

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE**NUMBER: 06-3E-0327 -X****SUBSYSTEM NAME:** ATCS - FLASH EVAPORATOR SYSTEM (FES)**REVISION:** 1 04/18/01

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
ASSY	:FLASH EVAPORATOR ASSY	MC250-0017
LRU	:DUCT & HEATER, OFFSET HAMILTON STANDARDS	MC250-0017-0004 SV767604
LRU	:NOZZLE DUCT, TOPPING HAMILTON STANDARDS	MC250-0017-0006 SV767606-1
LRU	:NOZZLE DUCT, TOPPING HAMILTON STANDARDS	MC250-0017-0007 SV767606-2
LRU	:DUCT & HEATER, TOPPING HAMILTON STANDARDS	MC250-0017-0502 SV767602
LRU	:TRANSITION HAMILTON STANDARDS	MC250-0017-0503 SV767603
LRU	:ELBOW & HEATER, TOPPING HAMILTON STANDARDS	MC250-0017-0505 SV767605

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

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 1
ONE; DUCT SECTIONS

FUNCTION:

TRANSFERS THE TOPPING EVAPORATOR EXHAUST OVERBOARD. THE DUCT ASSEMBLY CONTAINS TEN HEATER CONTROL ASSEMBLIES.

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

NUMBER: 06-3E-0327- 02

REVISION#: 0 04/18/01

SUBSYSTEM NAME: ATCS - FLASH EVAPORATOR SYSTEM (FES)

LRU: TOPPING DUCTS AND NOZZLES

CRITICALITY OF THIS

ITEM NAME: TOPPING DUCT ASSEMBLY

FAILURE MODE: 1R3

FUNCTIONAL CRITICALITY/

REQUIRED FAULT TOLERANCE/ACHIEVED FAULT TOLERANCE:1R/1/4

FAILURE MODE:

OPEN (HEATER OR THERMOSTAT)

MISSION PHASE:

- LO LIFT-OFF
- OO ON-ORBIT
- DO DE-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:

- 102 COLUMBIA
- 103 DISCOVERY
- 104 ATLANTIS
- 105 ENDEAVOUR

CAUSE:

PIECE PART FAILURE, VIBRATION, MECHANICAL SHOCK

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:

CREW CAN SWITCH TO REDUNDANT HEATER.

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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 ACTIVATED TO SUPPLEMENT RADIATORS FOR HEAT REJECTION.

THERE ARE THREE HEATER ELEMENTS FOR THE FOLLOWING TOPPING DUCT AREAS: SECTION D (FROM THE FES TO THE TRANSITION), AND SECTION E (FROM THE TRANSITION TO FIBERGLASS BELLOWS)

THERE ARE TWO HEATER ELEMENTS FOR THE FOLLOWING TOPPING DUCT AREAS: SECTIONS H & F (ELBOW & HEATER ZONES) AND SECTIONS I & G (NOZZLE).

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF ASSOCIATED HEATER

(B) INTERFACING SUBSYSTEM(S):

NO EFFECT

(C) MISSION:

POSSIBLE LOSS OF MISSION DUE TO LOSS OF TOPPING EVAPORATOR COOLING TO SUPPORT PAYLOAD OPERATIONS IF REDUNDANT HEATERS ARE LOST.

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

NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF VEHICLE COOLING CAPABILITY AFTER FOUR ADDITIONAL FAILURES (LOSS OF REDUNDANT HEATER ELEMENTS RESULTING IN LOSS OF TOPPING EVAPORATOR, AND ANY TWO OF FOLLOWING FAILURES: HI-LOAD EVAPORATOR, RADIATOR, AND/OR AMMONIA BOILER SYSTEM)

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- TIME FRAME -

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_____