assisted test cell personnel with the checkout of the J and W monitors and the flare boom limit indicating channels. The RPM trip circuits of the shutdown chain were checked and minor changes made to correct a problem area. Noise and drift tests were performed on the program amplifiers.

A modification was made on the power controller chassis to provide follow-up of the power throttle in either the ON/OFF or the NO FLUX mode.

2. 2. 3 Data Acquisition System

Some low-level patching was temporarily removed in order to short out cancelled channels. Before restoring the patching, the SEL multiplexers were reset and complete end-to-end checks were performed.

Several new channels were installed for use in Experimental Plan III. Channels H. -807. -4A and H. -808. -4A are accelerometer channels for the new TPCV actuator and M. -136. -AG through M. -138. -AG are displacement channels for PCV-41. Channel E. -870. -4A was installed to measure TPCV torque motor current.

Temperature channel T. -868. -4A was moved to the TPCV actuator.

2. 2. 4 Neutronics System

The neutronics system wide-band channels were set up and operationally checked.

Minor problems are being corrected as they occur in the power integrator chassis in an effort to adapt these new units to the system.

The start-up chambers were moved farther from the reactor in preparation for the higher radiation levels anticipated during Experimental Plan IIC.

A Varian recorder was installed to monitor channel 3 of the safety monitor system.

2. 2. 5 Photo System

The bunker, tower, and kinescope cameras were set up and operationally checked prior to each of the three experimental plans conducted in February.

Additional lead shielding was installed for the K-24 camera in the south tower.

2. 2. 6 Television System

The television system equipment was set up and checked for each test run. A new camera cable to the northeast station and a camera to view OBV-14 in the flow control room were installed. A camera was also installed in the direct component shield (DCS) and equipped with a non-browning vidicon.

2. 3 DATA PROCESSING

2. 3. 1 Digitizing (analog to digital tape reduction)

NRX/EST, Experimental Plan IA-IV

Seven multiplexers

NRX/EST, Experimental Plan IB Prime

Seven multiplexers

NRX/EST, Experimental Plan IIA

Eighteen multiplexers

NRX/EST, Experimental Plan IIB

Forty-five multiplexers

Sixteen multiplexers were re-digitized

NRX/EST, Experimental Plan IIC

Sixty-eight multiplexers

Four multiplexers were re-digitized

2. 3. 2 Playback (reduction of analog tape to Sanborn or CEC recorder presentations)

NRX-A3, Experimental Plan IV

Three narrow-band channels on Sanborn

NRX-A3, Experimental Plan IVB

Twenty wide-band channels on CEC

NRX/EST, Experimental Plan IIB

Fifty-five wide-band channels on CEC

Eighty narrow-band channels on Sanborn

NRX/EST, Experimental Plan IIC

Twenty-three wide-band channels on CEC

Thirty-five narrow-band channels on Sanborn

2. 3. 3 Spectral Analysis (reduction of analog tapes via wave analyzer)

NRX/EST, Experimental Plan IA-IV

Spectral density plot for one channel

NRX/EST, Experimental Plan IIB

Spectral density plots for twelve channels

NRX/EST, Experimental Plan IIC

Spectral density plots for twenty-eight channels

SECTION 3 ENGINEERING

3.1 AUXILIARY SYSTEMS

At present there is no activity by the Auxiliary Systems Group in the Test Cell A Area.

3.2 CONTROL SYSTEMS

The Test Cell A engineering effort has been to develop the design requirement of the Control Room A Scram and Shutdown Chain modification.

An amplifier comparator circuit has been prototyped for use as scram chain inputs. This circuit will be constructed on printed circuit cards for installation in the scram chassis when it is available. The chassis modification is expected to be completed within the first two weeks in April.

3.3 DATA SYSTEMS

VCO Calibrator -

The output loading errors have been reduced to less than 0.04% by changing the output impedance of the calibrator.

EG&G Multiplexer -

The ambient temperature of EG&G multiplexer rack at Test Cell A was continuously monitored over a 154 hour period. Also, the temperature was monitored during EP-2A run. The maximum change in ambient temperature over this period was 2.5° F.

