

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2277 -1 REV:04/25/88

ASSEMBLY : AFT LCA-1	CRIT. FUNC:	1R
P/N RI : JANTXVIN5551	CRIT. HDW:	2
P/N VENDOR:	VEHICLE	102 103 104
QUANTITY : 1	EFFECTIVITY:	X X X
: ONE	PHASE(S):	PL LO X OO DO LS

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

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <u>J BROWN</u>	DES <u>[Signature]</u>	EPDC SSM <u>[Signature]</u>
REL F DEFENSOR <u>[Signature]</u>	REL <u>[Signature]</u>	MPS SSM <u>[Signature]</u>
QE <u>[Signature]</u>	QE <u>[Signature]</u>	EPDC REL <u>[Signature]</u>
		MPS REL <u>[Signature]</u>
		QE <u>[Signature]</u>

ITEM: DIODE, BLOCKING (3 AMP), LH2 TOPPING VALVE, MDM OPEN COMMAND OUTPUT.

FUNCTION: ISOLATES MANUAL SWITCH OPEN COMMAND FROM MDM OPEN COMMAND. CONDUCTS MDM OPEN COMMAND TO HDC FOR CONTROL OF POWER TO OPEN SOLENOID (LV39) OF LH2 TOPPING VALVE. 54V76A121J1(47).

FAILURE MODE: OPENS, FAILS TO CONDUCT.

CAUSE(S): STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), 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 DUE TO LOSS OF MDM OPEN COMMAND.

(B) FIRST FAILURE HAS NO EFFECT. FAILURE DURING PRELAUNCH WILL PREVENT TOPPING OF LH2 TANK. LOSS OF BACKUP METHODS TO DETANK (INBOARD FILL AND DRAIN VALVE IS PRIMARY MODE OF DETANKING). FAILURE DURING NOMINAL DUMP RESULTS IN AN INCOMPLETE DUMP BECAUSE THE INBOARD FILL AND DRAIN VALVE (PV12) IS ONLY OPEN 6 SECONDS. LH2 PRESSURE BUILDUP IS RELIEVED THROUGH MANIFOLD RELIEF SYSTEM (RV6). POTENTIAL FOR ADDITIONAL VACUUM INERTINGS.

NO EFFECT ON RTLS/TAL BECAUSE DUMP OF PROPELLANT IN THE RECIRCULATION SYSTEM WILL BE ACCOMPLISHED THROUGH THE SSME FUEL BLEED SYSTEM. PROPELLANT IN THE MANIFOLD WILL BE DUMPED THROUGH THE INBOARD AND OUTBOARD FILL & DRAIN VALVES AND THE RTLS DUMP VALVES.

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(C) PRELAUNCH FAILURE WILL RESULT IN LAUNCH SCRUB. NO EFFECT FOR RTLS AND TAL ABORTS.

(D) NO EFFECT.

(E) 1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE. TIME FRAME - LH2 DUMP.
1) DIODE OPENING CAUSES TOPPING VALVE (PD13) TO CLOSE FOR DUMP.
2) LH2 MANIFOLD RELIEF SYSTEM FAILS TO RELIEVE.

RESULTS IN LH2 MANIFOLD RUPTURE AND LH2 LEAKAGE INTO AFT COMPARTMENT.
POSSIBLE AFT COMPARTMENT OVERPRESSURIZATION AND FIRE/EXPLOSION HAZARD.
POSSIBLE LOSS OF CRITICAL ADJACENT COMPONENTS DUE TO CRYO EXPOSURE,
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. 4 - DIODE, AXIAL LEAD.

(B) GROUND TURNAROUND TEST

MDM COMMAND/COPPER PATH VERIFICATION, V41ABO.131B EVERY FLIGHT.

(E) OPERATIONAL USE

THE CREW WILL BE DIRECTED TO OPEN THE BACKUP LH2 (RTLS) DUMP VALVES.
THESE VALVES WILL BE CLOSED AT TERMINATION OF VACUUM INERTING
OPERATIONS PRIOR TO TRANSITIONING OUT OF OPS 1.