

SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

ITEM NAME: SRB OF Watertight Reusable Cable X02W4R J1/P5 and X02W10R J1/P4 or SRB OF Throwaway Cable X02W4 J1/P5 and X02W10 J1/P4 (APU A, MPU 1 and MPU 2 Speed Control Signals)

PART NO.: 10400-0006, 10400-0656
10400-0011, 10400-0661

FM CODE: A13

ITEM CODE: 50-04-X02

REVISION: Basic

CRITICALITY CATEGORY: IR

REACTION TIME: Immediate

NO. REQUIRED: 1 each

DATE: March 1, 1995

CRITICAL PHASES: Final Countdown, Boost

SUPERCEDES: March 1, 1994

FMEA PAGE NO.: D-646

ANALYST: R. Smith/A. Craft

SHEET 1 OF 3

APPROVED: P. Kalia

FAILURE MODE AND CAUSES: Loss of APU A-MPU No. 1 and MPU No.2 speed control signals 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: Final Countdown: Loss of both turbine speed signals for APU A will cause the turbine to overspeed resulting in turbine wheel fragmenting. The wheel fragments could penetrate hydrazine and hydraulic components or damage the turbine housing resulting in a fire in the aft skirt leading to loss of mission, vehicle and crew.

Boost: Loss of both turbine speed signals for APU A will cause the turbine to overspeed resulting in turbine wheel fragmenting. The wheel fragments could penetrate hydrazine and hydraulic components or damage the turbine housing resulting in a fire in the aft skirt or loss of TVC leading to 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 - APU turbine speed sensors B46R1406C and B46R1408C.
- 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 Frequency Test) per 10REQ-0021, para. 2.3.4.2. (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). (Open, Short, or Loss of connector)

Last time cables are tested is during final countdown per OMRSD File V, Vol. 1, requirement numbers B42AP0.050 (APU BITE Resistance Test) and OMRSD File II, Vol. 1, requirement number S00FRO.070 (Start SRB HPU and Verify) at T-28 sec. (Open, Short, or Loss of connector)

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.