# SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - AFT-RCS  FMEA NO 05-6KA-2254E -2  REV:11/03/87

ASSEMBLY :AFT MCA 1,2
P/N RI :JANTXV1N4246
P/N VENDOR:
QUANTITY :4
:FOUR
:

ABORT, RTLS/TAL  CRIT. FUNC: 1R
CRIT. HDW: 3

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

PHASE(S): PL X LO X OO X DO X LS X

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

PREPARED BY:
DES D SOVEREIGN
REL J BEEXMAN
QE

APPROVED BY:
DES
REL
QE

APPROVED BY (NASA):
SSM
REL
QE
EPD&C MGR

ITEM:
BLOCKING DIODE (1 AMP) - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER TANK ISOLATION VALVES 3/4/5 A AND B CONTROL CIRCUITS (MANUAL OPEN/CLOSE INHIBIT).

FUNCTION:
PROVIDES BLOCKING BETWEEN DUAL STIMULI (FROM MANUAL SWITCH OPEN CIRCUIT AND CLOSE LIMIT SWITCHES) TO HYBRID RELAY INHIBIT LOGIC INPUTS FOR THE CONTROL OF 3 PHASE AC VOLTAGE TO THE FUEL AND OXIDIZER TANK ISOLATION VALVES 3/4/5 A AND B DRIVE MOTORS.
OV-102 - 54V76A114A2CR41,74. 55V76A115A1CR16,47.
OV-103 & SUBS - 54V76A114A2CR16,44. 55V76A115A2CR31. 55V76A115A1CR49.

FAILURE MODE:
SHORT, INTERNAL SHORT, LOW BACK RESISTANCE

CAUSE(S):
CONTAMINATION, THERMAL STRESS

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

(A) LOSS OR DEGRADATION OF STIMULI ISOLATION CAPABILITY.

(B) LOSS OF ISOLATION BETWEEN THE VALVE "CLOSE" LIMIT SWITCH CIRCUIT AND MANUAL SWITCH "OPEN" COMMAND CIRCUIT - NO EFFECT, SINCE "OPEN" RELAYS ARE INHIBITED WHEN THE MANUAL SWITCH IS IN THE "CLOSE" POSITION.

(C) NO EFFECT

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

(E) FUNCTIONAL CRITICALITY EFFECT - VALVE WILL CHATTER OFF THE CLOSE STOP. POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS MOTOR OPERATION IN CONJUNCTION WITH A POSSIBLE BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES 2 OTHER FAILURES (DIODE OPEN, BELLOWS LEAK) BEFORE THE EFFECT IS MANIFESTED. A BELLOWS LEAK IS UNDETECTABLE EXCEPT BY PERFORMING A SNIFF CHECK OF THE VALVE'S ACTUATOR ON THE GROUND.

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 GENERAL PURPOSE COMPUTER (GPC) COMMANDS TO CYCLE VALVES OR HEATERS WHILE MONITORING VEHICLE INSTRUMENTATION TO DETERMINE IF COMPONENTS HAVE FAILED.

(E) OPERATIONAL USE
NO ACTION FOR FIRST FAILURE - NOT DETECTABLE. IF CONTINUOUS POWER SITUATION EXISTS, REMOVE POWER FROM RELAY BY PLACING MANUAL SWITCH IN GPC POSITION.