

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2184 -2 REV:05/03/88

ASSEMBLY :PANEL 013 CRIT.FUNC: 1R
 P/N RI :JANTX1N1204RA CRIT. HDW: 2
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY :3 EFFECTIVITY: X X X
 :THREE, 1/EACH MN DC BUS PHASE(S): PL X LO X CO X DO X LS X
 : CONTROL CIRCUIT A,B&C

REDUNDANCY SCREEN: A-PASS B-N/A C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES R PHILLIPS DES S.M. Phillips SSM W.C. Steag 5/12/88
 REL M HOVE REL M. J. Clifton 5-6-88 REL W. J. Steag 5/12/88
 QE J COURSEN QE J. J. Courson 5/6/88 QE J. J. Courson

ITEM:
 DIODE, ISOLATION, 12 AMP - ESSENTIAL BUS CONTROL POWER ISOLATION - FUEL CELL AND MAIN DC BUS TIE

FUNCTION:
 ISOLATES POWER SOURCE ESSENTIAL BUS 1BC (2CA, 3AB) FROM MAIN DC BUS B (C, A) WHICH REDUNDANTLY SUPPLY CONTROL VOLTAGE TO THE MAIN DC BUS CONTROL FOR CONNECTING/DISCONNECTING FUEL CELL 1 (2, 3) TO MAIN DC BUS A (B, C) AND THE MAIN DC BUS A (B, C) TO THE TIE BUS. 33V73A13CR2, 4, 6

FAILURE MODE:
 SHORT (CONDUCTS IN REVERSE DIRECTION)

CAUSE(S):
 STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, THERMAL STRESS, ELECTRICAL STRESS, PROCESSING ANOMALY

EFFECT(S) ON:
 (A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE (E)FUNCTIONAL CRITICALITY EFFECT:
 (A) LOSS OF DIODE FUNCTION, POSSIBLE LOSS OF REDUNDANCY IF ESSENTIAL BUS CIRCUIT BREAKER TRIPS BECAUSE OF OVERCURRENT AS A RESULT OF VOLTAGE DIFFERENTIAL BETWEEN THE MAIN BUS AND ESSENTIAL BUS CONTROL SOURCES.
 (B,C,D) NO EFFECT - FIRST FAILURE.
 (E) POSSIBLE LOSS OF CREW/VEHICLE AFTER SECOND FAILURE (SHORT ON ESSENTIAL BUS), CAUSING ASSOCIATED MAIN BUS CIRCUIT BREAKER TO TRIP BEFORE ASSOCIATED ESSENTIAL BUS CIRCUIT BREAKER. LOSS OF THE ASSOCIATED ESSENTIAL BUS RESULTS IN LOSS OF THE ASSOCIATED FUEL CELL COOLANT PUMP AS WELL AS CONTROL OF THAT FUEL CELL'S REACTANT VALVES. THIS NECESSITATES REMOVAL OF ALL LOAD FROM THE FUEL CELL IN ORDER TO RENDER IT SAFE. INABILITY TO REMOVE THE BUS LOAD FROM THE FUEL CELL UNDER THESE CIRCUMSTANCES, WILL RESULT IN FUEL CELL OVERHEATING WITH SUBSEQUENT RUPTURE AND/OR EXPLOSION/FIRE. "B" SCREEN IS N/A DUE TO STANDBY REDUNDANCY.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2184 -2 REV:05/03/88

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE:

A, B, C, D) DISPOSITION AND RATIONALE

REFER TO APPENDIX F, ITEM NO. 2 - DIODE, POWER - STUD MOUNTED

1) GROUND TURNAROUND TEST

VERIFY INTEGRITY OF DIODE BY READING VOLTAGE ON ESSENTIAL BUS DURING NO SOURCE ESSENTIAL BUS TEST. TEST IS PERFORMED FOR ALL FLIGHTS.

2) OPERATIONAL USE

CREW REQUIRED TO VERIFY CORRECT CIRCUIT BREAKER POSITIONS. CREW WILL BE REQUIRED TO RECOGNIZE POSSIBILITY THAT THE ESSENTIAL BUS FEED CIRCUIT BREAKER MAY NEED TO BE OPENED PRIOR TO RESETTING THE MAIN B (C, A) FEED CIRCUIT BREAKER TO MAIN BUS A (B, C) CONTROL CIRCUITRY. ONBOARD PROCEDURES MANAGE POWER FOR LOSS OF ONE FUEL CELL/MAIN BUS.