CIL
EMU CRITICAL ITEMS LIST

01/02/90 SUPERSEDES / /

ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
COOLING CONTROL VALVE, ITEM 321 --- SW789693-1 (1)	2/1R	321FM04A: External water leakage. CAUSE: Seal failure. Spool seal failure (rotating seal backed up by a redundant chevron face seal), housing static seal failure.	END ITEM: Water leakage to ambient. GFE INTERFACE: Depletion of the water reservoir, reduction in heat rejection. MISSION: Terminate EVA when the water supply drops below CWS limits. CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of SOP.	A. Design - Two transport in-line filters (140 micron, SCU DCM side and 20 micron 1-141 Gas Trap) protect the valve from contamination. In addition, supplemental water from the condensate circuit is filtered by a 20 micron filter contained in the 1-127. The static seal and rotating seal are silicon and Viton, respectively, and their design configuration, dimensions and rigidness of assembly provide squeeze under all loading conditions. B. Test - Component Acceptance: An external leakage test is performed per AT-3-321-2 in which the valve is pressurized with nitrogen to 61.7 to 63.7 psia. The valve is then submerged in water for a 5 minute minimum test period. No leakage bubbles are allowed. PDA: An external leakage test is performed per SEMU-60-015. The valve is pressurized with water to 15.0-20.0 psig and observed for evidence of external leakage for a 5 minute minimum test period. No visible leakage is allowed. Certification: The item completed the 15 year structural vibration and shock certification requirement during 10/83. The item completed 10,000 cold-hot-cold cycles during 7/85 which fulfills the cycle certification requirement of 4,024. Engineering changes 42806-229 (facilitated valve acceptance at DCM level by providing consistency between component spec. and S/AD II) and 42806-515 (clarified Flow Requirement) have been incorporated and certified by analysis/similarity since this configuration was tested. C. Inspection - Spool seal failure (rotating seal), housing static seal failure. O-ring grooves are 100% inspected per drawing dimensions and surface finish. O-rings are inspected for surface characteristics per SVHS 3432: 100% for Class I & II and at least 1.5 AQL for Class III.

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	2/IR	321#HD6A:		D. Failure History - None. E. Ground Turnaround - Tested per #EMU-R-001, Water Servicing, Leakage and Gas Removal. F. Operational Use - Crew Response - Pre/PostEVA: Troubleshoot problem, if no success, consider third EMU if available. Otherwise, terminate EVA operations. EVA: When CWS data confirms loss of feedwater and cooling is insufficient, terminate EVA. Consider vacuum water recharge to recover EMU operation. Special Training - Standard 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 EMU thermal control. Real Time Data system allows ground monitoring of EMU systems.