

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2381 -1 REV:04/25/88

ASSEMBLY : APCA-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):  
 DES J BROWN DES A. Cousen EPDC SSM Local Ball Valve for w.c. Stage  
 REL F DEFENSOR (gnd) REL Michael Chilton 5-6-88 MPS SSM 5-13-88  
 QE D MASAI QE 9/2 Cousen EPDC REL 5/6/88  
 MPS REL 5/13/88

ITEM:

DIODE, BLOCKING (12 AMP), LH2 RTLS INBOARD/OUTBOARD DUMP VALVE (PV17/18), OPEN COMMAND B RPC OUTPUT.

FUNCTION:

ISOLATES REDUNDANT MAIN BUS POWER TO LH2 RTLS INBOARD/OUTBOARD DUMP VALVE SOLENOID (LV72/73). LOCATED AT OPEN COMMAND B RPC OUTPUT AHEAD OF OPEN COMMAND C HDC. 54V76A131A3CR8, A3CR9.

FAILURE MODE:

OPEN, 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 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 - POST MECO, PRE DUMP.

1) DIODE FAILS OPEN.

2) PARALLEL POWER PATH FAILS "OFF" (RPC, DIODE) 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 PARALLEL POWER PATH MASKS FAILURE.

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.180C, V41ABO.190C 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.