UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

February 27, 2004

MEMORANDUM TO: Chuck Paulk, Senior Reactor Inspector
Engineering Branch

FROM: Dwight D. Chamberlain, Director /RA/
Division of Reactor Safety

SUBJECT: SPECIAL INSPECTION CHARTER TO EVALUATE THE PALO VERDE, UNIT 2, EXTENDED PERIOD OF REDUCED INVENTORY OPERATION WITH GAS ENTRAINMENT IN THE SHUTDOWN COOLING SYSTEM AND THE PRIMARY TO SECONDARY LEAKAGE, WHICH RESULTED IN THE NEED TO ENTER REDUCED INVENTORY

In response to the extended period of reduced inventory operation with gas entrainment in the shutdown cooling system and the primary to secondary leakage that resulted in the shutdown initiated by the licensee at Palo Verde Nuclear Generating Station on February 19, 2004, a Special Inspection Team is being chartered. You are hereby designated as the Special Inspection Team leader. The Special Inspection Team will consist of you, Lee Ellershaw, John Hanna and Ken Karwoski (NRR). Additional regional and Office of Nuclear Reactor Regulation (NRR) resources are available for consultation as needed.

A. Basis

On February 19, 2004, at 3:45 p.m. MST, Palo Verde Nuclear Generating Station operators observed a small, but distinct, radiation peak on the condenser off-gas radiation monitor and associated control room annunciators. This peak was confirmed by indications on the Nitrogen-16 monitors. This leak rate was later quantified as 0.7 gallons per day (gpd) by chemical analysis. Approximately 1 hour later monitors indicated 10 - 11 gpd. Based on these indications, licensee management decided to shut down the reactor. Approximately 1 hour later, during the process of shutting down, licensed operators noted indications of a 20 gpd leak on the radiation monitors. Operators shut the reactor down without incident. Following the unit shutdown, the licensee entered reduced inventory operation to install nozzle dams in the steam generators. The installation of the nozzle dams in Steam Generator No. 1 was successful, but the installation of the nozzle dams in Steam Generator No. 2 resulted in damage to one of the two redundant seals on one nozzle dam. A second attempt at installing the nozzle dam in Steam Generator No. 2 again resulted in damage to the seal. As a result, the licensee was in reduced inventory for an extended period of time. While in reduced inventory with one shutdown cooling pump running, the licensee vented the system in accordance with procedural requirements. During the first venting evolution, it took several minutes to vent the gas from the system. As a result, the

licensee initiated venting on a 2-hour frequency. Subsequent venting evolutions also resulted in gas venting, but for a much shorter time frame. The license made a decision to exit reduced inventory after the second unsuccessful attempt to install the nozzle dam in Steam Generator No. 2.

This Special Inspection Team was chartered because of the increased risk associated with the extended period in reduced inventory and the unexpected system interactions, which may have caused the gas entrainment in the shutdown cooling system. The potential higher probability of inservice failure for the leaking tube during postulated initiating events and core damage sequences was also considered.

B. Scope

The team is expected to perform fact-finding in order to address the following:

1. Develop a complete sequence of events related to the primary to secondary leak rate and the activities associated with the plant shutdown and the extended period in reduced inventory operations.

2. Review the licensee's response to the entrained gases discovered February 25, 2004, in the operating train of shutdown cooling.

3. Assess the licensee's determination of the cause of gas entrainment in the shutdown cooling system. Evaluate the comprehensiveness of the licensee's determination of the extent of condition and the adequacy of planned or completed corrective actions for the gas entrainment.

4. Evaluate the effectiveness of the tube examination methods used during the manufacturing process. Determine whether the manufacturer missed an opportunity to identify a degraded condition during the fabrication testing.

5. Evaluate the effectiveness of the examination methods used during the current outage as it relates to detecting flaws similar to that in the location of the leak.

6. Review the licensee's evaluation of the cause of the leak for completeness and accuracy. Independently verify key assumptions and facts.

7. Evaluate the licensee's corrective action taken or planned and ensure that they have adequately evaluated and addressed the extent of condition for the tube leakage.

8. Evaluate the adequacy of the licensee's response to the leak (i.e., timeliness of shutdown, appropriate use of all relevant data, procedure usage, etc.).

9. As appropriate and available observe current licensee steam generator examination activities.

10. Review to determine whether there are any generic impact issues related to the cause of the leak. Promptly communicate any potential generic issues to regional management.

11. Evaluate the licensee's response to the degraded hot leg nozzle dams installed in Steam Generator No. 2, including cause of the degradation and corrective actions.

C. Guidance

Inspection Procedure 93812, "Special Inspection," provides additional guidance to be used by the Special Inspection Team. Your duties will be as described in Inspection Procedure 93812. During performance of the Special Inspection, designated team members are separated from their normal duties and report directly to you. The team is to emphasize fact-finding in its review of the circumstances surrounding the event, and it is not the responsibility of the team to examine the regulatory process. Safety concerns identified that are not directly related to the event should be reported to the Region IV office for appropriate action.

The Team will report to the site, conduct an entrance, and begin inspection no later than February 27, 2004. A report documenting the results of the inspection should be issued within 30 days of the completion of the inspection. While the team is on site, you will provide daily status briefings to Region IV management, who will coordinate with NRR to ensure that all other parties are kept informed.

This Charter may be modified should the team develop significant new information that warrants review. Should you have any questions concerning this Charter, contact me at (817) 860-8291.

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