FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER: M5-6SS-B010-X

SUBSYSTEM NAME: E - DOCKING SYSTEM

REVISION: 0   DEC, 1996

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	ENERGIA POWER PANEL RSC-E	MC621-0067-0009 SLIYU.468312.001
SRU	:	PUSH BUTTON SWITCH	PKZ-2 (AGO.360.212.TU)

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
PUSH-BUTTON SWITCHES (TWO DOUBLE POLE SWITCHES UNDER A SINGLE COVER CAP.) TWO POLE, MOMENTARY - APDS "UNDOCKING" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB3-B1
36V73A8A3SB3-B2

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:
PROVIDE THE "UNDOCKING" COMMAND STIMULI TO CLOSE THE APPROPRIATE CONTACTS IN THE DSCU TO IMPLEMENT THE "UNDOCKING" FUNCTION. THE "UNDOCKING" SIGNAL IS ROUTED BY THE DSCU TO THE PACU-1 AND PACU-2 TO ENABLE THE MOTORS (M6, M7, M8, AND M9) WHICH IMPLEMENT THE OPENING OF THE STRUCTURAL LATCHES (HOOKS 1 & 2) FOR SEPARATION FROM THE ISS. ~~NOMINAL UNDOCKING IS NOT PLANNED TO PMA1 ASSEMBLY.~~ THIS COMMAND CAN ONLY BE IMPLEMENTED AFTER THE "APDS CIRCUIT PROTECTION OFF" SWITCH IS ENABLED AND THE APDS CONTROL COMMAND PROTECTIVE COVER IS REMOVED.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6SS-B010- 02

REVISION#   0   DEC, 1996

SUBSYSTEM NAME: E - DOCKING SYSTEM
LRU: MC621-0087-0009
ITEM NAME: PUSH BUTTON SWITCH

CRITICALITY OF THIS
FAILURE MODE: 1R3

FAILURE MODE:
FAILS CLOSED (MULTIPLE CONTACTS WITHIN ONE SWITCH.) SHORTS TO GROUND

MISSION PHASE:
OO   ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 103 DISCOVERY
                                           104 ATLANTIS
                                           105 ENDEAVOUR

CAUSE:
A) PIECE PART FAILURE, B) CONTAMINATION, C) VIBRATION, D) MECHANICAL SHOCK, E)
PROCESSING ANOMALY, F) THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

REDUNDANCY SCREEN   A) PASS
                         B) N/A
                         C) PASS

PASS/FAIL RATIONALE:
A)

B)
N/A - AT LEAST TWO REMAINING PATHS ARE DETECTABLE IN FLIGHT.

C)

METHOD OF FAULT DETECTION:
NONE

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:
FOR CASE 1, THE CREW CAN DISABLE ONE OF THE THREE APDS LOGIC BUSES TO
PREVENT IMPLEMENTATION OF AN UNWANTED COMMAND.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6SS-B010-02

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF SWITCH CONTROL CAPABILITY FOR THE APDS "UNDOCKING" CIRCUITS.

(B) INTERFACING SUBSYSTEM(S):
UNWANTED "UNDOCKING" COMMAND TO THE DSCU.

(C) MISSION:
FIRST FAILURE - NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:
CASE 1: (2R3 - PPP)
SHUTTLE OR PMA1 MECHANISM CONTROL: POSSIBLE LOSS OF MISSION AFTER THREE
FAILURES.
1) ONE OF TWO ASSOCIATED SWITCHES FAILS CLOSED. ENABLES TWO OF THREE
PANEL COMMAND SIGNALS. TEMPORARY UNWANTED "UNDOCKING" COMMAND TO THE
DSCU. CREW WOULD PERFORM AN APDS LOGIC BUS DROP TO RECOVER DOCKING
FUNCTIONS. 2) REMAINING ASSOCIATED SWITCH FAILS CLOSED RESULTING IN
UNWANTED "UNDOCKING" COMMAND TO THE DSCU. 3) ONE OF TWO "APDS CIRC PROT
OFF" SWITCHES FAILS CLOSED. UNWANTED "UNDOCKING" COMMAND TO THE APDA
RESULTING IN POSSIBLE PREMATURE UNDOCKING PRIOR TO CREW INGRESS.

CASE 2: (1R3 - PNP)
WORST CASE, SHUTTLE MECHANISM CONTROL: POSSIBLE LOSS OF CREW OR VEHICLE
AFTER EIGHT FAILURES.
1) ONE OF TWO ASSOCIATED "UNDOCKING" SWITCHES FAILS CLOSED. 2) ONE OF TWO
ASSOCIATED "POWER ON" SWITCHES FAILS CLOSED. 3) ONE OF TWO ASSOCIATED
"APDS CIRC PROT OFF" SWITCHES FAILS CLOSED. 4, 5) TWO APDS POWER (A7&A3)
CIRCUIT BREAKERS FAIL CLOSED. 6, 7) TWO APDS CONTROL PANEL POWER (A8A3)
CIRCUIT BREAKERS FAIL CLOSED. 8) ONE PSU MAIN POWER RPC FAILS ON RESULTING
IN ALL HOOKS OPENING INADVERTENTLY. POSSIBLE LOSS OF HABITABLE
ENVIRONMENT.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F):

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
N/A

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: MINUTES

FAILURE MODES EFFECTS ANALYSIS (FMEA) — NON-CIL FAILURE MODE
                                        NUMBER: M5-6SS-B010-02

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT?
YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
FOR CASE 1: CREW WOULD HAVE SUFFICIENT TIME TO DISABLE THE LOGIC BUSES.

HAZARDS REPORT NUMBER(S) : ORBI 511

HAZARD DESCRIPTION:
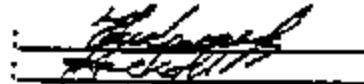**LOSS OF PRESSURE IN HABITABLE VOLUME.**

· APPROVALS ·

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