

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP.

FMEA NO 05-6J -2095 -3

REV: 04/25/88

5/14
05/14

ASSEMBLY : AFT PCA-2
P/N RI : JANTX1N1204RA
P/N VENDOR:
QUANTITY : 1
: ONE
:

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

		REDUNDANCY SCREEN: A- B- C-		
PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):		
DES <i>J Brown</i>	DES <i>R Brown</i>	EPDC SSM	<i>[Signature]</i>	
REL F DEFENSOR	REL <i>[Signature]</i>	MPS SSM	<i>[Signature]</i>	
QE <i>D Masai</i>	QE <i>[Signature]</i>	EPDC REL	<i>[Signature]</i>	
		MPS REL	<i>[Signature]</i>	
		QE	<i>[Signature]</i>	

ITEM:
DIODE, CROSSOVER (12 AMP), LO2 OVERBOARD BLEED VALVE CLOSE SOLENOID (LV76).

FUNCTION:
PREVENTS SINGLE MDM COMMAND FROM ACTUATING CLOSE SOLENOID INADVERTENTLY. 55V76A132A3CR15.

FAILURE MODE:
SHORT TO STRUCTURE (GROUND).

CAUSE(S):
STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY.

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

(A) LOSS OF POWER TO CLOSE SOLENOID - BOTH RPCs WILL TRIP. SERIES RPC WILL TRIP DUE TO THE LOAD TERMINAL DIRECTLY CONNECTING TO GROUND. PARALLEL RPC WILL TRIP DUE TO THE LOAD TERMINAL CONNECTING TO GROUND THROUGH THE HDC III REVERSE BIAS DIODE.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP.

FMEA NO 05-6J -2095 -3

REV 04/26/88

CASE I: TIMEFRAME - PRELAUNCH. DEP 1-14

5/14
DEP 5-14

(B) ✓ INADVERTENT OPENING OF LO2 OVERBOARD BLEED VALVE (PV19) AND CONTINUED BLEED FLOW RESULTING IN LOSS OF LO2 OVERBOARD WITH FAILURE OF BLEED DISCONNECT (PD13) TO CLOSE. BLEED DISCONNECT IS NOT CERTIFIED FOR CLOSURE UNDER FLOW CONDITIONS AND CANNOT BE CONSIDERED A REDUNDANT INHIBIT AGAINST OVERBOARD FLOW. POSSIBLE RUPTURE OF DISCONNECT HOUSING AND/OR DOWNSTREAM BLEED SYSTEM DUE TO WATER HAMMER. RESULTS IN LOSS OF APPROXIMATELY 3000 LBS OF PROPELLANT WHICH IS INSUFFICIENT TO CAUSE PREMATURE SSME SHUTDOWN.

POSSIBLE AFT COMPARTMENT OVERPRESSURIZATION. FIRE/EXPLOSIVE HAZARD BOTH INTERIOR AND EXTERIOR TO THE VEHICLE. NO LCC EXISTS FOR VERIFICATION OF VALVE POSITION PRIOR TO T-0. ~~POSSIBLE LOSS OF CREW/VEHICLE.~~ DEP 5-14

CASE I: TIMEFRAME - PRELAUNCH.

(C,D) POSSIBLE LOSS OF CREW/VEHICLE. CASE II: TIMEFRAME - ASCENT. NO EFFECT AT FIRST FAILURE

(E) 1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.
TIME FRAME - ASCENT.

- CASE 2:
- 1) DIODE SHORTS TO STRUCTURE (GROUND), CAUSING LO2 OVERBOARD BLEED VALVE (PV19) TO OPEN.
 - 2) BLEED DISCONNECT (PD13) FAILS TO CLOSE/REMAIN CLOSED.

RESULTS IN LOSS OF APPROXIMATELY 3000 LBS. OF PROPELLANT WHICH IS NOT ENOUGH TO CAUSE PREMATURE SSME SHUTDOWN. POSSIBLE FIRE/EXPLOSION HAZARD IN FLIGHT. POSSIBLE LOSS OF CREW/VEHICLE.

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 NO. 2 - DIODE, STUD-MOUNT.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION V41AB0.200B EVERY FLIGHT.

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.

INSERT
DEP 5-12

05-6J-194

INSERT FOR CIL 05-6J-2095-3
EFFECTS SECTION (8)

IF THE LO2 BLEED VALVE FAILS TO CLOSE BEFORE T-0 THE LO2 BLEED DISCONNECT WOULD BE CLOSING WITH AN OXYGEN FLOW OF 4.1 LBS/SEC. THIRTY-TWO PERCENT OF THIS FLOW WILL BE VAPOR. THE LO2 BLEED DISCONNECT IS NOT CERTIFIED FOR CLOSURE UNDER FLOW. HOWEVER, THE CLOSURE IS AT ONE "G" ACCELERATION RATE (T-0 UMBILICAL SEPARATION RATE) WHICH LIMITS THE IMPACT ENERGY ON THE VESPEL SEAL TO A LEVEL WHICH IS BELOW THE LO2/VESPEL IGNITION LEVEL (NOT PREVIOUSLY TESTED WITH THIS CONDITION). THE WATER HAMMER TOWARDS EFFECT GENERATED DURING THIS CLOSURE HAS BEEN CALCULATED TO BE APPROXIMATELY 60 PSIG. SYSTEM PROOF PRESSURE LEVEL IS 286 PSIG.

05-6J-195