FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6AB-2139-X

SUBSYSTEM NAME: EPD&C - ACTUATOR, VENT DOORS
REVISION : 2 07/20/90

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	AFT MCA-1	V070-765410
LRU	:	AFT MCA-2	V070-765420
LRU	:	AFT MCA-3	V070-765430
LRU	:	AFT MCA-3	V070-765600
LRU	:	AFT MCA-2	V070-765620
LRU	:	AFT MCA-1	V070-765630
SRU	:	RELAY, HYBRID	MC455-0135-0001

PART DATA

- **EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**
  RELAY, HYBRID, FOUR POLE, NON-LATCH, LEFT AND RIGHT AFT VENT DOORS 8 AND 9, "CLOSE/PURGE" CONTROL

- **REFERENCE DESIGNATORS:** 54V76A114K1
  : 54V76A114K2
  : 55V76A115K3
  : 55V76A115K4
  : 55V76A115K7
  : 55V76A115K8
  : 56V76A116K1
  : 56V76A116K2

- **QUANTITY OF LIKE ITEMS: 8**
  EIGHT (FOUR PER SIDE)

- **FUNCTION:**
  UPON RECEIVING A STIMULUS FROM ASSOCIATED HYBRID DRIVERS OR BY DIRECT COMMAND FROM A FLIGHT MDM, CONTACT SETS OF TWO HYBRID RELAYS IN SERIES CONNECT THREE PHASE AC VOLTAGE TO MOTORS TO OPERATE THE LEFT AND RIGHT AFT PAYLOAD BAY VENT DOORS 8 AND 9 TO THE CLOSE OR PURGE POSITION.

FAILURE MODES EFFECTS ANALYSIS (FMEA) — CRITICAL FAILURE MODE
NUMBER: 05-6AB-2139-03

REVISION# 2 07/20/90 R

SUBSYSTEM: EPD&C - ACTUATOR, VENT DOORS
LRU :AFT MCA-1
ITEM NAME: RELAY, HYBRID

CRITICALITY OF THIS FAILURE MODE: 1R3

■ FAILURE MODE:
SHORTS CONTACT-TO-CONTACT

MISSION PHASE:
DO DE-ORBIT

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

■ CAUSE:
PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS

■ CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

■ REDUNDANCY SCREEN A) PASS
■ B) FAIL
■ C) PASS

PASS/FAIL RATIONALE:
■ A)

■ B)
FAILS "B" SCREEN BECAUSE HYBRID RELAY SHORTS CONTACT-TO-CONTACT IS NOT READILY DETECTABLE INFLIGHT.

■ C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
FIRST FAILURE - NO EFFECT

■ (B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT

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■ (C) MISSION:
FIRST FAILURE - NO EFFECT

■ (D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - NO EFFECT

■ (E) FUNCTIONAL CRITICALITY EFFECTS:
1. HYBRID RELAY SHORTS CONTACT-TO-CONTACT (EITHER PHASE "B" OR PHASE "C")
2. SERIAL HYBRID RELAY SHORTS CONTACT-TO-CONTACT ON SIMILAR PHASE
3. LOSS OF REDUNDANT MOTOR
4. REDUNDANT DOOR FAILS CLOSED

AFTER THE SECOND FAILURE, PHASE-TO-PHASE SHORT WOULD OCCUR WHEN OPEN COMMAND IS PRESENT CAUSING AC CIRCUIT BREAKER TO TRIP WHICH RESULTS IN LOSS OF ABILITY TO OPEN VENT DOOR VIA ASSOCIATED MOTOR. POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO PROVIDE SUFFICIENT VENTING IF BOTH VENT DOORS FAIL CLOSED RESULTING IN STRUCTURAL OVERLOAD DURING ENTRY.

- DISPOSITION RATIONALE -

■ (A) DESIGN:
REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

■ (B) TEST:
REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

GROUND TURNAROUND TEST
NO OMRSD TEST AVAILABLE

■ (C) INSPECTION:
REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

■ (D) FAILURE HISTORY:
REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

■ (E) OPERATIONAL USE:
NONE

PRINT DATE: 07/23/90

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- APPROVALS -

RELIABILITY ENGINEERING	T. AI	
DESIGN ENGINEERING	J. KRAGER	
QUALITY SUPERVISOR	J. COURSEN	
NASA RELIABILITY		
NASA SUBSYSTEM MANAGER		9/6/90
NASA SUBSYSTEM MANAGER		9/4/90
NASA EPD&C RELIABILITY		
NASA QUALITY ASSURANCE		8/24/90