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PRINT DATE: 09/01/93

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE  
NUMBER: 05-6N-2055-X**

**SUBSYSTEM NAME: EPD&C - AUXILIARY POWER UNIT**

**REVISION: 1 08/30/93**

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	<b>PART NAME VENDOR NAME</b>	<b>PART NUMBER VENDOR NUMBER</b>
LRU	: PANEL A12	V070-730385
SRU	: SWITCH, TOGGLE	ME452-0102-7301

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**PART DATA**

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:  
SWITCH, TOGGLE, 3 POLE 2 POSITION - AUXILIARY POWER UNIT (APU) HEATERS  
TANK/FUEL LINE 1, 2 AND 3 (A AND B) POWER CIRCUITS**

**REFERENCE DESIGNATORS:** 36V73A12S7  
36V73A12S8  
36V73A12S9  
36V73A12S10  
36V73A12S11  
36V73A12S12

**QUANTITY OF LIKE ITEMS: 6  
SIX**

**FUNCTION:  
PROVIDES AUTO/OFF MANUAL CONTROL FOR APU TANK/FUEL LINE HEATERS.**

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL FAILURE MODE  
NUMBER: 05-6N-2055-01**

REVISION# 1 08/30/93

SUBSYSTEM NAME: EPD&C - AUXILIARY POWER UNIT

LRU: PANEL A12

CRITICALITY OF THIS  
FAILURE MODE: 1R2

ITEM NAME: SWITCH, TOGGLE

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**FAILURE MODE:**

FAILS OPEN, SHORT-TO-CASE (GROUND)

**MISSION PHASE:**

PL PRELAUNCH  
LO LIFT-OFF  
OO ON-ORBIT  
DO DE-ORBIT  
LS LANDING SAFING

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA  
103 DISCOVERY  
104 ATLANTIS  
105 ENDEAVOUR

**CAUSE:**

PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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REDUNDANCY SCREEN A) PASS  
B) PASS  
C) PASS

**PASS/FAIL RATIONALE:**

A)

B)

C)

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**- FAILURE EFFECTS -**

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**(A) SUBSYSTEM:**

LOSS OF POWER TO APU TANK/FUEL LINE HEATER CONTROL CIRCUIT.

**(B) INTERFACING SUBSYSTEM(S):**

LOSS OF HEATERS A OR B AFTER FIRST FAILURE.

**(C) MISSION:**

NO EFFECT - FIRST FAILURE

**(D) CREW, VEHICLE, AND ELEMENT(S):**

NO EFFECT - FIRST FAILURE

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL FAILURE MODE  
NUMBER: 05-6N-2055-01**

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

POSSIBLE LOSS OF CREW AND VEHICLE AFTER SECOND FAILURE (LOSS OF REDUNDANT TANK/LINE HEATERS) DUE TO FUEL (HYDRAZINE) FREEZING AND LINE RUPTURE.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

**(B) TEST:**

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

**GROUND TURNAROUND TEST**

APU 1/2/3 HEATER TEST BY COCKPIT COMMAND PERFORMED IN FLIGHT EVERY FLOW OR AFTER CIG RETEST.

**(C) INSPECTION:**

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

**(D) FAILURE HISTORY:**

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

**(E) OPERATIONAL USE:**

FIRST FAILURE - MANUALLY SWITCH TO ALTERNATE HEATER. SECOND FAILURE - ATTEMPT ATTITUDE THERMAL CONDITIONING TO MAINTAIN FUEL LINE TEMPERATURE.

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**- APPROVALS -**

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EDITORIALLY APPROVED  
EDITORIALLY APPROVED  
TECHNICAL APPROVAL

: RI  
: JSC  
: VIA CR

*Handwritten signatures and dates:*  
: [Signature] 9/1/93  
: [Signature] 9/7/93  
: 550270