

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER:MB-1SS-E043 -X****SUBSYSTEM NAME: ECLSS - EMU POTABLE & WASTE WATER SYSTEM
REVISION: 0 04/08/97**

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	:VALVE, SOLENOID LATCHING VALCOR ENGINEERING CORP	ME284-0518-1023 V70500-59-1

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
ECLSS PANEL EMU POTABLE WATER SUPPLY SOLENOID LATCHING (CONTROL) VALVE****QUANTITY OF LIKE ITEMS: 2
TWO****FUNCTION:
ALLOWS FLOW OF POTABLE WATER TO AFFECTED EMU WHEN VALVE IS LATCHED IN
THE OPEN POSITION. WHEN VALVE IS LATCHED CLOSED, IT PROVIDES EMU
ISOLATION AGAINST A 40 PSIA MAXIMUM WATER SUPPLY PRESSURE.****REFERENCE DOCUMENTS: VS28-643001**

FAILURE MODES EFFECTS ANALYSIS FMEA - NON-CIL FAILURE MODE

NUMBER: M8-1SS-E043-01

REVISION#: 0 04/08/97

SUBSYSTEM NAME: ECLSS - EMU POTABLE & WASTE WATER SYSTEM

LRU: ECLSS PANEL EMU POTABLE WATER CONTROL VALVE CRITICALITY OF THIS

ITEM NAME: VALVE, EMU POTABLE WATER CONTROL FAILURE MODE: 1R3

FAILURE MODE:

FAILS TO OPEN, RESTRICTED FLOW (CLOGGED)

MISSION PHASE: OO ON-ORBIT

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

CAUSE:

CHEMICAL REACTION, CONTAMINATION, MECHANICAL SHOCK, EXCESSIVE VIBRATION,
MISHANDLING OR ABUSE, INTERNAL COMPONENT FAILURE

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN	A) PASS
	B) PASS
	C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

METHOD OF FAULT DETECTION:

VISUAL OBSERVATION - INCREASED TIME IN FILLING EMU POTABLE WATER TANK.
INSTRUMENTATION - (1) SHUTOFF VALVE POSITION INDICATION ON M0130 PANEL AND
IN TELEMETRY DATA; (2) EMU POTABLE WATER SUPPLY PRESSURE ANOMALY ON THE
AW62D PANEL PRESSURE GAUGE; OR (3) REDUCED OR LOSS OF WATER PRESSURE TO
EMU'S CAN ALSO BE OBTAINED FROM THE ISSA POTABLE WATER SUPPLY PRESSURE
TRANSDUCER.

MASTER MEAS. LIST NUMBERS:	V64X0515E
	V64X0535E

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CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:

CREW COULD UTILIZE REDUNDANT POTABLE WATER PATH TO FILL ALL EMU'S. IN THE EVENT THE ALTERNATE PATH CANNOT BE USED, CREW COULD UTILIZE AN EMU THAT CONTAINS WATER TO PERFORM AN EVA SINCE EMU POTABLE WATER TANKS ARE FILLED PRIOR TO LAUNCH. TO REDUCE THE USE OF EMU POTABLE WATER CREW COULD MANEUVER ORBITER/ISS SUCH THAT EVA CREWMEMBERS ARE NOT EXPOSED TO THE SUN DURING AN EVA.

REMARKS/RECOMMENDATIONS:

WITHIN THE ECLSS PANEL DUAL POTABLE WATER SUPPLY PATHS ARE PROVIDED TO SERVICE THE EMU'S. EACH PATH CONTAINS ONE LATCHING VALVE TO CONTROL FLOW OF POTABLE WATER. WORST CASE SCENARIO IS WHEN POTABLE WATER FLOW THROUGH VALVE IS RESTRICTED PRIOR TO FILLING AFFECTED EMU. THIS WATER IS USED FOR DRINKING AND COOLING PURPOSES. THE EMU POTABLE WATER TANKS ARE FULL PRIOR TO LAUNCH.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

REDUCED OR LOSS OF POTABLE WATER TO AFFECTED EMU MECHANICAL FITTING.

(B) INTERFACING SUBSYSTEM(S):

FIRST FAILURE MAY INCREASE TIME REQUIRED FOR EVA PREPARATION SINCE ALL EMU'S WILL BE SERVICED FROM ONLY ONE POTABLE WATER PATH. LOSS OF EVA CAPABILITIES SUBSEQUENT TO FIRST EVA FOLLOWING SIMILAR FAILURE ON REDUNDANT PATH SINCE WATER IS NOT AVAILABLE TO COOL EMU'S.

(C) MISSION:

NO INITIAL EFFECT. SIMILAR FAILURE ON REDUNDANT WATER SUPPLY PATH - WORST CASE, LOSS OF CAPABILITY TO PERFORM A SECOND PLANNED EVA DUE TO LOSS OF POTABLE WATER TO EMU'S. LOSS OF MISSION OBJECTIVES ASSOCIATED WITH PLANNED EVA'S SUBSEQUENT TO INITIAL EVA.

(D) CREW, VEHICLE, AND ELEMENT(S):

NO EFFECT UNTIL FAILURE OCCURS AFTER INITIAL EVA. THEN INABILITY TO PERFORM A CONTINGENCY EVA TO CORRECT A POTENTIAL CRIT 1 EVENT COULD RESULT IN LOSS OF CREW AND VEHICLE.

(E) FUNCTIONAL CRITICALITY EFFECTS:

FIRST FAILURE (VALVE IN FIRST PATH FAILS TO OPEN OR CLOGS) - INABILITY TO SERVICE AFFECTED EMU USING ONE POTABLE WATER SUPPLY PATH RESULTING IN INCREASED TIME TO PREPARE FOR AN EVA.

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SECOND FAILURE (VALVE IN SECOND PATH FAILS TO OPEN OR CLOGS) - WORST CASE IF SECOND FAILURE OCCURS FOLLOWING AN INITIAL EVA. THEN LOSS OF WATER SUPPLY FOR COOLING EMU'S WOULD PRECLUDE SUBSEQUENT EVA CAPABILITIES. POTENTIAL LOSS OF CONTINGENCY EVA OPERATIONS. - CRITICALITY 1R3 CONDITION.

DESIGN CRITICALITY (PRIOR TO DOWNGRADE, DESCRIBED IN (F)): 1R3

(F) RATIONALE FOR CRITICALITY DOWNGRADE:
WORKAROUND TO MANEUVER ORBITER/ISS SUCH THAT EVA CREWMEMBERS ARE NOT EXPOSED TO THE SUN DOES NOT CHANGE THE CRITICALITY OF THIS FAILURE MODE. CRITICALITY REMAINS AT 1R3.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: SECONDS

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:
CREW HAS AMPLE TIME TO UTILIZE REDUNDANT POTABLE WATER PATH TO FILL ALL EMU'S OR MANEUVER ORBITER/ISS SUCH THAT EVA CREWMEMBERS ARE NOT EXPOSED TO THE SUN BEFORE LOSS OF EMU POTABLE WATER BECOMES CATASTROPHIC.

HAZARD REPORT NUMBER(S): FF-09

HAZARD(S) DESCRIPTION:
INABILITY TO SAFELY PERFORM EVA.

- APPROVALS -

SS & PAE
DESIGN ENGINEER

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