FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER: 05-6-2240 -X

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL
REVISION: 1 07/26/99

PART DATA

	PART NAME / **VENDOR NAME**	**PART NUMBER** / **VENDOR NUMBER**
LRU	: PANEL A12	V070-730365
SRU	: SWITCH, TOGGLE	ME452-0102-7105

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE, SPDT - STRUCTURE RETURN FOR FUEL CELL NO. 3

REFERENCE DESIGNATORS: 36V73A12S30

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:
PROVIDES MANUAL CONTROL FOR CONNECTING FUEL CELL NO. 3 RETURN TO ORBITER STRUCTURE.

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE
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SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL
LRU: PANEL A12 **CRITICALITY OF THIS**
ITEM NAME: SWITCH, TOGGLE **FAILURE MODE:** 1R3

FAILURE MODE:
SHORT TO CASE (GROUND)

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 STRUCTURAL FAILURE, MECHANICAL SHOCK, VIBRATION, CONTAMINATION, 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 SWITCH IS NOT NORMALLY OPERATED DURING FLIGHT.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF CAPABILITY TO RECLOSE FUEL CELL NO. 3 STRUCTURE RETURN MOTOR SWITCH IF MOTOR SWITCH INADVERTENTLY OPENS.

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(B) INTERFACING SUBSYSTEM(S):
FOR SHORT ON INPUT SIDE OF SWITCH, ASSOCIATED CIRCUIT BREAKERS WILL TRIP AND CONTROL OF ALL FUEL CELL NO. 3 AND MAIN DC BUS C MOTOR SWITCHES WILL BE LOST. RESULTS IN LOSS OF REDUNDANCY (ABILITY TO REMOVE BUS LOAD) FOR SAFING FUEL CELL NO. 3. FOR SHORT ON LOAD SIDE OF SWITCH, NO EFFECT SINCE IT IS NOT OPERATED DURING FLIGHT.

(C) MISSION:
FIRST FAILURE - NO EFFECT

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
SECOND FAILURE - LOSS OF REDUNDANT REACTANT VALVE CLOSURE CAPABILITY.
THIRD FAILURE (LOSS OF ESSENTIAL BUS 3AB) - POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO SAFE FUEL CELL NO. 3. LOSS OF ESSENTIAL 3AB BUS RESULTS IN LOSS OF FUEL CELL NO. 3 COOLANT PUMP, AS WELL AS REDUNDANT CONTROL OF ITS REACTANT VALVES. THIS NECESSITATES REMOVAL OF ALL LOADS 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.

- APPROVALS -

EDITORIALLY APPROVED	: BNA	: J. Kimura 7-26-99
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-025_05-6