

CIL
END CRITICAL ITEM LIST

Page: 1
Date: 11/29/93

12/24/93 SUPERSEDES 12/24/91

ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
FEEDWATER VALVE SWITCH, ITEM 367 ----- SV767793-3 (1)	2/2	367FH05: Electrical short to ground. CAUSE: Contamination, faulty wiring.	END ITEM: A direct short across the 0.7 amp current limiter. SPE INTERFACE: The feedwater valve current limiter would trip (open). Loss of capability to change feedwater valve position during EVA. CMS would issue H2O IS OFF message since no voltage would be detected. MISSION: During start of EVA, unable to open feedwater valve and consequently unable to go EVA. CREW/VEHICLE: None.	A. Design - Switching mechanism and contacts are enclosed in a hermetically sealed case backfilled with dry nitrogen. Each switch position has dual contacts for redundancy. The external lead wires are potted for strain relief. Contact is accomplished through a roller type contact. This keeps switching forces to a minimum. B. Test - Component Acceptance Test - Vendor acceptance tests include 500 actuation cycles, contact resistance, insulation resistance, and dielectric withstanding voltage tests. In-Process Test - Switch operation and continuity are verified during in-process tests during DDM Item 358 assembly. PDA Test - Proper operation is verified during DDM PDA which includes continuity, functional, and operating torque tests. The switch is vibrated and exposed to thermal cycles during PDA as part of the DDM. Certification Test - The item completed the 15 year structural vibration and shock cert requirements during 10/83. The item is cycle certified by similarity to the item 368 switch which has completed 127,000 cycles during 8/83. This is 86 times the Item 367 cycle cert requirement of 1,472. C. Inspection - The external lead wires are inspected for damage as part of the source inspection for the part and again during assembly of the BCM. To preclude failure due to internal contamination, the switches are assembled by the vendor in a Class 100,000 clean room. The switches are flushed internally using chlorothane 88 and Omexolve D to remove contaminants prior to case welding. After welding the switches are vacuum baked and back filled with GM2 to a pressure of 3-5 psig and sealed. Leak checks are performed during subsequent processing to verify seal integrity. Two X-ray inspections are performed, prior to run-in cycling and

SEM0-44-1
CHANGE 2
PAGE 153

CIL
 EMU CRITICAL ITEMS LIST

Page: 2
 Date: 11/20/93

12/24/93 SUPERSEDES 12/24/91

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2/2 367FM05:

after vibration, to verify absence of weld splatter and loose pieces, and to verify contact alignment.

D. Failure History -
None.

E. Ground Turnaround -
Tested per FEMU-R-001, PLSS & DCN electrical checkout, 137
Activation.

F. Operational Use -
Crew Response - PreEVA: No response, single failure cannot
be detected.
EVA: When CMS data confirms loss of feedwater and cooling is
insufficient, terminate EVA.
PostEVA: Perform water dump procedures. For subsequent
EVA's, consider third EMU if available. Otherwise EMU go for
SD without fan.
Training - Standard EMU training covers this failure mode.
Operational Considerations - EVA checklist procedures verify
hardware integrity and systems operational status prior to
EVA. Flight rules define go/no go criteria related to
thermal control.