SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2119 -1 REV:06/15/88

ASSEMBLY :AFT LCA-1,2,3
P/N RI :JANTXV1N5551
P/N VENDOR:
QUANTITY :6
:SIX
:

CRIT. FUNC: 1R
CRIT. HDW: 3

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

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

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

PREPARED BY:
DES J BROWN
REL F DEFENSOR
QE D MASAI

APPROVED BY:
DES
REL 6/27/88
QE 6/27/88

APPROVED BY (NASA):
EPDC SSM
MPS SSM
EPDC REL
MPS REL
QE

ITEM:
DIODE, BLOCKING (3 AMP), HELIUM ISOLATION VALVE A(LV1/3/5) SWITCH AND MDM OPEN COMMAND OUTPUT.

FUNCTION:
CONDUCTS SWITCH MANUAL AND MDM OPEN COMMAND FOR CONTROL OF POWER TO HELIUM SUPPLY ISOLATION VALVE A.
54V76A121J1(81), J3(76). 55V76A122J1(81), J3(76). 56V76A123J1(81),J3(76).

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 REDUNDANT CONTROL SIGNALS TO HYBRID DRIVER. DEGRADATION OF REDUNDANCY AGAINST INADVERTENT DEACTUATION OF HELIUM SUPPLY ISOLATION VALVE A.

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

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(E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - ENGINE OPERATION.
1) DIODE FAILS OPEN.
2) PARALLEL DIODE FAILS OPEN, RESULTING IN CLOSURE OF ISOLATION VALVE A.
3) HELIUM SUPPLY ISOLATION VALVE B (LV2/4/6) 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. 4 - DIODE, AXIAL LEAD.

(B) GROUND TURNAROUND TEST
MDM AND D&C CMD VERIF, V41AAO.010, V41AAO.030,V41AAO.050 EVERY FLIGHT.

(E) OPERATIONAL USE
NO CREW ACTION CAN BE TAKEN.