

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2249 -1 REV:11/04/87

ASSEMBLY : AFT PCA-2 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 FEED DISCONNECT VALVE

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 Melvin Clark MPS SSM [Signature]
 : 12-5-87 EPDC REL [Signature]
 QE D MASAI QE [Signature] 11/5/87 MPS REL [Signature]
 QE [Signature]

ITEM: DIODE, BLOCKING (12 AMP), LH2/LO2 17-INCH FEEDLINE DISCONNECT VALVE, CLOSE SOLENOID, RPC B OUTPUT DIODE.

FUNCTION: DIODE USED TO ISOLATE REDUNDANT MAIN BUS B POWER TO A CLOSE SOLENOID. LOCATED AT RPC B OUTPUT AHEAD OF CLOSE COMMAND C HDC III. 55V76A132A2CR14, A3CR13

FAILURE MODE: OPEN, FAILS OPEN, FAILS TO CONDUCT

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

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

(A) LOSS OF ONE OF TWO POWER PATHS TO FEED DISCONNECT VALVE CLOSE SOLENOID.

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

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(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THIRD FAILURE (SECOND FAILURE - LOSS OF SECOND POWER PATH TO CLOSE SOLENOID. THIRD FAILURE - DURING ET/ORBITER UMBILICAL RETRACTION, BACKUP 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 REDUNDANT 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.150J, 160J 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.

05-6J.404