FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER:M5-6SS-0608A -X

SUBSYSTEM NAME: ISS DOCKING SYSTEM

REVISION: 0 02/27/98

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:AW82D PANEL	VO75-730153
SRU	:TOGGLE SWITCH	ME452-0102-7105
SRU	:TOGGLE SWITCH	ME452-0102-7605

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
TOGGLE SWITCH, 1 POLE, 2 POSITION, MOMENTARY ON - EMU 1 AND 2 WATER SUPPLY VALVE CONTROL CIRCUIT

REFERENCE DESIGNATORS: 84V73A139S1
84V73A139S3

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:
OPEN OR CLOSE THE EXTRAVEHICULAR MOBILITY UNIT (EMU) WATER SUPPLY VALVES. WATER IS SUPPLIED TO THE EMU'S DURING PRE-BREATHE.

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

FAILURE MODES EFFECTS ANALYSIS FMEA – NON-CIL FAILURE MODE
NUMBER: M5-6SS-0608A-01

REVISION#: 0 02/27/98

SUBSYSTEM NAME: ISS DOCKING SYSTEM
LRU: AW62D
ITEM NAME: TOGGLE SWITCH

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
FAILS OPEN, SHORT TO CASE (GROUND)

MISSION PHASE: OO ON-ORBIT

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

CAUSE:
A) PIECE PART 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)

CORRECTING ACTION: NONE

CORRECTING ACTION DESCRIPTION:
DESIGN FAULT TOLERANCE: TOGGLE SWITCH OF WATER SUPPLY VALVE CIRCUIT FOR SECOND EMU SERVICE POINT REMAINS OPERATIONAL. BOTH EMU'S CAN STILL BE SERVICED.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6SS-0608A-01

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF CAPABILITY TO OPEN OR CLOSE EITHER EMU1 OR EMU2 WATER SUPPLY VALVE.

(B) INTERFACING SUBSYSTEM(S):
CANNOT SIMULTANEOUSLY CONNECT TO THE WATER SUPPLY LINES AND SERVICE THE TWO EMU'S.

(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 WATER SUPPLY SWITCH 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 WATER SUPPLY SWITCH 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 5050107W), 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
NUMBER: M5-6SS-0608A-01

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