FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER: 06-3E-0326 -X

SUBSYSTEM NAME: ATCS - FLASH EVAPORATOR SYSTEM (FES)
REVISION: 0 04/18/01

PART DATA

	PART NAME / **VENDOR NAME**	**PART NUMBER** / **VENDOR NUMBER**
ASSY	: FLASH EVAPORATOR ASSY HAMILTON STANDARD	MC250-0017
LRU	:NOZZLE DUCT, HIGH LOAD HAMILTON STANDARD	MC250-0017-0580 SV767380-4
LRU	:DUCT & HEATER, HI-LOAD HAMILTON STANDARD	MC250-0017-0501 SV767601-4
LRU	: ELBOW & HEATER, HI-LOAD HAMILTON STANDARD	MC250-0017-0581 SV767381-4

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
STEAM DUCT, HIGH LOAD EVAPORATOR.

QUANTITY OF LIKE ITEMS: 1
ONE; DUCT SECTIONS

FUNCTION:
TRANSFERS THE HIGH LOAD EVAPORATOR EXHAUST OVERBOARD. THE DUCT ASSEMBLY CONTAINS THREE HEATER CONTROL ASSEMBLIES.

REFERENCE DOCUMENTS: MC250-0017 - FLASH EVAPORATOR SUBSYSTEM SPEC

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LRU: HIGH LOAD DUCTS; NOZZLE, ELBOW, DUCT **CRITICALITY OF THIS**

ITEM NAME: HIGH LOAD DUCT ASSEMBLY **FAILURE MODE:** 1R3

FUNCTIONAL CRITICALITY/
REQUIRED FAULT TOLERANCE/ACHIEVED FAULT TOLERANCE:1R/1/2

FAILURE MODE:
BLOCKAGE (FREEZING)

MISSION PHASE:
LO LIFT-OFF
OO ON-ORBIT
DO DE-ORBIT

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

CAUSE:
EXCESSIVE WATER CARRYOVER

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN
A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:
A)

B)

C)

CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:
SWITCH TO REDUNDANT HEATER AND/OR ACTIVATE BOTH HEATERS.

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REMARKS/RECOMMENDATIONS:
THE FLASH EVAPORATOR SYSTEM (FES) IS THE PRIMARY HEAT REJECTION FOR ORBITER DURING ASCENT FROM 140,000 FT TO PAYLOAD BAY DOOR (PLB) OPEN. AFTER PLB OPENS, RADIATORS WILL BE THE PRIME HEAT REJECTION DEVICE. FOR DE-ORBIT PREP AND DE-ORBIT, THE FES OPERATES FROM THE PLB CLOSURE UNTIL 100,000 FT. AFTER 100,000 FT, AMMONIA BOILER SUBSYSTEM (ABS) CAN BE USED FOR VEHICLE HEAT REJECTION. DURING ORBITAL OPERATION, THE FES CAN BE USED TO SUPPLEMENT THE RADIATORS DURING THE HIGH ORBITAL HEAT.

BOTH TOPPING AND HI-LOAD EVAPORATORS ARE ACTIVE DURING HIGH VEHICLE HEAT LOADS (DURING ASCENT/ENTRY). DURING ON-ORBIT OPERATION, THE TOPPING EVAPORATOR CAN BE ACTIVATE TO SUPPLEMENT RADIATORS FOR HEAT REJECTION.

THERE ARE THREE HEATER ELEMENTS ON ALL SEGMENTS OF THE HIGH LOAD DUCT/NOZZLE.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF HIGH LOAD EVAPORATOR OPERATION DUE TO BLOCKED DUCT.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT, TOPPING EVAPORATOR CAN BE CONFIGURED TO COMPENSATE FOR THE LOSS OF HIGH LOAD EVAPORATOR.

(C) MISSION:
NO EFFECT

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:
FUNCTIONAL CRITICALITY EFFECT - ANY TWO ADDITIONAL FAILURES (TOPPING EVAPORATOR, RADIATOR, AND/OR AMMONIA BOILER SYSTEM) WILL CAUSE LOSS OF VEHICLE COOLING CAPABILITY AND MAY RESULT IN LOSS OF CREW/VEHICLE, A CRITICALITY 1R3 (PPP) EFFECT.

- TIME FRAME -

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TIME FROM FAILURE TO CRITICAL EFFECT: MINUTES

- APPROVALS -

S&R ENGINEER	: T. T. AI	:_/S/ T. AI_____
DESIGN ENGINEER	: J. HILL	:_/S/ J. HILL_____
SUBSYSTEM MANAGER	: S. NGUYEN	:_/S/ S. NGUYEN_____