

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE

NUMBER: M5-6MR-8002-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 0 OCT, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	ENERGIA POWER PANEL RSC-E	MC621-0087-0009 CKB-468-312-001
SRU	PUSH BUTTON SWITCH	PKZ-8 (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 "POWER-ON" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB1-B1.
36V73A8A3SB1-B2

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:

PROVIDE THE "TURN-ON" COMMAND TO THE POWER SWITCHING UNIT (PSU.) THE PSU PROVIDES THE LOGIC BUSES TO THE DSCU, DMCU, PACU, AND THE LACU. THESE LOGIC BUSES ARE REQUIRED TO IMPLEMENT ALL DOCKING AND UNDOCKING OPERATIONS.

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**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
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**SUBSYSTEM NAME: ORBITER 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: 104 ATLANTIS

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

CRITICALITY 1M DURING INTACT ABORT ONLY? NO

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

**REDUNDANCY SCREEN A) PASS
 B) PASS
 C) PASS**

**PASS/FAIL RATIONALE:
A)
B)
C)**

**METHOD OF FAULT DETECTION:
NONE**

MASTER MEAS. LIST NUMBERS: NONE

**CORRECTING ACTION:
NONE**

- FAILURE EFFECTS -

**(A) SUBSYSTEM:
LOSS OF SWITCH CONTROL CAPABILITY FOR THE APDS "POWER-ON" CIRCUITS.**

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(B) INTERFACING SUBSYSTEM(S):

ONE OF TWO ASSOCIATED SWITCHES FAILS CLOSED. UNWANTED "POWER ON" COMMAND TO THE PSU.

(C) MISSION:

NO EFFECT.

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

FIRST FAILURE - NO EFFECT

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW OR VEHICLE AFTER FOUR FAILURES. 1) ONE OF TWO "POWER ON" SWITCHES FAILS ON. CONTINUOUS POWER TO THE "POWER ON" CIRCUIT CAUSES THE PSU LATCHING RELAYS TO OVERHEAT. DISABLES CAPABILITY TO TURN POWER ON FOR NOMINAL UNDOCKING. LOSS OF NOMINAL UNDOCKING CAPABILITY. 3) ONE PYROBOLT FAILS TO INITIATE. LOSS OF CAPABILITY TO IMPLEMENT PYROTECHNIC SEPARATION. LOSS OF NOMINAL AND PYROTECHNIC SEPARATION CAPABILITY.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 1R2

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:

SECOND FAILURE (INABILITY TO PERFORM IFM TO DRIVE HOOKS OPEN) - ONE OR MORE HOOKS CANNOT BE OPENED.

FOURTH FAILURE (INABILITY TO PERFORM EVA TO REMOVE 96 BOLTS HOLDING DOCKING BASE TO EXTERNAL AIRLOCK) - INABILITY TO SEPARATE ORBITER AND MIR RESULTING IN LOSS OF CREW AND VEHICLE.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: HOURS

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

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:

CREW WOULD HAVE SUFFICIENT TIME TO USE OR PERFORM EVA.

HAZARDS REPORT NUMBER(S) : ORBI 401A

HAZARD DESCRIPTION:

INABILITY TO SEPARATE ORBITER AND MIR

- APPROVALS -

PRODUCT ASSURANCE ENGR

M. NIKOLAYEVA

DESIGN ENGINEER

B. VAKULIN

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