

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPC&C - MAIN PROP. FMEA NO 05-6J -2100 -2 REV:09/03/95
 ASSEMBLY :AFT LCA-3 ABORT: ALL
 P/N RI :MC477-0263-0002 CRIT. FUNC: 12
 P/N VENDOR: CRIT. HDW: 2
 QUANTITY :1 VEHICLE 102 103 104
 :ONE EFFECTIVITY: X X X
 PHASE(S): PL X LO X OC DO LS

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

ITEM:
 CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LH2 RECIRCULATION DISCONNECT VALVE OPEN SOLENOID (LV 50).

FUNCTION:
 CONDUCTS MAIN BUS C POWER TO LH2 RECIRCULATION DISCONNECT VALVE OPEN SOLENOID UPON MDM COMMAND. 56V76A123J1(52).

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) INABILITY TO DEACTIVATE THE LH2 RECIRCULATION DISCONNECT VALVE OPEN SOLENOID.
 (B) INABILITY TO CLOSE LH2 RECIRCULATION DISCONNECT VALVE (P23).
 (C,D) NO EFFECT - FIRST FAILURE.

05-6J-196

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- (E) CASE I: 1/3.
TIME FRAME - ORBITER/ET SEPARATION.

IF THE DISCONNECT WILL NOT CLOSE IN THE BACKUP MODE, IT WILL NOT CLOSE PNEUMATICALLY. THEREFORE, THE SOLENOID IS NOT CONSIDERED REDUNDANT TO THE MECHANICAL BACKUP (REFERENCE FMEA/CILS 03-1-0215-2).

- CASE II: 1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.
TIME FRAME - ASCENT.

- 1) HDC FAILS "ON", PREVENTING LH2 RECIRCULATION DISCONNECT VALVE (POJ) CLOSURE.
- 2) ENGINE SHUTDOWN WITH UNCONTAINED DAMAGE (ASSUMES ENGINE IS DAMAGED ONLY TO THE EXTENT THAT ISOLATION OF THE DAMAGE WILL SAVE THE SYSTEM).

RESULTS IN LH2/GH2 LEAKAGE INSIDE THE AFT COMPARTMENT. POSSIBLE AFT COMPARTMENT OVERPRESSURIZATION AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF ADJACENT CRITICAL FUNCTIONS DUE TO CRYO EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

CRITICALITY 1/1 FOR ENGINE OUT ABORT. FAILURE PREVENTS ISOLATION OF A SHUTDOWN ENGINE WITH UNCONTAINED DAMAGE.

DISPOSITION & RATIONALE:

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

(A-D) DISPOSITION AND RATIONALE:

REFER TO APPENDIX B, ITEM NUMBER 1 - HYBRID DRIVER CONTROLLER.

(B) GROUND TURNAROUND TEST

MDM COMMAND VERIFICATION, V41ABC.170 EVERY FLIGHT.

(E) OPERATIONAL USE

FLIGHT: NO CREW ACTION CAN BE TAKEN.

GROUND: OMI S2004 (LH2 SYSTEM) SEQUENCE TITLED "EMERGENCY PROCEDURE FOR MAJOR LEAK OR FIRE IN THE ORBITER AFT FUSELAGE" CONTAINS SAFING SEQUENCE OF EVENTS FOR MAJOR LEAKS IN THE HYDROGEN SYSTEMS.