

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2240 -1 REV:04/25/88

ASSEMBLY : MID PCA-3 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 X LO X OO DO LS
 :

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

PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES J BROWN DES J. Brown EPDC SSM Concillie 5/12/88
 REL F DEFENSOR REL Michael Chilton 5-6-88 EPDC REL Michael Chilton 5/12/88
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ITEM:
 DIODE, CROSSOVER (12 AMP), LO2/LH2 RELIEF SHUTOFF VALVE CLOSE SOLENOID (LV24/25).

FUNCTION:
 PREVENTS SINGLE MDM COMMAND FROM ACTUATING CLOSE SOLENOID INADVERTENTLY. 40V76A27A4CR2, 4.

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 (CLOSE COMMAND A) TO CLOSE COMMAND C HDC. DEGRADATION OF REDUNDANCY AGAINST INADVERTENT DEACTUATION OF CLOSE SOLENOID.
 (B,C,D) NO EFFECT - FIRST FAILURE.

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(E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - PRELAUNCH AND ASCENT.

1) DIODE OPENS.

2) LOSS OF MDM CLOSE COMMAND B CAUSING LO2/LH2 RELIEF SHUTOFF VALVE (FV7/8) TO OPEN. FEEDLINE RELIEF VALVE (RV5/6) WILL PREVENT OVERBOARD LEAKAGE OF LO2/LH2 (RELIEF VALVE CRACK PRESSURE IS ABOVE NOMINAL SYSTEM OPERATING PRESSURE).

3) RELIEF VALVE (RV5/6) FAILS TO REMAIN CLOSED.

LO2/LH2 WILL DUMP OVERBOARD RESULTING IN LOSS OF PROPELLANT AND POSSIBLE PREMATURE ENGINE SHUTDOWN. FIRE/EXPLOSION HAZARD EXTERIOR TO THE VEHICLE. POSSIBLE VIOLATION OF ET MINIMUM STRUCTURAL REQUIREMENTS DUE TO REDUCED ULLAGE PRESSURE. POSSIBLE LOSS OF CREW/VEHICLE.

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) DISPOSITION AND RATIONALE:

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

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION V41ABO.070N, V41ABO.080N EVERY FLIGHT.

(E) OPERATIONAL USE

FLIGHT: NO CREW ACTION CAN BE TAKEN.

GROUND: OMI S1003/S1004 (LO2/LH2 SYSTEM) SEQUENCE TITLED "EMERGENCY PROCEDURE FOR MAJOR LEAK OR FIRE . . ." CONTAINS SAFING SEQUENCE OF EVENTS FOR MAJOR LEAKS IN THE PROPELLANT SYSTEMS.

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