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SUBJECT: Provides status of recommended actions re response to NRC Generic Ltr 89-13, " Svc Water Sys Problems Affecting..."

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JACK N. BAILEY
VICE PRESIDENT
NUCLEAR SAFETY AND LICENSING

161-02801-JNB/JST
January 26, 1990

Docket Nos. 50-528/529/530

Document Control Desk
U. S. Nuclear Regulatory Commission
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Washington, D. C. 20555

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station
Units 1, 2 and 3
Response to NRC Generic Letter 89-13 "Service Water System Problems Affecting Safety Related Equipment"
File: 90-010-026

The Attachment to this letter provides the status of the recommended actions in NRC Generic Letter 89-13. Arizona Public Service is in the process of modifying existing programs to comply with the recommended actions of the Generic Letter.

If you should have any questions regarding this matter, contact Mr. A. C. Rogers, of my staff, at (602) 340-4041.

Sincerely,

WFC/ACR/JST

Attachment

cc: T. L. Chan (all w/Attachment)
S. R. Peterson
J. B. Martin
D. H. Coe
A. C. Gehr
A. H. Gutterman

A065
1/1

161-02801-JNB/JST
January 26, 1990

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, J. N. Bailey, represent that I am Vice President - Nuclear Safety and Licensing, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true and correct.

J. N. Bailey

Sworn To Before Me This 26 Day Of January, 1990.

Dora E. Meador
Notary Public

My Commission Expires

My Commission Expires April 6, 1991

ATTACHMENT

APS Response to NRC Generic Letter 89-13 Recommended Actions

Recommended Action I:

For open-cycle service water systems, implement and maintain an ongoing program of surveillance and control techniques to significantly reduce the incidence of flow blockage problems as a result of biofouling. A program acceptable to the NRC is described in "Recommended Program to Resolve Generic Issue 51" (Enclosure 1). It should be noted that Enclosure 1 is provided as guidance for an acceptable program. An equally effective program to preclude biofouling would also be acceptable. Initial activities should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. All activities should be documented and all relevant documentation should be retained in appropriate plant records.

APS Response:

The only safety-related open cycle service water system at PVNGS is the spray pond system which serves as the Ultimate Heat Sink (UHS). This system does not communicate with any untreated water or outside sources of biofouling. Thus only water chemistry controls are necessary to prevent piping corrosion and the growth of algae and microbiological organisms. This control is accomplished by maintaining the UHS chemistry within the bounds established in administrative control procedure 74AC-9CY04, "System Chemistry Specifications."

The spray pond systems are also monitored for flow and heat exchanger pressure drop on a monthly basis. These data are trended by the on-site Engineering Evaluation Department system engineer performance monitoring and trending program 70PR-0AP01, "System Engineer Program." These data have demonstrated, over the past 2 years, a sensitivity such that fouling/flow blockage is readily detectable well before design basis limits for heat transfer are reached.

Recommended Action II:

Conduct a test program to verify the heat transfer capability of all safety-related heat exchangers cooled by service water. The total test program should consist of an initial test program and a periodic retest program. Both the initial test program and the periodic retest program should include heat exchangers connected to or cooled by one or more open-cycle systems as defined above. Operating experience and studies indicate that closed-cycle service water systems, such as component cooling water systems, have the potential for significant fouling as a consequence of aging-related in-leakage and erosion or corrosion. The need for testing of closed-cycle system heat exchangers has not been considered necessary because of the assumed high quality of existing chemistry control programs. If the adequacy of these chemistry control programs

cannot be confirmed over the total operating history of the plant or if during the conduct of the total testing program any unexplained downward trend in heat exchanger performance is identified that cannot be remedied by maintenance of an open-cycle system, it may be necessary to selectively extend the test program and the routine inspection and maintenance program addressed in Action III, below to the attached closed-cycle systems.

A program acceptable to the NRC for heat exchanger testing is described in "Program for Testing Heat Transfer Capability" (Enclosure 2). It should be noted that Enclosure 2 is provided as guidance for an acceptable program. An equally effective program to ensure satisfaction of the heat removal requirements of the service water system would also be acceptable.

Testing should be done with necessary and sufficient instrumentation, though the instrumentation need not be permanently installed. The relevant temperatures should be verified to be within design limits. If similar or equivalent tests have not been performed during the past year, the initial tests should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter.

As a part of the initial test program, a licensee or applicant may decide to take corrective action before testing. Tests should be performed for the heat exchangers after the corrective actions are taken to establish baseline data for future monitoring of heat exchanger performance. In the periodic retest program, a licensee or applicant should determine after three tests the best frequency for testing to provide assurance that the equipment will perform the intended safety functions during the intervals between tests. Therefore, in the periodic retest program, to assist that determination, tests should be performed for the heat exchangers before any corrective actions are taken. As in the initial test program, tests should be repeated after any corrective actions are taken to establish baseline data for future monitoring of heat exchanger performance.

An example of an alternative action that would be acceptable to the NRC is frequent and regular maintenance of a heat exchanger in lieu of testing for degraded performance of the heat exchanger. This alternative might apply to small heat exchangers, such as lube oil coolers or pump bearing coolers or readily serviceable heat exchangers located in low radiation areas or the facility.

