FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER: M8-1MR-E011-X

SUBSYSTEM NAME: ECLSS - EXTERNAL AIRLOCK
REVISION: 2 9/15/95

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: TRANSDUCER, ABSOLUTE PRESSURE	ME449-0178-2101

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
EXTERNAL AIRLOCK ABSOLUTE PRESSURE TRANSDUCER

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:
ONE PRESSURE TRANSDUCER LOCATED IN EXTERNAL AIRLOCK PROVIDES STATUS OF ABSOLUTE PRESSURE WITHIN THE EXTERNAL AIRLOCK. THIS MEASUREMENT IS MONITORED BY THE CREW AND IS DOWNLINKED TO GROUND PERSONNEL.

REFERENCE DOCUMENTS: V828-754124
VS70-873099

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M8-1MR-E011- 01

REVISION# 2 9/15/95

SUBSYSTEM NAME: ECLSS - EXTERNAL AIRLOCK
LRU: TRANSDUCER, ABSOLUTE PRESSURE
ITEM NAME: TRANSDUCER, ABSOLUTE PRESSURE

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
OPEN, SHORTED, OUT-OF-TOLERANCE

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:
MECHANICAL SHOCK, VIBRATION, CORROSION, CONTAMINATION

CRITICALITY 1/1 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:
DELTA PRESSURE ANOMALY

MASTER MEAS. LIST NUMBERS: V64P0126A

CORRECTING ACTION: CREW CAN UTILIZE PRESSURE INDICATIONS IN THE CREW CABIN, INTERNAL AIRLOCK, AND SPACELAB ENVIRONMENTS SINCE PRESSURE IN THESE AREAS AND IN THE EXTERNAL AIRLOCK ARE THE SAME WITH ALL INTERNAL HATCHES OPEN. IF TRANSDUCER IS UTILIZED TO DETERMINE DELTA-PRESSURE ACROSS EXTERNAL AIRLOCK UPPER HATCH, DELTA-P SENSOR AND DELTA-P GAUGE CAN BE UTILIZED TO REMOTELY AND LOCALLY DETERMINE THE SAME PRESSURE DIFFERENTIAL.

REMARKS/RECOMMENDATIONS:
ALL INTERNAL HATCHES ARE OPEN DURING IVA OPERATIONS. PRESSURE TRANSDUCER CAN BE UTILIZED TO DETERMINE DIFFERENTIAL PRESSURE ACROSS EXTERNAL AIRLOCK UPPER HATCH AS PART OF THE UPPER HATCH LEAK TEST BEING

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PERFORMED PRIOR TO ORBITER/MIR SEPARATION. LEAK TESTS HAVE BEEN ESTABLISHED BY ORBITER TO BE A CRITICALITY 1 EVENT.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF FUNCTION - UNABLE TO REMOTELY MONITOR PRESSURE IN THE EXTERNAL AIRLOCK.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT ON ORBITER INTERFACING SUBSYSTEMS.

(C) MISSION:
NO EFFECT ON MISSION.

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT UNTIL ALL DELTA-PRESSURE INDICATIONS ACROSS EXTERNAL AIRLOCK UPPER HATCH ARE LOST. THEN CREW WOULD NOT BE ABLE TO PERFORM A LEAK CHECK ACROSS THIS HATCH PRIOR TO ORBITER/MIR SEPARATION.

(E) FUNCTIONAL CRITICALITY EFFECTS:
FIRST FAILURE (ERRONEOUS EXTERNAL AIRLOCK PRESSURE TRANSDUCER READING) - LOSS OF CREW CABIN CAPABILITY TO MONITOR PRESSURE WITHIN EXTERNAL AIRLOCK WHEN ALL INTERNAL HATCHES ARE CLOSED.
SECOND FAILURE (DELTA-PRESSURE SENSOR FAILURE) - UNABLE TO REMOTELY MONITOR DELTA-PRESSURE BETWEEN EXTERNAL AIRLOCK AND VESTIBULE TUNNEL.
THIRD FAILURE (ERRONEOUS DELTA-PRESSURE GAUGE READING ON EXTERNAL AIRLOCK UPPER HATCH) - UNABLE TO DETERMINE IF A LEAK EXISTS ACROSS EXTERNAL AIRLOCK UPPER HATCH DURING THE LEAK CHECK THAT IS PERFORMED PRIOR TO ORBITER/MIR SEPARATION.

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

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: 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 ENOUGH TIME TO UTILIZE OTHER ANNUNCIATIONS TO DETERMINE DELTA PRESSURE ACROSS THE HATCH BEFORE ALL LEAK CHECK CAPABILITIES ARE LOST.

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HAZARDS REPORT NUMBER(S): NONE

HAZARD(S) DESCRIPTION:
N/A

- APPROVALS -

PRODUCT ASSURANCE ENGR.	:	M. W. GUENTHER	:
DESIGN ENGINEER	:	K. J. KELLY	: