

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: A20

ITEM CODE: 50-01-01-03

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Immediate

NO. REQUIRED: 1

DATE: March 1, 2002

CRITICAL PHASES: Boost

SUPERCEDES: March 31, 1998

FMEA PAGE NO.: D-64

ANALYST: C. Webster/S. Finnegan

SHEET 1 OF 3

APPROVED: S. Parvathaneni

CN 044

FAILURE MODE AND CAUSES: Loss of HPU A fuel isolation valve (open) control signal and HPU B fuel isolation valve (open) control signal caused by:

- o Solid state switches (A1/B1 start) fail (open)
- o Wiring harnesses (open or shorted)

FAILURE EFFECT SUMMARY: Loss of fuel flow to APUs leads to loss of capability to gimbal SRB nozzle and vehicle breakup resulting in 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 -APU Turbine Speed measurements B46R1406C, B46R1407C, B46R1408C, B46R1409C. Isolation Valve Position measurements B46X1851X, B46X1852X, B46X1853X, B46X1854X.
- 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(1)

2. Component Description

See Appendix B, Section 2, Paragraph (s) E(1)(2), F(2)

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:

SRB Aft Skirt Assembly Checkout (ACO) - APU BITE interlock test and the TVC Hot Fire test are verified per 10REQ-0021, paras. 2.3.4.3 and 2.3.16.2. These tests verify the Fuel Isolation Valve (FIV) control functions. (All Failure Causes)

Prelaunch Tests -

Shuttle Interface Test (SIT) - The APU A/B BITE resistance test is verified per OMRSD File V, Vol. 1, Requirement Numbers B42AP0.050. This test verifies FIV control functions. (All Failure Causes)

Launch Countdown - The APU nominal start-up is verified per OMRSD File II, Vol. 1, Requirement Number S00FR0.070. The TVC Hot Fire test and Fuel Pump Bearing Soak checkout are per OMRSD File V, Vol. 1, Requirement Numbers B42AP0.050 and B42AP0.080. These tests verify the FIV control functions. (All Failure Causes)

Last Test of Failure Mode Prior to Launch - Launch Countdown tests per OMRSD File II, Vol. 1, Requirement Number S00FR0.070 and OMRSD File V, Vol. 1, Requirement Numbers B42AP0.050 and B42AP0.080 is the last verification of FIV control circuits in the Aft IEA prior to launch. (All Failure Causes)

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C. INSPECTION

1) VENDOR RELATED:

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

2) KSC RELATED:

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

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, 4, 5, 7-15.