

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE**  
**NUMBER: 05-6-2213 -X**

**SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL**  
**REVISION: 0 05/03/88**

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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	: PANEL R1A1	V070-730275
SRU	: SWITCH, TOGGLE	ME452-0102-7301

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
 SWITCH, TOGGLE, 3PDT - FUEL CELL TO ESSENTIAL BUS CONTROL

**REFERENCE DESIGNATORS:** 32V73A1A1S7  
 32V73A1A1S8  
 32V73A1A1S9

**QUANTITY OF LIKE ITEMS:** 3  
 THREE-ONE PER ESSENTIAL BUS

**FUNCTION:**  
 PROVIDES CAPABILITY TO CONNECT THE FUEL CELL TO AND DISCONNECT THE FUEL CELL FROM THE ESSENTIAL BUS ON TWO CONTACT SETS. OTHER CONTACT SET PROVIDES SWITCH SCAN TO MDM'S AND ESS BUS FEED TO DISPLAYS AND CONTROL PANELS R12, O14, O15, O16, C3, F9, O6, O7, O8, A11, R1 AND R2.

## FAILURE MODES EFFECTS ANALYSIS FMEA - CIL FAILURE MODE

NUMBER: 05-6-2213-02

REVISION#: 1 07/26/99

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION &amp; CONTROL

LRU: PANEL R1A1

CRITICALITY OF THIS

ITEM NAME: SWITCH, TOGGLE

FAILURE MODE: 1R2

## FAILURE MODE:

SHORTS TO GROUND (ESSENTIAL BUS TO FLIGHT DECK PANELS CONTACT)

MISSION PHASE:        LO    LIFT-OFF  
                               DO    DE-ORBIT

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

REDUNDANCY SCREEN        A) PASS  
                                       B) PASS  
                                       C) PASS

## PASS/FAIL RATIONALE:

A)

B)

C)

## - FAILURE EFFECTS -

## (A) SUBSYSTEM:

LOSS OF ONE ESSENTIAL BUS IN FLIGHT DECK PANELS

## (B) INTERFACING SUBSYSTEM(S):

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LOSS OF THE ASSOCIATED FUEL CELL CONTROLLER AND, CONSEQUENTLY, THE ASSOCIATED FUEL CELL. LOSS OF FUEL CELL CONTROLLER REQUIRES FUEL CELL TO BE SHUTDOWN (CLOSE REACTANT VALVES OR REMOVE ALL LOADS FROM THE AFFECTED FUEL CELL) WITHIN NINE MINUTES DUE TO LOSS OF FUEL CELL COOLANT PUMPS.

**(C) MISSION:**

POSSIBLE ABORT DECISION REQUIRED FOR LOSS OF ONE ESSENTIAL BUS IN THE FLIGHT DECK PANELS.

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

FIRST FAILURE - NO EFFECT

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

POSSIBLE LOSS OF CREW/VEHICLE AFTER SECOND FAILURE (SECOND SIMILAR SWITCH FAILURE) DUE TO LOSS OF TWO FUEL CELLS DURING ASCENT OR ENTRY WHICH RESULTS IN A POSSIBLE UNDERVOLTAGE CONDITION TO CRITICAL LOADS.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

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

**(B) TEST:**

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

**GROUND TURNAROUND TEST**

ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

**(C) INSPECTION:**

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

**(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.

**(E) OPERATIONAL USE:**

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE  
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| AFTER MECO, FLIGHT CREW PERFORMS FUEL CELL SHUTDOWN PROCEDURE AND  
MANAGES POWER FOR LOSS OF ONE FUEL CELL.

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**- APPROVALS -**

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EDITORIALLY APPROVED	: BNA	: <u>J. Kemura 7-26-99</u>
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-025_05-6