

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE  
 NUMBER: 05-6MA-2011 -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	: FUSE	ME451-001B-0300

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EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:  
 FUSE, 3 AMP - FUEL CELL CONTROL POWER

REFERENCE DESIGNATORS: 40V76A25F6  
 40V76A26F5  
 40V76A27F5

QUANTITY OF LIKE ITEMS: 3  
 THREE, 1/EACH FCP CONTROL POWER CIRCUIT

FUNCTION:  
 EACH FUSE CONDUCTS INPUT CONTROL POWER AND PROVIDES CIRCUIT  
 PROTECTION FOR ITS ASSOCIATED FUEL CELL POWER PLANT (FCP) NO. 1, 2, OR 3  
 CONTROL POWER CIRCUIT.

## FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 05-8MA-2011-01

REVISION#: 0 04/16/96

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

LRU: MID PCA 1

CRITICALITY OF THIS

ITEM NAME: FUSE

FAILURE MODE: 1R2

## FAILURE MODE:

FAILS OPEN, FAILS TO CONDUCT

## MISSION PHASE:

LO LIFT-OFF

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

## CAUSE:

STRUCTURAL FAILURE, CONTAMINATION, MECHANICAL SHOCK, VIBRATION,  
PROCESSING ANOMALY, THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN	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. REQUIRES CREW ACTION TO  
SHUTDOWN FCP. TIME CRITICAL

**(C) MISSION:**

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

**(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  
SUBSEQUENT EXTERNAL REACTANT LEAKAGE.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

REFER TO APPENDIX D, ITEM NO. 4 - FUSE, PLUG-IN TYPE

**(B) TEST:**

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

**(C) INSPECTION:**

REFER TO APPENDIX D, ITEM NO. 4 - FUSE, PLUG-IN TYPE

**(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 D IS NO LONGER BEING KEPT UP-TO-DATE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE

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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>JSC</i>
TECHNICAL APPROVAL	: VIA APPROVAL FORM :	96-CIL-012_05-M8A