

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE**  
**NUMBER: 06-3D-0509 -X**

**SUBSYSTEM NAME:** ATCS - RADIATORS AND FLOW CONTROL  
**REVISION:** 0 01/12/98

**PART DATA**

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	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
LRU	: VALVE, ISOLATION CARLETON TECHNOLOGIES	ME284-0603 2632-1001-5

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
FREON LOOP ISOLATION VALVE CONTROL

**REFERENCE DESIGNATORS:**

**QUANTITY OF LIKE ITEMS:** 2  
ONE PER LOOP

**FUNCTION:**  
PROVIDES MEANS OF ISOLATING FREON FLOW FROM THE RADIATOR ARRAY IN THE  
EVENT OF AN EXTERNAL LEAK IN THAT ARRAY.

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

NUMBER: 06-3D-0509- 03

REVISION#: 0 12/09/97

SUBSYSTEM NAME: ATCS - RADIATORS AND FLOW CONTROL

LRU: VALVE, ISOLATION

CRITICALITY OF THIS  
FAILURE MODE: 1R3

ITEM NAME: VALVE, ISOLATION

**FAILURE MODE:**

FAILS IN THE RADIATOR BYPASS POSITION, MECHANICAL JAMMING

MISSION PHASE: OO ON-ORBIT

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

**CAUSE:**

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

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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REDUNDANCY SCREEN	A) PASS
	B) PASS
	C) PASS

**PASS/FAIL RATIONALE:**

A)

B)

C)

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**- FAILURE EFFECTS -**


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**(A) SUBSYSTEM:**

POSSIBLE LOSS OF MISSION DUE TO REDUCED COOLING CAPACITY.

**(B) INTERFACING SUBSYSTEM(S):**

EFFECTED SUBSYSTEMS MAY HAVE TO SHUTDOWN BECAUSE OF REDUCED COOLING CAPACITY.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE**  
**NUMBER: 06-3D-0509- 03**

**(C) MISSION:**

POSSIBLE LOSS OF MISSION AFTER TWO FAILURES:

- (1) INSTRUMENTATION ERROR CAUSES ISOLATION VALVE TO SWITCH TO BYPASS POSITION
- (2) VALVE JAMS IN BYPASS POSITION RESULTING IN INABILITY TO GO TO RAD FLOW.

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

POSSIBLE LOSS OF CREW/VEHICLE AFTER FOUR FAILURES:

- (1) INSTRUMENTATION ERROR CAUSES ISOLATION VALVE TO SWITCH TO RAD BYPASS.
- (2) ISOLATION VALVE JAMS IN RAD BYPASS CAUSING LOSS OF RADIATOR COOLING FOR EFFECTED LOOP AND POSSIBLE LOSS OF MISSION.
- (3) FAILURE OF ANY OTHER COMPONENT IN ASSOCIATED COOLANT LOOP CAUSES LOSS OF COOLANT LOOP.
- (4) LOSS OF REDUNDANT COOLANT LOOP WILL CAUSE LOSS OF ALL VEHICLE COOLING AND MAY CAUSE LOSS OF CREW/VEHICLE.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

POSSIBLE LOSS MISSION AFTER TWO FAILURES:

INSTRUMENTATION ERROR CAUSES ISOLATION VALVE TO SWITCH TO RAD BYPASS POSITION THEN IF ISOLATION VALVE JAMS IN RAD BYPASS POSITION THIS CAUSES LOSS OF RADIATOR COOLING FOR THAT LOOP WITH POTENTIAL LOSS OF MISSION. AFTER THESE TWO FAILURES, FAILURE OF ANY OTHER COMPONENT IN ASSOCIATED COOLANT LOOP WILL CAUSE LOSS OF THAT COOLANT LOOP AND FAILURE OF THE REDUNDANT COOLANT LOOP MAY CAUSE LOSS OF CREW/VEHICLE.

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- APPROVALS -

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SS & PAE MANAGER	:	D.F. MIKULA
SS & PAE ENGINEER	:	K.E. RYAN
ECLSS-ATCS	:	L. T. HARPER
BNA SSM	:	S. N. NGUYEN
JSC MOD	:	
JSC NASA SRQA	:	
JSC NASA SSM	:	
JSC/SAM	:	
JSC/PROJECT MANAGER	:	

USA/eskiter

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