FAILURE MODES EFFECTS ANALYSIS FMEA – CIL FAILURE MODE
NUMBER: 05-6-2660- 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, ROTARY   **FAILURE MODE: 1R2**

FAILURE MODE:
FAILS CLOSED, BROKEN SHAFT WITH DETENT FEEL REMAINING

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:
NO EFFECT

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(B) INTERFACING SUBSYSTEM(S):
IF THE SHAFT BREAKS WHILE MOVING THE SWITCH OUT OF THE "OFF" DETENT, THE
ABILITY TO PLACE THE ROTARY SWITCH IN THE DESIRED POSITION MAY BE LOST.

(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 ROTARY SWITCH IN THE "OFF" POSITION FOR AN RTLS ABORT OR IN
A POSITION OTHER THAN THE DESIRED POSITION FOR TAL OR ATO ABORTS, 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 ROTARY 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. 2 - ROTARY SWITCH

(B) TEST:
REFER TO APPENDIX A, ITEM NO. 2 - ROTARY SWITCH

GROUND TURNAROUND TEST
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH
OMRSD.

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(C) INSPECTION:
REFER TO APPENDIX A, ITEM NO. 2 - ROTARY 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. RECOVERY FROM INADVERTENT SELECTION OF THE
ATO ABORT WHEN ATTEMPTING THE TAL ABORT CAN BE ACCOMPLISHED VIA THE
KEYBOARD.

- APPROVALS -

EDITORIALLY APPROVED   : BNA   : *J. Kimura 7-26-99*
TECHNICAL APPROVAL   : VIA APPROVAL FORM   : 96-CIL-026_05-6