

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2002 -1 REV:04/25/88

ASSEMBLY : AFT PCA-1 CRIT. FUNC: 1R  
 P/N RI : JANTX1N1204RA CRIT. HDW: 3  
 P/N VENDOR: VEHICLE 102 103 104  
 QUANTITY : 2 EFFECTIVITY: X X X  
 : TWO PHASE(S): PL LO X OO DO LS  
 :

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS

PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
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 REL F DEFENSOR REL [Signature] 5-6-88 MPS SSM [Signature] 5-13-88  
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ITEM:

DIODE, CROSSOVER (12 AMP), LH2 RTLS INBOARD/OUTBOARD DUMP VALVE OPEN SOLENOID (LV72/LV73).

FUNCTION:

PREVENTS SINGLE MDM COMMAND FROM ACTUATING OPEN SOLENOID INADVERTENTLY. 54V76A131A3CR4, A3CR10.

FAILURE MODE:

OPENS, FAILS TO CONDUCT.

CAUSE(S):

STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY

(A) LOSS OF ONE OF TWO POWER PATHS (OPEN COMMAND A) TO OPEN COMMAND C HDC. DEGRADATION OF REDUNDANCY AGAINST INADVERTENT DEACTUATION OF OPEN SOLENOID.

(B,C,D) NO EFFECT - FIRST FAILURE.

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- (E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE. TIME FRAME - ASCENT.
- 1) DIODE FAILS OPEN.
  - 2) OPEN MDM COMMAND B FAILS "OFF" CAUSING ONE OF TWO SERIES LH2 RTLS INBOARD/OUTBOARD DUMP VALVES (FV17/18) TO CLOSE. ALTERNATE PATH AVAILABLE THROUGH LH2 FEEDLINE RELIEF SYSTEM.
  - 3) LH2 FEEDLINE RELIEF SYSTEM FAILS TO RELIEVE.

FOR OI-8C, RESULTS IN LACK OF RELIEF CAPABILITY\*. POSSIBLE RUPTURE OF THE LH2 MANIFOLD CAUSING LH2 LEAKAGE INTO THE AFT COMPARTMENT, OVERPRESSURIZATION, AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT COMPONENTS DUE TO CRYOGENIC EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

\*NOTE: FOR OI-8B, ORBITER SOFTWARE OPENS RTLS DUMP VALVES FROM MECO +10 TO MECO +40 SECONDS. VENTING IS NOT CONSIDERED REDUNDANT TO RELIEF SYSTEM SINCE MANIFOLD PRESSURE INCREASES TO RELIEF SETTING REGARDLESS OF RTLS VALVE OPERATION. FOR OI-8C, APPROVED SOFTWARE CHANGE CR 89399 EXTENDS RTLS DUMP VALVE OPEN TIME TO MECO +90 SECONDS FOR ALL MISSIONS EXCEPT RTLS. THIS CHANGE WILL ALLOW SUFFICIENT DURATION TO PROVIDE A REDUNDANT MANIFOLD RELIEF PATH PRIOR TO THE INITIATION OF DUMP.

FAILS B SCREEN BECAUSE OF SERIES/PARALLEL CIRCUIT CONFIGURATION.

DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE

REFER TO APPENDIX F, ITEM NO. 2 - DIODE, POWER-STUD MOUNTED.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION V41ABO.180G, V41ABO.190G EVERY FLIGHT.

(E) OPERATIONAL USE

LH2 MANIFOLD PRESSURE IS ON CAUTION AND WARNING.

POST MECO/PRE DUMP: START MPS PROPELLANT DUMP AS SOON AS POSSIBLE.

POST DUMP: OPEN THE LH2 FILL AND DRAIN VALVES.