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: Power Supply Assembly (PSA) Qty: 1 FMEA Number: US-SFR-220

Item Part Number: SED33107326 ORU Name: SAFER

Subsystem Name: Avionics ORU Part Number: SED33105900-311

Function: Receives power from battery, regulates power to avionics and thrusters.

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

Reference Designator/Find No.: N/A Drawing Number: SED33107326

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

ISS Shuttle

1R/3

Paths:

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: PSA fails to provide required power to Control Electronics Assembly (CEA), Valve Driver

Assembly (VDA), or Inertial Reference Unit (IRU).

Failure Mode Code:

Failure Cause: EEE part failure, short/open circuit, contamination, software error, radiation event, EMI.

Failure Detection:

Flight: IVA – IVA checkout.

EVA – No thrust response, no LED/LCD illumination.

Ground: Functional Test.

Time To Detect Quantity: 10 Time To Detect Units: Seconds

Correcting Action: IVA – If a failure is detected during the IVA checkout, the back-up SAFER (if available) will be used.

EVA – Crewmember may cycle power switch in an attempt to restore power.

Remarks: None

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> No power sent to thrusters, no LED/LCD illumination..

On Subsystem/Next Assembly: None.

On End Item/Segment: Prevents self rescue.

On Crew/ISS: Possible loss of EVA 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