SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2140 -2 REV:05/03/88

ASSEMBLY :MAIN DC DISTR ASSY 3 CRIT.FUNC: 1R
P/N RI :MC455-0126-0001 CRIT. HDW: 2
P/N VENDOR: VEHICLE 102 103 104
QUANTITY :1 EFFECTIVITY: X X X
:ONE, MN DC DIST ASSY 3 PHASE(S): PL X LO X OO X DO X LS X
:

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

PREPARED BY:			APPROVED BY:	APPROVED BY (NASA):
DES	R	PHILLIPS	DES	SSM
REL	M	HOVE	REL	REL
QE	J	COURSEN	QE	QE

ITEM:
CONTACTOR, POWER, MOTOR DRIVEN - PAYLOAD PRIMARY POWER, FUEL CELL NO. 3

FUNCTION:
UPON COMMAND, THE MOTOR-SWITCH ACTUATES ITS POWER CONTACTS, CONNECTING OR DISCONNECTING THE FUEL CELL TO THE PRIMARY PAYLOAD POWER INTERFACE. HAS AUXILIARY CONTACTS FOR POSITION MONITOR AND ON/OFF CONTROL. 40V76A33S3

FAILURE MODE:
FAILS CLOSED, FAILS TO OPEN, INADVERTENTLY CLOSES

CAUSE(S):
CONTAMINATION, PIECE PART FAILURE, MECHANICAL SHOCK, VIBRATION, PROCESSING ANOMALY

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

(A) LOSS OF ABILITY TO REMOVE PAYLOAD LOADS FROM FCP NO. 3, OR INADVERTENT CONNECTION OF PAYLOAD ELECTRICAL LOADS TO FCP 3 WITH NO CAPABILITY TO REMOVE THESE LOADS.

(B) LOSS OF REDUNDANCY TO "SAFE" FCP 3.

(C,D) NO EFFECT - FIRST FAILURE.

(E) SECOND FAILURE (LOSS OF ESSENTIAL BUS 3AB) POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO "SAFE" A FUEL CELL. LOSS OF ESSENTIAL BUS 3AB RESULTS IN LOSS OF THE FUEL CELL 3 COOLANT PUMP AS WELL AS CONTROL OF FUEL CELL 3 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 BECAUSE OF STANDBY REDUNDANCY.

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

(A,B,C,D) DISPOSITION AND RATIONALE
REFER TO APPENDIX C, ITEM NO. 6 - POWER CONTACTOR

(B) GROUND TURNAROUND TEST
VERIFY POWER TRANSFER CAPABILITY FROM FUEL CELL NO. 3 TO PAYLOAD PRIMARY BUS. CYCLE PAYLOAD PRIMARY FUEL CELL 3 POWER SWITCH AND MONITOR STIMULI COMMANDS, DISCRETE EVENTS, AND PAYLOAD BUS VOLTAGE. TEST PERFORMED FOR FLIGHTS WITH MISSION PAYLOAD REQUIREMENTS.

(E) OPERATIONAL USE
POWER CONTACTOR NORMALLY CONFIGURED TO "OPEN" POSITION DURING ALL MISSION PHASES.