

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AUXILIARY PWR FMEA NO 05-6N -201001-2 REV:08/02/90

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, ONE/APU PHASE(S): PL LO OO X DO LS

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES T NGUYEN DES *Y.M. [Signature] 8-12-90* SSM *Walter S. [Signature] 9/6/90*
 REL T KIMURA REL *Michael [Signature] 9-16-90* REL *[Signature] 9-16-90*
 QE J T COURSEN QE *[Signature] 8-15-90* QE *[Signature]*
 EPD&C Rev *[Signature] 8/30/90*
 EPD&C SSM *[Signature] 9-5-90*

ITEM:
 CONTROLLER, HYBRID DRIVER, HDC TYPE 1 - AUXILIARY POWER UNIT (APU) 1, 2,
 AND 3 FUEL PULSE CONTROL VALVE PURGE NO. 2

FUNCTION:
 UPON GSE COMMAND FROM MDM LA1 THROUGH THE HYBRID DRIVER TO THE APU
 CONTROLLER, THE FUEL PULSE CONTROL VALVE IS CLOSED.
 54V76A121AR(J9-97);
 55V76A122AR(J9-97);
 56V76A123AR(J9-97)

FAILURE MODE:
 INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF"

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

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

- (A) DEGRADATION OF REDUNDANCY AGAINST THE INADVERTENT POWERING OF THE PULSE CONTROL VALVE SOLENOID.
- (B,C,D) NO EFFECT - FIRST FAILURE
- (E) POSSIBLE LOSS OF CREW/VEHICLE AFTER TWO OTHER FAILURES (TWOPREFLIGHT-TO-ESSENTIAL BUS DIODES FAIL SHORT WHICH ENERGIZES THE PREFLIGHT TEST BUS) RESULTING IN CONTINUOUS POWER TO THE PULSE CONTROL VALVE SOLENOID CAUSING OVERHEATING OF NONFLOWING HYDRAZINE INDUCING DECOMPOSITION AND VALVE/LINE RUPTURE.

FAILS SCREEN "B" BECAUSE FIRST FAILURE NOT DETECTABLE SINCE THE PREFLIGHT TEST BUS IS NOT POWERED DURING FLIGHT UNLESS REQUIRED BY FLIGHT RULE 9-41.

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DISPOSITION & RATIONALE:

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

(A-D) DISPOSITION AND RATIONALE

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

(B) TEST

GROUND TURNAROUND TEST - FAILED "ON" HDC DETECTABLE WHEN PRE-FLIGHT TEST BUS IS ENERGIZED AND APU IS STARTED FIVE MINUTES BEFORE LAUNCH (THIS HDC FAILED "ON" WILL PREVENT ASSOCIATED APU FROM STARTING). ALSO, APU CONTROL VALVE FUNCTIONAL TEST PERFORMED AFTER LRU REPLACEMENT OF APU ASSEMBLY.

(E) OPERATIONAL USE

NONE