SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2004 -2 REV:04/25/88

ASSEMBLY :AFT LCA-1, 3
P/N RI :MC477-0263-0002
P/N VENDOR:
QUANTITY :4
:FOUR
:

CRIT. FUNC: 1R
CRIT. HDW: 3

VEHICLE	102	103	104
EFFECTIVITY:	X	X	X

PHASE(S): PL X LO X OO DO LS

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

PREPARED BY:
DES J BROWN
REL F DEFENSOR
QE for D MASAI

APPROVED BY:
DES
REL 5-6-88
QE 5-6-88

APPROVED BY (NASA):
EPDC SSM
MPS SSM 5-12-88
EPDC REL
MPS REL
QE

ITEM:
CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LH2 RTLS INBOARD/OUTBOARD DUMP VALVES OPEN SOLENOID (LV72/LV73).

FUNCTION:
CONDUCTS POWER TO OPEN SOLENOID IN EACH REDUNDANT CIRCUIT FOR LH2 RTLS DUMP VALVE. HDC IS IN SERIES WITH A DIODE AND A RPC IN EACH CIRCUIT.
54V76A121AR J3(63), J3(64). 56V76A123AR J3(63), J3(64).

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 LH2 RTLS DUMP VALVE OPEN SOLENOID.

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

(E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - PRELAUNCH AND ASCENT.
1) HDC FAILS "ON".
2) SERIES RPC FAILS "ON" CAUSING INADVERTENT ACTUATION OF OPEN SOLENOID. ONE OF THE TWO SERIES DUMP VALVES (PV17/18) INADVERTENTLY OPENS.
3) SERIES LH2 RTLS DUMP VALVE FAILED OPEN.

FAILURE RESULTS IN LH2 LEAKAGE OVERBOARD, CAUSING FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF HELIUM SUPPLY DURING MANIFOLD REPRESSURIZATION RESULTING IN LOSS OF AFT COMPARTMENT PURGE (RTLS/TAL ABORT CRITICAL). POSSIBLE LOSS OF CREW/VEHICLE.

A MAXIMUM OF 1800 LBS OF LH2 COULD BE LOST BETWEEN LIFTOFF AND MECO. THIS WOULD NOT AFFECT ENGINE INLET CONDITIONS, BUT WOULD CAUSE A LOW LEVEL CUTOFF (MAY CAUSE ATO OR AOA).

FAILS B SCREEN DUE TO 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.180B, V41ABO.19CB EVERY FLIGHT.

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