PRINT DATE: 10/26/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NONCRITICAL HARDWARE
NUMBER: M5-6MR-0001-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 1 SEP 30, 1995

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	DOCKING SYSTEM POWER PANEL	V828-730150
SRU	:	CIRCUIT BREAKER	MC454-0026-2030

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
PNL A7A3, CIRCUIT BREAKERS, 3 AMP - ODS SYSTEM 1 POWER CONTROL CIRCUIT (MAIN "A" - ESS 1BC) - ODS SYSTEM 2 POWER CONTROL CIRCUIT (MAIN "B" - ESS 2CA)

REFERENCE DESIGNATORS: 36V73A7A3CB1
36V73A7A3CB6

QUANTITY OF LIKE ITEM: 2
(TWO)

FUNCTION:
PROVIDE OVERLOAD PROTECTION FOR THE ORBITER MAIN A-ESS 1BC, AND THE MAIN B-ESS 2CA BUSES FROM THE ODS SYSTEMS 1 & 2 POWER ENABLE CIRCUITS.

REFERENCE DOCUMENTS:
1) ECN 104-25012A. ODS ELECTRICAL CHANGE NOTICE.
2) V828-733002. SCHEMATIC DIAGRAM - D&C PANEL A7A3 AFT STATION
3) CKB>=468=3=12=001_J "P. SCHEMATIC DIAGRAM - ANDROGYNOUS PERIPHERAL DOCKING SYSTEM (APDS) CONTROL PANEL PU-APSS SCHEMATIC.
4) 33Y.5212.005."3. APDS CONTROL UNIT ELECTRICAL SCHEMATIC.
5) VS70-953104. ODS INTEGRATED SCHEMATIC.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NONCRITICAL FAILURE MODE
NUMBER: M5-6MR-0001-01

REVISION# 1 **SEP 30, 1995**

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC454-0026-2030
ITEM NAME: CIRCUIT BREAKER

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
FAILS OPEN, FAILS TO CONDUCT, FAILS TO CLOSE

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

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) 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 DEPRESSURIZATION VALVE FUNCTIONAL STATUS AVAILABLE.

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:
UTILIZE OVERHEAD DOCKING FLOODLIGHT AND PAYLOAD BAY FLOODLIGHTS 1 AND 2 TO IMPLEMENT DOCKING PROCEDURE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NONCRITICAL FAILURE MODE
NUMBER: M5-6MR-0001- 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 A7A3 MAIN A POWER.
ODS FUNCTIONS LOST DUE TO CB1 SYSTEM 1 POWER CONTROL CIRCUIT) FAILURE INCLUDE: VESTIBULE DE-PRESSURIZATION 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 A8A3. DEGRADATION OF PNL BUS REDUNDANCY. DEGRADED DOCKING LIGHTS REDUNDANCY. DEGRADATION OF APDS LOGIC BUS REDUNDANCY.

CASE 2: LOSS OF PNL A7A3 MAIN B POWER.
ODS FUNCTIONS LOST DUE TO CB6 SYSTEM 2 POWER CONTROL CIRCUIT) FAILURE INCLUDE: VESTIBULE DE-PRESSURIZATION 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 A8A3. 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 CREW OR VEHICLE AFTER FIVE~~THREE~~ FAILURES. 1) ONE CIRCUIT BREAKER FAILS OPEN. DEGRADATION OF PNL BUS REDUNDANCY. DEGRADED CENTERLINE AND TRUSS DOCKING LIGHTS CAPABILITY. TWO REDUNDANT APDS LOGIC POWER BUS SOURCES REMAIN OPERATIONAL. 2) REDUNDANT CIRCUIT BREAKER FAILS OPEN. 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 FAILS 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. 5) FAILURE OF EVA TO REMOVE BOLTS. LOSS OF ALL UNDOCKING CAPABILITY.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NONCRITICAL FAILURE MODE
NUMBER: M5-6MR-0001-01

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: MINUTES

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

HAZARDS: DM2OHA04(F)~~ODS-18.~~
INABILITY TO SAFELY SEPARATE ORBITER FROM DOCKING MODULE OR MIR.

- APPROVALS -

PRODUCT ASSURANCE ENGINEERING	:R. BLACKWELL	: R. Blackwell
DESIGN ENGINEERING	:T. NGUYEN	: T. Nguyen