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PRINT DATE: 10/26/95

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL HARDWARE
NUMBER: M5-6MR-0005-X**

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 1 SEP 30, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: MPCA-1	V070-764400
LRU	: MPCA-2	V070-764430
SRU	: GENERAL PURPOSE CONTACTOR	MC455-0134-0003

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CONTACTOR, GENERAL PURPOSE, LATCHING. 125 AMP - SYSTEM 1 POWER MAIN A,
AND SYSTEM 2 POWER MAIN B CONTROL.

REFERENCE DESIGNATORS: 40V76A25K5
40V76A28K5

QUANTITY OF LIKE ITEM: 2
(TWO)

FUNCTION:
THE CONTACTORS PROVIDE POWER DISTRIBUTION TO THE PNL MAIN A AND MAIN B
ODS POWER CIRCUITS.

REFERENCE DOCUMENTS: 1) EGN 104-25012A. ODS ELECTRICAL CHANGE NOTICE.
2) CKB>=468=312=001 _ J"P. SCHEMATIC DIAGRAM -
ANDROGYNOUS PERIPHERAL DOCKING SYSTEM (APDS)
CONTROL PANEL PU-APSS SCHEMATIC.
3) V828-733002. SCHEMATIC DIAGRAM - D&C PANEL A7A3
AFT STATION
4) V570-953104. ODS INTEGRATED SCHEMATIC.
5) 33Y.5212.005 *P. APDS CONTROL UNIT ELECTRICAL
SCHEMATIC.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE
NUMBER: M5-6MR-0005- 01**

REVISION# 1 SEP 30, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC455-0134-0003
ITEM NAME: CONTACTOR

CRITICALITY OF THIS
FAILURE MODE: 1R3

FAILURE MODE:

OPEN, FAILS TO CONDUCT. INADVERTENTLY OPENS, FAILS TO TRANSFER. SHORT TO
STRUCTURE

MISSION PHASE:

OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:

A) PIECE PART STRUCTURAL FAILURE. B) CONTAMINATION, C) VIBRATION,
D) MECHANICAL SHOCK, 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) PASS
C) PASS

PASS/FAIL RATIONALE:

- A)
- B)
- C)

METHOD OF FAULT DETECTION:

VISUAL CUE FROM DS1 AND DS2. VISUAL INSPECTION OF AIRLOCK CENTERLINE
FLOODLIGHTS AND TRUSS DOCKING LIGHTS AVAILABLE. VESTIBULE DE-
PRESSURIZATION VALVE FUNCTIONAL STATUS AVAILABLE.

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:
NONE

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE
NUMBER: M5-6MR-0005-01**

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF CAPABILITY TO ACTIVATE ONE OF THE TWO ODS SYSTEM POWER CIRCUITS.

(B) INTERFACING SUBSYSTEM(S):

CASE 1: LOSS OF PNL MN A POWER.

ODS FUNCTIONS LOST DUE TO PNL MN A CONTACTOR (SYSTEM 1 POWER CONTROL CIRCUIT) FAILURE INCLUDE: VESTIBULE DEPRESSURIZATION VALVE FUNCTIONAL CAPABILITY (MAIN "A" BRANCH); EXTERNAL AIRLOCK FLOODLIGHTS 1 & 4 ENABLE; TRUSS DOCKING LIGHT 1 ENABLE; CENTERLINE PORT DOCKING LIGHT ENABLE; PNL "A" BUS (PARTIAL) ENABLE FOR THE APDS PANEL A5A3. DEGRADATION OF PNL BUS REDUNDANCY. DEGRADED DOCKING LIGHTS REDUNDANCY. DEGRADATION OF APDS LOGIC BUS REDUNDANCY

CASE 2: LOSS OF PNL MN B POWER.

ODS FUNCTIONS LOST DUE TO PNL MN B CONTACTOR (SYSTEM 2 POWER CONTROL CIRCUIT) FAILURE INCLUDE: VESTIBULE DEPRESSURIZATION VALVE FUNCTIONAL CAPABILITY (MAIN "B" BRANCH); EXTERNAL AIRLOCK FLOODLIGHTS 2 & 3 ENABLE; TRUSS DOCKING LIGHT 2 ENABLE; CENTERLINE STBD DOCKING LIGHT ENABLE; PNL "B" BUS (PARTIAL) ENABLE FOR THE APDS PANEL A5A3. DEGRADATION OF PNL BUS REDUNDANCY. DEGRADED DOCKING LIGHTS REDUNDANCY. DEGRADATION OF APDS LOGIC BUS REDUNDANCY.

(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 FIVETHREE FAILURES. 1) LOSS OF ONE CONTACTOR - NO EFFECT. DEGRADATION OF PNL BUS REDUNDANCY, DEGRADED CENTERLINE AND TRUSS DOCKING LIGHTS CAPABILITY. TWO REDUNDANT APDS LOGIC POWER BUS SOURCES REMAIN OPERATIONAL. 2) LOSS OF REMAINING CONTACTOR. LOSS OF PNL BUSES. LOSS OF CENTERLINE AND TRUSS DOCKING LIGHTS CAPABILITY. PAYLOAD OVERHEAD DOCKING FLOODLIGHT AND PAYLOAD BAY FLOODLIGHTS 1 AND 2 REMAIN OPERATIONAL. ONE APDS LOGIC BUS POWER SOURCE REMAINS OPERATIONAL. 3) ONE OF TWO MAIN C-LOGIC 2 & 3 BUSES CIRCUIT BREAKERS OR DIODES FAIL OPEN. ~~LOSS OF ALL UNDOCKING CAPABILITY.~~ LOSS OF TWO OF THREE APDS LOGIC BUSES DISABLES NOMINAL AND PYROTECHNIC SEPARATION SYSTEMS CONTROL. USE IFM TO DRIVE HOOKS OPEN THROUGH A BREAKOUT BOX. 4) FAILURE OF IFM TO OPEN HOOKS. PERFORM EVA TO REMOVE 96 BOLTS HOLDING DOCKING BASE TO EXTERNAL AIRLOCK. 5) FAILURE OF EVA TO REMOVE BOLTS. LOSS OF ALL UNDOCKING CAPABILITY.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE
NUMBER: M5-6MR-0005- 01**

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: N/AMINUTES

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

HAZARDS: DM2OHA04.

INABILITY TO SAFELY SEPARATE FROM ORBITER FROM DOCKING MODULE OR MIR.

- APPROVALS -

PRODUCT ASSURANCE ENGINEERING
DESIGN ENGINEERING

:R. BLACKWELL :
:T. NGUYEN :

R. Blackwell
T. Nguyen