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ATTACHMENT 8

(PROGRAM ASPECT)

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MEMORANDUM

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27 February 1959

To: M. Pitkin

From: N. E. Landy

Mail No. A-87

Ext. 2251

Subject: Stand D1

1. As a result of the accident that occurred during the second portion of Run 10 of B Battleship, the following are the program effects:

- a. Run 10 is considered two-thirds successful - i.e., the sequence did take place and the first stage was shut down by the chamber pressure switch.
- b. Run 11 (a repeat of 10) is cancelled because, whereas we did have time to make this run prior to the accident and the data would have been nice to have, we do not have time now to repair and run 11 without delaying the CET Program; plus, we have accomplished all of the captive prerequisites.
- c. We plan to go, on schedule, with Run 11a, which is a tantem cold run to get second stage compartment data and run a degreasing operation. This is scheduled for 11 March 1959 and this date is still good.
- d. Tear-down of Stand D1 would then take place and the modification to the CET (Calibrated Engine Test - 20 hot runs for outage info.) is sized as a 30 day task. Three actions control this 30 day period:
 - 1) Installation of "G" load simulator is sized at 30 days.
 - 2) Aerojet has to update their GSE to accommodate the "G" engines - this is sized as a two weeks job.
 - 3) The Lot "G" umbilicals are not on order as yet.
 - 4) There are other minor modifications that do not control.
- e. Cleanup of the second stage hole will progress on a non-interference basis with the preparations and run of 11a.

2. We are, therefore, planning to hold our present program and schedule on Stand D1 except for the elimination of Run 11.

3. It is desirable to accumulate run time in the Lot "G" engines on plan.

_____/s/
N. E. Landy

NEL/he

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ATTACHMENT 9
(ENGINE SCHEMATIC)

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ATTACHMENT 10

(ENGINE OPERATION TIMES)

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RUN TIME SEQUENCE FOR MAJOR ENGINE FUNCTIONS

<u>Event</u>	<u>Time</u>	<u>Recorder</u>	<u>Remarks</u>
Gas Generator Fire Switch I (GGFS ₁)	-10.3 Sec.	CEC	The gas generator fire switch signal was initiated by the MOC programmer.
Thrust Chamber Fire Switch I (FS ₁)	0.0 Sec.	CEC	The thrust chamber fire switch signal was initiated at the time out of the staging timer (3 sec. timer).
Hot Gas Valve Start to Open	.04 Sec.	S	The hot gas valve pilot valve opening solenoid was energized at FS ₁ and APDA fuel discharge pressure actuated the hot gas valve open.
Thrust Chamber Valve Pressure Sequence Valve Switch Makes	.43 Sec.	E	Rising PDA fuel discharge pressure (approximately 220 psi) snaps the thrust chamber pressure sequence valve open, closing the valve switch.
Thrust Chamber Valves Start to Open	.44 Sec.	S	Opening of the thrust chamber pressure sequence valve allowed PDA fuel discharge pressure to actuate the thrust chamber valves open.
The Thrust Chamber Valve Switch Makes	.60 Sec.		Opening of the thrust chamber valves makes the thrust chamber valve switch at 25% at opening travel. This locks out the thrust chamber valve switch malfunction timer.
Thrust Chamber and Lox & Fuel Injector Pressures Rise	.98 Sec.	CEC	The rapid rise in chamber and lox and fuel injector pressures indicate thrust chamber ignition.
Sharp Lox Injector Pressure Rise	1.06 Sec.	CEC	Lox injector pressure rose rapidly to 735 psi (150 psi higher than lox pump discharge pressure). Dropped to normally rising pressure immediately.
The Hot Gas Valve Switch Opens	1.24 Sec.	E	The hot gas valve switch opens (approximately 90% of hot gas valve opening travel).
Thrust Chamber Valve Pressure Sequence Valve Switch Breaks	1.265 Sec.	E	The thrust chamber valve pressure sequence valve switch breaks indicating that the valve shuttle back to the closed position. Fuel discharge pressure was still rising.

