

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2306 -2 REV:06/22/88

ASSEMBLY : APT LCA-1,2 CRIT. FUNC: 1R
 P/N RI : JANTXVIN5551 CRIT. HDW: 3
 P/N VENDOR:
 QUANTITY : 2 VEHICLE 102 103 104
 EFFECTIVITY: X X X
 PHASE(S): PL LO X OO DO LS

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

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <u>J BROWN</u>	DES <u>R. Brown</u>	EPDC SSM <u>Lowell J. ... for w.c. Sta 59</u>
REL <u>F DEFENSOR</u>	REL <u>J. Kamura 6/27/88</u>	MPS SSM <u>...</u>
QE <u>D. MASAI</u>	QE <u>J.D. Conner 6/27/88</u>	EPDC REL <u>...</u>
		MPS REL <u>...</u>
		QE <u>...</u>

ITEM:

DIODE, BLOCKING (3 AMP), PNEUMATIC HELIUM SUPPLY ISOLATION VALVE NO. 1 AND 2 (LV7/8) MANUAL SWITCH OPEN COMMAND.

FUNCTION:

ISOLATES MANUAL SWITCH OPEN COMMAND FROM MDM OPEN COMMAND. CONDUCTS MANUAL SWITCH OPEN COMMAND TO HDC FOR CONTROL OF POWER TO PNEUMATIC HELIUM SUPPLY ISOLATION VALVES. 54V76A12LJ3(80), 55V76A122J3(80).

FAILURE MODE:

SHORT (END TO END).

CAUSE(S):

STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY

(A) LOSS OF ISOLATION BETWEEN MDM OPEN COMMAND AND MANUAL SWITCH OPEN COMMAND.

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

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- (E) 1R/3, 3 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - PRE LAUNCH AND ASCENT.
- 1) DIODE SHORT (END TO END).
 - 2) ASSOCIATED SWITCH CONTACT SHORTS TO GROUND, RESULTING IN CLOSURE OF ONE OF TWO PNEUMATIC HELIUM ISOLATION VALVES.
 - 3) PARALLEL ISOLATION VALVE FAILS CLOSED.
 - 4) CROSOVER VALVE (LV10) FAILS TO OPEN/REMAIN OPEN.

THE HELIUM REGULATOR AND ACCUMULATOR PRESSURES ARE MONITORED BY THE LCC PRIOR TO T MINUS 10 SECONDS. FAILURE SUBSEQUENT TO T MINUS 10 SECONDS WILL NOT PREVENT LAUNCH. THERE SHOULD BE SUFFICIENT HELIUM REMAINING IN THE ACCUMULATOR LEG TO OPERATE THE LH2 PREVALVES PRIOR TO ENGINE START AND THEIR VALVE OPEN INDICATIONS WILL PASS THEIR LCC CHECKS AT T MINUS 7 SECONDS. ACTUATION OF VALVES PRIOR TO LIFT-OFF REDUCES THE PRESSURE OF THE GAS REMAINING IN THE ACCUMULATOR. AT MECO, IF LV10 DOES NOT REPLENISH THE ACCUMULATOR PRESSURE, THE REDUCED PRESSURE WILL NOT CLOSE THE LO2 PREVALVES WITHIN THE TIME REQUIRED BY THE ENGINE (0.95 +/- 0.20 SECONDS) AND UNCONTAINED ENGINE DAMAGE MAY RESULT.

POSSIBLE LOSS OF CREW/VEHICLE.

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) FOR DISPOSITION AND RATIONALE:

REFER TO APPENDIX F, ITEM NO. 4 - DIODE, AXIAL LEAD.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIF, V41AA0.070B,C EVERY FLIGHT.

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.

EFFECTIVE FOR OI-8D SOFTWARE, CR89397B "MPS PNEUMATIC SYSTEM FDA AND DISPLAY - BFS" ADDS PNEUMATIC TANK, REGULATOR, AND ACCUMULATOR PRESSURE TO THE S/M ALERT FDA SYSTEM AND ADDS THE 3 PRESSURE MEASUREMENTS TO THE BFS SYSTEM SUMMARY DISPLAY. THIS ALLOWS THE FLIGHT CREW TO RESPOND TO A PNEUMATIC HELIUM SYSTEM LEAK INDEPENDENT OF GROUND CONTROL.