SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2304 -2 REV:06/22/88

ASSEMBLY :AFT LCA-1,2
P/N RI :JANTXV1N5551
P/N VENDOR:
QUANTITY :2
:TWO
:

CRIT. FUNC: 1R
CRIT. HDW: 3

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL LO X OO DO LS

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

PREPARED BY:
DES J BROWN
REL F DEFENSOR
QE D MASAI

APPROVED BY:
DES
REL 6/27/88
QE 6/27/88

APPROVED BY (NASA):
EPDC SSM
MPS SSM
EPDC REL 7/1/88
MPS REL
QE 6/28/88

ITEM:
DIODE, BLOCKING (3 AMP), PNEUMATIC HELIUM SUPPLY ISOLATION VALVE NO. 1 AND 2 (LV7/8) CLOSE SWITCH SCAN CIRCUIT.

FUNCTION:
ISOLATES CONTROL BUSES AND CLOSE COMMANDS IN THE SWITCH SCAN CIRCUIT.. 54V76A121J1(90), 55V76A122J1(90).

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 CONTROL BUSES. DEGRADATION OF REDUNDANCY AGAINST INADVERTENT CLOSURE OF PNEUMATIC HELIUM SUPPLY ISOLATION VALVES.

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

(E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE
TIME FRAME - ASCENT.
1) DIODE SHORT (END TO END).
2) CONTACT-TO-CONTACT SHORT ("CLOSE" CONTACTS) OF SECOND POLE RESULTING IN CLOSURE OF PNEUMATIC HELIUM SUPPLY ISOLATION VALVES.
3) CROSSOVER 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, V41AAO.070H,I 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.