SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2381 -2 REV:04/25/88

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

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

PREPARED BY:
DES J BROWN
REL F DEFENSOR
QE D MASAI

APPROVED BY:
DES
REL
QE

APPROVED BY (NASA):
EPDC SSM
MPS SSM
EPDC REL
MPS REL
QE

ITEM:
DIODE, BLOCKING (12 AMP), LH2 RTLS INBOARD/OUTBOARD DUMP VALVES (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. 54V76A131A3CR3, A3CR9.

FAILURE MODE:
SHORT (END TO END).

CAUSE(S):
STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY.

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE (E)FUNCTIONAL CRITICALITY

(A) LOSS OF MAIN BUS ISOLATION. 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 SHORTS.
2) FAILURE OF MAIN BUS TO SERIES RPC TRIPS PARALLEL RPC CAUSING ONE OF TWO SERIES LH2 RTLS INBOARD/OUTBOARD DUMP VALVES (PV17/18) TO CLOSE. ALTERNATE PATH IS 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 NO INSTRUMENTATION IS AVAILABLE TO DETECT 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.180B, V41ABO.190B 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.