PRINT DATE: 12/19/89

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 05-6JB-20128-X

SUBSYSTEM NAME: EPD&C - MAIN PROPULSION

REVISION : 2 12/19/89

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	MID PCA 1	V070-764400
LRU	:	MID PCA 3	V070-764450
SRU	:	DIODE	JANTXV1N4246

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DIODE, BLOCKING (1 AMP), LH2 RELIEF SHUTOFF VALVE, CLOSE SWITCH SCAN.

REFERENCE DESIGNATORS: 40V76A27A1CR29
: 40V76A25A5CR8
: 40V76A25A5CR10

QUANTITY OF LIKE ITEMS: 3
THREE

6 HxN 11/6/90

FUNCTION:
ISOLATES CONTROL BUSES AND CLOSE COMMANDS IN THE SWITCH SCAN CIRCUIT.

PRINT DATE: 12/19/89

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 05-6J-2012B-02 H×N 1/4/90

REVISION# 2 12/19/89

SUBSYSTEM: EPD&C - MAIN PROPULSION
LRU :MID PCA 1, 3 H×N
ITEM NAME: DIODE 1/4/90

CRITICALITY OF THIS FAILURE MODE:1R3

FAILURE MODE:
SHORT (END TO END)

MISSION PHASE:
LO LIFT-OFF

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
: 103 DISCOVERY
: 104 ATLANTIS

CAUSE:
STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:
A)

B)
FAILS B SCREEN BECAUSE NO INSTRUMENTATION IS AVAILABLE TO DETECT FAILURE.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF MANUAL SWITCH CLOSE COMMAND AND CONTROL BUS ISOLATION. DEGRADATION OF REDUNDANCY AGAINST INADVERTENT POWER TO CLOSE SOLENOID OF LH2 RELIEF SHUTOFF VALVE.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT - FIRST FAILURE.

(C) MISSION:
NO EFFECT - FIRST FAILURE.

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT - FIRST FAILURE.

(E) FUNCTIONAL CRITICALITY EFFECTS:
1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE. TIME FRAME - POST MECO.
1) DIODE SHORTS.
2) SWITCH CONTACT-TO-CONTACT SHORT OF EITHER CLOSE COMMAND, RESULTING IN LOSS OF CAPABILITY TO OPEN LH2 RELIEF SHUTOFF VALVE (PVB).
3) EITHER LH2 RTLS DUMP VALVE (PV17,18) FAILS TO REMAIN OPEN THE FULL TIME IT IS COMMANDED FROM MECO +10 TO MECO +90 SECONDS.

RESULTS IN LACK OF RELIEF CAPABILITY PRIOR TO DUMP. POSSIBLE RUPTURE OF THE LH2 MANIFOLD CAUSING LH2 LEAKAGE INTO THE AFT COMPARTMENT, OVERPRESSURIZATION, AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF ADJACENT CRITICAL COMPONENTS DUE TO CRYOGENIC EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

SOFTWARE CR 89399 EXTENDED THE RTLS DUMP VALVE OPEN TIME TO MECO +90 SECONDS, WHICH IS SUFFICIENT DURATION TO PROVIDE A REDUNDANT RELIEF PATH PRIOR TO INITIATION OF DUMP. NOTE RESIDUALS FOLLOWING RTLS/TAL ABORT WILL BE SUFFICIENT TO REQUIRE RELIEF SYSTEM OPERATION (RTLS/TAL ABORT CRITICAL).

FAILS B SCREEN BECAUSE NO INSTRUMENTATION IS AVAILABLE TO DETECT FAILURE.

- DISPOSITION RATIONALE -

(A) DESIGN:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE, AXIAL LEAD.

(B) TEST:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE, AXIAL LEAD.

GROUND TURNAROUND TEST
COMPLETE ELECTRICAL VERIFICATION V41A80.080A, E, EVERY FLIGHT.

(C) INSPECTION:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE, AXIAL LEAD.

(D) FAILURE HISTORY:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE, AXIAL LEAD.

(E) OPERATIONAL USE:
LH2 MANIFOLD PRESSURE IS ON CAUTION AND WARNING.
POST MECO/PRE DUMP: START MPS PROPELLANT DUMP AS SOON AS POSSIBLE.
POST DUMP: OPEN THE LH2 FILL/DRAIN VALVES.

- APPROVALS -

RELIABILITY ENGINEERING	D. DEFENSOR	
DESIGN ENGINEERING	J. BROWN	
QUALITY ENGINEERING	O. MASAI	
NASA RELIABILITY		12/30
NASA SUBSYSTEM MANAGER		1/2/90
NASA EPD&C RELIABILITY		1/4/90 HXN 1/4/90
NASA QUALITY ASSURANCE		
NASA EPD&C SUBSYS MGR		1/29/90