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<u>Event</u>	<u>Time</u>	<u>Recorder</u>	<u>Remarks</u>
The Thrust Chamber Valves Start to Close	1.27 Sec.	S	The thrust chamber valves start to close.
The Hot Gas Valve Reaches the Full Open Position	1.33 Sec.	S	The hot gas valve is full open and 90% of the gas generator exhaust gases are diverted to the PDA turbine.
The Thrust Chamber Valve Switch Opens	1.37 Sec.		The thrust chamber valve switch closes as the valves reach approximately 75% closed.
The Thrust Chamber Valves Reach Full Closed	1.38 Sec.		The thrust chamber valves (lox and fuel) are full closed.
Lox Pump Discharge Pressure Spiked	1.43		Lox pump discharge pressure spiked to 1570 psia.
Lox Pump Discharge Pressure Spiked	1.45		Lox pump discharge pressure again spiked to 1720 psig and immediately dropped to 0 psi. This sudden drop indicated that the lox pump housing was ruptured by this spike.

NOTE: The recorders used were: (a) CEC - Oscillograph, (b) S - Sanborne, (c) E - Brush Events Recorder.

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ATTACHMENT 11

(ENCLOSURE PARAMETER CURVES)

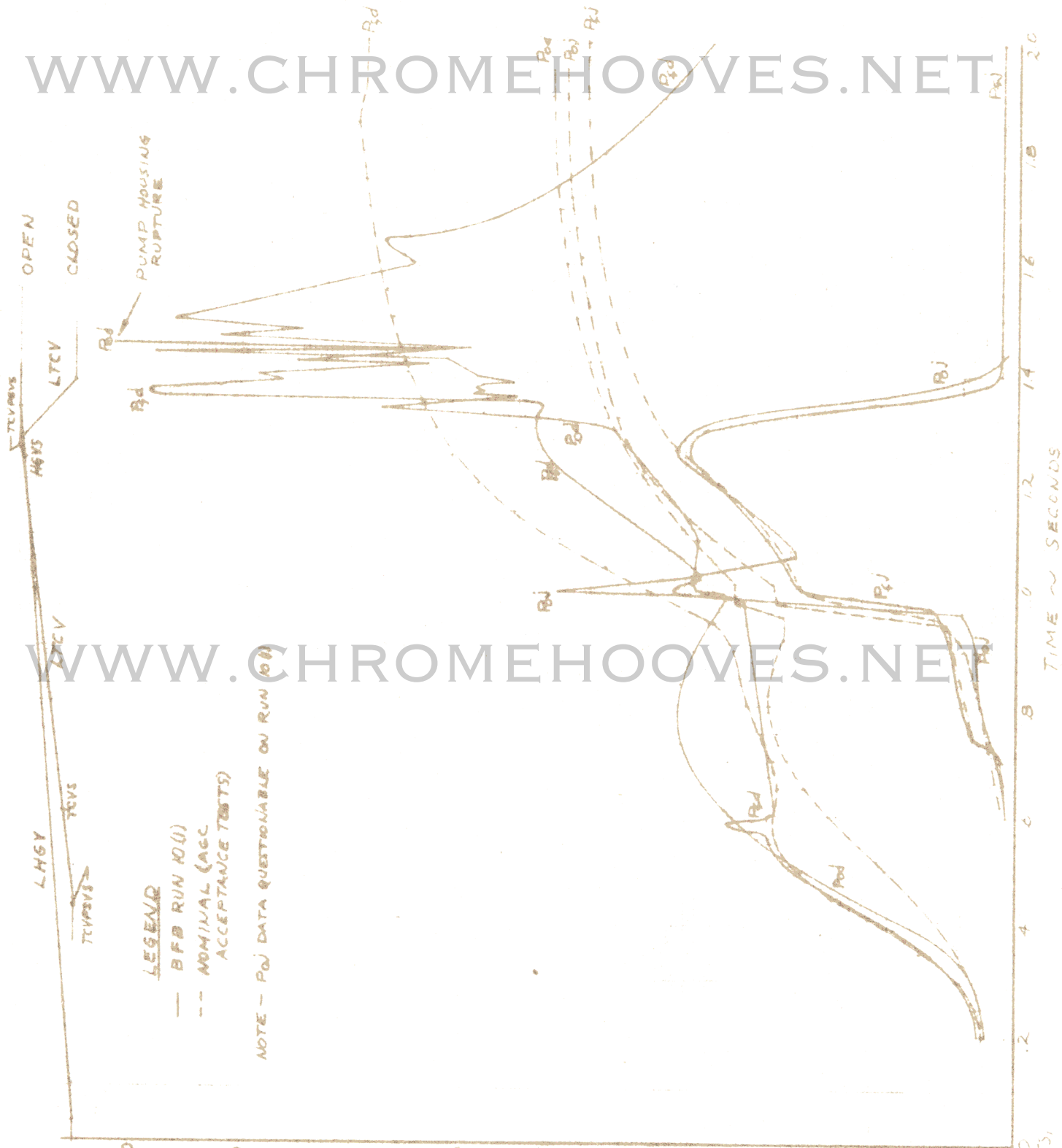
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START TRANSIENTS ON XLR-91-AJ-1 ENGINE SN 00203 DURING
LOT B BATTLESHIP TEST RUN 10(1)