In implementing the continuing program for periodic retesting of safety-related heat exchangers cooled by service water in open-cycle systems, the initial frequency of testing should be at least once each fuel cycle, but after three tests, licensees and applicants should determine the best frequency for testing to provide assurance that the equipment will perform the intended safety functions during the intervals between tests and meet the requirements of GDC 44, 45, and 46. The minimum final testing frequency should be once every 5 years. A summary of the program should be documented, including the schedule for tests, and all relevant documentation should be retained in appropriate plant records.

APS Response:

Arizona Public Service intends to perform testing on only one train of safety related heat exchangers each refueling outage. Previous inspections and testing have shown essentially no degradation in heat exchanger performance or significant biofouling and support the conclusion that this testing interval is adequate to ensure no detrimental effect on safety-related equipment performance will occur between test intervals.

Testing to demonstrate thermal performance and heat transfer capability of both open and closed cycle service water systems will be performed on a one train per refueling outage basis. At Palo Verde, one of two independent trains of shutdown cooling is normally used to bring the plant to cold shutdown conditions. It is planned to use alternate trains at alternate refueling outages such that each train is tested every other refueling outage. The procedure for this test was first run almost three years ago as part of the system engineer performance monitoring program. The procedure is being revised to enhance its capabilities for monitoring individual heat exchanger heat transfer performance. Performing the procedure while the plant is being brought to cold shutdown conditions provides a significant amount of decay heat and allows a more precise measurement of heat transfer capability. Data obtained in this manner will optimize the extrapolation of test results to design basis conditions. Although the closed cycle systems (essential cooling water and essential chiller) have had excellent chemistry control, as evidenced by numerous maintenance component level inspections showing minimum deposits on wetted surfaces, the essential cooling water elements are included in the test procedure as a part of the system engineer performance monitoring program. Implementation of the revised test procedure will begin in each unit on an every other refueling outage per train basis not later than the first refueling outage beginning after April 18, 1990.

Recommended Action III:

Ensure by establishing a routine inspection and maintenance program for open-cycle service water system piping and components that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of the safety-related systems supplied by service water. The maintenance program should have at least the following purposes:

A. To remove excessive accumulations of biofouling agents, corrosion products, and silt;

B. To repair defective protective coatings and corroded service water system piping and components that could adversely affect performance of their intended safety functions.

This program should be established before plant startup following the first refueling outage beginning 9 months after the date of this letter. A description of the program and the results of these maintenance inspections should be documented. All relevant documentation should be retained in appropriate plant records.

APS Response:

Existing Preventative Maintenance tasks regularly inspect many of the components identified in the Generic Letter. Tasks are being initiated by the system engineer to add other components to the existing program such that the design basis heat transfer capability is maintained for the open-cycle system piping, heat exchangers, and other components. These additional tasks will be added to the preventative maintenance program not later than each units startup from the first refueling outage beginning after April 18, 1990.

Recommended Action IV:

Confirm that the service water system will perform its intended function in accordance with the licensing basis for the plant. Reconstitution of the design basis of the system is not intended. This confirmation should include a review of the ability to perform required safety functions in the event of failure of a single active component. To ensure that the as-built system is in accordance with the appropriate licensing basis documentation, this confirmation should include recent (within the past 2 years) system walkdown inspections. This confirmation should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. Results should be documented and retained in appropriate plant records.

APS Response:

Confirmation that the service water system would perform its intended function was provided by test 73PE-1EW01 "Heat Balancing of Essential Cooling Water System." This test verified the design heat transfer capability of the shutdown cooling heat exchangers, essential cooling water heat exchangers and the spray ponds. The Nuclear Engineering Department (design engineering group) is performing a design review of the service water system to reverify the ability of the system to perform required safety functions in the event of the failure of a single active component. Additionally, the Nuclear Engineering and Engineering Evaluation Department system engineers will perform walkdown inspections of the service water systems to ensure the as-built system is in accordance with the appropriate licensing basis documentation. The design review and walkdown inspections will be performed in each unit prior to startup from any refueling outage beginning after April 18, 1990.

Recommended Action V:

Confirm that maintenance practices, operating and emergency procedures, and training that involves the service water system are adequate to ensure that safety-related equipment cooled by the service water system will function as intended and that operators of this equipment will perform effectively. This confirmation should include recent (within the past 2 years) reviews of practices, procedures, and training modules. The intent of this action is to reduce human errors in the operation, repair, and maintenance of the service water system. This confirmation should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. Results should be documented and retained in appropriate plant records.

APS Response:

The PVNGS Training Department will conduct a review of training modules that involve the service water system. Particular emphasis will be placed on maintenance practices, operating procedures, and emergency procedures as specified in Section V of the recommended actions of the Generic Letter, and in Section 7 (4) of NUREG 1275 (enclosure 4 of the Generic Letter). This review will be completed prior to restart from any refueling outage beginning after April 18, 1990.

PVNGS procedure 01AC-0AP01 "Format and Content of Nuclear Administrative and Technical Procedures" requires biennial review of all emergency and operating procedures. Procedures are also reviewed after any significant event in which procedural guidance may have been inadequate. Procedure 03GB-0AP01 "Instruction/Procedure/Task Change Request" provides that any problems experienced during the performance of procedures be reported back to the Standards Department for corrective action. These procedural reviews are ongoing and meet the requirements for review of the adequacy of maintenance, operating, and emergency procedures to ensure that safety-related equipment cooled by the service water system will function as intended and that operators of this equipment will perform effectively.