

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2074 -1 REV: 11/04/87

ASSEMBLY : AFT LCA-1, 2, & 3 CRIT. FUNC: LR
 P/N RI : MC477-0263-0002 CRIT. HDW: 3
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 12 EFFECTIVITY: X X X
 : TWELVE PHASE(S): PL X LO X OO DO LS
 : 4 PER PREVALVE 1, 2, 3

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

ITEM:
 CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LO2 PREVALVE 1, 2, & 3, CONTROL POWER FOR CLOSE SOLENOIDS.

FUNCTION:
 ALLOWS GPC & MANUAL REMOTE CONTROL OF POWER TO REDUNDANT CLOSE SOLENOID FOR EACH LO2 PREVALVE 1, 2, & 3. HYBRID DRIVER CONTROLLER IS IN SERIES WITH A REMOTE POWER CONTROLLER. NOTE - HDC IDENTIFIED BY LCA INPUT PINS.

- 54V76A121 (J3,49), (J6,B), (J6,D), (J13,53).
- 55V76A122 (J3,49), (J3,53), (J6,B), (J6,D).
- 56V76A123 (J3,49), (J3,53), (J6,B), (J6,D).

FAILURE MODE:
 LOSS OF OUTPUT, FAILS OPEN, FAILS TO CONDUCT.

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) LOSS OF ONE OF TWO POWER PATHS TO CLOSE SOLENOID.
- (B,C,D) FIRST FAILURE - NO EFFECT.

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(E) POSSIBLE LOSS OF CREW AND VEHICLE AFTER THE THIRD FAILURE (SECOND FAILURE - LOSS OF SECOND POWER PATH TO CLOSE SOLENOID, REDUNDANT SOLENOID PERFORMS FUNCTION. THIRD FAILURE - FAILURE OF REDUNDANT SOLENOID) 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 REDUNDANT POWER PATH MASKS FAILURE.

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.380L,P: 400L,P; 420L,P EVERY FLIGHT.

(E) OPERATIONAL USE

FLIGHT - NO CREW ACTION CAN BE TAKEN.

GROUND - IF A MAJOR LEAK IS DETECTED, CLOSE PREVALVES (PV1, 2, 3), 15 17-INCH DISCONNECT (PD1); DRAIN MANIFOLD.

05-6J-138