

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE  
 NUMBER: 05-6MA-2205 -X

SUBSYSTEM NAME: EPD&C - ELEC PWR GENERATION:FUEL CELL (04-1A)  
 REVISION: 0 03/30/89

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PART DATA

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	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: MID PCA 1	V070-764400
LRU	: MID PCA 2	V070-764430
LRU	: MID PCA 3	V070-764450
SRU	: CONTROLLER, HYBRID DRIVER	MC477-0263-0002

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
 CONTROLLER, HYBRID DRIVER, HDC TYPE III, FUEL CELL NO. 1, 2 AND 3 CONTROL  
 POWER

**REFERENCE DESIGNATORS:** 40V76A25AR8  
 40V76A26AR7  
 40V76A27AR7

**QUANTITY OF LIKE ITEMS:** 3  
 THREE, 1/FCP CIRCUIT, NO. 1, 2 AND 3

**FUNCTION:**  
 PROVIDES FOR REMOTE CONTROL OF POWER APPLICATION FROM AN ESS BUS TO  
 THE ASSOCIATED FCP UPON COMMAND FROM THE FUEL CELL POWER PLANT (FCP)  
 CONTROL POWER SWITCH.

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

**NUMBER: 05-6MA-2205- 01**

**REVISION#: 0 04/18/96**

**SUBSYSTEM NAME: EPD&C - ELEC PWR GENERATION:FUEL CELL (04-1A)**

**LRU: MID PCA 1, 2, 3**

**CRITICALITY OF THIS**

**ITEM NAME: CONTROLLER, HYBRID DRIVER**

**FAILURE MODE: 1R2**

**FAILURE MODE:**

**LOSS OF OUTPUT, FAILS TO CONDUCT, FAILS TO TURN "ON"**

**MISSION PHASE: LO LIFT-OFF**

<b>VEHICLE/PAYLOAD/KIT EFFECTIVITY:</b>	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**

<b>REDUNDANCY SCREEN</b>	A) PASS
	B) PASS
	C) PASS

**PASS/FAIL RATIONALE:**

A)

B)

C)

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**

**LOSS OF ASSOCIATED FUEL CELL CONTROL POWER**

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

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LOSS OF POWER TO COOLANT PUMP AND H2 PUMP LEADING TO FCP OVERHEATING,  
FLOODING AND OUTPUT VOLTAGE DEGRADATION. TIME CRITICAL

**(C) MISSION:**

NO EFFECT - MINIMUM DURATION FLIGHT. LOSS OF ONE FUEL CELL REDUNDANCY  
(CAPABILITY EXISTS FOR SAFE RETURN ON ONE OF THREE FCP'S).

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

FIRST FCP LOSS NO EFFECT - SECOND FCP SHUTDOWN DURING ASCENT LOSES  
CRITICAL FUNCTIONS AND MAY RESULT IN CREW/VEHICLE LOSS. FAILURE TO REMOVE  
LOAD FROM AFFECTED FCP WITHIN 9 MINUTES MAY RESULT IN OVERTEMP AND  
SUBSEQUENT EXTERNAL REACTANT LEAKAGE.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

FIRST FCP LOSS NO EFFECT - SECOND FCP SHUTDOWN DURING ASCENT LOSES  
CRITICAL FUNCTIONS AND MAY RESULT IN CREW/VEHICLE LOSS. FAILURE TO REMOVE  
LOAD FROM AFFECTED FCP WITHIN 9 MINUTES MAY RESULT IN OVERTEMP AND SUB-  
SEQUENT EXTERNAL REACTANT LEAKAGE.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

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

**(B) TEST:**

GROUND TURNAROUND TEST  
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH  
OMRSD.

**(C) INSPECTION:**

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

**(D) FAILURE HISTORY:**

CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND  
OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE  
FOUND IN THE PRACA DATA BASE. THE FAILURE HISTORY DATA PROVIDED IN  
APPENDIX B IS NO LONGER BEING KEPT UP-TO-DATE.

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(E) OPERATIONAL USE:

CREW ACTION REQUIRED TO SHUTDOWN AFFECTED FCP DURING FLIGHT. ONBOARD PROCEDURES MANAGE POWER FOR LOSS OF ONE FCP.

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- APPROVALS -

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PAE MANAGER	:	P. STENGER-NGUYEN	:	<i>P. Stenger-Nguyen</i>
PRODUCT ASSURANCE ENGR	:	J. NGUYEN	:	<i>J. Nguyen</i>
DESIGN ENGINEERING	:	T. D. NGUYEN	:	<i>T. D. Nguyen</i>
EDITORIALLY APPROVED	:	JSC	:	<i>J. Stenger</i>
TECHNICAL APPROVAL	:	VIA APPROVAL FORM	:	96-CIL-012_ 05-6MA