A proposal for eight new buffer amplifiers and a spare to replace the existing amplifier in the multiplexers has been made.

Offner Amplifier Chopper Replacement -

A replacement chopper for the Offner 190 amplifiers is being investigated.

Additional Neff Amplifiers -

NTO has requested a study be made to determine if it is possible to test and install 64 additional Neff amplifiers and the associated signal conditioners and inhibit patch panels prior to NRX A-5 testing.

3.4 NEUTRONICS

Experimental Plans -

The Neutronics System was set up and operated for EP IIA, EP IIB, and EP IIC.

Power Integrators -

Work is continuing to correct intermittent miscounts in the Linear Power Integrators. The manual is complete with the exception of photographs.

APPENDIX A
CHANNEL ENGINEERING

The major effort during February continued to be channel revisions. Channel assignments are currently 99 percent complete. The following table reflects the channel engineering status by system.

System	No. Channels In System	Completed In Feb.	Net Total Completed	Percent Completed	Incomplete Channels	Re- vised	Can- celled
A	517	-	517	100	-	5	4
B	42	-	42	100	-	3	-
C	29	-	29	100	-	4	-
D	29	-	29	100	-	-	-
E	50	-	50	100	-	-	-
F	30	-	30	100	-	1	-
G	89	-	89	100	-	1	-
H	38	-	38	100	-	10	-
I	571	-	570	99	1	12	-
J	20	-	20	100	-	-	-
K	43	-	43	100	-	-	-
L	216	1	214	99	2	7	-
M	39	-	37	94	2	-	-
N	125	-	125	100	-	8	-
P	63	-	63	100	-	-	-
Q	127	-	127	100	-	-	-
R	128	-	128	100	-	2	-
S	115	-	111	96	4	9	-
T	30	-	30	100	-	-	-
U	33	-	33	100	-	2	-
V	350	-	346	98	4	-	-
X	67	-	67	100	-	-	-
Z	21	-	21	100	-	-	-
TOTALS	2772	2	2759	99	13	64	4

APPENDIX B

TRAVEL

Trips made during February were as follows:

DATE	NAME	DESTINATION	PURPOSE
2/18/66 thru 2/19/66	Magness, E. L.	San Diego	Demonstration of new TV equipment

APPENDIX C

REPORTS ISSUED DURING FEBRUARY

Report No. L-763

EG&G NERVA Test Operations

Progress Report for January

APPENDIX D
TCA OVERTIME REPORT

The following is a tabulation by name and by week of overtime beyond 40 hours worked during this reporting period.

<u>NAME</u>	<u>FEB 6</u>	<u>FEB 13</u>	<u>FEB 20</u>	<u>FEB 27</u>
Arambula, L.	4.5	1.5		
Barksdale, J.	4			
Bernier, R.	4			
Bond, R.	7			
Brentlinger, D.				8
Crim, L.	4			
Eck, F.	6	6		
Engbersen, E.	2			
Fleischman, R.	1	8		
Goplin, R.	5.5	11.5		
Halkens, M.	8			
Hefty, P.	10.5			
Herry, R.	4.5	12		
Hill, G.	16	13.5		
Hunt, D.	1	5		
Jensen, C.	4.5			
Johnson, G.	20	16		
Jones, B.	17	12.5		
Knighten, M.	4.5	13		
Maus, C.	4.5	12		
Meadows, W.	16	16		
Miller, A.	4.5	13		
Moore, R.	2			
Nuckolls, R.	14	9		
Ortiz, M.	4			8

NAME	FEB 6	FEB 13	FEB 20	FEB 27
Palmer, R.	6.5			
Patterson, J.	2	13.5		
Pugh, A.	4			
Rose, W.	8	4		
Snyder, M.	4			
Spendlove, J.	16	20		
Stowe, V.	16	16		
Walker, T.	1			
Webb, C.	1	5.5		
Wood, M.		8		
Zamora, R.	10,5	5		
Zusy, R.	1			

APPENDIX E
PERSONNEL LEVEL REPORT

	<u>Hours/Week</u>	<u>Men</u>
Installation and Operation	44	59
Engineering Support	40	14
Quality Control	44	<u>4</u>
		77

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