

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE**  
**NUMBER: 05-6-2387B -X**

**SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL**  
**REVISION: 2 07/26/99**

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**PART DATA**

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	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
LRU	: MID PCA 1	V070-764400
LRU	: MID PCA 2	V070-764430
LRU	: MID PCA 3	V070-764450
SRU	: CONTROLLER, REMOTE POWER	MC450-0017-1075
SRU	: CONTROLLER, REMOTE POWER	MC450-0017-2075
SRU	: CONTROLLER, REMOTE POWER	MC450-0017-3075
SRU	: CONTROLLER, REMOTE POWER	MC450-0017-4075

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

CONTROLLER, REMOTE POWER, 7.5 AMP - FUEL CELL/MAIN BUS "ON" GSE CONTROL

**REFERENCE DESIGNATORS:** 40V76A25RPC5  
 40V76A26RPC5  
 40V76A27RPC5

**QUANTITY OF LIKE ITEMS:** 3  
 THREE - ONE PER MID PCA

**FUNCTION:**

UPON COMMAND FROM A GSE CONTROLLED MULTIPLEXER/DEMUTIPLEXER (MDM), THE RPC CONNECTS PREFLIGHT TEST BUS POWER TO THE ASSOCIATED MOTOR SWITCH FOR CLOSING THE FUEL CELL TO MAIN DC BUS POWER CONTACTOR.

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

NUMBER: 05-6-2387B- 02

REVISION#: 1 07/26/99

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION &amp; CONTROL

LRU: MID PCA 1

CRITICALITY OF THIS

ITEM NAME: CONTROLLER, REMOTE POWER

FAILURE MODE: 1R3

**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, MECHANICAL SHOCK, VIBRATION, THERMAL STRESS, PROCESSING ANOMALY.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

**PASS/FAIL RATIONALE:**

A)

B)

"B" SCREEN IS "N/A" BECAUSE FAILURE OF AT LEAST TWO REMAINING PATHS IS READILY DETECTABLE DURING FLIGHT.

C)

**- FAILURE EFFECTS -****(A) SUBSYSTEM:**

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE  
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DURING PRELAUNCH THE ASSOCIATED FUEL CELL TO MAIN DC BUS POWER CONTACTOR WILL CONTINUOUSLY POWERED CLOSED. NO EFFECT FOR OTHER MISSION PHASES SINCE THE PRE-FLIGHT TEST BUS IS NOT POWERED.

**(B) INTERFACING SUBSYSTEM(S):**  
SAME AS (A)

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

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

**(E) FUNCTIONAL CRITICALITY EFFECTS:**  
POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO "SAFE" A FUEL CELL VIA THE FOLLOWING SCENARIO:

- (1) RPC FAILED "ON"
- (2,3) ASSOCIATED PRE-FLIGHT TEST BUS POWERED (REQUIRES TWO FAILURES) RESULTS IN THE ASSOCIATED FUEL CELL TO MAIN DC BUS POWER CONTACTOR CONTINUOUSLY COMMANDED CLOSED. THESE TWO FAILURES ARE NOT REQUIRED DURING PRELAUNCH SINCE THE PRE-FLIGHT TEST BUS IS NORMALLY POWERED DURING THIS PERIOD.
- (4) LOSS OF REDUNDANT REACTANT VALVE CLOSURE CAPABILITY.
- (5) LOSS OF THE ASSOCIATED ESSENTIAL BUS RESULTS IN LOSS OF THE ASSOCIATED FUEL CELL COOLANT PUMP AS WELL AS CONTROL OF THAT FUEL CELL'S REACTANT VALVES. THIS NECESSITATES REMOVAL OF ALL LOAD FROM THE FUEL CELL IN ORDER TO RENDER IT SAFE. INABILITY TO REMOVE THE BUS LOAD FROM THE FUEL CELL UNDER THESE CIRCUMSTANCES, WILL RESULT IN FUEL CELL OVERHEATING WITH SUBSEQUENT RUPTURE AND/OR EXPLOSION/FIRE.

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**- APPROVALS -**

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EDITORIALLY APPROVED : BNA : J. Kamura 7-26-99  
TECHNICAL APPROVAL : VIA APPROVAL FORM : 95-CIL-025\_05-8