

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER:M5-6SS-0607A -X

SUBSYSTEM NAME: ISS DOCKING SYSTEM

REVISION: 0

02/27/98

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	:ML86B PANEL	VO70-730382
SRU	:CIRCUIT BREAKER	MC454-0026-2030

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
 CIRCUIT BREAKER (3 AMP) - EMU 1 AND 2 WATER SUPPLY VALVE POWER

REFERENCE DESIGNATORS: 80V73A130CB57
 80V73A130CB58

QUANTITY OF LIKE ITEMS: 2
 (TWO)

FUNCTION:
 PROVIDES OVERLOAD PROTECTION FOR THE ORBITER MAIN "A" AND MAIN "C" BUS
 AND PROVIDES POWER ISOLATION FOR THE EMU 1 AND 2 WATER SUPPLY VALVE
 CONTROL CIRCUITS.

REFERENCE DOCUMENTS: 1) VS70-640109, SCHEMATIC DIAGRAM - AIRLOCK
 ENVIRONMENTAL CONTROL SUBSYSTEM

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE

NUMBER: M5-6SS-0607A-01

REVISION#: 0 02/27/98

SUBSYSTEM NAME: ISS DOCKING SYSTEM

LRU: ML86B PANEL

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:	103	DISCOVERY
	104	ATLANTIS
	105	ENDEAVOUR

CAUSE:

A) STRUCTURAL FAILURE, B) CONTAMINATION, C) VIBRATION, D) MECHANICAL SHOCK, E) PROCESSING ANOMALLY, 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)

CORRECTING ACTION: NONE

CORRECTING ACTION DESCRIPTION:

DESIGN FAULT TOLERANCE: THE WATER SUPPLY VALVE CIRCUIT FOR THE SECOND EMU SERVICE POINT REMAINS OPERATIONAL - BOTH EMU'S CAN STILL BE SERVICED.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
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- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF CAPABILITY TO OPEN OR CLOSE AN EMU WATER SUPPLY VALVE.

(B) INTERFACING SUBSYSTEM(S):

CANNOT SIMULTANEOUSLY CONNECT AND SERVICE TWO EMU'S TO WATER SUPPLY LINES.

(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) EMU 1 CIRCUIT BREAKER FAILS OPEN WHEN THE WATER SUPPLY VALVE IS IN THE CLOSED POSITION. LOSS OF CAPABILITY TO SERVICE TWO EMU'S SIMULTANEOUSLY FROM THE WATER SUPPLY CONNECTIONS.
- 2) EMU 2 CIRCUIT BREAKER FAILS OPEN WHEN THE WATER SUPPLY VALVE IS IN THE CLOSED POSITION. LOSS OF NOMINAL WATER SUPPLY TO EMU'S. WORST CASE IF FAILURE OCCURS FOLLOWING AN INITIAL EVA. THEN LOSS OF WATER SUPPLY TO REFILL THE EMU SUBLIMATOR TO PROVIDE COOLING FOR BOTH EMU'S WOULD PRECLUDE SUBSEQUENT EVA CAPABILITIES.
- 3) A FAILURE NECESSITATING AN EVA TO PREVENT A POTENTIAL CATASTROPHIC SITUATION - INABILITY TO PERFORM A CONTINGENCY EVA TO CORRECT A CRIT 1 CONDITION COULD RESULT IN A LOSS OF CREW/VEHICLE.

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), THEY ARE PROVIDING ADDITIONAL FAULT TOLERANCE TO THE SYSTEM.

AFTER THE THIRD FAILURE (FAILURE NECESSITATING AN EVA TO PREVENT A POTENTIAL CATASTROPHIC SITUATION) - INABILITY TO PERFORM CONTINGENCY EVA (FOURTH FAILURE) TO CORRECT A CRIT 1 CONDITION COULD RESULT IN LOSS OF CREW AND VEHICLE.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
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- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: MINUTES

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

**RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
THE WATER SUPPLY VALVE CIRCUIT FOR THE SECOND EMU SERVICE POINT REMAINS
OPERATIONAL - BOTH EMU'S CAN STILL BE SERVICED.**

HAZARD REPORT NUMBER(S): NONE

**HAZARD(S) DESCRIPTION:
NONE**

- APPROVALS -

SS&PAE
DESIGN ENGINEER

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

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