SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2002 -3 REV:04/25/88

ASSEMBLY :AFT PCA-1 CRIT. FUNC: 1R
P/N RI :JANTX1N1204RA CRIT. HDW: 2
P/N VENDOR:
QUANTITY :2
:TWO
:

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL LO X OO DO LS

REDUNDANCY SCREEN: A-PASS B-PASS 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 5-17-88
EPDC REL 5/11/88
MPS REL
QE

ITEM:
DIODE, CROSSOVER (12 AMP), LH2 RTLS INBOARD/OUTBOARD DUMP VALVES OPEN SOLENOID (LV72/LV73).

FUNCTION:
PREVENTS SINGLE MDM COMMAND FROM ACTUATING OPEN SOLENOID INADVERTENTLY. 54V76A131A3CR4, A3CR10.

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 OPEN 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 REVERSE BIAS DIODE.

(B) INADVERTENT CLOSING OF ONE OF TWO SERIES DUMP VALVES (PV17/18).

(C,D) NO EFFECT - FIRST FAILURE.

(E) 1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE. TIME FRAME - ASCENT.
1) DIODE SHORTS TO STRUCTURE (GROUND) CAUSING ONE OF THE TWO SERIES LH2 RTLS INBOARD/OUTBOARD DUMP VALVES (PV17/18) TO CLOSE. ALTERNATE PATH AVAILABLE THROUGH LH2 FEEDLINE RELIEF SYSTEM.
2) LH2 FEEDLINE RELIEF SYSTEM FAILS TO RELIEVE.

FOR OI-8C, RESULTS IN LACK OF RELIEF CAPABILITY*. POSSIBLE RUPTURE OF THE LH2 MANIFOLD CAUSING LH2 LEAKAGE INTO THE AFT COMPARTMENT, OVERPRESSURIZATION, AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT COMPONENTS DUE TO CRYOGENIC EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

*NOTE: FOR OI-8B, ORBITER SOFTWARE OPENS RTLS DUMP VALVES FROM MECO +10 TO MECO +40 SECONDS. VENTING IS NOT CONSIDERED REDUNDANT TO RELIEF SYSTEM SINCE MANIFOLD PRESSURE INCREASES TO RELIEF SETTING REGARDLESS OF RTLS VALVE OPERATION. FOR OI-8C, APPROVED SOFTWARE CHANGE CR 89399 EXTENDS RTLS DUMP VALVE OPEN TIME TO MECO +90 SECONDS FOR ALL MISSIONS EXCEPT RTLS. THIS CHANGE WILL ALLOW SUFFICIENT DURATION TO PROVIDE A REDUNDANT MANIFOLD RELIEF PATH PRIOR TO THE INITIATION OF DUMP.

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, POWER-STUD MOUNTED.

(B) GROUND TURNAROUND TEST
COMPLETE ELECTRICAL VERIFICATION V41ABO.180B, V41ABO.190B EVERY FLIGHT.

(E) OPERATIONAL USE
LH2 MANIFOLD PRESSURE IS ON CAUTION AND WARNING.

POST MECO/PRE DUMP: START MPS PROPELLANT DUMP AS SOON AS POSSIBLE.
POST DUMP: OPEN THE LH2 FILL AND DRAIN VALVES.