

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE**

NUMBER: 05-6N-2052 -X

SUBSYSTEM NAME: EPD&amp;C - AUXILIARY POWER UNIT (04-2)

REVISION: 0

08/02/90

**PART DATA**

PART NAME	PART NUMBER
VENDOR NAME	VENDOR NUMBER
LRU : AFT LCA 1	MC450-0057-0001
LRU : AFT LCA 2	MC450-0058-0001
LRU : AFT LCA 3	MC450-0059-0001
LRU : CONTROLLER, HYBRID DRIVER	MC477-0261-0002

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

CONTROLLER, HYBRID DRIVER, HDC TYPE 1 - AUXILIARY POWER UNIT (APU) 1, 2, AND 3  
OIL LINE HEATERS (A AND B) POWER CIRCUIT

REFERENCE DESIGNATORS: 54V76A121AR(J1-11)  
54V76A121AR(J1-20)  
55V76A122AR(J1-11)  
55V76A122AR(J1-20)  
56V76A123AR(J1-11)  
56V76A123AR(J1-20)

QUANTITY OF LIKE ITEMS: 6  
SIX, TWO/APU

**FUNCTION:**

UPON GSE COMMAND FROM MDM LA1, POWER IS PROVIDED TO THE APU OIL LINE  
HEATER (A OR B).

**FAILURE MODES EFFECTS ANALYSIS FMEA - NON-CIL FAILURE MODE**

NUMBER: 05-6N-2052-02

REVISION#: 01 08/01/96

SUBSYSTEM NAME: EPD&amp;C - AUXILIARY POWER UNIT (04-2)

LRU: AFT LCA 1, 2, 3

CRITICALITY OF THIS  
FAILURE MODE: 1R3

ITEM NAME: CONTROLLER, HYBRID DRIVER

**FAILURE MODE:**

INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF"

**MISSION PHASE:**

PL	PRE-LAUNCH
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 FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK,  
PROCESSING ANOMALY, THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN	A) PASS
	B) N/A
	C) PASS

**PASS/FAIL RATIONALE:**

A)

B)

DRIVER IS 2-FAULT TOLERANT WITH 2 REMAINING LEGS VERIFIABLE IN FLIGHT. LUBE OIL THERMOSTAT OPERATION IS VERIFIABLE IN FLIGHT. STATUS OF REMAINING APUS IS VERIFIABLE IN FLIGHT.

C)

- FAILURE EFFECTS -

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE  
NUMBER: 05-6N-2052- 02**

DEGRADATION OF REDUNDANCY AGAINST INADVERTENT POWERING OF HEATERS

**(B) INTERFACING SUBSYSTEM(S):**  
NO EFFECT - FIRST FAILURE

**(C) MISSION:**  
NO EFFECT - FIRST FAILURE

**(D) CREW, VEHICLE, AND ELEMENT(S):**  
NO EFFECT - FIRST FAILURE

**(E) FUNCTIONAL CRITICALITY EFFECTS:**  
POSSIBLE LOSS OF CREW/VEHICLE AFTER FOUR OTHER FAILURES (TWO PREFLIGHT-TO-ESSENTIAL BUS DIODES FAIL SHORT WHICH ENERGIZES THE PREFLIGHT TEST BUS, THERMOSTAT FAILS CLOSED RESULTING IN THE LOSS OF ONE APU BECAUSE OF LUBE OIL OVER TEMPERATURE, LOSS OF SECOND APU) DUE TO LOSS OF TWO OF THREE APUS RESULTING IN THE LOSS OF SUFFICIENT HYDRAULIC POWER FOR SAFE DESCENT/LANDING.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**  
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

**(B) TEST:**  
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

GROUND TURNAROUND TEST APU 1/2/3 LUBE OIL HEATER CIRCUIT TESTS PERFORMED EVERY FIFTH FLOW OR AFTER CIG RETEST.

**(C) INSPECTION:**  
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

**(D) FAILURE HISTORY:**

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE**  
**NUMBER: 05-8N-2052- 02**

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

(E) OPERATIONAL USE:  
NONE

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- APPROVALS -

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EDITORIALLY APPROVED : RI  
EDITORIALLY APPROVED : JSC  
TECHNICAL APPROVAL : VIA JSC

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