

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2245 -2 REV: 11/04/87

ASSEMBLY : AFT LCA-2, 3 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 X LO X OO DO LS
 : 2 PER LH2/LO2 FEED DISCONNECT VALVE

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

PREPARED BY:	DES	J BROWN	APPROVED BY:	DES	<i>[Signature]</i>	APPROVED BY (NASA):	EPDC SSM	<i>[Signature]</i>
REL	F DEFENSOR	REL	<i>[Signature]</i>	12/5/87	EPDC REL	<i>[Signature]</i>	MPS SSM	<i>[Signature]</i>
QE	D MASAI	QE	<i>[Signature]</i>	12/4/87	MPS REL	<i>[Signature]</i>	QE	<i>[Signature]</i>

ITEM:

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

FUNCTION:

CONDUCTS POWER TO THE CLOSE SOLENOID IN EACH REDUNDANT CIRCUIT FOR THE LH2/LO2 TANK FEED DISCONNECT VALVE. THE HDC IS IN SERIES WITH A RPC AND DIODE IN EACH CIRCUIT. 56V76A123AR-J3(70), (72); 55V76A122AR-J3(70), (72).

FAILURE MODE:

INADVERTENT OUTPUT; CONDUCTS PREMATURELY, INTERNAL SHORT.

CAUSE(S):

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

EFFECT(S) ON:

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

(A) DEGRADATION OF REDUNDANCY AGAINST PREMATURELY CLOSING THE FEED DISCONNECT VALVE.

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

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(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THIRD FAILURE (SECOND FAILURE - INADVERTENT OUTPUT FROM SERIES RPC PREMATURELY ACTUATING THE CLOSE SOLENOID. THIRD FAILURE - PREMATURE DEACTUATION OF OPEN SOLENOID) RESULTING IN PREMATURE DISCONNECT VALVE CLOSURE WHILE ENGINES ARE RUNNING. SURGE PRESSURE FROM VALVE CLOSURE MAY CAUSE DAMAGE OR RUPTURE TO THE MPS AND/OR ET SYSTEM, DEPENDING ON THE RATE OF CLOSURE. SHUTDOWN OF ALL THREE SSMEs SIMULTANEOUSLY. UNCONTAINED ENGINE DAMAGE DUE TO STARVATION CUTOFF. FAILS B SCREEN DUE TO SERIES CIRCUIT CONFIGURATION. NOTE - LATCH IS NOT DESIGNED OR CERTIFIED TO HOLD PNEUMATICALLY-CLOSED FLAPPER UNDER FLOW CONDITIONS, THEREFORE, NOT CONSIDERED A VALID SUCCESS PATH FOR THIS SCENARIO.

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

COMPLETE ELECTRICAL VERIFICATION, V41ABO.150G, 160G EVERY FLIGHT.

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.

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