

SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

ITEM NAME: SRB OF Watertight Reusable Cable X02W1R J1/P7 and X02W2R J1/P7 or SRB Of Throwaway Cable X02W1 J1/P7 and X02W2 J1/P7 (APU A and APU B Fuel Shutoff Valve Commands)

PART NO.: 10400-0003, 10400-0653
10400-0004, 10400-0654

FM CODE: A04C, A05

ITEM CODE: 50-04-X02

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Immediate

NO. REQUIRED: 1 each

DATE: March 1, 1995

CRITICAL PHASES: Boost

SUPERCEDES: March 1, 1994

FMEA PAGE NO.: D-631C, D-632

ANALYST: R. Smith/A. Craft

SHEET 1 OF 2

APPROVED: P. Kalia

FAILURE MODE AND CAUSES: Loss of APU System A and B Fuel Shutoff Valve commands in both cables due to:

- o One pin or wire open caused by: open solder, open wire, broken/ bent pin, corroded pin.
- o One pin or wire short to ground caused by: bent pin, contamination in connector, insulation breakdown, frayed shielding, abraded or cut insulation.
- o Loss of connector caused by: connector not fully mated, improperly safety wired, improperly torqued, defective threads, mechanical overstress.

FAILURE EFFECT SUMMARY: Loss of System A and B Fuel Shutoff Valve commands from open circuits results in loss of both APUs causing loss of TVC leading to loss of mission, vehicle and crew. Short circuits to ground will result in loss of Bus A & B and subsequent loss of TVC and separation capability with loss of mission vehicle and crew. One success path remains after the first failure. Operation is not affected until both paths are lost.

REDUNDANCY SCREENS AND MEASUREMENTS:

- 1) Pass - All cables are system tested during ground turnaround sequence.
- 2) Pass - Event measurements B46X1861X and B46X1863X.
- 3) Pass - No credible causes.

RATIONALE FOR RETENTION:

A. DESIGN Per Appendix A Section # I & III

B. TESTING

1) VENDOR RELATED Per Appendix B Section # IA & IB

2) KSC RELATED Per Appendix B Section # IIA

3) SYSTEM/ UNIQUE FUNCTIONAL

Cables are tested during Assembly Checkout Operations (ACO) (HPU BITE interlock tests) per 10REQ-0021, para. 2.3.4.3. (Open, Short or Loss of Connector)

Cables are again tested during hotfire operations per 10REQ-0021, para. 2.3.16.

After transfer to SPC, Cables are tested per OMRSD File V, Vol. 1, requirement number B42AP0.050 (APU Resistance BITE Tests).

Last time cables are tested is during final countdown per OMRSD File II, Vol. 1, requirement number S00FR0.070 (Start SRB HPU and verify) at T-28 sec.

C. INSPECTION

1) VENDOR RELATED Per Appendix C Section # I (Soldered Connector)

2) KSC RELATED Per Appendix C Section # IIA

D. FAILURE HISTORY

Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

Not applicable to this failure mode.