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 --- SV767795-3 (1)	2/2	367FM03: Toggle switch stuck in the "CLOSE" position. CAUSE: Contact weld caused by arcing or a failure of the hermetic seal and exposure to vacuum, jamming, aborting due to contamination.	END ITEM: Feedwater switch continuously sends current to 137 valve close solenoid. GFE INTERFACE: Unable to open the feedwater valve. Unable to place the 140 substimator on line. MISSION: Terminate EVA. CREW/VEHICLE: None.	A. Design - Switching mechanism and contacts are encased in a hermetically sealed case backfilled with dry nitrogen. Each switch position has dual contacts for redundancy. The switch is designed to withstand a toggle force of 25 lbs. without degradation in subsequent performance. 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 four separate in-process tests during DCN Item 350 assembly. PBA Test - Proper operation is verified during DCN PBA which includes continuity, functional, and operating torque tests. The switch is vibrated and exposed to thermal cycles during PBA as part of the DCN. 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 8/85. This is 86 times the Item 367 cycle cert requirement of 1,472. ED42806-599-7 added a lead to the switch for the redesign DCN. This created the -2 switch configuration. Switch certification was not affected. 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 DCN. To preclude failure due to internal contamination, the switches are assembled by the vendor in a Class 100,000 clean room. The switches flushed internally using chlorothene BG and Genesolve D to remove contaminants prior to case welding. After welding the switches are

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	2/2	367FM03:		vacuum baked and back filled with GN2 to a pressure of 3-5 psig and sealed. Leak checks are during subsequent process to verify seal integrity. Two X-ray inspections are performed, prior to run-in cycling and 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-801. Electrical Checkout, 137 Activation.

F. Operational Use -
Crew Response - EVA: When CWS data confirms loss of feedwater and cooling is insufficient, terminate EVA.
Training - Standard EMU training covers this failure mode.
Operational Considerations - Flight rules define go/no go criteria related to thermal control. Real Time Data System allows ground monitoring of EMU systems.