FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER:M8-1SS-E032 -X

SUBSYSTEM NAME: ECLSS - ARPCS

REVISION: 0 04/08/97

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:CAP, PRESSURE CARELTON TECHNOLOGIES	MC250-0004-0011 2765-0018-5

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
EXTERNAL AIRLOCK MANUAL DEPRESS VALVE PRESSURE CAP

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:
CAPS ONTO EXTERNAL AIRLOCK MANUAL DEPRESSURIZATION VALVE TO PROVIDE SECONDARY PROTECTION FOR INTERNAL LEAKAGE THROUGH THE VALVE. CAN BE REMOVED BY CREW IN A PRESSURE GARMENT ASSEMBLY AND IS TETHERED TO PREVENT MOVEMENT AWAY FROM THE VALVE ASSEMBLY.

REFERENCE DOCUMENTS: VS28-643001
VB28-643050

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SUBSYSTEM NAME: ECLSS - APRCS
LRU: CAP, DEPRESSURIZATION VALVE PRESSURE CRITICALITY OF THIS
ITEM NAME: CAP, DEPRESSURIZATION VALVE PRESSURE FAILURE MODE: 1R3

FAILURE MODE:
INABILITY TO REMOVE

MISSION PHASE: OO ON-ORBIT

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

CAUSE:
CONTAMINATION, PHYSICAL BINDING/JAMMING, CORROSION, MATERIAL DEFECT, FATIGUE

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:
PHYSICAL OBSERVATION - CREW CANNOT UNSCREW CAP WHEN REQUIRED.

CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:
CREW COULD UTILIZE ONE OR BOTH EQUALIZATION VALVES ON THE EXTERNAL AIRLOCK AFT HATCH (WHEN A PRESSURIZED PAYLOAD IS NOT INSTALLED) OR UTILIZE ONE OR BOTH EQUALIZATION VALVES ON THE TUNNEL ADAPTER "C" HATCH (WHEN A PRESSURIZED PAYLOAD IS INSTALLED) TO VENT PRESSURE TO THE OUTSIDE WHEN

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ORBITER AND SPACE STATION ARE DOCKED. ADDITIONAL CAPABILITY TO DEPRESSURIZE ODS IS AVAILABLE WHEN ORBITER AND SPACE STATION ARE NOT DOCKED BY THE USE OF ONE OR BOTH EQUALIZATION VALVES ON EXTERNAL AIRLOCK UPPER HATCH.

REMARKS/RECOMMENDATIONS:
VALVE/CAP IS ONLY UTILIZED TO DEPRESSURIZE ODS FOR PERFORMING AN EVA. IT IS IDENTICAL TO THE MANUAL DEPRESS VALVE/CAP LOCATED WITHIN THE INTERNAL AIRLOCK.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF MANUAL DEPRESS VALVE RESULTING IN LOSS OF CAPABILITY TO DEPRESS ODS USING THIS VALVE.

(B) INTERFACING SUBSYSTEM(S):
EVA ACTIVITIES WOULD BE MORE COMPLEX.

(C) MISSION:
NO EFFECT UNTIL ALL ODS DEPRESSURIZATION CAPABILITIES ARE LOST. THEN INABILITY TO DEPRESSURIZE ODS TO PERFORM A PLANNED EVA WOULD RESULT IN LOSS OF MISSION OBJECTIVES ASSOCIATED WITH EVA.

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT UNTIL ALL ODS DEPRESSURIZATION CAPABILITIES ARE LOST. THEN INABILITY TO DEPRESSURIZE ODS TO PERFORM A CONTINGENCY EVA COULD RESULT IN LOSS OF CREW AND VEHICLE.

(E) FUNCTIONAL CRITICALITY EFFECTS:
WORST CASE WHEN ORBITER AND SPACE STATION ARE DOCKED:
FIRST FAILURE (INABILITY TO REMOVE PRESSURE CAP FROM MANUAL DEPRESS VALVE) - INABILITY TO DEPRESSURIZE ODS USING EXTERNAL AIRLOCK MANUAL DEPRESS VALVE.
SECOND FAILURE (FIRST EQUALIZATION VALVE ON EXTERNAL AIRLOCK AFT HATCH (WHEN NO PRESSURIZED PAYLOAD IS INSTALLED) OR ON TUNNEL ADAPTER "C" HATCH (WHEN A PRESSURIZED PAYLOAD IS INSTALLED) FAILS TO OPEN) - NO EFFECT OTHER THAN DEPRESSURIZATION TIME INCREASED WHEN USING A SINGLE EQUALIZATION VALVE TO VENT PRESSURE OVERBOARD.
THIRD FAILURE (SECOND EQUALIZATION VALVE ON EXTERNAL AIRLOCK AFT HATCH (WHEN NO PRESSURIZED PAYLOAD IS INSTALLED) OR ON TUNNEL ADAPTER "C" HATCH (WHEN A PRESSURIZED PAYLOAD IS INSTALLED) FAILS TO OPEN) - LOSS OF ALL ODS DEPRESS CAPABILITIES RESULTING IN THE INABILITY TO PERFORM AN EVA. LOSS OF

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MISSION OBJECTIVES ASSOCIATED WITH A PLANNED EVA. - CRITICALITY 2R3 CONDITION.
FOURTH FAILURE (FAILURE NECESSITATING AN EVA TO CORRECT A POTENTIAL CATASTROPHIC SITUATION) - LOSS OF CONTINGENCY EVA CAPABILITIES TO CORRECT A CRIT 1 CONDITION COULD RESULT IN LOSS OF CREW AND VEHICLE. - CRITICALITY 1R3 CONDITION.

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

(F) RATIONALE FOR CRITICALITY DOWNGRADE:
NONE. ALL WORKAROUNDS HAVE ALREADY BEEN CONSIDERED IN THE 1R3 CRITICALITY OF THIS FAILURE MODE.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: IMMEDIATE

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 AMPLE TIME TO DEPRESSURIZE ODS FOR PERFORMING AN EVA USING HATCH EQUALIZATION VALVES BEFORE PROBLEM BECAME CATASTROPHIC.

HAZARD REPORT NUMBER(S): FF-09

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

- APPROVALS -

SS & PAE	:	M. W. GUENTHER	:
DESIGN ENGINEER	:	K. J. KELLY	: