FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: M5-6SS-B025-X

SUBSYSTEM NAME: E - DOCKING SYSTEM
REVISION: 0 FEBDEC, 19976

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	POWER SWITCHING UNIT (PSU) RSC-E	MC621-0067-1003 33Y.5114.007

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
LINE REPLACEABLE UNIT (LRU) PSU - APDS LOGIC AND POWER CONTROL, DISTRIBUTION, AND PROTECTION.

REFERENCE DESIGNATORS: 45V53A2A4

QUANTITY OF LIKE ITEMS: 1
(ONE)

FUNCTION:
THE PSU CONTROLS AND DISTRIBUTES THE APDS LOGIC BUSES. IT PROTECTS AND DISTRIBUTES THE APDS POWER BUSES. LOGIC AND MAIN POWER IS RECEIVED FROM THE ORBITER THROUGH CONNECTOR X3 AND RETURNED THROUGH CONNECTOR X4. THE LOGIC POWER BUSES ARE +LIIA +LII5 +LII8 AND THE POWER BUSES ARE +CIII1 AND +CIII2. THE PSU PROVIDES THE FOLLOWING OUTPUTS:

OUTPUT FUNCTIONS:

1) POWER BUS +CIII1: RING MOTOR M4, PACU MOTORS M6 & M8, FIXERS 1 & 2, AND HI-ENERGY (AND LOW-ENERGY FOR THE "SOFT" DOCKING MECHANISM) DAMPERS 1 & 2.
2) POWER BUS +CIII2: RING MOTOR M5, PACU MOTORS M7 & M9, FIXERS 3, 4, & 5, AND HI-ENERGY (AND LOW-ENERGY FOR THE "SOFT" DOCKING MECHANISM) DAMPER 3.
3) LOGIC POWER BUSES +LIIA +LII5 +LII8 ARE PROTECTED BY PANEL A8A3 CIRCUIT BREAKERS AND PROVIDE POWER ~~PROVIDED UNFUSED~~ TO THE LACU, PACU-1, PACU-2, DSCU, AND THE DMCU.

PRINT DATE: 13.02.97

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6SS-B025- 03

REVISION# 0 FEBDEC, 1997

SUBSYSTEM NAME: E - DOCKING SYSTEM
LRU: MC621-0087-1003
ITEM NAME: POWER SWITCHING UNIT

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
INADVERTENT ACTIVATION OF ONE OF THREE LOGIC BUSES.

MISSION PHASE:
OO ON-ORBIT

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

CAUSE:
MULTIPLE INTERNAL COMPONENT FAILURES

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)

METHOD OF FAULT DETECTION:
NONE.

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:
NONE.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY AGAINST INADVERTENT LOGIC BUS ACTIVATION.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6SS-B025- 03

(B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT.

(C) MISSION:
NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:
SHUTTLE OR PMA1 MECHANISM CONTROL: POSSIBLE LOSS OF CREW OR VEHICLE AFTER *EIGHT* FAILURES.
1, 2) TWO INTERNAL SWITCHING DEVICES FAIL CLOSED. NO EFFECT. 3, 4) TWO APDS CONTROL PANEL POWER (A8A3) CIRCUIT BREAKERS FAIL CLOSED. 5, 6) TWO APDS POWER (A7A3) CIRCUIT BREAKERS FAIL CLOSED. 7) "APDS PROT CIRC OFF" SWITCH FAILS CLOSED IN THE A8A3 PANEL. LOSS OF ALL PROTECTION AGAINST AN INADVERTENT SEPARATION COMMAND. 8) "HOOKS OPEN" SWITCH FAILS CLOSED RESULTING IN POTENTIAL LOSS OF PRESSURIZED ENVIRONMENT.

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
N/A

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: N/A

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT? N/A

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
N/A

HAZARDS REPORT NUMBER(S) : ORBI 511

HAZARD DESCRIPTION:
LOSS OF PRESSURE IN HABITABLE VOLUME.

- APPROVALS -

PRODUCT ASSURANCE ENGR : M. NIKOLAYEVA :
DESIGN ENGINEER : B. VAKULIN :