

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP.

FMEA NO 05-6J -2225 -2

REV: 04/25/88

ASSEMBLY : APT LCA-1,2
 P/N RI : MC477-0263-0002
 P/N VENDOR:
 QUANTITY : 4
 : FOUR
 :

	VEHICLE	102	103	104	
	EFFECTIVITY:	X	X	X	
	PHASE(S):	PL X	LO X	OO	DO LS

CRIT. FUNC: 1R
 CRIT. HDW: 3

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

PREPARED BY: J BROWN
 DES

APPROVED BY: [Signature]
 DES

APPROVED BY (NASA):

EPDC SSM [Signature] 5/13/88

MPS SSM [Signature] 5/13/88

REL F DEFENSOR [Signature]

REL [Signature] 5-6-88

EPDC REL [Signature] 5/13/88

MPS REL [Signature] 5/13/88

QE [Signature] D MASAI

QE [Signature] 5-6-88

QE [Signature]

ITEM:

CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LO2 POGO RECIRCULATION VALVE
 CLOSE SOLENOID CONTROL POWER (LV77/LV78).

FUNCTION:

CONDUCTS MAIN BUS POWER TO CLOSE SOLENOID OF LO2 POGO RECIRCULATION
 VALVE. THE TWO HDCs ARE IN SERIES.
 54V76A121J1(43). 55V76A122J1(43).

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

(A) DEGRADATION OF REDUNDANCY AGAINST INADVERTENT POWER TO CLOSE
 SOLENOID OF LO2 POGO RECIRCULATION VALVE.

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

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- (E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
- 1) HDC FAILS "ON".
 - 2) SERIES HDC FAILS "ON", CLOSING ONE OF TWO LO2 POGO RECIRCULATION VALVES (PV20/21).
 - 3) REDUNDANT LO2 POGO RECIRCULATION VALVE FAILS CLOSED.

CASE I: TIME FRAME - SSME START TRANSIENT.

NO EFFECT. LOSS OF POGO RETURN PATH CAUSING OVERFLOW OF HELIUM PRECHARGE FROM POGO ACCUMULATOR INTO HIGH PRESSURE OXIDIZER TURBOPUMP (HPOT) IS TOLERATED.

CASE II: TIME FRAME - ASCENT.

LOSS OF POGO RETURN PATH CAUSES EXCESSIVE GO2 VOLUME IN POGO ACCUMULATOR RESULTING IN BUBBLE COLLAPSE AND LOSS OF POGO DAMPING FUNCTION. MAY RESULT IN EXCESSIVE VEHICLE POGO OSCILLATION. POSSIBLE LOSS OF CREW/VEHICLE.

CASE III: TIME FRAME - POST MECO ENGINE SHUTDOWN SEQUENCE.

DURING ZERO-G SHUTDOWN SEQUENCE, HELIUM IS INJECTED INTO POGO ACCUMULATORS TO MAINTAIN NPSP AND PREVENT HPOT OVERSPEED. LOSS OF POGO RETURN PATH CAUSES GHe OVERFLOW FROM ACCUMULATORS AND INGESTION INTO THE HPOT RESULTING IN PUMP OVERSPEED AND POSSIBLE UNCONTAINED ENGINE DAMAGE. POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE OF SERIES CIRCUIT CONFIGURATION.

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.210A, B; V41ABO.215A, B EVERY FLIGHT.

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.

05-6J-356