

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2114 -1 REV: 06/15/88

ASSEMBLY : AFT PCA-4, 5, 6	CRIT. FUNC:	IR
P/N RI : JANTXV1N4246	CRIT. HDW:	3
P/N VENDOR:	VEHICLE	102 103 104
QUANTITY : 6	EFFECTIVITY:	X X X
: SIX	PHASE(S):	PL X LO X OO DO LS

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

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <i>JWB</i> J BROWN	DES <i>[Signature]</i>	EPDC SSM <i>[Signature]</i>
REL <i>[Signature]</i> DEFENSOR	REL <i>[Signature]</i> 6/27/88	MPS SSM <i>[Signature]</i>
QE <i>[Signature]</i> D MASAI	QE <i>[Signature]</i> 6/20/88	EPDC REL <i>[Signature]</i>
		MPS REL <i>[Signature]</i>

ITEM:

DIODE, BLOCKING (1-AMP), HELIUM ISOLATION VALVE B (LV2/4/6) SWITCH OPEN COMMAND B OUTPUT.

FUNCTION:

CONDUCTS SWITCH MANUAL OPEN COMMAND FOR CONTROL OF POWER TO HELIUM SUPPLY ISOLATION VALVE B.
54V76A134A1CR4, A3CR3. 55V76A135A1CR4, A3CR3. 56V76A136A1CR4, A3CR3.

FAILURE MODE:

OPEN, 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 ONE OF TWO MANUAL REDUNDANT POWER PATHS TO HELIUM SUPPLY ISOLATION VALVE B. DEGRADATION OF REDUNDANCY AGAINST INADVERTENT DEACTUATION OF HELIUM SUPPLY ISOLATION VALVE B.

(B, C, D) NO EFFECT - FIRST FAILURE.

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- (E) 1R/3, 3 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - ENGINE OPERATION.
- 1) DIODE FAILS OPEN.
 - 2) ASSOCIATED HDC FAILS "OFF", RESULTING IN LOSS OF ONE OF TWO POWER PATHS OF ISOLATION VALVE B.
 - 3) PARALLEL POWER PATH (RPC, DIODE) FAILS "OFF", RESULTING IN CLOSURE OF ISOLATION VALVE B.
 - 4) HELIUM SUPPLY ISOLATION VALVE A (LV1/3/5) FAILS CLOSED.

FAILURES WILL RESULT IN LOSS OF HELIUM REQUIRED TO PERFORM CONTINUOUS PURGING OF HIGH PRESSURE OXIDIZER TURBOPUMP INTERMEDIATE SEAL CAVITY. THIS CAVITY IS BETWEEN TWO SEALS, ONE OF WHICH CONTAINS THE HOT, FUEL-RICH GAS IN OXIDIZER TURBINE AND THE OTHER CONTAINS THE LIQUID OXYGEN IN OXIDIZER TURBOPUMP. LEAKAGE THROUGH ONE OR BOTH SEALS COULD RESULT IN A CATASTROPHIC EXPLOSION IF ALLOWED TO ACCUMULATE. CONTINUOUS OVERBOARD PURGE OF THIS AREA PREVENTS THIS ACCUMULATION FROM OCCURRING. POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE FAILURE IS NOT READILY DETECTABLE DURING CRITICAL PERIOD (ENGINE OPERATION) WHILE REDUNDANT SWITCH AND MDM CONTROL SIGNALS ARE PRESENT.

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. 3 - DIODE, AXIAL LEAD.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION, V41AAO.015E, V41AAO.035E, V41AAO.055E EVERY FLIGHT.

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.

05-6J-213