SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2101 -1 REV:09/02/86
ABORT: ALL

ASSEMBLY :AFT LCA-3
P/N RI :MC477-0263-0002
F/N VENDOR:
QUANTITY :1
:ONE
:

		CRIT. FUNC:	1R
		CRIT. HDW:	2
VEHICLE EFFECTIVITY:	102 X	103 X	104 X
PHASE(S):	PL X LO X OO	DO	LS

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

PREPARED BY:
DES J BROWN
REL F DEFENSOR
QE DAVID MASAI

APPROVED BY:
DES
REL
QE

APPROVED BY (NASA):
EPDC SSM
MPS SSM
EPDC REL
MPS REL
QE

ITEM:
CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LH2 RECIRCULATION DISCONNECT VALVE CLOSE SOLENOID (LV51).

FUNCTION:
CONDUCTS MAIN BUS C POWER TO LH2 RECIRCULATION DISCONNECT VALVE CLOSE SOLENOID UPON MDM COMMAND. 56V76A123J1(54).

FAILURE MODE:
LOSS OF OUTPUT, FAILS TO CONDUCT, FAILS TO TURN "ON".

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 ACTUATE THE LH2 RECIRCULATION DISCONNECT VALVE CLOSE SOLENOID.

(B) INABILITY TO CLOSE LH2 RECIRCULATION DISCONNECT VALVE (PD2).

(C,D) NO EFFECT - FIRST FAILURE.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2101 -1 REV:09/02/88

(E) CASE I: 3/3.
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 "OFF", PREVENTING LH2 RECIRCULATION DISCONNECT VALVE (FD3) CLOSURE.
2) ENGINE SHUTDOWN WITH UNCONTAINED DAMAGE (ASSUMES ENGINE IS DAMAGED ONLY TO THE EXTENT THAT ISOLATION OF THE DAMAGE WILL SAFE 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, V41AB0.170 EVERY FLIGHT.

(E) OPERATIONAL USE
FLIGHT: NO CREW ACTION CAN BE TAKEN.

GROUND: OMI S1004 (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.