

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - FWD-RCS FMEA NO 05-6KF-2213 -2 REV: 11/03/87

ASSEMBLY : FWD LCA 3 CRIT. FUNC: 1R
 P/N RI : MC477-0263-0002 CRIT. HDW: 3
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 1 EFFECTIVITY: X X X
 : ONE PHASE(S): PL X LO X OO X DO X LS X
 :

PREPARED BY: REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 DES D SOVEREIGN APPROVED BY: APPROVED BY (NASA):
 REL J BECKMAN DES D. S. R. B... SSM
 QE REL ... 11-14-87 REL ...
 QE ... 11/14/87 QE ...
 EPD&C USA

ITEM:
 HYBRID DRIVER CONTROLLER (HDC) TYPE III - FORWARD RCS FUEL AND OXIDIZER
 MANIFOLD 5 ISOLATION VALVES "CLOSE" POWER CIRCUIT.

FUNCTION:
 UPON A GENERAL PURPOSE COMPUTER (GPC) OR CREW INITIATED (MANUAL SWITCH)
 COMMAND, THE DRIVER, IN CONJUNCTION WITH OTHER SERIES ELEMENTS, CONDUCTS
 AND CONTROLS THE "CLOSE" COIL CURRENT TO THE FUEL AND OXIDIZER MANIFOLD
 5 ISOLATION VALVE SOLENOIDS. 83V76A18AR(JS-L,K).

FAILURE MODE:
 INADVERTENT OPERATION, SHORT, INADVERTENTLY CONDUCTS.

CAUSE(S):
 PIECE PART FAILURE, CONTAMINATION, MECHANICAL AND THERMAL
 SHOCK,
 VIBRATION.

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
 (A) DEGRADATION OF REDUNDANCY AGAINST AN INADVERTENT SOLENOID COIL
 POWERING.

(B) NO EFFECT - REQUIRES ADDITIONAL FAILURES BEFORE SOLENOID CIRCUIT CAN
 BE ENERGIZED CONTINUOUSLY.

(C,D) NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO
 VALVE OVERHEATING AND PROPELLANT DECOMPOSITION BY CONTINUOUS SOLENOID
 COIL POWERING LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES
 TWO OTHER FAILURES (REMOTE POWER CONTROLLER FAILS ON, TYPE IV OPEN/CLOSE
 DRIVER ON) BEFORE EFFECT IS MANIFESTED. THE FAILURE STRING COULD BE
 UNDETECTABLE AFTER THE FIRST FAILURE DUE TO LACK OF MEASUREMENT
 INDICATIONS FOR THE TYPE III AND TYPE IV HYBRID DRIVERS.

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DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER.

(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 GROUND DRIVER BY PULLING CIRCUIT BREAKER. CIRCUIT BREAKER WILL BE RESET WHEN THE VALVE IS TO BE MOVED.