

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER: M5-6SS-8011-X

SUBSYSTEM NAME: E - DOCKING SYSTEM

REVISION: 0 DEC. 1996

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: ENERGIA POWER PANEL RSC-E	MC821-0087-0009 SLYU.468312.001
SRU	: PUSH BUTTON SWITCH	PKZ-4 (AGO.380.212.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 'OPEN HOOKS' COMMAND.

REFERENCE DESIGNATORS: 36V73A8A35B4-B1
36V73A8A35B4-B2

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:

PROVIDE THE "OPEN HOOKS" COMMAND STIMULI TO CLOSE THE APPROPRIATE
CONTACTS IN THE DSCU TO IMPLEMENT THE "OPEN HOOKS" FUNCTION. THE "OPEN
HOOKS" 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 HOOKS OPENING
IS NOT PLANNED TO FULL ASSEMBLY)~~

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE
NUMBER: M5-6SS-B011-02

REVISION# 0 FEBDEC, 1997

SUBSYSTEM NAME: E - DOCKING SYSTEM

LRU: MCE21-0087-0009

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 1R1 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:

CREW CAN DISABLE ONE OF THE THREE APDS LOGIC BUSES TO PREVENT IMPLEMENTATION OF AN UNWANTED COMMAND.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF SWITCH CONTROL CAPABILITY FOR THE APDS "HOOKS OPEN" CIRCUITS.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-OIL FAILURE MODE
NUMBER: M5-655-B011-02**

(B) INTERFACING SUBSYSTEM(S):
POTENTIAL UNWANTED "HOOKS OPEN" COMMAND TO THE DSCU.

(C) MISSION:
NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - 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 "HOOKS OPEN" COMMAND TO THE DSCU. CREW WOULD PERFORM AN APDS LOGIC BUS DROP TO RECOVER DOCKING FUNCTIONS. 2) REMAINING ASSOCIATED SWITCH FAILS CLOSED. UNWANTED "HOOKS OPEN" COMMAND. 3) ONE OF TWO "APDS CIRC PROT OFF" FAILS CLOSED. POSSIBLE PREMATURE UNDOCKING IF FAILURE OCCURS PRIOR TO SYSTEMS POWER DOWN AND OPENING OF HATCHES.

CASE 2: (1R3 - PNP)

SHUTTLE OR PMA1 MECHANISM CONTROL: POSSIBLE LOSS OF CREW OR VEHICLE AFTER EIGHT FAILURES. 1) ONE OF TWO ASSOCIATED "HOOKS OPEN" 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

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

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

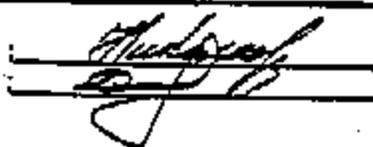
HAZARDS REPORT NUMBER(S) : ORBI 511

HAZARD DESCRIPTION:
LOSS OF PRESSURE IN HABITABLE VOLUME.

- APPROVALS -

PRODUCT ASSURANCE ENGR
DESIGN ENGINEER

: M. NIKOLAYEVA
: B. VAKULIN



Handwritten signatures of M. Nikolayeva and B. Vakulin, each on a separate line.