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PRINT DATE: 10/13/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER: M8-1MR-E027-X

SUBSYSTEM NAME: ECLSS - PRESSURIZED PAYLOAD

REVISION: 2 9/15/95

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	CLAMP, LATCHING OVER CENTER	ME277-0028-0002

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

EXTERNAL AIRLOCK/SPACELAB (OR OTHER PRESSURIZED PAYLOAD) FLEXIBLE DUCT
OVER CENTER LATCHING CLAMP

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:

PROVIDES QUICK CONNECT/DISCONNECT OF THE SPACELAB (OR OTHER
PRESSURIZED PAYLOAD) INLET FLEXIBLE DUCT TO/FROM THE SPACELAB (OR OTHER
PRESSURIZED PAYLOAD) DUCT AIR ELBOW ADAPTER. THE OTHER END OF THE
FLEXIBLE DUCT CONNECTS TO THE EXTERNAL AIRLOCK RIGID DUCT OUTLET USING A
COUPLING NUT. THIS FMEA IS ONLY APPLICABLE IF THERE IS A PRESSURIZED
PAYLOAD CONNECTED TO THE EXTERNAL AIRLOCK AFT ADAPTER.

REFERENCE DOCUMENTS: V727-634126
M072-643400
M072-643829

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE

NUMBER: M8-1MR-E027-01

REVISION# 2 9/15/95

SUBSYSTEM NAME: ECLSS - PRESSURIZED PAYLOAD

LRU: CLAMP, LATCHING OVER CENTER

CRITICALITY OF THIS

ITEM NAME: CLAMP, LATCHING OVER CENTER

FAILURE MODE: 1R3

FAILURE MODE:

UNABLE TO DISCONNECT

MISSION PHASE:

OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:

MECHANICAL SHOCK, PHYSICAL DAMAGE

CRITICALITY 1R1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? N/A

REDUNDANCY SCREEN

A) PASS

B) N/A

C) PASS

PASS/FAIL RATIONALE:

A)

B)

N/A - AT LEAST TWO REMAINING PATHS ARE DETECTABLE IN FLIGHT.

C)

METHOD OF FAULT DETECTION:

PHYSICAL OBSERVATION

CORRECTING ACTION: CREW CAN DISCONNECT OTHER END OF FLEXIBLE DUCT BY USING THE COUPLING NUT. IF THE NUT CANNOT BE REMOVED, GIVEN ENOUGH TIME, THE CREW COULD SEPARATE THE FLEXIBLE DUCT FROM THE FLANGE AT THE CLAMP END OR FROM THE ELBOW AT THE NUT END BY REMOVING THE FLEXIBLE DUCT STRAP OR CUT THE FLEXIBLE DUCT ITSELF. ONCE SEPARATED THE FLEXIBLE DUCT CAN BE STOWED AND EXTERNAL AIRLOCK AFT HATCH CLOSED.

REMARKS/RECOMMENDATIONS:

THE LATCHING OVER-CENTER CLAMP IS DESIGNED FOR QUICK DISCONNECT. THIS FMEA IS ONLY APPLICABLE IF THERE IS A PRESSURIZED PAYLOAD CONNECTED TO THE EXTERNAL AIRLOCK AFT ADAPTER.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE
NUMBER: M8-1MR-E027- 01**

- FAILURE EFFECTS -

(A) SUBSYSTEM:

UNABLE TO REMOVE FLEXIBLE DUCT AT SPACELAB (OR OTHER PRESSURIZED PAYLOAD) DUCT AIR ELBOW ADAPTER INLET. NO EFFECT FIRST FAILURE. FAILURE TO DETACH FLEXIBLE DUCT AT OTHER END WOULD RESULT IN LOSS OF CAPABILITY TO QUICKLY CLOSE EXTERNAL AIRLOCK AFT HATCH WHEN REQUIRED.

(B) INTERFACING SUBSYSTEM(S):

NO EFFECT ON ORBITER INTERFACING SUBSYSTEMS.

