

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2287 -1 REV: 11/23/87

ASSEMBLY : AFT LCA-2
 P/N RI : JANTXVIN5551
 P/N VENDOR:
 QUANTITY : 1
 : ONE
 : 1 PER LO2 INBOARD FILL/DRAIN VALVE

VEHICLE 102
 EFFECTIVITY: X X X
 PHASE(S): PL X LO X CO DO LS

CRIT. FUNC: 1R
 CRIT. HDW: 2

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

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES J BROWN	DES <u>[Signature]</u>	EPDC SSM <u>[Signature]</u>
REL <u>[Signature]</u> F DEFENSOR	REL <u>[Signature]</u> 12-5-87	MPS SSM <u>[Signature]</u>
QE D MASAI	QE <u>[Signature]</u> 12/9/87	EPDC REL <u>[Signature]</u>
		MPS REL <u>[Signature]</u>
		QE <u>[Signature]</u> 1/11/88

ITEM:
 DIODE, BLOCKING (3 AMP), LO2 INBOARD FILL/DRAIN VALVE (PV10), MDM CLOSE COMMAND OUTPUT.

FUNCTION:
 ISOLATES MANUAL SWITCH CLOSE COMMAND FROM THE MDM CLOSE COMMAND, CONDUCTS MDM CLOSE COMMAND TO HDC III FOR CONTROL OF POWER TO THE CLOSE SOLENOID OF THE LO2 INBOARD FILL/DRAIN VALVE. 55V76A122 J1(50).

FAILURE MODE:
 OPEN, FAILS OPEN, FAILS TO CONDUCT

CAUSE(S):
 CONTAMINATION, MECHANICAL SHOCK, VIBRATION, THERMAL STRESS.

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A) LOSS OF POWER TO THE CLOSE SOLENOID DUE TO LOSS OF MDM CLOSE COMMAND.

(B) NO EFFECT - FIRST FAILURE. BISTABLE FEATURE MAINTAINS FILL/DRAIN VALVE IN CLOSE POSITION.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPO&C - MAIN PROP. FMEA NO 05-6J -2287 -1 REV:11/23/87

(C,D) NO EFFECT - FIRST FAILURE. POSSIBLE LOSS OF CREW AND VEHICLE AFTER SECOND FAILURE:

CASE 1 - PREMATURE ACTUATION OF OPEN SOLENOID RESULTING IN PREMATURE OPENING OF FILL/DRAIN VALVE. POTENTIAL WATER HAMMER EFFECT OF APPROXIMATELY 700 PSI (AT 1-G). LO2 FILL/DRAIN LINE IS ONLY CERTIFIED TO WITHSTAND FLIGHT LOADS WHILE EMPTY. FAILURE RESULTS IN POSSIBLE RUPTURE OF THE LO2 FILL LINE, AFT COMPARTMENT OVERPRESSURIZATION, AND FIRE/EXPLOSIVE HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYO EXPOSURE. DISPLACED GAS MAY ENTER ONE OR MORE SSMEs. POSSIBLE SHUTDOWN OF ONE OR MORE SSMEs.

CASE 2 - FAILURE OF GROUND SYSTEM TO DETECT LOSS OF CLOSE SOLENOID POWER AND INHIBIT SLAM OPENING OF INBOARD VALVE AT INITIATION OF DETANK FOLLOWING FRF OR TANKING TEST. WATER HAMMER IN FILL LINE RESULTS IN POSSIBLE RUPTURE, AFT OVERPRESS, FIRE/EXPLOSIVE HAZARD, POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYO EXPOSURE.

DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE:

REFER TO APPENDIX F, ITEM NUMBER 4 - DIODE.

(B) GROUND TURNAROUND TEST

MDM COMMAND/COPPER PATH VERIFICATION, V41LABO.101E EVERY FLIGHT

(E) OPERATIONAL USE

FLIGHT - NO CREW ACTION CAN BE TAKEN.

GROUND -

CASE 1: FOR PAD ABORT IF A MAJOR LEAK IS DETECTED CLOSE 17-INCH DISCONNECT (PD1).

CASE 2: DO NOT INITIATE DETANK UNTIL CLOSE POWER IS RESTORED.