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PRESSURE ~ PSIA

meaterson 3-6-59

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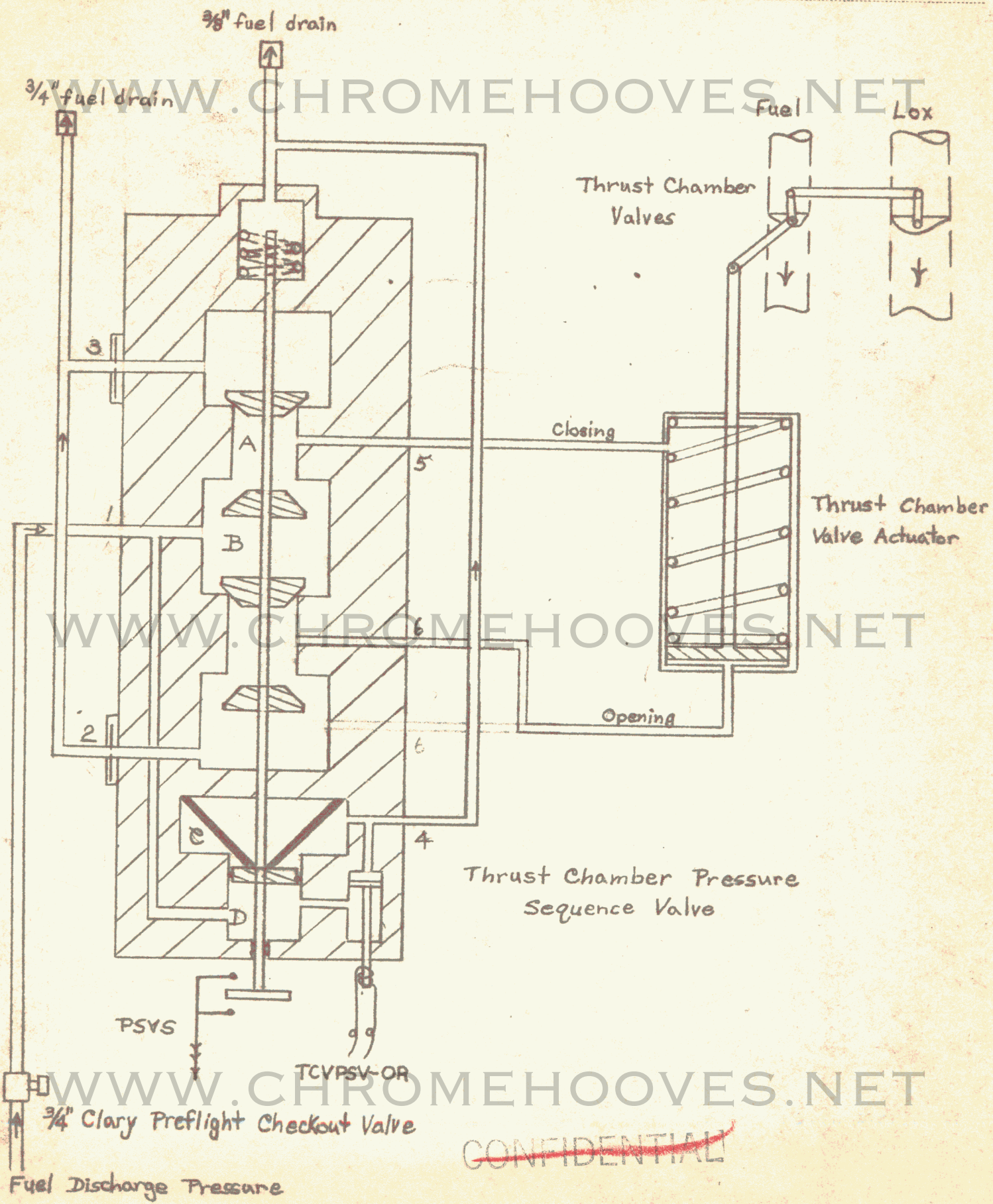
ATTACHMENT 12

