

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE
NUMBER: M8-1SS-E048 -X**

**SUBSYSTEM NAME: ECLSS - EMU OXYGEN RECHARGE SYSTEM
REVISION: 0 04/08/97**

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:VALVE, O2 CONTROL CARLETON TECHNOLOGIES	MC250-0004-0006 1-4-00-51-27

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
ECLSS PANEL EMU OXYGEN CONTROL VALVE**

**QUANTITY OF LIKE ITEMS: 2
TWO**

FUNCTION:
ALLOWS FLOW OF OXYGEN TO AFFECTED EMU SERVICE PORT WHEN VALVE IS IN THE OPEN POSITION. WHEN VALVE IS CLOSED, IT PROVIDES EMU ISOLATION AGAINST OXYGEN SUPPLY PRESSURE. VALVE IS NORMALLY OPEN DURING EMU SERVICING.

REFERENCE DOCUMENTS: VS2B-643001

FAILURE MODES EFFECTS ANALYSIS FMEA - NON-CIL FAILURE MODE

NUMBER: M8-1SS-E048-01

REVISION#: 0 04/08/97

SUBSYSTEM NAME: ECLSS - EMU OXYGEN RECHARGE SYSTEM

LRU: ECLSS PANEL EMU OXYGEN CONTROL VALVE

CRITICALITY OF THIS

ITEM NAME: VALVE, EMU OXYGEN 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:**

CONTAMINATION, CORROSION, MECHANICAL SHOCK, EXCESSIVE VIBRATION, PHYSICAL BINDING/JAMMING

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 OXYGEN TANKS.

INSTRUMENTATION - EMU OXYGEN PRESSURE ANOMALY ON AW82D PANEL PRESSURE GAUGE OR ON EMU ITSELF.

CORRECTING ACTION: MANUAL

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CORRECTING ACTION DESCRIPTION:

CREW COULD UTILIZE REDUNDANT ECLSS EMU OXYGEN SUPPLY PATH TO FILL ALL EMU'S OR UTILIZE AN EMU THAT CONTAINS SUFFICIENT AMOUNT OF OXYGEN TO PERFORM AN EVA.

REMARKS/RECOMMENDATIONS:

WITHIN THE ECLSS PANEL DUAL OXYGEN SUPPLY PATHS ARE PROVIDED TO SERVICE THE EMU'S. EACH PATH CONTAINS ONE VALVE TO CONTROL FLOW OF OXYGEN. WORST CASE SCENARIO IS WHEN OXYGEN FLOW THROUGH VALVE IS RESTRICTED PRIOR TO FILLING AFFECTED EMU. EACH EMU CONTAINS TWO PRIMARY AND TWO SECONDARY TANKS ALL OF WHICH ARE FILLED PRIOR TO LAUNCH.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

REDUCED OR LOSS OF OXYGEN TO AFFECTED EMU MECHANICAL FITTING AND QUICK DISCONNECT.

(B) INTERFACING SUBSYSTEM(S):

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

(C) MISSION:

NO INITIAL EFFECT. SIMILAR FAILURE ON REDUNDANT OXYGEN SUPPLY PATH - WORST CASE, LOSS OF CAPABILITY TO PERFORM A SECOND PLANNED EVA DUE TO LOSS OF OXYGEN 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 SECOND 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 OXYGEN SUPPLY PATH RESULTING IN INCREASED TIME TO PREPARE FOR AN EVA.
SECOND FAILURE (VALVE IN SECOND PATH FAILS TO OPEN OR CLOGS) - WORST CASE IF SECOND FAILURE OCCURS FOLLOWING AN INITIAL EVA. THEN LOSS OF OXYGEN SUPPLY FOR BREATHING PURPOSES WOULD PRECLUDE SUBSEQUENT EVA CAPABILITIES. CREW DECISION TO ABORT A SECOND PLANNED EVA WOULD RESULT IN

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LOSS OF MISSION OBJECTIVES ASSOCIATED WITH SUBSEQUENT PLANNED EVA'S -
CRITICALITY 2R3 CONDITION.
THIRD FAILURE (FAILURE NECESSITATING AN EVA TO PREVENT A POTENTIAL
CATASTROPHIC SITUATION) - INABILITY TO PERFORM CONTINGENCY EVA TO
CORRECT A CRIT 1 CONDITION COULD RESULT IN LOSS OF CREW AND VEHICLE -
CRITICALITY 1R3 CONDITION.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: SECONDS

TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: HOURS

**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 ECLSS EMU OXYGEN SUPPLY PATH TO
FILL ALL EMU'S BEFORE PROBLEM BECOMES CATASTROPHIC.**

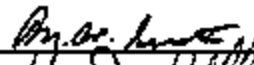
HAZARD REPORT NUMBER(S): FF-09

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

- APPROVALS -

SS & PAE
DESIGN ENGINEER

: M. W. GUENTHER
: K. J. KELLY

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