FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER:M8-1SS-E033 -X

SUBSYSTEM NAME: ECLSS - ARPCS

REVISION: 0 04/08/97

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:FILTER, MANUAL DEPRESS VALVE CARELTON TECHNOLOGIES	2765-0023-1 2765-0023-1

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

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:
LOCATED ON THE INLET OF THE MANUAL DEPRESS VALVE, THE FILTER PROVIDES FOR SCREENING OUT EXTERNAL AIRLOCK DEBRIS AND CONDENSATE TO PREVENT THE VALVE FROM BEING CONTAMINATED. THE FILTER CAN BE REMOVED BY A CREW MEMBER IN A PRESSURIZED SUIT FOR IN-FLIGHT MAINTENANCE.

REFERENCE DOCUMENTS: VS28-643001
V828-643050

FAILURE MODES EFFECTS ANALYSIS FMEA – NON-CIL FAILURE MODE
NUMBER: M8-1SS-E033-01

REVISION#: 0 04/08/97

SUBSYSTEM NAME: ECLSS - ARPCS
LRU: FILTER, MANUAL DEPRESSURIZATION VALVE CRITICALITY OF THIS
ITEM NAME: FILTER, MANUAL DEPRESSURIZATION VALVE FAILURE MODE: 1R3

FAILURE MODE:
RESTRICTED FLOW (CLOGGED)

MISSION PHASE: OO ON-ORBIT

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

CAUSE:
EXCESSIVE DEBRIS FROM EXTERNAL AIRLOCK, GRADUAL BUILDUP OF CONTAMINATES, CORROSION

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:
INSTRUMENTATION/PHYSICAL OBSERVATION - REDUCED DEPRESSURIZATION RATE.

CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:
FILTER IS ACCESSIBLE FOR IN-FLIGHT MAINTENANCE. IN THE VENT SCREEN CANNOT BE CLEANED OR REMOVED, 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

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ADAPTER "C" HATCH (WHEN A PRESSURIZED PAYLOAD IS INSTALLED) TO VENT PRESSURE TO THE OUTSIDE WHEN 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:
FILTER IS LOCATED ON THE INLET OF THE DEPRESSURIZATION VALVE AND IS ACCESSIBLE DURING FLIGHT.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
FUNCTIONAL DEGRADATION - REDUCED AIRFLOW THRU DEPRESSURIZATION VALVE.

(B) INTERFACING SUBSYSTEM(S):
INCREASED USE OF EMU OXYGEN DURING EVA OPERATIONS. EVA ACTIVITIES WOULD BE MORE COMPLEX.

(C) MISSION:
ODS DEPRESS/EVA OPERATIONS WOULD REQUIRE MORE TIME. 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):
CREW INCONVENIENCE - INCREASE USE OF CREW'S TIME IN COMPLETING ODS DEPRESS/EVA OPERATIONS. 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 (RESTRICTED AIRFLOW THRU DEPRESS VALVE FILTER) - NO EFFECT UNTIL FILTER CANNOT BE REMOVED OR CLEANED.
SECOND FAILURE (FILTER CANNOT BE REMOVED OR CLEANED) - ODS DEPRESS OPERATIONS THROUGH DEPRESS VALVE WOULD REQUIRE MORE TIME. WORST CASE IF AIRFLOW IS COMPLETELY RESTRICTED, LOSS OF ODS DEPRESS CAPABILITIES USING EXTERNAL AIRLOCK MANUAL DEPRESS VALVE.
THIRD 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.

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FOURTH 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 MISSION OBJECTIVES ASSOCIATED WITH A PLANNED EVA. - CRITICALITY 2R3 CONDITION.
FIFTH 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: 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:
CREW HAS ENOUGH TIME TO REMOVE/CLEAN FILTER OR UTILIZE HATCH EQUALIZATION VALVES TO DEPRESSURIZE EXTERNAL AIRLOCK BEFORE THE NEED TO PERFORM CONTINGENCY EVA 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	: