

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2345 -1 REV: 11/04/87

ASSEMBLY : AFT PCA-5, 6 CRIT. FUNC: 1R
 P/N RI : MC477-0263-0002 CRIT. HDW: 3
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 4 EFFECTIVITY: X X X
 : FOUR PHASE(S): PL LO X OO DO LS
 : 2 PER LH2/LO2 17" DISCONNECT LATCH

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES J BROWN	DES <u>[Signature]</u>	EPDC SSM <u>[Signature]</u>
REL F DEFENSOR	REL <u>[Signature]</u> (12-5-87)	MPS SSM <u>[Signature]</u>
QE D MASAI	QE <u>[Signature]</u> 12/1/87	EPDC REL <u>[Signature]</u>
		MPS REL <u>[Signature]</u>
		QE <u>[Signature]</u> 1/1/88

ITEM:

CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LH2/LO2 17-INCH FEEDLINE DISCONNECT VALVE LATCH UNLOCK SOLENOID CONTROL AND POWER.

FUNCTION:

CONDUCTS POWER TO THE UNLOCK SOLENOID IN EACH REDUNDANT CIRCUIT FOR THE LH2/LO2 FEED DISCONNECT VALVE LATCH UNLOCK SOLENOID. THE HDC IS IN SERIES WITH A RPC AND DIODE IN EACH CIRCUIT. 55V76A135AR4, AR6; 56V76A136AR5, AR3.

FAILURE MODE:

LOSS OF OUTPUT, FAILS OPEN, FAILS TO CONDUCT.

CAUSE(S):

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

EFFECT(S) ON:

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

(A) LOSS OF ONE OF TWO POWER PATHS TO LATCH UNLOCK SOLENOID.

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

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(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THIRD FAILURE (SECOND FAILURE - LOSS OF SECOND POWER PATH TO UNLOCK SOLENOID. THIRD FAILURE - DURING ET/ORBITER UMBILICAL RETRACTION, BACKUP MECHANICAL LINKAGE FAILS, PREVENTING FLAPPER CLOSURE) RESULTING IN INABILITY TO CLOSE THE FEED DISCONNECT VALVE PRIOR TO UMBILICAL RETRACTION. FOR NOMINAL, ATO, AND AOA MISSIONS ET SEPARATION IS DELAYED FOR SIX MINUTES TO VENT RESIDUAL PROPELLANT THROUGH FAILED DISCONNECT. THIS IS TO PREVENT ORBITER/ET RECONTACT DUE TO PROPULSIVE VENTING AT SEPARATION. POSSIBLE TILE AND DOOR DAMAGE AT THE ORBITER/ET UMBILICAL AREA DUE TO CRYO IMPACT. FOR RTLS, TAL, AND MISSIONS WHERE OMS BURN CANNOT BE DELAYED ET STRUCTURAL SEPARATION IS INITIATED IMMEDIATELY AND ORBITER/ET RECONTACT IS LIKELY. ALSO RESULTS IN LOSS OF HELIUM SUPPLY DURING MANIFOLD REPRESS CAUSING POSSIBLE LOSS OF CRITICAL AFT COMPARTMENT ENTRY PURGE. FAILS B SCREEN BECAUSE PARALLEL POWER PATH MASKS FAILURE.

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) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION, V41ABO.155H, J; 165H, J EVERY FLIGHT

(E) OPERATIONAL USE

FOR NOMINAL MISSIONS, CREW WILL PERFORM MANUAL ET STRUCTURAL SEPARATION AFTER SIX MINUTE DELAY PERIOD. FOR RTLS, VEHICLE SOFTWARE PERFORMS ET STRUCTURAL SEPARATION AFTER A SIX SECOND (MAXIMUM) DELAY. FOR TAL OR MISSIONS WHERE OMS BURN CANNOT BE DELAYED CREW WILL MANUALLY INITIATE ET STRUCTURAL SEPARATION WITHOUT DELAY: