SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2017 -1 REV:04/25/88

ASSEMBLY :MID PCA-1, 3
P/N RI :MC477-0263-0002
P/N VENDOR:
QUANTITY :2
:TWO
:

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 D MASAI

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

APPROVED BY (NASA):
EPDC SSM
MPS SSM 5-13-88
EPDC REL
MPS REL
QE

ITEM:
CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LO2 RELIEF SHUTOFF VALVE CLOSE SOLENOID (LV 24).

FUNCTION:
CONDUCTS POWER TO CLOSE SOLENOID IN EACH REDUNDANT CIRCUIT FOR LO2 RELIEF SHUTOFF VALVE. HDC IS IN SERIES WITH A DIODE AND A RPC IN EACH CIRCUIT. 40V76A25AR42, 40V76A27AR30.

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) LOSS OF ONE OF TWO POWER PATHS TO LO2 RELIEF SHUTOFF VALVE CLOSE SOLENOID. DEGRADATION OF REDUNDANCY AGAINST PREMATURE DEACTUATION OF CLOSE SOLENOID.

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

(E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - PRELAUNCH AND ASCENT.
1,2) HDCs FAIL "OFF" CAUSING LO2 RELIEF SHUTOFF VALVE (PV7) TO OPEN. FEEDLINE RELIEF VALVE (RV5) WILL PREVENT OVERBOARD LEAKAGE OF LO2 (RELIEF VALVE CRACK PRESSURE IS ABOVE NOMINAL SYSTEM OPERATING PRESSURE).
3)RELIEF VALVE (RV5) FAILS TO REMAIN CLOSED.

LO2 WILL DUMP OVERBOARD RESULTING IN LOSS OF PROPELLANT AND POSSIBLE PREMATURE ENGINE SHUTDOWN. FIRE/EXPLOSION HAZARD EXTERIOR TO THE VEHICLE. POSSIBLE VIOLATION OF ET MINIMUM STRUCTURAL REQUIREMENTS DUE TO REDUCED ULLAGE PRESSURE. POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE PARALLEL POWER PATH MASKS FAILURE.

DISPOSITION & RATIONALE:
(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A-D) DISPOSITION AND RATIONALE:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

(B) GROUND TURNAROUND TEST
COMPLETE ELECTRICAL VERIFICATION V41ABO.070J,K. EVERY FLIGHT.

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

GROUND: OMI S1003 (LO2 SYSTEM) SEQUENCE TITLED "EMERGENCY PROCEDURE FOR MAJOR LEAK OR FIRE . . . " CONTAINS SAFING SEQUENCE OF EVENTS FOR MAJOR LEAKS IN THE PROPELLANT SYSTEMS.