FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER: 05-6-2212 -X

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

PART DATA

	PART NAME / **VENDOR NAME**	**PART NUMBER** / **VENDOR NUMBER**
LRU	: PANEL R1A1	V070-730275
SRU	: SWITCH, TOGGLE	ME452-0102-7105

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE, MOMENTARY, SPDT - MAIN DC BUS TO TIE BUS CONTROL

REFERENCE DESIGNATORS: 32V73A1A1S13
32V73A1A1S14
32V73A1A1S15

QUANTITY OF LIKE ITEMS: 3
THREE-ONE PER MAIN BUS

FUNCTION:
PROVIDES MANUAL CONTROL FOR CONNECTING A MAIN DC BUS TO OR DISCONNECTING A MAIN DC BUS FROM THE COMMON MAIN DC BUS TIE JUNCTION. APPLIES ESSENTIAL OR MAIN BUS POWER MOMENTARILY TO "OPEN" OR "CLOSE" A MOTOR SWITCH FOR TRANSFERRING MAIN DC BUSES AS DESIRED TO THE MAIN DC BUS TIE.

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE
NUMBER: 05-6-2212- 02

REVISION#: 1 07/26/99
SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL
LRU: PANEL R1A1 **CRITICALITY OF THIS**
ITEM NAME: SWITCH, TOGGLE **FAILURE MODE:** 1R3

FAILURE MODE:
SHORTS TO GROUND

MISSION PHASE:
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 SWITCHING FUNCTION. NEITHER FUEL CELL TO MAIN BUS NOR MAIN BUS TO TIE BUS MOTOR SWITCHES CAN BE OPERATED BECAUSE BOTH CIRCUIT BREAKERS FOR

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MAIN DC BUS CONTROL WILL TRIP. RESULTS IN LOSS OF REDUNDANCY FOR FUEL CELL SAFING (CAPABILITY TO REMOVE MAIN DC BUS LOAD FROM FUEL CELL).

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

(C) MISSION:
FIRST FAILURE - NO EFFECT

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
AFTER THIRD FAILURE (LOSS OF ASSOCIATED ESS BUS), POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO SAFE FUEL CELL WHEN FUEL CELL COOLING IS LOST (SECOND FAILURE: LOSS OF REDUNDANT REACTANT VALVE CLOSURE CAPABILITY). LOSS OF THE ASSOCIATED ESSENTIAL BUS RESULTS IN LOSS OF THE ASSOCIATED FUEL CELL COOLANT PUMP AS WELL AS REDUNDANT 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.

- APPROVALS -

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