

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2377 -2 REV:11/04/87

ASSEMBLY : AFT PCA-6 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
 : 1 PER LH2/LO2 1.7" DISCONNECT LATCH

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES J BROWN DES *[Signature]* EPDC SSM *[Signature]*
 REL F DEFENSOR REL *[Signature]* 12-5-87 MPS SSM *[Signature]*
 QE D MASAI QE *[Signature]* 1/1/88 EPDC REL *[Signature]*
 MPS REL *[Signature]*

ITEM:
 DIODE, BLOCKING (12 AMP), LH2/LO2 17-IN FEEDLINE DISCONNECT VALVE LATCH
 UNLOCK SOLENOID, RPC C OUTPUT DIODE.

FUNCTION:
 DIODE USED TO ISOLATE REDUNDANT MAIN BUS POWER TO AN UNLOCK SOLENOID.
 LOCATED AT RPC C OUTPUT AHEAD OF UNLOCK COMMAND B HDC III.
 56V76A136A2CR39, CR42.

FAILURE MODE:
 SHORT, INTERNAL SHORT, CURRENT LEAKAGE

CAUSE(S):
 PIECE PART STRUCTURAL FAILURE, CONTAMINATION, MECHANICAL SHOCK,
 VIBRATION, THERMAL SHOCK

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL
 CRITICALITY
 (A) DEGRADATION OF MAIN BUS ISOLATION.
 (B,C,D) NO EFFECT - FIRST FAILURE.

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(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THIRD FAILURE (SECOND FAILURE - LOSS OF MAIN BUS TO COMMAND A RPC. COMMAND B RPC TRIPS BECAUSE IT FEEDS THE LOAD ON THE FAILED BUS BY WAY OF THE COMMAND B HDC III REVERSE BIAS DIODE. LOSS OF POWER TO LATCH UNLOCK SOLENOID. THIRD FAILURE - DURING ET/ ORBITER UMBILICAL RETRACTION, MECHANICAL LINKAGE FAILS, PREVENTING FLAPPER CLOSURE) RESULTING IN INABILITY TO CLOSE THE FEED DISCONNECT VALVE PRIOR TO UMBILICAL RETRACTION. FOR NOMINAL, ATO, AND AOA MISSIONS ET SEPARATION IS DELAYED FOR SIX MINUTES TO VENT RESIDUAL PROPELLANT THROUGH FAILED DISCONNECT. THIS IS TO PREVENT ORBITER/ET RECONTACT DUE TO PROPULSIVE VENTING AT SEPARATION. POSSIBLE TILE AND DOOR DAMAGE AT THE ORBITER/ET UMBILICAL AREA DUE TO CRYO IMPACT. FOR RTLS, TAL, AND MISSIONS WHERE OMS BURN CANNOT BE DELAYED ET STRUCTURAL SEPARATION IS INITIATED IMMEDIATELY AND ORBITER/ET RECONTACT IS LIKELY. ALSO RESULTS IN LOSS OF HELIUM SUPPLY DURING MANIFOLD REPRESS CAUSING POSSIBLE LOSS OF CRITICAL AFT COMPARTMENT ENTRY PURGE. 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) DISPOSITION AND RATIONALE:

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

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION, V41ABO.155J, 165J EVERY FLIGHT.

(E) OPERATIONAL USE

FOR NOMINAL MISSIONS, CREW WILL PERFORM MANUAL ET STRUCTURAL SEPARATION AFTER SIX MINUTE DELAY PERIOD. FOR RTLS, VEHICLE SOFTWARE PERFORMS ET STRUCTURAL SEPARATION AFTER A SIX SECOND (MAXIMUM) DELAY. FOR TAL OR MISSIONS WHERE OMS BURN CANNOT BE DELAYED CREW WILL MANUALLY INITIATE ET STRUCTURAL SEPARATION WITHOUT DELAY.