

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP.      FMEA NO 05-6J -2117 -2      REV:06/15/88  
 ASSEMBLY : D & C PANEL R2      CRIT. FUNC: 1R  
 P/N RI : ME452-0102-7103      CRIT. HDW: 2  
 P/N VENDOR:      VEHICLE 102 103 104  
 QUANTITY : 3      EFFECTIVITY: X X X  
 :THREE      PHASE(S): PL X LO X OO DO LS  
 :

REDUNDANCY SCREEN: A-PASS B-PASS C-PASS  
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
 DES J.B. J BROWN      DES [Signature]      EPDC SSM [Signature] 6/27/88  
 REL [Signature] F DEFENSOR      REL J. Kamura 6/27/88      MPS SSM [Signature] 6/27/88  
 QE [Signature] D MASAI      QE J.D. Conner 6/27/88      EPDC REL [Signature] 6/27/88  
 MPS REL [Signature] 6/27/88  
 QE [Signature] 6/27/88

ITEM:  
 SWITCH, TOGGLE (ONE POLE, THREE POSITIONS), HELIUM SUPPLY ISOLATION VALVE A (LV1/3/5).

FUNCTION:  
 PROVIDES MANUAL CONTROL OF POWER TO HELIUM SUPPLY ISOLATION VALVE A. 32V73A2S55, 56, 57.

FAILURE MODE:  
 CONTACT-TO-CONTACT SHORT ("CLOSE" POLE).

CAUSE(S):  
 PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY.

EFFECT(S) ON:  
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY  
 (A) INADVERTENT SWITCH CLOSE COMMAND TO HELIUM SUPPLY ISOLATION VALVE A (LV1/3/5) PROVIDING INHIBIT SIGNAL TO HDC.  
 (B) INADVERTENT CLOSING OF THE HELIUM SUPPLY ISOLATION VALVE A.  
 (C,D) FIRST FAILURE - NO EFFECT.

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- (E) 1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.  
TIME FRAME - ENGINE OPERATION.
- 1) CONTACT-TO-CONTACT SHORT ("CLOSE" POLE) CAUSING HELIUM SUPPLY ISOLATION VALVE A (LV1/3/5) TO CLOSE.
  - 2) PARALLEL HELIUM ISOLATION VALVE B (LV2/4/6) FAILS CLOSED.

FAILURES WILL RESULT IN LOSS OF HELIUM REQUIRED TO PERFORM CONTINUOUS PURGING OF HIGH PRESSURE OXIDIZER TURBOPUMP INTERMEDIATE SEAL CAVITY. THIS CAVITY IS BETWEEN TWO SEALS, ONE OF WHICH CONTAINS THE HOT, FUEL-RICH GAS IN OXIDIZER TURBINE AND THE OTHER CONTAINS THE LIQUID OXYGEN IN OXIDIZER TURBOPUMP. LEAKAGE THROUGH ONE OR BOTH SEALS COULD RESULT IN A CATASTROPHIC EXPLOSION IF ALLOWED TO ACCUMULATE. CONTINUOUS OVERBOARD PURGE OF THIS AREA PREVENTS THIS ACCUMULATION FROM OCCURRING. POSSIBLE LOSS OF CREW/VEHICLE.

DISPOSITION & RATIONALE:

(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A-D) FOR DISPOSITION AND RATIONALE:

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

(B) GROUND TURNAROUND TEST

MDM AND D&C CMD VERIF, V41AAO.010, V41AAO.030, V41AAO.050 EVERY FLIGHT.

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.