

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2011 -3 REV:04/25/88

ASSEMBLY : D & C PANEL R4	CRIT. FUNC: 1R
P/N RI : ME452-0102-7354	CRIT. HDW: 2
P/N VENDOR:	VEHICLE 102 103 104
QUANTITY : 1	EFFECTIVITY: X X X
: ONE	PHASE(S): PL X LO X OO DO LS

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

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <i>J BROWN</i>	DES <i>[Signature]</i>	EPDC SSM <i>[Signature]</i>
REL F DEFENSOR <i>[Signature]</i>	REL <i>Melvin Ch. Hall 5-6-88</i>	MPS SSM <i>[Signature]</i>
QE <i>D MASAI</i>	QE <i>J. J. Conner 5-6-88</i>	EPDC REL <i>[Signature]</i>
		MPS REL <i>[Signature]</i>
		QE <i>[Signature]</i>

ITEM:

TOGGLE SWITCH (THREE POLES, THREE POSITIONS, CENTER LEVER LOCKED), LO2 RELIEF SHUTOFF VALVE CLOSE SOLENOID (LV24).

FUNCTION:

PROVIDES MANUAL CONTROL OF POWER TO CLOSE SOLENOID OF LO2 RELIEF SHUTOFF VALVE. 32V73A4S17.

FAILURE MODE:

FAILS CLOSED, CONTACT-TO-CONTACT SHORT, POLE-TO-POLE SHORT - "OPEN" COMMAND CONTACTS.

CAUSE(S):

PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY

(A) INADVERTENT SWITCH OPEN COMMANDS INHIBITING CLOSE HDCs.

(B) INADVERTENT OPENING OF LO2 RELIEF SHUTOFF VALVE (PV7).

(C,D) NO EFFECT - FIRST FAILURE.

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- (E) 1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.  
TIME FRAME - PRELAUNCH AND ASCENT.  
1) SWITCH OPEN CONTACTS FAIL CLOSED 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).  
2) 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.

DISPOSITION & RATIONALE:

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

(A-D) DISPOSITION AND RATIONALE:

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION V41AB0.070 "O" 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.