FAILURE MODE EFFECTS ANALYSIS/CRITICAL ITEMS LIST

FMEA NUMBER: EC-PWP72-09 ORIGINATOR: JSC PROJECT:EDFT-03

PART NAME: ACTIVE WIF ASSY
P/N: SED39127151-301
LSC CONTROL NO: N/A
ZONE/LOCATION: STBD-2

LRU/ORU PART NUMBER:SED39126415-301
LRU/ORU PART NAME: APFR
DRAWING/REF DESIGNATOR: SEE P/N
EFFECTIVITY/AFFECT STAGE: STS-72

QUANTITY:1
SYSTEM: GFE
SUBSYSTEM: EVA

CRITICALITY:

CRITICAL ITEM: YES
CRITICALITY CATEGORY: 1R/2

SUCCESS PATHS: 2
SUCCESS PATH REMAINING: 1

END ITEM NAME: N/A
END ITEM FUNCTIONAL: N/A
END ITEM CAPABILITY: N/A
END ITEM FAILURE TOLERANCE: N/A

REDUNDANCY SCREENS:
A/1. C/O PRELAUNCH: Pass
2. C/O ON ORBIT: N/A for NSTS
B/3. DETECTION FLIGHT CREW: N/A
4. DETECTION GROUND CREW: N/A
C/5. LOSS OF REDUNDANCY FROM SINGLE CAUSE: Pass
6. ON-ORBIT RESTORABILITY: N/A for NSTS

FUNCTION: The APFR WIF allows connections of the APFR to structure of the TERA. It consists of passive and active halves. The active half is on the APFR. The WIF mechanism acts as a latch. The WIF pedal is depressed, the mechanism is deactivated and the halves can be separated. A locking collar prevents inadvertent activation of the pedals.

FAILURE MODE CODE: N/A for NSTS

FAILURE MODE: Unable to separate Worksite Interface.

CAUSE: Contamination, wear, piece part defect.

REMAINING PATHS: 1 - Jettison or EVA contingency release bolts.

EFFECT/ MISSION PHASE: EVA

CORRECTIVE ACTION:
- If unable to separate APFR from TERA - jettison APFR/TERA.
- If unable to separate APFR from transition plate - remove EVA contingency bolts at WIF base and jettison.

-FAILURE EFFECTS-

END ITEM/LRU/ORU/ASSEMBLY: Unable to separate passive and active valves of WIF.

SUBSYSTEM/NEXT ASSEMBLY/INTERFACE: N/A

SYSTEM/END ITEM/MISSION: Unable to separate APFR from TERA or transition plate.

CREW/VEHICLE : Possible vehicle damage if contingency operation cannot configure PLB safely.

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QUANTITY:1
SYSTEM: GFE
SUBSYSTEM: EVA

HAZARD INFORMATION:

HAZARD: N/A

HAZARD ORGANIZATION CODE: N/A

HAZARD NUMBER: N/A

TIME TO EFFECT: Hours
TIME TO DETECT: Seconds
TIME TO CORRECT: Minutes
FAILURE DETECTION/FLIGHT: Visual

REMARKS:

-RATIONALE FOR ACCEPTABILITY-

(A) DESIGN: The Active WIF is designed to the requirements specified in JSC-33009, " Certification and Acceptance Requirements Document for the Articulating Portable Foot Restraint". The APFR is designed to withstand 4200 in-lb in bending and torsion and 274 lb in shear and tension using a factor of safety of 1.4. The WIF design incorporates a locking collar which prevents the latch activation levers from being depressed inadvertently. Also to deactivate the latch 2 of the 4 latch levers must be depressed simultaneously. Three tabs in the active probe engage a slot in the passive WIF to prevent separation. Only 2 of the 3 tabs are required.

(B) TEST: Applicable requirements per JSC-33205.

Acceptance:

1) Fit check of the Active and Passive WIF performed at PDA.
2) Force required to install/ remove the active and passive WIF's shall be between 3 and 10 lb. verified at PDA, PIA, Pre and Post Environmental test and during qualification thermal test.
3) Force required to activate paddles between 2 and 10 lb., two paddles must be depressed for actuation, and torque required to rotate locking collar is between 1 and 5 in-lb. verified at PDA, PIA, and qualification thermal test.

Qualification:

Qualification Vibration : A vibration test was performed to the following levels for a duration of 1 minute in each axis as a part of the Bay two starboard integrated proto-flight vibration test:

X AXIS		Y AXIS		Z AXIS	
				20 - 45Hz	.009g^2/Hz
20 - 80 Hz	+3 db/oct	20 - 45 Hz	+10.0 db/oct	45 -70 Hz	+12.0 db/oct
80 - 350 Hz	.040g^2/Hz	45 - 600 Hz	0.060 g2/Hz	70 - 600 Hz	.050 g^2/Hz
350 - 2000 Hz	-3db/oct	600 - 2000Hz	-6.0 db/oct	600 - 2000Hz	-6.0 db/oct
6.1 grms		7.7 grms		7.0 grms	

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PART NAME: ACTIVE WIF ASSY	LRU/ORU PART NUMBER:SED39126415-301	QUANTITY:1
P/N: SED39127151-301	LRU/ORU PART NAME: APFR	SYSTEM: GFE
LSC CONTROL NO: N/A	DRAWING/REF DESIGNATOR: SEE P/N	SUBSYSTEM: EVA
ZONE/LOCATION: STBD-2	EFFECTIVITY/AFFECT STAGE: STS-72	

Qualification Acceptance Thermal: Functional test is performed at -100°F and +200°F. During one portion of the test an interface check between the passive and active WIF is performed with a minimum temperature difference of 100°F.

C) INSPECTION:
Fabrication - All WIF components are verified to visibly clean individually.
Test - Quality Assurance surveillance is required at all test and inspections. Discrepancy reports are written on all noncompliances.

(D) FAILURE HISTORY: None

(E) OPERATIONAL USE:
1) Operational Effect - Unable to separate WIF halves. APFR remains attached to TERA or transition plate during EVA operations.
2) Crew Action - If stuck to TERA, jettison TERA/APFR. If stuck on transition plate remove bolts restraining WIF socket.
3) Crew Training - Crew trained in proper operation of WIF.
4) Mission constraint - None.
5) In Flight Checkout - Proper function verified during EVA operations.

(F) MAINTAINABILITY: N/A

PREPARED BY: G. Wright REVISION:

DATE: 8/10/95 WAIVER NUMBER: