

## SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

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

PART NO.: 10400-0329

FM CODE: A41

ITEM CODE: 50-01-01-02

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Seconds

NO. REQUIRED: 1

DATE: March 1, 2002

CRITICAL PHASES: Boost (T+0 to T+27 sec.)

SUPERCEDES: March 31, 1998

FMEA PAGE NO.: D-35

ANALYST: C. Webster/S. Finnegan

SHEET 1 OF 3

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FAILURE MODE AND CAUSES: Unscheduled Nozzle Extension Jettison (NEJ) Arm and fire command to aft IEA caused by:

- o Shorted Fire 1 "OR" gate on Logic III Card-or-Shorted Solid State Switch on Logic IA Card.

AND

- o Shorted Solid State Switch on Logic IIB Card.

FAILURE EFFECT SUMMARY: Unscheduled Nozzle Extension Jettison Arm and fire commands cause severance of SRB Nozzle Extension, failure of thermal curtain, and subsequent failure of TVC system; resulting in loss of vehicle control and 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 - PIC Load Test B55X1840X, PIC capacitor voltage B55V1619C.
- 2) Fail- Recovery ARM switch short cannot be detected in ascent.
- 3) Pass - No credible causes.

### RATIONALE FOR RETENTION:

#### A. DESIGN:

##### 1. System Description

See Appendix A, Section 1, Paragraph (s) G & I

2. Component Description

See Appendix A, Section 2, Paragraph (s) A, H(1)(2)(3)

B. TESTING

1) VENDOR RELATED:

See Appendix A, Section 3, Paragraph(s) A(7), B

2) KSC RELATED:

See Appendix A, Section 3, Paragraph B

3) SYSTEM FUNCTIONAL/FAILURE MODE UNIQUE:

Acceptance Tests (Unique to this Failure Mode) - Forward IEA acceptance is conducted to 5135110-GTSP which tests the series redundancy of the +XD21 Recovery Power On and the +XD22 Recovery System Arm switches (including the operation of the Separation Fire 1 and Fire 2 "or" gates) and the operation of the 30 second arm timer at statements 12.007 through 12.691. Specific tests verify that simulated one millisecond separation A or B Fire 1 and Fire 2 stimuli will not set the +XD21 power on latch or the +XD22 arm power latch respectively. Forward IEA acceptance tests include random vibration (operating), and thermal functional performance tests (+30 degrees F. to +135 degrees F.). (All Failure Causes)

SRB Forward Skirt Assembly Checkout (ACO) - SRB Forward Skirt stand alone tests verify the Separation PIC system A and B Fire 1 or Fire 2 commands alone do not Arm the Nozzle Extension Jetison PIC in 10REQ-0021, para. 1.2.2.10.2.2 and 1.2.2.10.2.3. (All Failure Causes)

Prelaunch Tests -

Shuttle Interface Test (SIT) - Verification the SRB Forward IEA Separation PIC A and B Fire 1 and Fire 2 commands alone do not Arm the Nozzle Extension Jetison PIC is per OMRSD File V, Vol. 1, requirement number B52RY0.011. (All Failure Causes)

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The last test for this failure mode prior to launch is accomplished during Shuttle Interface Test per OMRSD File V, Vol. 1, requirement number B52RY0.011. (All Failure Causes)

C. INSPECTION

1) VENDOR RELATED:

See Appendix A, Section 4, Paragraph(s) A,G,H(3), H(2)

2) KSC RELATED:

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

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, 7-15.