(PRESSURE SEQUENCING VALVE SCHEMATIC A HISTORY)

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History of PSV on XLR91 S/N AJ-E-00203 at Martin-Denver Prior to Run BFB 10

1. Engine Prep Area -

Complete functional check of engine conducted once -

PSV opened and closed 3 times - of these 2 closures effected by override and 1 by pressure decay.

2. Test Stand D-1 -

Complete prefiring checkout of engine conducted once.

a. Pressure programmer -

PSV opened and closed 3 times - of these 3 - 2 closures effected by override and 1 by pressure decay.

b. Operation check -

PSV opened & closed 1 time - closure by override.

3. Total Operating Cycles

PSV opened 7 times -- closed 5 times by override and 2 times by pressure decay.

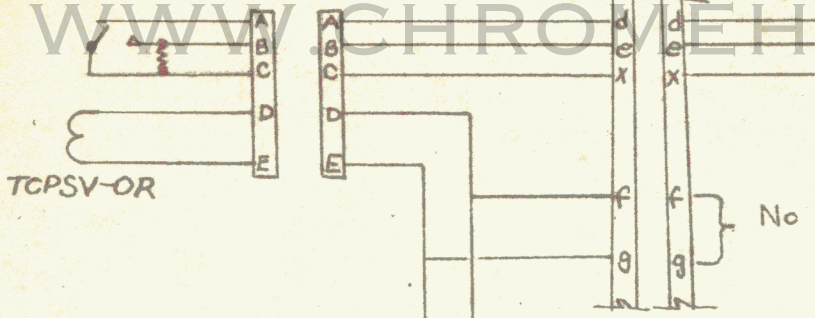
4. All operation of the PSV and TCV actuation system was satisfactory in the above checkout.

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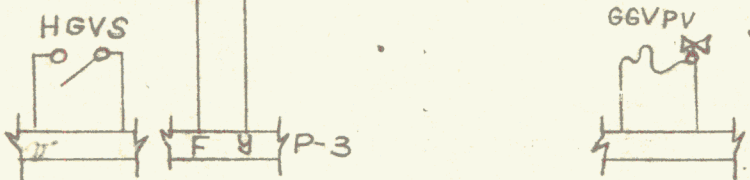
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TCVPSVS

J-5 P-5 (Instrumentation Connector)



