

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER:M5-6SS-0110 -X**

SUBSYSTEM NAME: ISS DOCKING SYSTEM

REVISION: 0 02/27/98

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:PANEL A6A3	V828-730150
SRU	:FUSE	MC454-0018-0300

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
FUSE, PLUG-IN, SUB-MINIATURE, 3 AMP - PFCU LOGIC POWER, MAIN A, MAIN C CONTROL

REFERENCE DESIGNATORS: 36V73A7A3F1
36V73A7A3F2

QUANTITY OF LIKE ITEMS: 2
TWO

FUNCTION:
PROVIDE OVERLOAD PROTECTION TO THE ORBITER ESSENTIAL BUSES (MN A - ESS3AB, MN B - ESS1BC) FROM THE PFCU LOGIC CONTROL CIRCUIT.

REFERENCE DOCUMENTS: 1) VS70-953103, INTEGRATED SCHEMATIC - 53PA, PFCU POWER DISTRIBUTION CONTROL CIRCUIT

FAILURE MODES EFFECTS ANALYSIS FMEA - NON-CIL FAILURE MODE

NUMBER: M5-6SS-0110-01

REVISION#: 0 02/27/98

SUBSYSTEM NAME: ISS DOCKING SYSTEM

LRU: PANEL A6A3

ITEM NAME: FUSE

CRITICALITY OF THIS

FAILURE MODE: 1R3

FAILURE MODE:

FAILS OPEN

MISSION PHASE: OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	103	DISCOVERY
	104	ATLANTIS
	105	ENDEAVOUR

CAUSE:

A) STRUCTURAL 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)

PYROTECHNIC SEPARATION CLASSIFIED AS STAND-BY REDUNDANCY.

C)

CORRECTING ACTION: NONE**CORRECTING ACTION DESCRIPTION:**

DESIGN FAULT TOLERANCE: REDUNDANT PYROTECHNIC SEPARATION CIRCUIT REMAINS OPERATIONAL.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6SS-0110-01**

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF CAPABILITY TO ACTIVATE ONE OF THE TWO PFCU FIRE CIRCUITS.

(B) INTERFACING SUBSYSTEM(S):

DEGRADED REDUNDANCY FOR PYROTECHNIC SEPARATION CAPABILITY. LOSS OF ONE OF TWO +Y LOGIC SIGNALS TO THE PFCU.

(C) MISSION:

FIRST FAILURE - NO EFFECT

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

FIRST FAILURE - NO EFFECT

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW/VEHICLE AFTER THREE FAILURES:

- 1) FUSE OPENS - DEGRADED REDUNDANCY FOR PYROTECHNIC SEPARATION.
- 2) ONE OF THE TWELVE HOOKS FAILS TO OPEN (REF. FMEA M5-ISS-BM001-04). LOSS OF NOMINAL UNDOCKING CAPABILITY.
- 3) FUSE IN THE REDUNDANT CIRCUIT FAILS OPEN³. LOSS OF PFCU LOGIC. LOSS OF NOMINAL AND PYROTECHNIC UNDOCKING CAPABILITY.

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

(F) RATIONALE FOR CRITICALITY DOWNGRADE:

ALTHOUGH THE CRITICALITY REMAINS UNCHANGED AFTER WORKAROUNDS CONSIDERATION (ALLOWED PER CR S050107W), ADDITIONAL FAULT TOLERANCE IS PROVIDED TO THE SYSTEM.

AFTER THE THIRD FAILURE, THE CREW WOULD PERFORM EVA TO REMOVE 96 BOLTS FROM THE DOCKING BASE TO CIRCUMVENT THE WORST CASE "DESIGN CRITICALITY" EFFECT. IF UNABLE TO PERFORM EVA (FOURTH FAILURE), POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF ALL UNDOCKING CAPABILITY.

- TIME FRAME -

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE
NUMBER: M5-6SS-0110-01

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: HOURS

IS TIME REQUIRED TO IMPLEMENT CORRECTING ACTION LESS THAN TIME TO EFFECT?
YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
DESIGN FAULT TOLERANCE: REDUNDANT PYROTECHNIC SEPARATION CIRCUIT REMAINS OPERATIONAL. AFTER THE THIRD FAILURE, THE CREW CAN PERFORM EVA TO REMOVE 96 BOLTS FROM THE DOCKING BASE TO UNDOCK.

HAZARD REPORT NUMBER(S): ORBI 401

HAZARD(S) DESCRIPTION:
INABILITY TO SAFELY SEPARATE ORBITER FROM A MATED ELEMENT.

- APPROVALS -

SS&PAE
DESIGN ENGINEERING

: T. K. KIMURA
: C. J. ARROYO

: *J. Kimura 4-13-98*
: *[Signature]*