

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: 05-6-2659 -X**

**SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL
REVISION: 1 11/16/97**

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:PANEL F6A8 (PRE-MEDS)	V070-730259
LRU	:PANEL F6A4 (MEDS)	V070-730735
SRU	:SWITCH, PUSHBUTTON	ME452-0061-4187
SRU	:SWITCH, PUSHBUTTON	ME452-0061-7187

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, PUSHBUTTON, 4 POLE - ABORT (INITIATE) SWITCH**

REFERENCE DESIGNATORS: 34V73A6A8S2 (PRE-MEDS)
34V73A6A4S5 (MEDS CONFIGURATION)

**QUANTITY OF LIKE ITEMS: 1
ONE**

FUNCTION:

UNIQUE TO INTACT ABORT, PUSHBUTTON SWITCH IS USED TO INITIATE ABORT COMMAND VOLTAGES THROUGH ITS MULTIPLE POLES TO THE ABORT MODE SELECT ROTARY SWITCH IN SERIES. TWO OF THREE POLES (FOURTH POLE IS NOT CONNECTED) ARE REQUIRED TO INITIATE ABORT FUNCTION. THE PUSHBUTTON AND ROTARY SWITCHES CAN BE USED TO INITIATE RTL5, TAL, AND ATO ABORTS.

THIS SWITCH IS ALSO USED IN CONJUNCTION WITH THE ABORT MODE SELECT ROTARY SWITCH TO ENGAGE "BAILOUT" SOFTWARE DURING CONTINGENCY ABORTS BY PLACING THE ROTARY SWITCH IN THE "ATO" POSITION AND DEPRESSING THE PUSHBUTTON SWITCH. THIS IS THE ONLY METHOD OF ENGAGING THE "BAILOUT" SOFTWARE AND IS ACCEPTED ONLY IN ORBITER SOFTWARE MODES 305 (APPROACH AND LANDING) AND 603 (GRTLS APPROACH AND LANDING).

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE
NUMBER: 05-6-2659-02

REVISION#: 2 07/26/99

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL
 LRU: PANEL F6A8 (PRE-MEDS), F6A4 (MEDS) CRITICALITY OF THIS
 ITEM NAME: SWITCH, PUSHBUTTON FAILURE MODE: 1R2

FAILURE MODE:
 FAILS OPEN (JAMS)

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? YES

AOA ABORT ONCE AROUND
 RTLS RETURN TO LAUNCH SITE
 TAL TRANS-ATLANTIC LANDING

REDUNDANCY SCREEN A) PASS
 B) FAIL
 C) PASS

PASS/FAIL RATIONALE:

A)

B)

FAILS "B" SCREEN BECAUSE TIME FOR CORRECTIVE ACTION EXCEEDS TIME TO EFFECT.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
 ALL CONTACTS OF PUSHBUTTON FAIL OPEN.

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(B) INTERFACING SUBSYSTEM(S):

LOSS OF COMMANDS TO ABORT MODE SELECT SWITCH. LOSS OF ABORT INITIATION FUNCTION THROUGH SWITCH. ALSO, LOSS OF ABILITY TO ENGAGE "BAILOUT" SOFTWARE DURING CONTINGENCY ABORT CONDITIONS AND EMERGENCY DEORBITS.

(C) MISSION:

NO EFFECT

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

CRIT 1R2 FOR EMERGENCY DEORBITS. AFTER FIRST FAILURE (WHICH CAUSES THE EMERGENCY SITUATION), POSSIBLE LOSS OF COMMANDER DUE TO INABILITY TO PERFORM EMERGENCY FUNCTION ("BAILOUT" SOFTWARE ENGAGE) AND PROVIDE HIMSELF WITH A STABLE FLYING CONDITION FROM WHICH TO EGRESS WHEN INSUFFICIENT VEHICLE ENERGY IS AVAILABLE TO REACH PLANNED RUNWAY. CRIT 1/1 FOR RTLS, TAL, AND AOA ABORTS.

ALSO, POSSIBLE LOSS OF CREW/VEHICLE VIA THE FOLLOWING SCENARIO:

(1) FAILURE OF THE PUSHBUTTON SWITCH IN THE OPEN CONDITION, AND (2,3) LOSS OF CAPABILITY TO INITIATE ANY ABORT MODE VIA EITHER OF TWO KEYBOARD UNITS, RESULTING IN THE LOSS OF CAPABILITY TO EFFECT A SAFE ORBITER LANDING UNDER ASCENT ABORT CONDITIONS.

IN THE PRECEDING SCENARIO, THE PUSHBUTTON SWITCH FAILURE IS FUNCTIONAL CRITICALITY "1R" AND HARDWARE CRITICALITY "3" RATHER THAN THE "1R2" CRITICALITY WHICH IS ASSIGNED DUE TO THE EMERGENCY BAILOUT FUNCTION.

(E) FUNCTIONAL CRITICALITY EFFECTS:

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX A, ITEM NO. 3 - PUSHBUTTON SWITCH

(B) TEST:

REFER TO APPENDIX A, ITEM NO. 3 - PUSHBUTTON SWITCH

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

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REFER TO APPENDIX A, ITEM NO. 3 - PUSHBUTTON SWITCH

(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 DATABASE.

(E) OPERATIONAL USE:

THE ROTARY ABORT SWITCH IN CONJUNCTION WITH THE ABORT PUSHBUTTON SWITCH IS PRIME FOR SELECTING RTLS, ATO, AND TAL ABORTS AND IS THE ONLY MEANS OF ENGAGING THE "BAILOUT" MODE. ALL ABORT MODES EXCEPT "BAILOUT" CAN BE SELECTED VIA THE KEYBOARD.

- APPROVALS -

EDITORIALLY APPROVED	: BNA	: <u>J. Kamisa 7-26-99</u>
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-25_05-6