

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

NUMBER: M5-6MR-B018-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	CIRCUIT BREAKER F4	Az2-2 (8>3.619.242. TU)
SRU	CIRCUIT BREAKER F8, F12	Az2-3 (8>3.619.242. TU)

**PART DATA****EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

PNL ABA3, CIRCUIT BREAKER (AZ2-2 TRIPPING CURRENT IS 4.2 AMPS; AZ2-3 TRIPPING CURRENT IS 5.1 AMPS) - APDS "HEATER & DCU" POWER BUSES.

REFERENCE DESIGNATORS: 35V73A8A3F4  
35V73A8A3F8  
35V73A8A3F12

QUANTITY OF LIKE ITEMS: 3  
(THREE)

**FUNCTION:**

CIRCUIT BREAKER F4 PROVIDES BUS +A (H1) POWER TO THE APDS MECHANISM HEATERS. THE +A BUS PROVIDES POWER TO THE H1-1/TS, H2-2/TS, AND THE H3-3/TS HEATING ELEMENTS MOUNTED ON THE APDS DOCKING MECHANISM. CIRCUIT BREAKER F8 PROVIDES BUS +B (H2) POWER TO THE APDS MECHANISM HEATERS. THE +B BUS PROVIDES POWER TO THE H1-2/TS, H2-3/TS, AND THE H3-2/TS HEATING ELEMENTS MOUNTED ON THE APDS DOCKING MECHANISM. IT ALSO PROVIDES ONE OF THE REDUNDANT POWER STRINGS (+T1) TO THE DATA NORMALIZATION DEVICES (DCU/BNU 1 AND 2.) CIRCUIT BREAKER F12 PROVIDES BUS +C (H3+) POWER TO THE APDS MECHANISM HEATERS. THE BUS PROVIDES POWER TO THE H1-3/TS, H2-1/TS, AND THE H3-1/TS HEATING ELEMENTS MOUNTED ON THE APDS DOCKING MECHANISM. IT ALSO PROVIDES ONE OF THE REDUNDANT POWER STRINGS (+T2) TO THE DATA NORMALIZATION DEVICES (DCU/BNU 1 AND 2.)

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE  
NUMBER: M6-SMR-B016-03**

**REVISION# 0 OCT, 1996**

**SUBSYSTEM NAME: ORBITER DOCKING SYSTEM  
LRU: MC621-0087-0009  
ITEM NAME: CIRCUIT BREAKER**

**CRITICALITY OF THIS  
FAILURE MODE: 1R3**

**FAILURE MODE:  
FAILS TO TRIP UNDER OVERLOAD**

**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)  
C)**

**METHOD OF FAULT DETECTION:  
NONE**

**MASTER MEAS. LIST NUMBERS: NONE**

**CORRECTING ACTION:  
NONE**

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:  
LOSS OF OVERLOAD PROTECTION CAPABILITY FOR POWER SOURCES FROM APDS  
MECHANISM HEATERS AND DCU POWER CIRCUITS.**

**(B) INTERFERING SUBSYSTEM(S):  
NO EFFECT**

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE  
NUMBER: M5-6MR-8018-03**

**(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 FIVE FAILURES. 1) ONE CIRCUIT BREAKER FAILS CLOSED LOSS OF CAPABILITY TO REMOVE POWER FOR ONE OF THREE HEATERS/DCU BUSES. 2) A HEATER DOWNSTREAM ON THE SAME HEATER/DCU BUS SHORTS TO GROUND. LOSS OF ONE OF THREE HEATERS/DCU BUSES DUE TO OPENING (TRIPPING) OF THE CIRCUIT BREAKERS IN PANEL A7A3. LOSS OF ONE OF THREE CAPTURE LATCHES. 3) CAPTURE LATCH MANUAL UNBLOCKING DEVICE FAILS TO RELEASE ASSOCIATED CAPTURE LATCH RESULTING IN LOSS OF NOMINAL UNDOCKING CAPABILITY. PYROTECHNIC SEPARATION CANNOT BE USED TO OPEN THE CAPTURE LATCHES.

**DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 1R3**

**(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:**  
FOURTH FAILURE (INABILITY TO EXTEND DOCKING RING) - INABILITY TO ENABLE SEPARATION WITH A SINGLE CLOSED CAPTURE LATCH.  
FIFTH 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.

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**- TIME FRAME -**

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**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 PERFORM IFM OR EVA.  
**HAZARDS REPORT NUMBER(S): ORBI 401A**  
**HAZARD DESCRIPTION:**  
INABILITY TO SEPARATE ORBITER AND MIR.

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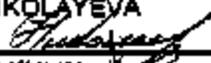
**- APPROVALS -**

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