

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2230 -2 REV:09/02/88

ASSEMBLY : AFT LCA-3					
P/N RI : MC477-0261-0002					CRIT. FUNC: 02
P/N VENDOR:					CRIT. HDW: 2
QUANTITY : 1	VEHICLE	102	103	104	
: ONE	EFFECTIVITY:	X	X	X	
:	PHASE(S):	PL X LO	OO	DO	LS

PREPARED BY:	APPROVED BY:	REUNDANCY SCREEN: A-PASS B-FAIL C-PASS
DES <u>DHS</u> J BROWN	DES <u>J. Kemura for M. Hare</u>	APPROVED BY (NASA):
REL <u>J.F. DEFENSOR</u>	REL <u>J. Kemura for M. Hare</u>	EPDC SSM <u>[Signature]</u>
QE <u>DND D MASAI</u>	QE <u>[Signature]</u>	MPS SSM <u>[Signature]</u>
		EPDC REL <u>[Signature]</u>
		MPS REL <u>[Signature]</u>
		QE <u>[Signature]</u>

ITEM:

CONTROLLER, HYBRID DRIVER (HDC), TYPE I, LEVEL DRY SIMULATION COMMAND.
POINT SENSOR ELECTRONICS BOX CHECKOUT CIRCUIT.

FUNCTION:

UPON GROUND MDM COMMAND, CONDUCTS MAIN BUS C POWER TO LEVEL DRY SIMULATION COMMAND INPUT OF POINT SENSOR ELECTRONICS BOX. IN COMBINATION WITH OPEN OR WET SIMULATION COMMAND, STIMULATES ALL LO2/LH2 LEVEL DRY SIGNALS. 56V76A12102 (121).

FAILURE MODE:

INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF".

CAUSE(S):

PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS.

EFFECT(S) ON:

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

(A) LOSS OF CAPABILITY TO REMOVE DRY SIMULATION COMMAND BY GROUND MEN.

(B) DEGRADATION OF REDUNDANCY AGAINST FALSE DRY LEVEL SIGNALS.

(C,D) NO EFFECT - FIRST FAILURE.

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- (E) CASE I: LH2
1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE. TIME FRAME - FAST FILL.
1) SIM DRY HDC FAILS "ON" - NO EFFECT. LO2/LH2 LEVEL CHANNELS OPERATE NORMALLY.
2) SIM WET OR SIM OPEN HDC FAILS "ON", RESULTING IN FALSE DRY LEVEL SIGNALS (ALL LO2 LH2 LEVEL SENSORS).
3) ERRONEOUS ULLAGE PRESSURE MEASUREMENT (BACKUP TO LEVEL SENSORS FOR TERMINATING LH2 FAST FILL).

THESE FAILURES WOULD RESULT IN A RAPID TANK OVERFILL AND FLUID FLOW EXITING FROM THE ET VENT. POSSIBLE TANK DAMAGE DUE TO VIOLATION OF THE MAXIMUM STRUCTURAL REQUIREMENTS. POSSIBLE FIRE/EXPLOSION HAZARDS. POSSIBLE LOSS OF CREW/VEHICLE.

- CASE II: LO2
1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE. TIME FRAME - FAST FILL.
1) SIM DRY HDC FAILS "ON" - NO EFFECT. LO2/LH2 LEVEL CHANNELS OPERATE NORMALLY.
2) SIM WET OR SIM OPEN HDC FAILS "ON", RESULTING IN FALSE DRY LEVEL SIGNALS (ALL LO2/LH2 LEVEL SENSORS).

THESE FAILURES WOULD RESULT IN A RAPID TANK OVERFILL AND FLUID FLOW EXITING FROM THE ET VENT. POSSIBLE TANK DAMAGE DUE TO VIOLATION OF THE MAXIMUM STRUCTURAL REQUIREMENTS. POSSIBLE FIRE/EXPLOSION HAZARDS. POSSIBLE LOSS OF CREW/VEHICLE.

- CASE III: LO2/LH2
1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.
TIME FRAME - PROPELLANT REPLENISHING.
1) SIM DRY HDC FAILS "ON" - NO EFFECT. LO2/LH2 LEVEL CHANNELS OPERATE NORMALLY.
2) SIM WET OR SIM OPEN HDC FAILS "ON", RESULTING IN FALSE DRY LEVEL SIGNALS (ALL LO2/LH2 LEVEL SENSORS).

THESE FAILURES WOULD RESULT IN A TANK OVERFILL AND FLUID FLOW EXITING FROM THE ET VENT. POSSIBLE TANK DAMAGE DUE TO VIOLATION OF THE MAXIMUM STRUCTURAL REQUIREMENTS. POSSIBLE FIRE/EXPLOSION HAZARDS. POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE NO INSTRUMENTATION AVAILABLE TO DETECT FAILURE.

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SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2210 -3 REV:09/02/88

DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

(B) GROUND TURNAROUND TEST

LIQ LVL SENSOR "DRY" SIM COND V41AHO.030 EVERY FLIGHT.

(E) OPERATIONAL USE

FLIGHT: N/A

GROUND: OMI S1003/S1004 (LO2/LH2 SYSTEMS) TITLED "EMERGENCY PROCEDURE FOR MAJOR LEAK OR FIRE ..." CONTAINS SAFING SEQUENCE OF EVENTS FOR MAJOR LEAKS IN PROPELLANT SYSTEMS.

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