FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

NUMBER: 05-6WB-1001-X

SUBSYSTEM NAME: EPD&C - ECLSS - ATCS/ABS

REVISION : 4 07/03/91

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	PANEL L1A2	V070-730271
SRU	:	SWITCH, TOGGLE	ME452-0102-7354

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE. NH3 CONTROLLERS.

REFERENCE DESIGNATORS: 31V73A1A2 S42
: 31V73A1A2 S43

QUANTITY OF LIKE ITEMS: 2
(TWO), ONE PER CONTROLLER

FUNCTION:
ACTIVATES NH3 FLOW CONTROL "A" OR "B" CIRCUITRY IN THE PRIMARY/GPC OR SECONDARY POSITIONS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6WB-1001-03

REVISION# 4 07/03/91 R

SUBSYSTEM: EPD&C - ECLSS - ATCS/ABS
LRU :PANEL L1A2
ITEM NAME: SWITCH, TOGGLE

CRITICALITY OF THIS FAILURE MODE:1/1

FAILURE MODE:
FAILS CLOSED IN THE "SECONDARY" POSITION, PREMATURE CLOSURE, POLE-TO-POLE SHORT.

MISSION PHASE:
OO ON-ORBIT
DO DE-ORBIT

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

CAUSE:
PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? N

REDUNDANCY SCREEN A) N/A
■ B) N/A
■ C) N/A

PASS/FAIL RATIONALE:
A)

B)

C)

MASTER MEAS. LIST NUMBERS: V63S1190E
: V63S1182E
: V63S1186E
: V63S1178E

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6WB-1001-03

- FAILURE EFFECTS -

(A) SUBSYSTEM:
ACTIVATES ONE AMMONIA BOILER THROUGH SECONDARY CONTROLLER.

(B) INTERFACING SUBSYSTEM(S):
ADDITIONAL HEAT REMOVAL FROM FREON COOLANT LOOPS PROVIDED BY ONE AMMONIA SYSTEM. POSSIBLE OVERCOOLING OF THE FREON/H2O HEAT INTERCHANGER.

(C) MISSION:
POSSIBLE LOSS OF MISSION OBJECTIVES DUE TO LOSS OF PAYLOAD POSTLANDING COOLING.

■ (D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE CAN RESULT IN LOSS OF CREW/VEHICLE DUE TO LOSS OF ORBITER COOLING IF WORKAROUND PROCEDURE IS NOT IMPLEMENTED IN TIME. EXCESSIVE LOWERING OF FREON LOOPS' TEMPERATURE CAN FREEZE THE FREON/H2O INTERCHANGER WHICH WILL RESULT IN RUPTURE OF WATER AND FREON LOOPS.

■ (E) FUNCTIONAL CRITICALITY EFFECTS:

- DISPOSITION RATIONALE -

(A) DESIGN:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

■ (B) TEST:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.
THIS FAILURE MODE IS TESTED FOR WHENEVER THE VEHICLE IS POWERED UP (INFLIGHT AND DURING GROUND TURNAROUND) BY VERIFYING THAT THE NH3 BOILER DOES NOT COME ON SPONTANEOUSLY.

(C) INSPECTION:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

(D) FAILURE HISTORY:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

■ (E) OPERATIONAL USE:
FAILURE IS INDICATED BY ONBOARD ALARM - "EVAP OUT TEMPERATURE". FOR SECONDARY AMMONIA CONTROLLER FAILED ON, ACTIVATE REDUNDANT ARS WATER LOOP. IF RADIATOR FLOW ACTIVATED, POSITION RADIATOR OUT TEMPERATURE SWITCH TO HIGH SET POINT UNTIL NH3 DEPLETION, OR TURN OFF A FREON PUMP TO PREVENT FREEZING OF INTERCHANGER.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6WB-1001-03

- APPROVALS -

RELIABILITY ENGINEERING	D. ANVARI	D.A. Melas CL for 2-4-92
DESIGN ENGINEERING	J. L. PECK	
DESIGN MANAGER	G. M. ANDERSON	1/14/92
QUALITY MANAGER	R. M. SPURLOCK	1/13/92
NASA RELIABILITY		1/8/92
NASA SUBSYSTEM MANAGER		1/10/92
NASA EPD&C RELIABILITY		for B.S. Woodall 1-17-92
NASA QUALITY ASSURANCE		for R.T. Tenteris
NASA EPD&C SUBSYS MGR		for F. Alwis 17 Jan 92