

SNUPPS

Standardized Nuclear Unit
Power Plant System

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April 11, 1984

Nicholas A. Petrick
Executive Director

SLNRC 84- 0063 FILE: 0278/8021
SUBJ: Environmental Qualification of
Solenoid Valves

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Docket Nos: STN 50-482 and STN 50-483

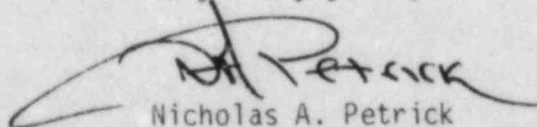
Dear Mr. Denton:

On April 3, 1984, the NRC staff informed the SNUPPS Utilities that the issue of environmental qualification of ASCO solenoid valves, as described in Board Notification 83-128A, was considered to be an open licensing issue for the SNUPPS plants - Callaway Plant Unit No. 1 and Wolf Creek Generating Station Unit No. 1.

The SNUPPS Utilities have evaluated the issue of ASCO solenoid valve qualification and have concluded that the qualification of these valves for SNUPPS applications is supported by documentation currently in SNUPPS environmental qualification files. A summary of the evaluation leading to this conclusion is provided as enclosure 1. However, with due regard for the information contained in NUREG/CR-3424 which resulted in the issuance of Board Notification 83-128A, additional information supporting qualification of the ASCO solenoids for SNUPPS applications is provided in enclosure 2.

Based on the results of the above evaluation, the SNUPPS Utilities have concluded that the ASCO solenoid valves employed for safety-related applications in the SNUPPS design are fully qualified for their intended use.

Very truly yours,


Nicholas A. Petrick

MHF/nld9b12
Enclosures

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Environmental Qualification Documentation
for SNUPPS Solenoid Valves

The information presented in support of Board Notification 83-128A and recently issued IE Notice 84-23 indicate that the ASCO qualification concern exists for applications of the valves in environmental conditions more severe than those described in a 1978 Isomedix Test Report AQS 21678/TR-Rev. A. In addition, the valve models in question are models NP8344 and NP8316 which were naturally-aged prior to DBE testing. Because of the severity of the testing program documented in NUREG/CR-3424, the test results for artificially-aged valves is inconclusive.

The ASCO solenoids which may be required to function in postulated post-accident conditions more severe than the conditions in AQS 21678/TR-Rev. A are those located inside containment at the SNUPPS plants.

The applicable SNUPPS specifications/qualification programs for these valves are M-237 and HE-2. A summary of qualification documentation for M-237 and HE-2 can be found in the SNUPPS NUREG-0588 licensing submittal which has been provided to the NRC.

The qualification of M-237 ASCO valves is based on testing performed in November 1980 by Wyle Laboratories for Fisher Controls Company. The test program qualified a model NP8320 valve; SNUPPS uses model NP8320 valves in M-237 equipment. The ASCO valves control the air supply to air-operated containment isolation valve assemblies. NUREG/CR-3424 states that the model NP8320 ASCO performed its safety function but leaked severely. This leakage would not prevent the SNUPPS M-237 equipment inside containment from performing its safety function because the solenoid valves are required to deenergize to vent air pressure and allow the valve assembly to close. The isolation valve assemblies are not required to function following an accident after initial closure is completed.

The qualification of HE-2 ASCO valves is based on Westinghouse reports WCAP-8587 and WCAP-8687. The Board Notification and IE Notice indicate that the model NP8316 ASCO valves may not be suitable for the environmental conditions and operating time requirements as reported in these Westinghouse reports.

By letters dated September 23, 1983 and April 6, 1984, Westinghouse has provided the NRC with evaluations of the ASCO testing reported in NUREG/CR-3424. Westinghouse concluded that the test results related to ASCO model NP8316 valves are specific to the test conditions and methodology of the NUREG/CR-3424 testing program and cannot be related directly to previous testing done by Westinghouse and ASCO. Specific Westinghouse conclusions are that one NP8316 valve was exposed to overly severe environmental conditions (450 - 460°F) and high steam mass flow rates which caused the valve to heat up to 50°F higher than normal, that one NP8316 valve failure can probably be attributed to test-induced contaminants and is thus not indicative of a common mode

failure mechanism, and that degradation of valves during previous Westinghouse/ASCO tests after 30 days of testing does not indicate marginal performance because the 30 day period includes 25 days of test margin for demonstrating post-accident operability requirements.

The SNUPPS Utilities concur with the Westinghouse conclusions stated above and note that a test temperature of 450°F is 65° greater than the worst case post-accident temperature in the SNUPPS plants (384.9°F). In addition, the SNUPPS ASCO solenoid valves are not required to operate periodically at elevated post-accident temperatures as occurred during the NUREG/CR-3424 testing. Finally, the 30 day testing period employed during previous Westinghouse/ASCO tests provides a test margin in excess of 25 days for demonstrating SNUPPS post-accident operability requirements.

Based on the above, it is concluded that the qualification of ASCO solenoid valves used for safety-related applications inside containment at the SNUPPS plants is adequately supported by the existing qualification reports for specification M-237 and qualification program HE-2.

Additional Information Supporting
ASCO Valve Qualification

All the SNUPPS ASCO solenoid valves, under specifications M-237 and HE-2, which are required to function following postulated Loss of Coolant Accidents (LOCA) and Main Steam Line Breaks (MSLB) inside containment are provided on air-operated containment isolation valves designed such that the ASCO valve is required to deenergize for the isolation valve to perform its safety function. In no case are the solenoid valves required to isolate high energy fluids nor are they required to function in the post-accident environment after the initial isolation function is accomplished. The containment isolation signal is generated very early in the events following a LOCA or MSLB inside containment. The larger the break size, the more rapidly is generated a containment isolation signal. Based on the combined SNUPPS LOCA/MSLB temperature profile temperature conditions will not exceed the AQS 21678/TR-Rev. A conditions for at least 60 seconds following a postulated MSLB in the SNUPPS plant containment. After the isolation valves are closed, the ASCO solenoid valves have performed their safety function and continued operability is not required. Therefore, in the SNUPPS design, the ASCO valves will have completed their safety functions prior to occurrence of the failures of the type reported in NUREG/CR-3424.

Surface temperature calculations of the type reported in Section 6.2.2 of the SNUPPS NUREG-0588 licensing submittal have not been performed for ASCO solenoid valves. However, based on an inspection of Figures 7 and 7A of the submittal and consideration of equipment heat transfer characteristics, the ASCO solenoid valve surface temperature response curve is expected to lie between the response curves for energized coaxial electrical cables (peak temperature 348°F) and electronic pressure transmitters (peak temperature 290°F). The Isomedix AQS 21678/TR-Rev. A test temperature was 346°F. Therefore, the ASCO solenoid valve surface temperature for the SNUPPS plants is not expected to exceed the qualified temperature reported in the Isomedix report.