

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPO&C - MAIN PROP. FMEA NO 05-6J -2079 -2 REV: 11/19/87

ASSEMBLY : AFT LCA-1, 2, & 3 CRIT. FUNC: 1R
 P/N RI : MC477-0261-0002 CRIT. HDW: 3
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 3 EFFECTIVITY: X X X
 : THREE PHASE(S): PL LO X OO DO LS
 : 1 PER PREVALVE 1, 2, & 3

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 PREPARED BY: DES J BROWN *JLB* APPROVED BY: DES *[Signature]* APPROVED BY (NASA):
 REL F DEFENSOR *fd* REL *[Signature]* 12-5-87 EPDC SSM *[Signature]*
 QE D MASAI *DM* QE *[Signature]* MPS SSM *[Signature]*
 EPDC REL *[Signature]*
 MPS REL *[Signature]*
 QE *[Signature]*

ITEM:

CONTROLLER, HYBRID DRIVER (HDC), TYPE I, LO2 PREVALVE 1, 2, & 3, CONTROL POWER FOR OPEN SOLENOID.

FUNCTION:

CONDUCTS MDM OPEN COMMAND TO TYPE III HDC. LEFT OVER FROM PREVIOUS CIRCUIT CONFIGURATION, COULD BE REPLACED BY A WIRE AND DIODE. 54V76A121AR (J1-33), 55V76A122AR (J1-33), 56V76A123AR (J1-33).

FAILURE MODE:

INADVERTENT OUTPUT, FAILS ON, CONDUCTS PREMATURELY.

CAUSE(S):

PIECE PART FAILURE, CONTAMINATION, THERMAL STRESS, MECHANICAL SHOCK, VIBRATION.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY

(A) DEGRADATION OF REDUNDANCY AGAINST PREMATURE OPEN SOLENOID POWER.

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

(E) POSSIBLE LOSS OF CREW AND VEHICLE AFTER THE THIRD FAILURE (SECOND FAILURE - SERIES RPC FAILS ON RESULTING IN PREMATURE POWER TO OPEN SOLENOID, REDUNDANT OPEN SOLENOID WILL VENT ACTUATOR. THIRD FAILURE - REDUNDANT OPEN SOLENOID FAILS TO DEACTUATE) RESULTING IN UNCONTAINED ENGINE DAMAGE DUE TO FAILURE TO CLOSE LO2 PREVALVE AT MECO + 1.158 SECONDS. PREVALVE CLOSURE REQUIRED TO MAINTAIN NET POSITIVE SUCTION PRESSURE ON SSME HIGH PRESSURE OXIDIZER TURBOPUMP. FAILS B SCREEN BECAUSE SERIES/PARALLEL REDUNDANCY.

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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 CONTROLLER.

(B) GROUND TURNAROUND TEST

MDM COMMAND REDUNDANCY, V41AEO.380A; 400A; 420A EVERY FLIGHT.

(E) OPERATIONAL USE

FLIGHT - NO CREW ACTION CAN BE TAKEN.

GROUND - IF A MAJOR LEAK IS DETECTED, CLOSE PREVALVES (PV1, 2, 3), LOC
17-INCH DISCONNECT (PD1); DRAIN MANIFOLD.

05-6J-156