SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2237 -2 REV:04/25/88

ASSEMBLY :MID PCA-3 CRIT. FUNC: 1R
P/N RI :JANTXV1N4246 CRIT. HDW: 3
P/N VENDOR:
QUANTITY :4 VEHICLE EFFECTIVITY: 102 X 103 X 104 X
:FOUR 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		EPDC SSM	
				MPS SSM	5-17-88
REL	F DEFENSOR	REL	5-6-88	EPDC REL	
				MPS REL	
QE	D MASAI	QE	5-6-88	QE	

ITEM:
DIODE, BLOCKING (1 AMP), LH2/LO2 RELIEF SHUTOFF VALVE, OPEN SWITCH SCAN.

FUNCTION:
ISOLATES CONTROL BUSES AND OPEN COMMANDS IN THE SWITCH SCAN CIRCUIT. 40V76A27A1CR27, CR28, CR33, CR34.

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 MANUAL SWITCH OPEN COMMAND AND CONTROL BUS ISOLATION. 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 SHORTS.
2) SWITCH CONTACT-TO-CONTACT SHORT OF EITHER OPEN COMMAND, 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 NO INSTRUMENTATION IS AVAILABLE TO DETECT 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.070 S,T; V41ABO.080 S,T 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.