SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - AFT-RCS FMEA NO 05-6KA-2253A -1 REV:11/03/87

ASSEMBLY :AFT MCA 3
P/N RI :JANTXV1N4246
P/N VENDOR:
QUANTITY :6
:SIX
:

ABORT, RTLS, TAL
CRIT. FUNC: 2R
CRIT. HDW: 3

| VEHICLE EFFECTIVITY: | 102 | 103 | 104 |
|---|---|---|---|
| | X | X | X |

PHASE(S): PL LO OO X DO LS

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

PREPARED BY:
DES D SOVEREIGN
REL J BEEKMAN
QE

APPROVED BY:
DES
REL
QE

APPROVED BY (NASA):
SSM
REL
QE

ITEM:
BLOCKING DIODE (1 AMP) - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER TANK ISOLATION VALVES 1/2 CONTROL CIRCUITS (GENERAL PURPOSE COMPUTER (GPC) CLOSE).

FUNCTION:
PROVIDES BLOCKING BETWEEN DUAL STIMULI (FROM GPC CLOSE AND MANUAL SWITCH CLOSE) TO HYBRID RELAY LOGIC INPUTS FOR THE CONTROL OF 3 PHASE AC VOLTAG TO THE FUEL AND OXIDIZER TANK ISOLATION VALVES 1/2 DRIVE MOTORS.
OV-102 - 56V76A116A1CR9,10,13,14,52,72.
OV-103 & SUBS - 56V76A116A1CR11,12,15,16,59,77.

FAILURE MODE:
OPEN, FAILS TO CONDUCT, HIGH RESISTANCE

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

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

(A) LOSS OR DEGRADATION OF ABILITY TO ENERGIZE THE AFFECTED VALVE DRIVE CIRCUIT (THROUGH GPC).

(B) THE AFFECTED LOGIC INPUT (GPC) CANNOT COMMAND THE FUNCTION, HOWEVER REDUNDANT COMMAND CAN BE INITIATED FROM A CREW OPERATED MANUAL SWITCH THROUGH A SEPARATE DIODE PROTECTED CIRCUIT.

(C) NO EFFECT.

(D) NO EFFECT FOR NOMINAL MISSION - CRITICALITY INCREASED TO 1/1 DURING RTLS AND TAL ABORT. GPC COMMAND UTILIZED BY MCA OPTIMIZATION SOFTWARE I "LANDING HEAVY" CONDITION. WILL ALSO RESULT IN CONTROL PROBLEMS DURING ENTRY. RESULTS IN LOSS OF 12 AFT RCS THRUSTERS BEING USED DURING THE OM DUMP.

(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE MISSION LOSS DUE TO INABILITY TO PERFORM OMS TO RCS INTERCONNECT IF MANUAL CAPABILITY IS LOST. REQUIRES 2 OTHER FAILURES (MANUAL SWITCH, OPEN TANK ISOLATION) BEFORE EFFECT IS MANIFESTED.

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
COMPONENT CHECKED OUT EVERY FLIGHT DURING GROUND TURNAROUND. THE TESTING CONSISTS OF CYCLING VALVE MANUAL SWITCHES AND/OR SENDING GPC COMMANDS TO CYCLE VALVES OR HEATERS WHILE MONITORING VEHICLE INSTRUMENTATION TO DETERMINE IF COMPONENTS HAVE FAILED.

(E) OPERATIONAL USE
USE MANUAL SWITCH CAPABILITY.