



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 14, 1999

MEMORANDUM FOR: Docket File  
FROM: *Mel B. Fields*  
Mel B. Fields, Project Manager  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation  
SUBJECT: PALO VERDE NUCLEAR GENERATING STATION -  
ELECTRONIC TRANSMISSION OF ISSUES TO BE DISCUSSED  
IN AN UPCOMING PHONE CONVERSATION ON GENERIC  
LETTER 95-07 (TAC NOS. M93497, M93498, AND M93499)

The attached questions were prepared by Steve Tingen of the Mechanical & Civil Engineering Branch and electronically transmitted to Mr. Scott Bauer of Arizona Public Service Company on April 14, 1999, in preparation for an upcoming telephone conference. This memorandum and the attachment do not convey a formal request for information or represent an NRC staff position. Formal questions, if any, will be developed by the staff after the telephone conference with the licensee.

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1. Your submittal dated February 21, 1996, states that you used a pressure locking analytical method to predict the opening stem thrust required to overcome pressure locking. This analytical method was used to demonstrate the valves were operable until modifications could be implemented to eliminate the potential for pressure locking. Your submittal dated June 28, 1996, states that as of April 1999, all Unit 2 valves that are susceptible to pressure locking have been modified or are in the process of being modified during the current outage and that your pressure locking analytical method is still being used to demonstrate that Unit 1 valves SG-134, SG-138, SI-655, SI-672, SI-685, SI-686, and SI-688 and Unit 3 valves SI-694, SI-696, and SI-693 will operate during pressure locking conditions.

On April 9, 1997, a public meeting was conducted to discuss the Commonwealth Edison and Entergy Operations, Inc. pressure locking thrust prediction methodologies presented in GL 95-07 submittals. The minutes of the public meeting were issued on April 25, 1997, and placed in the Public Document Room. The Commonwealth Edison and Entergy Operations, Inc., methodologies that predict the thrust required to open pressure locked flexible-wedge gate valves, validation testing of the analytical method, enhancements to the Commonwealth Edison pressure locking methodology, and pressure locking tests sponsored by the NRC conducted by Idaho National Engineering and Environmental Laboratory were discussed during the meeting. The minutes of this public meeting indicate the type of information requested by the NRC in order to review and approve pressure locking thrust prediction methodologies.

In order for the NRC to review your pressure locking thrust prediction methodology, please provide the following information:

- a. Describe the pressure locking thrust prediction methodology and provide the test procedure/results that validated the methodology. Include any information that will help evaluate if your valve is similar to test valves as applicable.
- b. Results from pressure locking testing sponsored by the NRC performed by Idaho National Engineering and Environmental Laboratory on a double disk and a flexible wedge gate valve have been placed in the Public Document Room (NUREG/CR-6611). Please discuss if your pressure locking thrust prediction methodology accurately predicted the results of these pressure locking tests. It would be helpful if you discussed whether your pressure locking thrust prediction methodology accurately predicted the results of pressure locking tests performed by Commonwealth Edison that were discussed during the April 9, 1997, public meeting.
- c. Discuss the recommended margin between actuator capability and the calculated thrust value when using your pressure locking prediction methodology, any limitations associated with the use of your methodology and any diagnostic test equipment accuracy requirements. Commonwealth Edison Company provided this type of information to the NRC in a letter dated May 29, 1998. This letter is in the Public Document Room (Accession Number: 9806040184).
- d. Identify valves that were considered not susceptible to pressure locking because your pressure locking analytical method demonstrated that the valves would operate during pressure locking conditions.



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2. Your February 21, 1996, submittal states that an algorithm was used to calculate bonnet pressures increases due to increased temperature. Describe the algorithm if it is currently being used to demonstrate that valves are not susceptible to thermal induced pressure locking and discuss if your algorithm accurately predicted the pressure/temperature relationship test results sponsored by the NRC conducted by Idaho National Engineering and Environmental Laboratory discussed in NUREG/CR-6111.

3. Your February 21, 1996, submittal states that thermal binding test results from a 10 inch Borg Warner valve were used to demonstrate that shutdown cooling valves, SI-651, SI-652, SI-653 and SI-654, would operate during thermal binding condition. Discuss how your shutdown cooling valves are similar to the Borg Warner test valve.

4. Discuss if flexible and solid wedge gate valves were evaluated for thermal binding and thermal binding temperature thresholds used to determine if valves were susceptible to thermal binding.

Explain why AFW turbine steam admission valves, AFW 134 and AFW 138, shutdown cooling suction valves, SI-655 and SI-656, and shutdown cooling heat exchanger inlet and outlet isolation valves, SI-685, SI-694, SI-686 and SI-696, are not susceptible to thermal binding.

5. Identify any analysis that is currently being used that credits bonnet leakage, air in the bonnet, decreased pressure due to retracting the stem, ample open margin capacity, full voltage in lieu of reduced voltage and/or elasticity of valve metal to prevent pressure locking.

6. Briefly explain the modifications that have been implemented or are scheduled to be implemented to eliminate the potential for pressure locking. If the modification involved the installation of a bonnet relief valve, discuss relief valve setpoint and how you verified that the valve will open when pressure in the bonnet is higher than upstream and downstream pressure but below the relief valve setpoint.

7. The June 28, 1996, submittal states that SI-604 and SI-609 are no longer susceptible to pressure locking because the maximum unwedging loads for these valves have been limited. Explain what this means.

8. Are nonessential AFW pump discharge and feed regulating valves included in the scope of GL 95-07 and do these valves have a history of pressure locking or thermal binding? If they are included in the scope of GL 95-07, explain why they are not susceptible to pressure locking and thermal binding. If they are not included in the scope of GL 95-07, discuss if your licensing basis/technical specifications require that these valves be capable of opening.



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