

PAGE: 1

PRINT DATE: 05/30/90

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6VE-2003-X

SUBSYSTEM NAME: EPD&C - ECLSS - WASTE WATER MANAGEMENT
REVISION : 2 05/30/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	PANEL ML31C	V570-733852
SRU :	SWITCH, TOGGLE	ME452-0102-7105

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE - WASTE WATER DUMP VALVE

REFERENCE DESIGNATORS: 80V73A127 S4

QUANTITY OF LIKE ITEMS: 1
ONE PER SYSTEM
ONE PER VEHICLE

FUNCTION:
PROVIDES POWER CONTROL FOR THE WASTE WATER DUMP VALVE ACTUATION.

PAGE: 2

PRINT DATE: 05/30/90

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
 NUMBER: 05-6VE-2003-01

SUBSYSTEM: EPD&C - ECLSS - WASTE WATER MANAGEMENT
 LRU :PANEL ML31C
 ITEM NAME: SWITCH, TOGGLE

REVISION# 2 05/30/90 R
 CRITICALITY OF THIS
 FAILURE MODE:2/2

FAILURE MODE:
 SWITCH FAILS OPEN (VALVE OPEN), SWITCH FAILS CLOSED IN "OPEN" POSITION,
 SHORTS-TO-GROUND (VALVE OPEN)

MISSION PHASE:
 00 ON-ORBIT

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

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

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

PASS/FAIL RATIONALE:
 A)
 B)
 C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
 WASTE WATER STOWAGE CAPABILITY - 2/2
 INABILITY TO POWER VALVE TO THE CLOSED POSITION

EFFECT(S) ON SUPPLY WATER CONTINGENCY DUMP CAPABILITY - 1R/3
 INABILITY TO POWER VALVE TO THE CLOSED POSITION

(B) INTERFACING SUBSYSTEM(S):
 WASTE WATER STOWAGE CAPABILITY - 2/2

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6VE-2003-01**

INABILITY TO PERFORM THE NEXT WASTE WATER DUMP. DUMP LINE FREEZES WHEN PRESENT DUMP IS TERMINATED.

EFFECT(S) ON SUPPLY WATER CONTINGENCY DUMP CAPABILITY - 1R/3
INABILITY TO PERFORM THE NEXT WATER DUMP. DUMP LINE FREEZES WHEN PRESENT DUMP IS TERMINATED.

(C) MISSION:

WASTE WATER STOWAGE CAPABILITY - 2/2
MISSION DURATION IS LIMITED BECAUSE OF WASTE WATER DUMP CAPABILITY AND LOSS OF USE OF CONTINGENCY WATER CONTAINER.

EFFECTS ON SUPPLY WATER CONTINGENCY DUMP CAPABILITY - 1R/3
NO EFFECT

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

WASTE WATER STOWAGE CAPABILITY - 2/2
NO EFFECT

EFFECT(S) ON SUPPLY WATER CONTINGENCY DUMP CAPABILITY - 1R/3
NO EFFECT

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW/VEHICLE BASED UPON THE FOLLOWING SCENARIO:

- (1) FAILURE OF THE WASTE DUMP CAPABILITY (CB OPEN/DUMP VALVE OPEN OR CLOSED.)
- (2) LOSS OF SUPPLY WATER DUMP CAPABILITY
- (3) LOSS OF TOPPING EVAPORATOR DUMP CAPABILITY
- (4) LOSS OF VENTING THROUGH THE FUEL CELL WATER RELIEF VALVES

THESE FAILURES RESULT IN THE LOSS OF ELECTRICAL POWER DUE TO FUEL CELL FLOODING.

- DISPOSITION RATIONALE -

(A) DESIGN:

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

■ **(B) TEST:**

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

VALVE OPERATION IS VERIFIED IN FLIGHT EVERY FLOW.

(C) INSPECTION:

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6VE-2003-01

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

(E) OPERATIONAL USE:
IF THE DUMP VALVE IS FAILED OPEN, THE CREW WILL CLOSE THE DUMP
ISOLATION VALVE AND RETURN TO THE PRIMARY LANDING SITE BEFORE THE WASTE
WATER TANK BECOMES HARD FILLED.

- APPROVALS -

RELIABILITY ENGINEERING:	D. ANVARI	:	<i>D.A. Melwan Chilton 5/31/90</i>
DESIGN ENGINEERING	: J. L. PECK	:	<i>[Signature]</i>
DESIGN SUPERVISOR	: G. ANDERSON	:	<i>G. Anderson 5/31/90</i>
QUALITY SUPERVISOR	: J. COURSEN	:	<i>[Signature]</i>
NASA RELIABILITY	:	:	<i>[Signature]</i>
NASA SUBSYSTEM MANAGER	:	:	<i>[Signature] 6-11-90</i>
EPDC NASA SUBSYSTEM MANAGER	:	:	<i>[Signature] 6-26-90</i>
NASA EPD&C RELIABILITY	:	:	<i>[Signature] 25 June 90</i>
NASA QUALITY ASSURANCE	:	:	<i>[Signature] 6/15/90</i>
		:	<i>[Signature] 12 June 90</i>