FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER:M5-6SS-0117 -X

SUBSYSTEM NAME: ISS DOCKING SYSTEM
REVISION: 0 02/27/98

PART DATA

	PART NAME / **VENDOR NAME**	**PART NUMBER** / **VENDOR NUMBER**
LRU	:PANEL A6A3	V628-730150
SRU	:DIODE	JANTX1N1188R

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DIODES, POWER, 35 AMP - PANEL LOGIC BUSES A, B, AND C CIRCUITS.

REFERENCE DESIGNATORS:
36V73A7A3CR1
36V73A7A3CR2
36V73A7A3CR3
36V73A7A3CR4
36V73A7A3CR5
36V73A7A3CR6

QUANTITY OF LIKE ITEMS: 6
SIX

FUNCTION:
THESE DIODES PROVIDE BACK SURGE PROTECTION AND DISTRIBUTION FOR THE MAIN A, MAIN B, AND MAIN C POWER BUSES FROM THE A6A3 PANEL CIRCUITS.

REFERENCE DOCUMENTS:
1) VS70-953103, INTEGRATED SCHEMATIC - 53A, MAIN A/MAIN B SYSTEM POWER AND APDS LOGIC BUSES

PRINT DATE: 04/11/98

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE
NUMBER: M5-6SS-0117-02

REVISION#: 0 02/27/98

SUBSYSTEM NAME: ISS DOCKING SYSTEM
LRU: PANEL A6A3
ITEM NAME: DIODE

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
SHORT (END TO END)

MISSION PHASE: OO ON-ORBIT

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

CAUSE:
A) STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), B) CONTAMINATION, C) ELECTRICAL STRESS, D) THERMAL STRESS, E) PROCESSING ANOMALY

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)
N/A - AT LEAST TWO REMAINING PATHS ARE DETECTABLE IN FLIGHT.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF MAIN BUS ISOLATION.

(B) INTERFACING SUBSYSTEM(S):

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6SS-0117-02

FIRST FAILURE - NO EFFECT

(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 FOUR FAILURES:
1) DIODE SHORTS END TO END - NO EFFECT.
2) SAME DIODE SHORTS TO STRUCTURE - LOSS OF ONE PANEL LOGIC BUS.
3) REDUNDANT CIRCUIT BREAKER FEEDING ONE OF TWO REMAINING PANEL LOGIC BUSES FAILS OPEN - LOSS OF PANEL POWER REDUNDANCY.
4) ASSOCIATED CIRCUIT BREAKER FEEDING THE SAME PANEL BUS FAILS OPEN. LOSS OF NOMINAL AND PYROTECHNIC UNDOCKING CAPABILITY DUE TO LOSS OF TWO OF THREE APDS PANEL LOGIC BUSES.

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 FOURTH FAILURE, THE CREW WOULD PERFORM IFM TO COMPLETE ALL REQUIRED APDS MOTOR DRIVE FUNCTION. IF UNABLE TO PERFORM THE IFM (FIFTH FAILURE) THEN PERFORM EVA TO REMOVE 96 BOLTS FROM THE DOCKING BASE TO CIRCUMVENT THE WORST CASE "DESIGN CRITICALITY" EFFECT. IF UNABLE TO PERFORM EVA (SIXTH FAILURE), POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF ALL UNDOCKING CAPABILITY.

- TIME FRAME -

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?
N/A

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6SS-0117-02

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
DESIGN FAULT TOLERANCE: REDUNDANT LOGIC POWER CIRCUIT REMAINS OPERATIONAL. AFTER THE FOURTH FAILURE, THE CREW CAN PERFORM IFM TO COMPLETE ALL REQUIRED APDS MOTOR DRIVE FUNCTIONS TO UNDOCK.

HAZARD REPORT NUMBER(S): ORBI 401

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

- APPROVALS -

SS&PAE	: T. K. KIMURA	: J. Kimura 4-13-98
DESIGN ENGINEERING	: C. J. ARROYO	: