

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2115 -2 REV:05/14/88

ASSEMBLY : AFT PCA-4,5,6 CRIT. FUNC: 1R
P/N RI : JANTX1N1204RA CRIT. HDW: 3

F/N VENDOR: VEHICLE 102 103 104
EFFECTIVITY: X X X
QUANTITY : 6 PHASE(S): PL X LO X OO DO LS
: SIX
:

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

PREPARED BY: APPROVED BY: APPROVED BY (NASA):
DES *AK* J BROWN DES *D. Brown* EPDC SSM *David L. ... 6/14/88*
REL *gaf* DEFENSOR REL *J. Kamen 6/27/88* MPS SSM *...*
QE *...* D MASAI QE *J. Kamen 6/27/88* EPDC REL *...*
MPS REL *...* QE *...*

ITEM:
DIODE, BLOCKING (12 AMP), HELIUM ISOLATION VALVE B (LV2/4/6) RPC OUTPUT.

FUNCTION:
ISOLATES REDUNDANT MAIN BUS POWER TO HELIUM SUPPLY ISOLATION VALVE B.
CONDUCTS MANUAL SWITCH AND MDM OPEN COMMANDS TO HELIUM SUPPLY ISOLATION VALVE B.
54V76A134A4CR23, A4CR24. 55V76A135A4CR23, A4CR24. 56V76A134A4CR23, A4CR24.

FAILURE MODE:
SHORTS (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) CRITICALITY EFFECT

(A) LOSS OF MAIN BUS ISOLATION. DEGRADATION OF REDUNDANCY AGAINST INADVERTENT DEACTUATION OF HELIUM SUPPLY ISOLATION VALVE B.

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

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SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2115 -2 REV:06/14/88

- (E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - ENGINE OPERATION.
- 1) DIODE SHORTS (END-TO-END), RESULTING IN LOSS OF MAIN BUS ISOLATION.
 - 2) LOSS OF MAIN BUS TO SERIES RPC CAUSING PARALLEL RPC TO TRIP WHICH RESULTS IN LOSS OF OPEN POWER TO HELIUM ISOLATION VALVE B.
 - 3) ISOLATION VALVE A (LV1/3/5) FAILS CLOSED.

FAILURES WILL RESULT IN LOSS OF HELIUM REQUIRED TO PERFORM CONTINUOUS PURGING OF HIGH PRESSURE OXIDIZER TURBOPUMP INTERMEDIATE SEAL CAVITY. THIS CAVITY IS BETWEEN TWO SEALS, ONE OF WHICH CONTAINS THE HOT, FUEL-RICH GAS IN OXIDIZER TURBINE AND THE OTHER CONTAINS THE LIQUID OXYGEN IN OXIDIZER TURBOPUMP. LEAKAGE THROUGH ONE OR BOTH SEALS COULD RESULT IN A CATASTROPHIC EXPLOSION IF ALLOWED TO ACCUMULATE. CONTINUOUS OVERBOARD PURGE OF THIS AREA PREVENTS THIS ACCUMULATION FROM OCCURRING. 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. 2 - DIODE, STUD-MOUNT.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION, V41AAO.015B,C, V41AAO.035B,C, V41AAO.055B,C EVERY FLIGHT.

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.