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PRINT DATE: 12/27/95

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

NUMBER: MS-6MR-8013-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 0 OCT, 1995

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	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-4 (AGO.360.212.TU)

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**PART DATA**

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

PUSH-BUTTON SWITCHES (TWO DOUBLE POLE SWITCHES UNDER A SINGLE COVER CAP.) TWO POLE, MOMENTARY - APDS "PYRO CIRCUIT PROTECTION OFF" COMMAND.

REFERENCE DESIGNATORS: 35V73A&A3SB5-B1  
35V73A&A3SB5-B2

QUANTITY OF LIKE ITEMS: 2  
(TWO)

**FUNCTION:**

PROVIDE THE "PYRO CIRCUIT PROTECTION OFF" COMMAND STIMULI TO CLOSE THE APPROPRIATE CONTACTS IN THE PYROTECHNIC FIRE CONTROL UNIT (PFCU.)

REFERENCE DOCUMENTS: 1) ECN 104-25012A. ODS ELECTRICAL CHANGE NOTICE.  
2) CKB>=468312=001 \_J"P. SCHEMATIC DIAGRAM - ANDROGYNOUS PERIPHERAL DOCKING SYSTEM (APDS) CONTROL PANEL PU-APSS SCHEMATIC.  
3) 33Y.5212.005. \*3. APDS CONTROL UNIT ELECTRICAL SCHEMATIC.  
4) VS70-953104. ODS INTEGRATED SCHEMATIC.  
5) I7RC=10> 2601F \_J "P. PYRO FIRING CONTROL UNIT ELECTRICAL

C4

**ORIGINAL**

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE**

**NUMBER: M5-6MR-B013- 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 1M 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)**

**PYROTECHNIC SEPARATION SYSTEM IS CONSIDERED STAND-BY.**

**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 "PYRO CIRCUIT PROTECTION OFF" COMMAND.**

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**ORIGINAL**

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE  
NUMBER: M8-6MR-B013-01**

**(B) INTERFACING SUBSYSTEM(S):**  
LOSS OF COMMAND REDUNDANCY.

**(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 ASSOCIATED "PYRO CIRCUIT PROTECTION OFF" SWITCHES FAILS OPEN. DEGRADED COMMAND IMPLEMENTATION. 2) REMAINING ASSOCIATED "PYRO CIRCUIT PROTECTION OFF" SWITCH FAILS OPEN. LOSS OF CAPABILITY TO DISABLE THE PYROTECHNIC COMMAND CIRCUIT PROTECTION. LOSS OF PYROTECHNIC SEPARATION CAPABILITY. 3) ONE OF TWELVE HOOKS FAILS TO OPEN (REF. M8-1MR-BM001-04.) LOSS OF CAPABILITY TO IMPLEMENT NOMINAL SEPARATION.

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

**(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:**  
NONE. CRITICALITY UNCHANGED. WORKAROUNDS ADD TO REDUNDANCY.

4) FAILURE OF EVA TO REMOVE 96 BOLTS - LOSS OF ALL UNDOCKING CAPABILITY.

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**- TIME FRAME -**

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**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 PERFORM EVA.

**HAZARDS REPORT NUMBER(S):** ORBI 401A

**HAZARD DESCRIPTION:**

INABILITY TO SEPARATE ORBITER AND MIR.

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**- APPROVALS -**

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**PRODUCT ASSURANCE ENGR**

**M. NIKOLAYEVA**  
*[Signature]*

**DESIGN ENGINEER**

**B. VAKULIN**  
*[Signature]*

**ORIGINAL**