PRINT DATE: 07/26/99

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER: 05-6-2226 -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, SPDT - PAYLOAD PRIMARY POWER, FUEL CELL NO. 3

REFERENCE DESIGNATORS: 32V73A1A1S27

QUANTITY OF LIKE ITEMS: 1
ONE, PILOT RH CONSOLE

FUNCTION:
PROVIDES MANUAL CONTROL TO MOTOR SWITCH USED TO CONNECT FUEL CELL NO. 3 TO OR DISCONNECT FUEL CELL NO. 3 FROM THE PRIMARY PAYLOAD BUS. THE SWITCH CONNECTS ESSENTIAL BUS 3AB OR MAIN DC BUS A FOR CLOSING (ON) OR OPENING (OFF) THE MOTOR SWITCH POWER CONTACTS.

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE
NUMBER: 05-6-2226- 03

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:
SHORT TO CASE (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:
SHORT TO GROUND CAUSES ASSOCIATED CIRCUIT BREAKERS TO OPEN RESULTING IN LOSS OF SWITCHING CAPABILITY TO CONNECT FUEL CELL 3 TO OR DISCONNECT FUEL CELL 3 FROM THE PAYLOAD PRIMARY BUS OR MAIN DC BUS C, OR MAIN DC BUS C

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: 05-6-2225- 03

TO/FROM THE TIE BUS. NEITHER FUEL CELL 3 TO MAIN DC BUS C NOR FUEL CELL 3 TO PAYLOAD PRIMARY BUS NOR MAIN DC BUS C TO TIE BUS MOTOR SWITCH CAN BE OPERATED. RESULTS IN LOSS OF REDUNDANCY (ABILITY TO REMOVE LOAD) FOR FUEL CELL 3 SAFING.

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

(C) MISSION:
NO EFFECT - FIRST FAILURE

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
SECOND FAILURE - LOSS OF REDUNDANT REACTANT VALVE CLOSURE CAPABILITY. AFTER THIRD FAILURE (LOSS OF ESS BUS 3AB), POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO SAFE FUEL CELL 3 WHEN FUEL CELL COOLING IS LOST. LOSS OF THE ESSENTIAL BUS 3AB RESULTS IN LOSS OF FUEL CELL 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