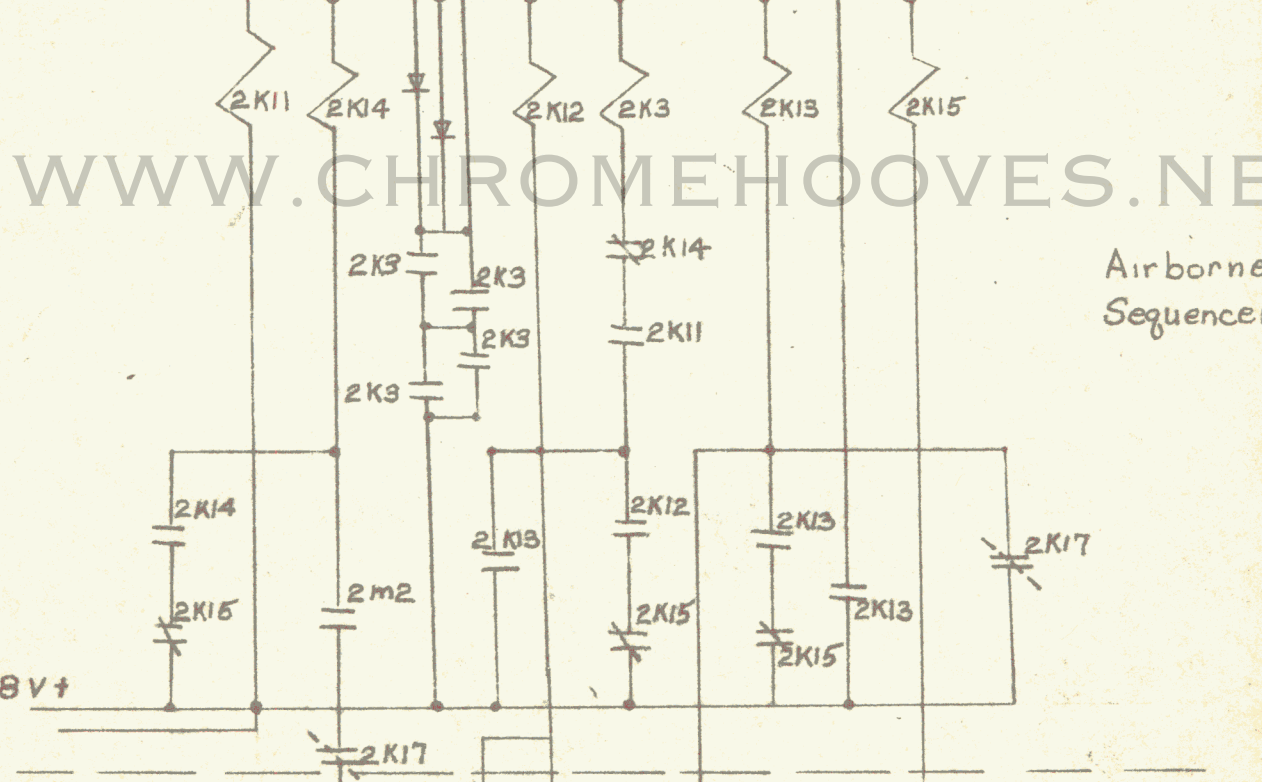
No wires were installed in these pins



Engine Controls

J-3

28V-



Airborne Sequencer

GSE and Missile Signals

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Note: The N.C. 2K17 points are shown energized open.

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ATTACHMENT 14

(100 AND 1 L LAB SAMPLE REPORT

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Oil and Fuel Quality Control Laboratory Report

The following is a summary of the results of the oil and fuel samples taken prior to the run:

Liquid Oxygen

Lot No: 9BA-0115
From: D-1 Test Stand
Date: 2-21-59
Spec. No: 327-105032
Sample Size: 100 ml
Count:

150 to 650 Microns 1 particle
650 Microns and larger 0 particles
largest particle 164 Microns
second largest particle 86 Microns
Type of particle Crystal and tal

Fuel

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Lot No: 9BA-0115
From: D-1 Test Stand
Date: 2-21-59
Spec. No: 327-105032
Sample Size: 100 ml
Count:

150 to 500 Microns 0 particles
500 Microns and larger 0 particles
largest particle 116 Microns
second largest particle 108 Microns
Type of particle Crystal and tal

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