

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2241 -1 REV:04/25/88

ASSEMBLY :MID PCA-3 CRIT. FUNC: 1R
 P/N RI :JANTXVIN4246 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 <i>ANB</i> J BROWN	DES <i>R. Brown</i>	EPDC SSM <i>Conceded to testing done w/ C. Shroy</i>
REL F DEFENSOR <i>gd</i>	REL <i>Michael Chilton 5-6-88</i>	MPS SSM <i>5-13-88</i>
QE <i>Jim</i> D MASAI	QE <i>J. J. Conner 5-6-88</i>	EPDC REL <i>Approved by [unclear] 5/11/88</i>
		MPS REL <i>Approved by [unclear] 5/13/88</i>
		QE <i>[unclear]</i>

ITEM:

DIODE, BLOCKING (1 AMP), LH2/LO2 RELIEF SHUTOFF VALVE, MDM CLOSE COMMAND C OUTPUT.

FUNCTION:

ISOLATES MANUAL SWITCH CLOSE COMMAND FROM MDM CLOSE COMMAND C. CONDUCTS MDM CLOSE COMMAND C TO HDC FOR CONTROL OF POWER TO LH2/LO2 RELIEF SHUTOFF VALVE CLOSE SOLENOID (LV24/25). 40V76A27A1CR31, A1CR37.

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 LO2/LH2 RELIEF SHUTOFF VALVE CLOSE SOLENOID. 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) PARALLEL POWER PATH FAILS (HDC, RPC, OR DIODE) CAUSING LO2/LH2 RELIEF SHUTOFF VALVE (PV7/8) 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. 3 - DIODE, AXIAL LEAD.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION V41ABO.070K, V41ABO.080K 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.

05-6J-390