Failure Modes and Effects Analysis/Critical Items List

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Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: Battery Fuel Gauge Qty: 1 FMEA Number: US-SFR-480

Item Part Number: SED33108530 ORU Name: SAFER

Subsystem Name: Battery ORU Part Number: SED33105900-311

Function: Provides temperature, current, voltage, and % capacity remaining indication for the battery.

Item Type Designator: C PG/IP Identifier: N/A

Reference Designator/Find No.: N/A Drawing Number: SED33108530

Logistics Control Number: N/A

End Item Name: SAFER

End Item Capability: Six degrees of freedom through 24 thrusters, each rated at 0.8 ± 0.08 lbs. force in vacuum.

End Item Function: Provides emergency EVA self-rescue for separated crewmember.

ISS Zone: EVA Shuttle Zone: EVA

Criticality

ritical Item: Yes: No: X Criticality Category: 1R 1R/3

Critical Item: Yes: No: X Criticality Category:
Success Success Paths Remaining:

Paths:

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: Battery fuel gauge provides inaccurate data to CEA.

Failure Mode Code: Failure Cause: Failure Detection:

Flight: IVA – IVA checkout.

EVA – Inaccurate display of temperature, voltage, current, and %capacity.

Ground: Functional Test.

Time To Detect Quantity: 30 Time To Detect Units: Seconds

Correcting Action: IVA – If a failure or apparent bad battery indication is detected during the IVA checkout, the battery

pack will be changed with a spare battery and re-tested. IF changing the battery has no effect on the

failure, the back-up SAFER (if available) will be used.

EVA – Cycle power. If not successful, no other corrective action.

Remarks: The battery level gauge IC is required for IVA checkout but is not required for self-rescue. But a false positive

checkout could result in loss of crewmember.

Failure Effect Phase: EVA Operations Affected Stage(S): EVA Operations

Failure Effect

On ORU/Assembly:

First/Second Failure: Inadvertent EVA crewmember separation.

<u>Third (this) Failure:</u> Inaccurate display of temperature, voltage, current, and %capacity.

On Subsystem/Next Assembly: N/A

On End Item/Segment: Possible loss of mission objectives if SAFER is required for EVA.

On Crew/ISS: Possible loss of crewmember.

Time To Effect Quantity: 1 Time To Effect Units: Minutes

Redundancy Screen

ISS (Shuttle)

Checkout Pre-Launch (A): Pass Checkout On-Orbit (B): N/A

Detection Flight Crew: Pass Or Detection Ground Crew: Fail

Loss Of Redundancy

From A Single Cause (C): N/A