SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - OMS FMEA NO 05-6L -2261 -1 REV:10/30/87

ASSEMBLY :AFT LCA 1, 2, 3
P/N RI :JANTXV1N4246
P/N VENDOR:
QUANTITY :8
:EIGHT
:(FOUR PER ENGINE)

CRIT. FUNC: 1R
CRIT. HDW: 3

		102	103	104
VEHICLE EFFECTIVITY:		X	X	X

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

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

PREPARED BY:
DES D SOVEREIGN
REL F DEFENSOR
QE J COURSEN

APPROVED BY:
DES [signature]
REL [signature] 11-14-87
QE [signature]

APPROVED BY (NASA):
SSM [signature]
REL [signature]
QE [signature]
EPDC SSM [signature]

ITEM:
DIODE, BLOCKING (LAMP), LEFT AND RIGHT OMS ENGINE CONTROL CIRCUITS. (MANUAL "ARM/PRESS-ARM" POSITION SWITCH DIODE).

FUNCTION:
PROVIDES INPUT FROM THE OMS ENGINE CONTROL SWITCH TO THE ENGINE CONTROL VALVE POWER HYBRID DRIVER AND INPUT TO THE ENGINE PRESSURIZATION ISOLATION VALVE HYBRID DRIVER. PROVIDES BLOCKING FROM THE "ARM" SWITCH POSITION TO THE ENGINE PRESSURIZATION ISOLATION VALVE DRIVER AND PROVIDES BLOCKING FROM THE "ARM/PRESS" SWITCH POSITION TO THE "ARM" POSITION SWITCH SCAN. 54V76A121CR (J3-94, 95, 107, 108). 55V76A122CR (J3-94, 95). 56V76A123CR(J3-94, 95).

FAILURE MODE:
OPENS, FAILS TO CONDUCT, HIGH RESISTANCE.

CAUSE(S):
CONTAMINATION, THERMAL STRESS, MECHANICAL SHOCK, VIBRATION.

EFFECT(S) ON:
(A) SUBSYSTEM CRITICALITY (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL

(A) LOSS OF REDUNDANCY - LOSS OF INPUT FROM ONE ARM OR ARM/PRESS SWITCH CONTACT.

(B) LOSS OF REDUNDANCY. AN OPEN DIODE IN "ARM" CONTROL CIRCUIT PRECLUDES THE ENERGIZING OF ONE COIL ON EACH ENGINE CONTROL VALVE WHILE ENGINE PRESSURIZATION ISOLATION VALVE ARE CLOSED. AN OPEN DIODE IN "ARM/PRESSURIZE" CONTROL CIRCUIT PRECLUDES THE ENERGIZING OF ONE COIL ON EACH ENGINE CONTROL VALVE. NEXT SIMILAR FAILURE ON REDUNDANT CIRCUIT WILL RESULT TO INABILITY TO OPEN THE OMS ENGINE CONTROL VALVES - LOSS OF ABILITY TO FIRE ONE OMS ENGINE.

(C) NO EFFECT.

(D) NO EFFECT.

(E) POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF ELECTRICAL POWER TO CONTROL THE OMS LEFT AND RIGHT OMS ENGINE CONTROL CIRCUITS. INABILITY TO ENERGIZE REDUNDANT CONTROL CIRCUITS RESULTS IN INABILITY TO FIRE OMS ENGINE. REQUIRES THREE OTHER FAILURES (OTHER DIODE ON SAME CONTROL STRING FAILS OPEN, UPSTREAM HYBRID DRIVER ON REDUNDANT CONTROL CIRCUIT FAILS TO CONDUCT, LOSS OF OTHER OMS ENGINE) BEFORE THE EFFECT IS MANIFESTED. FAILURE IS NOT READILY DETECTABLE IN FLIGHT DUE TO LACK OF MONITORING MEASUREMENTS.

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 3 - DIODE.

(B) GROUND TURNAROUND TEST
V43CE0.100 PNEUMATIC SYSTEM ELECTRICAL CONTROL VERIFICATION; PERFORMED EACH FLIGHT. REDUNDANCY VERIFICATION OF CONTROL CIRCUIT PER FIGURE V43CA0.070-5.

(E) OPERATIONAL USE
NO ACTION FOR FIRST FAILURE - REDUNDANT CONTROL CIRCUIT FULFILLS FUNCTION. IF REDUNDANT CONTROL CIRCUIT FAILS, REDLINE ADDITIONAL PROPELLANT FOR RCS BACKUP DEORBIT, POSSIBLE MISSION IMPACT (DECREASED PROPELLANT AVAILABLE FROM OMS TO RCS THROUGH INTERCONNECT FOR ON-ORBIT OPERATIONS). NEXT PLS DEORBIT IF PROPELLANT FOR RCS BACKUP NOT AVAILABLE.