FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER: M5-6MR-B003-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-OFF" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB1-B3
36V73A8A3SB1-B4

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:
PROVIDE THE "POWER-OFF" 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
NUMBER: M5-6MR-B003- 01

REVISION# 0 **OCT, 1995**

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

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
FAILS OPEN (MULTIPLE CONTACTS WITHIN ONE SWITCH)

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

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)
FUNCTIONAL CRITICALITY 1R (FOUR FAULT TOLERANT OR GREATER) WITH AT LEAST TWO REMAINING OPERATIONAL STATUS VERIFIED IN FLIGHT.
C)

METHOD OF FAULT DETECTION:
THE SECOND FAILURE WOULD BE DETECTED DURING SYSTEM POWER DOWN.

MASTER MEAS. LIST NUMBERS: V53X0785E

CORRECTING ACTION:
NONE

- FAILURE EFFECTS -

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

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FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6MR-B003- 01

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT.

(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 EIGHT FAILURES. 1) ONE OF TWO ASSOCIATED SWITCHES FAILS OPEN - NO EFFECT. 2) SECOND ASSOCIATED SWITCH FAILS OPEN. LOSS OF NOMINAL CAPABILITY TO POWER OFF. 3) ONE OF THREE "APDS POWER" CIRCUIT BREAKERS FAILS CLOSED. REDUCED UPSTREAM CAPABILITY TO POWER OFF. 4) ONE OF TWO REMAINING "APDS POWER" CIRCUIT BREAKERS FAILS CLOSED. REDUCED UPSTREAM CAPABILITY TO POWER OFF. 5) MULTIPLE CIRCUIT BREAKERS FAIL CLOSED IN THE A7A3 PANEL WHICH WOULD PRECLUDE POWER DOWN. CONTINUOUS POWER TO THE AVIONICS BOXES COULD CAUSE COMPONENTS TO OVERHEAT RESULTING IN LOSS OF NOMINAL UNDOCKING CAPABILITY. 6) ONE PYROBOLT FAILS TO INITIATE. LOSS OF CAPABILITY TO IMPLEMENT PYROTECHNIC SEPARATION CAPABILITY.

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
NONE. CRITICALITY UNCHANGED. WORKAROUNDS ADD TO REDUNDANCY.
7) FAILURE OF IFM TO OPEN HOOKS - INABILITY TO DRIVE HOOKS OPEN.
8) FAILURE OF EVA TO REMOVE BOLTS - LOSS OF ALL UNDOCKING CAPABILITY.

- 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
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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