(C) MISSION:

NO EFFECT UNTIL EXTERNAL AIRLOCK AFT HATCH CANNOT BE CLOSED. AT WHICH TIME MISSION OBJECTIVES WOULD BE LOST SINCE SPACELAB (OR OTHER PRESSURIZED PAYLOAD) CANNOT BE USED FOLLOWING AN EMERGENCY EVA OUT EXTERNAL AIRLOCK.

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

NO EFFECT FIRST FAILURE. FAILURE TO QUICKLY CLOSE EXTERNAL AIRLOCK AFT HATCH FOLLOWING SECOND FLEXIBLE DUCT ATTACHMENT FAILURE WOULD JEOPARDIZE THE SAFETY OF CREW AND VEHICLE IF AN EXCESSIVE LEAK WITHIN SPACELAB (OR OTHER PRESSURIZED PAYLOAD) OCCURS OR IF CONTINGENCY EVA IS REQUIRED OUT EXTERNAL AIRLOCK.

(E) FUNCTIONAL CRITICALITY EFFECTS:

FIRST FAILURE (UNABLE TO DISCONNECT QUICK DISCONNECT CLAMP) - NO EFFECT. SECOND FAILURE (UNABLE TO DISCONNECT COUPLING NUT ON OTHER END OF FLEXIBLE DUCT) - INABILITY TO QUICKLY DETACH FLEXIBLE DUCT AT BOTH ENDS RESULTING IN LOSS OF CAPABILITY TO CLOSE EXTERNAL AIRLOCK AFT HATCH IN A TIMELY MANNER.

THIRD FAILURE: (1) AN EXCESSIVE PRESSURE LEAK WITHIN THE SPACELAB (OR OTHER PRESSURIZED PAYLOAD) - CREW IS PREVENTED FROM ISOLATED THE EXTERNAL AIRLOCK FROM THE SPACELAB (OR OTHER PRESSURIZED PAYLOAD) RESULTING IN LOSS OF CONSUMABLES WITHIN EXTERNAL AIRLOCK HABITABLE VOLUME. CREW SAFETY JEOPARDIZED WITH LOSS OF CONSUMABLES. (2) AN EXCESSIVE PRESSURE LEAK WITH EXTERNAL AIRLOCK - INABILITY TO ISOLATE SPACELAB (OR OTHER PRESSURIZED PAYLOAD) FROM EXTERNAL AIRLOCK VOLUME COULD RESULT IN LOSS OF PRESSURE WITHIN SPACELAB (OR OTHER PRESSURIZED PAYLOAD). INSUFFICIENT AMOUNT OF CONSUMABLES TO REPRESSURIZE EXTERNAL AIRLOCK AND SPACELAB (OR OTHER PRESSURIZED PAYLOAD) VOLUMES TOGETHER COULD PRECLUDE CONTINGENCY EVA CAPABILITIES OUT EXTERNA AIRLOCK.

POSSIBLE LOSS OF PRESSURE IN MIR WITH EXTERNAL AIRLOCK UPPER HATCH OPEN FOLLOWING THIRD FAILURE.

DESIGN CRITICALITY (PRIOR TO DOWNGRADE, DESCRIBED IN (F)): N/A

(F) RATIONALE FOR CRITICALITY DOWNGRADE:

NONE. THE CRITICALITY OF THIS FAILURE MODE REMAINS UNCHANGED.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: HOURS TO DAYS

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NUMBER: M8-1MR-E027-01

TIME FROM FAILURE OCCURRENCE TO DETECTION: IMMEDIATE

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: SECONDS TO MINUTES

IS TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT?
YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
CREW WOULD HAVE AMPLE TIME TO REMOVE THE FLEXIBLE DUCT AND CLOSE
EXTERNAL AIRLOCK AFT HATCH BEFORE LOSS OF CONSUMABLES BECAME
CATASTROPHIC.

HAZARDS REPORT NUMBER(S): ORBI 511

HAZARD(S) DESCRIPTION:
LOSS OF HABITABLE PRESSURE.

- APPROVALS -

PRODUCT ASSURANCE ENGR. : M. W. GUENTHER
DESIGN ENGINEER : K. N. DUONG

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