SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2192 -1 REV:11/04/87

ASSEMBLY :D & C PANEL R4 CRIT. FUNC: 1R
P/N RI :JANTXV1N4246 CRIT. HDW: 3
P/N VENDOR: VEHICLE 102 103 104
QUANTITY :12 EFFECTIVITY: X X X
:TWELVE PHASE(S): PL X LO X OO DO LS
:4 PER PREVALVE 1, 2, & 3

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

PREPARED BY: APPROVED BY APPROVED BY (NASA):
DES J BROWN DES EPDC SSM
MPS SSM
REL F DEFENSOR REL 12-5-87 EPDC REL
MPS REL
QE D MASAI QE QE

ITEM:
DIODE BLOCKING (1 AMP), SWITCH GROUND DIODE (OPEN SIDE), LO2 PREVALVES 1 2, & 3

FUNCTION:
ISOLATES OPEN POLES FROM CENTER POLE (GPC), WHICH IS GROUNDED, IN THE LO2 PREVALVES 1, 2, & 3 CONTROL AND POWER CIRCUITS. PROTECTS AGAINST INADVERTENT OPEN COMMANDS. (SWITCHES S11, S12, AND S13). 32V73A4 - P1(33), (35), (37); - P2(33), (35), (37); - P3(33), (35), (37); - P5(18), (20), (22).

FAILURE MODE:
OPENS, FAILS OPEN, FAILS TO CONDUCT

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 CAPABILITY TO GROUND INADVERTENT OPEN COMMAND. DEGRADATION OF REDUNDANCY TO CLOSE LO2 PREVALVE.

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

(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THIRD FAILURE (SECOND FAILURE - ROLLER/SPRING BREAKS. ONE PARTICLE BRIDGES OPEN CONTACTS OF POLE WITH FAILED DIODE. SECOND PARTICLE BRIDGES OPEN CONTACTS OF FAILED POLE. THIS RESULTS IN TWO INADVERTENT OPEN COMMANDS INHIBITING CLOSE SOLENOID POWER, REDUNDANT SOLENOIDS PERFORM FUNCTION. THIRD FAILURE - LOSS OF REDUNDANT OPEN OR CLOSE SOLENOID) RESULTING IN UNCONTAINED ENGINE DAMAGE DUE TO FAILURE TO CLOSE LO2 PREVALVE AT MECO + 1.158 SECONDS. PREVALVE CLOSURE REQUIRED TO MAINTAIN NET POSITIVE SUCTION PRESSURE ON SSME HIGH PRESSURE OXIDIZER TURBOPUMP. FAILS A AND B SCREENS BECAUSE NO INSTRUMENTATION IS AVAILABLE TO DETECT FAILURE - REQUIRES INVASIVE TESTING.

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. 3 - DIODE.

(B) GROUND TURNAROUND TEST
UNDETECTABLE - REQUIRES INVASIVE TESTING.

(E) OPERATIONAL USE
FLIGHT - NO CREW ACTION CAN BE TAKEN.
GROUND - IF A MAJOR LEAK IS DETECTED, CLOSE PREVALVES (PV1, 2, 3), [illegible] 17-INCH DISCONNECT (PD1); DRAIN MANIFOLD.