SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

ITEM NAME: Integrated Electronic Assembly (IEA), Aft (Logic and Networks Distributor and OF Signal Conditioner)

PART NO.: 10400-0328 FM CODE: A29

ITEM CODE: 50-01-01-03 REVISION: Basic

CRITICALITY CATEGORY: 1R REACTION TIME: Immediate

NO. REQUIRED: 1 DATE: March 1, 2002

CRITICAL PHASES: Final Countdown, Boost SUPERCEDES: March 31, 1998

FMEA PAGE NO.: D-73 ANALYST: C. Webster/S. Finnegan

SHEET 1 OF 3 APPROVED: S. Parvathaneni

CN 044

FAILURE MODE AND CAUSES: Unscheduled fuel shut off valve (secondary) control signal (valve open) and loss of fuel control valve (primary) control signal (valve close) to APU A or APU B caused by:

- APU controller failures
- Wiring harness (open or shorted)
- APU BITE module (shorts)

FAILURE EFFECT SUMMARY: Final Countdown (after A1/B1 start commands) - APU A or B will overspeed, resulting in the turbine wheel fragmenting and penetrating other SRB components leading to fire and/or explosion and loss of mission, vehicle and crew.

Boost - APU A or B will overspeed, resulting in the turbine wheel fragmenting and penetrating other SRB components causing the loss of TVC, and vehicle breakup, resulting in loss of mission, vehicle and crew.

One success path remains after the first failure. Operation is not affected until two paths are lost.

REDUNDANCY SCREENS AND MEASUREMENTS

1) Pass -APU Turbine Speed Measurements B46R1406C, B46R1407C, B46R1408C, B46R1409C. Shutoff valve position measurement B46X1861X.

2) Pass - Same as Screen No. 1.

3) Pass - No credible causes.

RATIONALE FOR RETENTION:

A. DESIGN:

1. System Description

See Appendix B, Section 1, Paragraph (s) D(4), K

2. Component Description

See Appendix B, Section 2, Paragraph (s) A,E(2)(3),G,H

B. TESTING

1) VENDOR RELATED:

See Appendix B, Section 3, Paragraph(s) A(5), B

2) KSC RELATED:

See Appendix B, Section 3, Paragraph B

3) SYSTEM FUNCTIONAL/FAILURE MODE UNIQUE:

Assembly Checkout (ACO) - The APU BITE interlock test and the TVC Hot Fire test are verified per 10REQ-0021, para. 2.3.4.3 and 2.3.16.2. These tests verify the Fuel Shut Off Valve (FSOV) and Fuel Control Valve (FCV) functions. (All Failure Causes)

Prelaunch Tests -

Shuttle Interface Test (SIT) - The APU A and B BITE resistance and frequency tests are verified per OMRSD File V, Vol. 1, Requirement Numbers B42AP0.050 and B42AP0.060. These tests verify the FSOV and FCV functions. (All Failure Causes)

Countdown Demonstration Test (TCDT) - The APU A/B BITE resistance and frequency tests are verified per OMRSD File V, Vol. 1, Requirement Numbers B42AP0.050 and B42AP0.060. These tests verify the Fuel Shut Off Valve (FSOV) and Fuel Control Valve (FCV) functions. (All Failure Causes)

Launch Countdown - The APU A/B BITE resistance and frequency tests are verified per OMRSD File V, Vol. 1, Requirement Numbers B42AP0.050 and B42AP0.060. APU nominal start-up is verified per OMRSD File II, Vol. 1, requirement number S00FR0.070. These tests verify the FSOV and FCV functions.(All Failure Causes)

CN 044

Last Test of Failure Mode Prior to Launch - Launch Countdown is the last test of this failure mode prior to launch. The APU A/B BITE Resistance and Frequency tests are verified per OMRSD File V, Vol. 1, Requirement Numbers B42AP0.050 and B42AP0.060. APU nominal start-up is verified per OMRSD File II, Vol. 1, requirement number S00FR0.070. These tests verify the Fuel Shut Off Valve (FSOV) and Fuel Control Valve (FCV) functions. (All Failure Causes) CN 044

C. INSPECTION

1) VENDOR RELATED:

See Appendix B, Section 4, Paragraph(s) A,E,G,H

2) KSC RELATED:

See Appendix B, Section 5, Paragraph(s) A.(1),(2)(e)(f)

D. FAILURE HISTORY

Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

Not applicable to this failure mode.

F. WAIVERS/DARS

See Appendix E, Paragraphs 2, 5, 7-15.