

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2282 -2 REV: 11/19/87
 ASSEMBLY : AFT LCA-2 CRIT. FUNC: 1R
 P/N RI : JANTXV1N5551 CRIT. HDW: 3
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 1 EFFECTIVITY: X X X
 : ONE PHASE(S): PL X LO X OO DO LS
 : 1 PER LO2 INBOARD FILL/DRAIN VALVE

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES J.B. J BROWN DES R.V. Bussan EPDC SSM M. Blawie W.C. Stapp
 REL J.F. DEFENSOR REL Mohamed Ch. Ham 12-5-87 MPS SSM [Signature]
 QE D MASAI QE [Signature] EPDC REL [Signature]
 MPS REL [Signature]
 QE [Signature] QE [Signature] 1/10/88

ITEM:
 DIODE, BLOCKING (3 AMP), LO2 INBOARD FILL/DRAIN VALVE, OPEN COMMAND A SWITCH BLOCKING.

FUNCTION:
 DIODE ISOLATES MDM OPEN COMMAND A FROM MANUAL SWITCH GROUND AND GROUND OPEN COMMAND, CONDUCTS MANUAL SWITCH OPEN COMMAND AND GROUND OPEN COMMAND TO HDC III FOR CONTROL OF POWER TO OPEN SOLENOID OF LO2 INBOARD FILL/DRAIN VALVE (PV10). 55V76A122-J3(60)

FAILURE MODE:
 SHORT, INTERNAL SHORT, CURRENT LEAKAGE

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

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

(A) LOSS OF OPEN COMMAND A ISOLATION FROM CLOSE INHIBIT. DEGRADATION OF REDUNDANCY AGAINST LOSS OF POWER TO CLOSE SOLENOID.

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

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPO&C - MAIN PROP.

FMEA NO 05-6J -2282 -2

REV: 11/19/87

(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THE THIRD FAILURE (SECOND FAILURE - OPEN COMMAND A FAILS ON, INHIBITING THE CLOSE SOLENOID AND ACTIVATING ONE OF THE TWO SERIES HDC III's FOR THE OPEN SOLENOID, BISTABLE FEATURE MAINTAINS FILL/DRAIN VALVE IN CLOSE POSITION. THIRD FAILURE - THE SECOND HDC III FOR THE OPEN SOLENOID FAILS ON) RESULTING IN PREMATURE OPENING OF FILL/DRAIN VALVE. POTENTIAL WATER HAMMER EFFECT OF APPROXIMATELY 700 PS (AT 1-G). LO2 FILL/DRAIN LINE IS ONLY CERTIFIED TO WITHSTAND FLIGHT LOADS WHILE EMPTY. FAILURE RESULTS IN POSSIBLE RUPTURE OF THE LO2 FILL LINE, AFT OVERPRESS, AND FIRE/EXPLOSIVE HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYO EXPOSURE. DISPLACED GAS MAY ENTER ONE OR MORE SSMEs. POSSIBLE SHUTDOWN OF ONE OR MORE SSMEs. FAILS B SCREEN BECAUSE NO INSTRUMENTATION IS AVAILABLE TO DETECT FAILURE WHILE OPEN COMMAND A IS OFF. NOTE - DURING PRELAUNCH THIS FAILURE MODE IS ALSO 1R3 PFP DUE TO PREMATURE CLOSING OF FILL/DRAIN VALVE AFTER THIRD 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 NUMBER 4 - DIODE.

(B) GROUND TURNAROUND TEST

MEM COMMAND REDUNDANCY, V41AEQ.071A EVERY FLIGHT

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.