

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EW&I/MPS

FMEA NO 05-7J -2003 -1 REV:06/02/89

LOCATION : ON LO2 OVERBOARD BLEED VALVE CLOSE SOLENOID CRIT.FUNC: 1
P/N RI QUANTITY CRIT. HDW: 1

1. NBS6GE8-3XX 1

VEHICLE	102	103	104	105
EFFECTIVITY	X	X	X	X

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

REDUNDANCY SCREEN: A- N/A B- N/A C- N/A

PREPARED BY: APPROVED BY:
DES J BROWN *JTB* DES *JTB*
REL T KIMURA *Tic* REL *William Ch...*
QE J COURSEN *Dum* QE *William Ch...*

APPROVED BY (NASA):
EW&I SSM *William Ch...*
EW&I REL *William Ch...* 7/12/89
SSM *JTB* 7/10/89
REL *William Ch...* 7/10/89
QE *William Ch...*

ITEM:

CONNECTOR, PLUG, 3 #20 CONTACTS - LO2 OVERBOARD BLEED VALVE CIRCUIT.

FUNCTION:

PROVIDES MATE/DEMATE CAPABILITY FOR WIRING WHICH CONTAINS CIRCUITS FOR ENERGIZING THE LO2 OVERBOARD BLEED VALVE CLOSE SOLENOID. 50V77W91P733

FAILURE MODE:

INADVERTENT DEMATING

CAUSE(S):

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

EFFECT(S) ON:

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

(A) LOSS OF CAPABILITY TO ENERGIZE THE LO2 OVERBOARD BLEED VALVE CLOSE SOLENOID CIRCUIT.

(B) INABILITY TO CLOSE THE LO2 OVERBOARD BLEED VALVE.

(C,D) POSSIBLE LOSS OF CREW/VEHICLE WHERE A CONTINUED BLEED FLOW RESULTS 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. IF THE LO2 BLEED VALVE FAILS TO CLOSE BEFORE T-0, THE LO2 BLEED

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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 EFFECT GENERATED DURING THIS CLOSURE HAS BEEN CALCULATED TO BE APPROXIMATELY 60 PSIG. SYSTEM PROOF PRESSURE LEVEL IS 286 PSIG.

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.

REFERENCE CIL 05-6J-2090-1

DISPOSITION & RATIONALE:

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

(A,B,C,D) DISPOSITION AND RATIONALE

REFER TO APPENDIX K, ITEM NO. 2 - TYPE NBS CONNECTOR, CIRCULAR, MINIATURE

(B) GROUND TURNAROUND TEST

V41ABO.200 - COMPLETE ELECTRICAL VERIFICATION (EVERY FLIGHT)

V41BIO.170 - LO2 OVERBOARD BLEED VALVE RESPONSE (EVERY FLIGHT)

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.