

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER:M8-1SS-ED42 -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:
EMU POTABLE WATER SUPPLY SOLENOID LATCHING (SHUTOFF) VALVE

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:
 PROVIDES A QUICK MEANS OF SHUTTING OFF POTABLE WATER FLOW TO BOTH EMU SERVICE PORTS. VALVE IS NORMALLY OPEN DURING EMU SERVICING.

REFERENCE DOCUMENTS: VS28-643001

FAILURE MODES EFFECTS ANALYSIS FMEA - NON-CIL FAILURE MODE

NUMBER: M8-1SS-E042-02

REVISION#: 0 04/08/97

SUBSYSTEM NAME: ECLSS - EMU POTABLE & WASTE WATER SYSTEM

LRU: EMU POTABLE WATER SHUTOFF VALVE

CRITICALITY OF THIS

ITEM NAME: VALVE, EMU POTABLE WATER SHUTOFF

FAILURE MODE: 1R3

FAILURE MODE:

FAILS TO CLOSE, INTERNAL LEAKAGE

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/PHYSICAL OBSERVATION - EMU TANKS CONTINUE TO FILL WITH WATER WHEN VALVE IS COMMANDED CLOSED.

INSTRUMENTATION - (1) OPEN SHUTOFF VALVE POSITION INDICATION ON M013Q PANEL AND IN TELEMETRY DATA; (2) EMU POTABLE WATER SUPPLY PRESSURE INDICATION ON THE AW82D PANEL PRESSURE GAUGE; OR (3) WATER PRESSURE TO EMU'S CAN ALSO BE OBTAINED FROM THE ISSA POTABLE WATER SUPPLY PRESSURE TRANSDUCER.

MASTER MEAS. LIST NUMBERS: V64X0156E

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CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:
POTABLE WATER TO EMU'S CAN BE SHUTOFF BY DISCONNECTING THE QD LOCATED AT THE MICROBIAL CHECK VALVE OR BY CLOSING THE INDIVIDUAL SOLENOID LATCHING VALVES ON THE ECLSS PANEL.

REMARKS/RECOMMENDATIONS:
A SINGLE PATH PROVIDES POTABLE WATER TO THE ECLSS PANEL TO SERVICE BOTH EMU'S. CONTROL OF POTABLE WATER IN EACH OF THE TWO EMU PATHS IS PROVIDED BY A SOLENOID OPERATED LATCHING VALVE LOCATED IN THE ELCSS PANEL.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

INABILITY TO QUICKLY SHUT OFF POTABLE WATER FLOW TO EMU'S.

(B) INTERFACING SUBSYSTEM(S):

NO EFFECT UNTIL AN EXTERNAL LEAKAGE OCCURS. THEN INCREASED USE OF POTABLE WATER FOLLOWING FIFTH FAILURE COULD POTENTIALLY DRAIN ORBITER FLASH EVAP SYSTEM. POTENTIAL FOR WATER BUILDUP IN EXTERNAL AIRLOCK, CREW CABIN MID DECK, OR PAYLOAD BAY DEPENDING ON WHERE LEAKAGE OCCURRED.

(C) MISSION:

NO EFFECT ON MISSION SINCE VALVE IS NORMALLY FLOWN OPEN.

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

NO EFFECT FIRST FAILURE. INADVERTENT DRAINING OF ORBITER FLASH EVAP SYSTEM FOLLOWING FIFTH FAILURE COULD RESULT IN LOSS OF CREW AND VEHICLE.

(E) FUNCTIONAL CRITICALITY EFFECTS:

FIRST FAILURE (POTABLE WATER SHUTOFF VALVE FAILS TO CLOSE OR INTERNALLY LEAKS) - NO EFFECT UNTIL AN EXTERNAL LEAKAGE OF POTABLE WATER OCCURS DOWNSTREAM OF THIS VALVE.
SECOND FAILURE (EXTERNAL LEAKAGE OF POTABLE WATER DOWNSTREAM OF SHUTOFF VALVE) - UNABLE TO NOMINALLY STOP INADVERTENT DRAINING OF WATER FROM ORBITER FLASH EVAP SYSTEM WITHOUT PERFORMING A WORKAROUND. -
CRITICALITY 1R2 CONDITION

DESIGN CRITICALITY (PRIOR TO DOWNGRADE, DESCRIBED IN (F)): 1R2

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(F) RATIONALE FOR CRITICALITY DOWNGRADE:

THIRD FAILURE (UNABLE TO PERFORM WORKAROUND TO DISCONNECT QD) - UNABLE TO STOP INADVERTENT DRAINING OF ORBITER FLASH EVAP SYSTEM USING THIS QD.
FOURTH FAILURE (DUCT TAPING OF LEAK FAILS TO STOP LEAKAGE) - UNABLE TO STOP INADVERTENT DRAINING OF ORBITER FLASH EVAP SYSTEM USING TAPE.
FIFTH FAILURE (UNABLE TO STOP FLOW OF WATER TO AIRLOCK BY CLOSING APPROPRIATE ORBITER POTABLE & SUPPLY WATER SYSTEM VALVES) - UNABLE TO PERFORM WORKAROUND TO ISOLATE EXTERNAL LEAKAGE OF WATER FROM ORBITER POTABLE & SUPPLY WATER SYSTEM. CONTINUOUS DRAINING OF ORBITER FLASH EVAP SYSTEM COULD RESULT IN POTENTIAL LOSS OF CREW AND VEHICLE. - CRITICALITY 1R3 CONDITION.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

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 WOULD HAVE SUFFICIENT TIME TO STOP EXTERNAL LEAKAGE OF POTABLE WATER BEFORE LOSS OF WATER FROM ORBITER FLASH EVAP SYSTEM BECOMES CATASTROPHIC.

HAZARD REPORT NUMBER(S): ORBI 278

HAZARD(S) DESCRIPTION:

LOSS OF FLASH EVAPORATION FUNCTION

- APPROVALS -

SS & PAE
DESIGN ENGINEER

: M. W. GUENTHER
: S. CASTILLO

M. W. Guenther
S. Castillo
