

SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

ITEM NAME: SRB OF Nonwatertight Reusable Cables X31W2R P1/P2 or 131W414RP1/P3 (231W414RP1/P3) and 131W413RP4/P10 (231W413RP4/P10) (Recovery Battery and Range Safety Battery Power) and X31W424R J1/P2 Adapter Cable (For Silver Zinc Battery only) or X31W426R J1/P2 Adapter Cable (for BST Battery)

PART NO.: 10400-0060,  
or 10400-0109 (10400-0120)  
10400-0108 (10400-0119)  
and 10400-0942 (Silver Zinc Only)  
10400-0964 (BST only)

FM CODE: A01

ITEM CODE: 50-04-X31

REVISION: BASIC

CRITICALITY CATEGORY: 1R

REACTION TIME: Seconds

NO. REQUIRED: 1 each

DATE: March 1, 1995

CRITICAL PHASES: Boost

SUPERCEDES: March 1, 1994

FMEA PAGE NO.: D-709

ANALYST: R. Smith/A. Craft

SHEET 1 OF 3

APPROVED: P. Kalia

FAILURE MODE AND CAUSES: Loss of Recovery Battery and Range Safety Battery power to Range Safety Distributor in both cables and adapter cable (when using Silver Zinc or BST Battery) due to:

- o One pin or wire open caused by: open crimp, open wire, broken/bent pin, unseated pin, broken pin locking mechanism, 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 131W414R/231W414R or X31W2R Connector P1 caused by: connector not fully mated, improperly safety wired, improperly torqued, defective threads, mechanical overstress.
- o Loss of 131W414R/ 231W414R connector P3 or 131W413R/231W413R connector P4/P10 or X31W424R connector J1/P2 or X31W426R connector J1/P2 or X31W2R connector P2 caused by: connector not fully mated, mechanical overstress, failure of locking mechanism.

FAILURE EFFECT SUMMARY: Loss of Recovery Battery and Range Safety Battery power to Range Safety Distributor and/or IRDs results in loss of SRB destruct capability leading to loss of life or injury to the public. One success path remains after the first failure. Operation is not affected until both paths are lost.

- 1) Pass - All cables are system tested during ground turnaround sequence.
- 2) Pass - Range Safety Battery voltage measurements B55V1625C and B55V1602C; IRD A and B power on measurements B55X1871X and B55X1872X and current measurements B76C1050C and B55C1051C
- 3) Pass - No credible causes.

RATIONALE FOR RETENTION:

A. DESIGN Per Appendix A Section # Y

B. TESTING

1) VENDOR RELATED Per Appendix B Section # IA

2) KSC RELATED Per Appendix B Section # IIA

3) SYSTEM/ UNIQUE FUNCTIONAL

Cables are tested during ACO power on capability verification per 10REQ-0021, para. 1.2.2.13.1 and 1.2.2.13.4. (open, short or loss of connector)

After cables are transferred to SPC, cables are tested during SIT per OMRSD File V, Vol. 1, requirement number B55PRO.012. (RSS Power Up Test, RSS receiver test with flight code) (Open, Short or Loss of Connector)

Cables are again tested per OMRSD File II, Vol. 1, requirement number S00000.390. (Closed Loop Test, RSS Receiver Test with Flight Code) (Open, Short or Loss of Connector)

The last time the cables are tested is at final countdown per OMRSD File II, Vol. 1, requirement number S00FH0.031 (Closed Loop Test, Activate and Verify RSS). (Open, Short or Loss of Connector)

C. INSPECTION

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

## 2) KSC RELATED

Cable X31W2R P1 and 131W413R P10 (231W413R P10) connector is mated, torqued, and lockwired per Appendix C Section IIA.

Cables X31W2R P2 and X31W424R P2 connectors are inspected and mated per Appendix C Section IIB.

Cable 131W414R P1 (231W414R P1) connector is inspected, mated, torqued, and lockwired per Appendix C Section IIA.

Cables 131W413R P4 (231W413R P4), 131W414R P3 (231W414R P3) and X31W424R J1 (X31W426R J1) connectors are inspected, mated and locking pins verified visible 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.

## F. WAIVERS/DARS

- o BI 1791, 12/07/89, LEVEL III, SB3-01-2903

Requirement: Design shall preclude possibility of cross connection.

Departure: Cross connection of cables X31W2R/P2 and X31W601/P1 to Recovery Battery J1 and DFI Battery J1 respectively is possible on all DFI camera on SRBTS flights.

Rationale: The DFI and Recovery Battery are identical. Cross connections of the battery cable would have no effect.

- o BI 1864, 10/17/90, LEVEL III, SB3-01-3849

Requirement: 10CEI-0001, Rev. J, para. 3.3.5.15 "connectors shall be designed to preclude improper mating and where in close physical proximity to similar connectors, design shall preclude the capability of cross connections".

Departure: Potential exists for cross connection of recovery cable to DFI Battery/RSS Ag Zn Battery. For complete list of combinations which violated the requirements, see Waiver BI-1864.

Rationale: Two additional inspections have been added to all undetectable Crit I and IR cross connections. All other cross connections are either detectable or have no effect on mission, vehicle or crew.