



Palo Verde Nuclear
Generating Station

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U.S. Nuclear Regulatory Commission
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Washington, DC 20555

Reference: Letter from B. S. Mallett (NRC) to G. R. Overbeck (APS) dated April 8, 2005, Subject: Final Significance Determination for a Yellow Finding and Notice of Violation – NRC Special Inspection Report 2004-014 – Palo Verde Nuclear Generating Station

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. STN 50-528, 50-529, and 50-530
Reply to a Notice of Violation; EA-04-221**

In the referenced letter, the NRC documented a violation of 10 CFR Part 50, Appendix B, Criterion III, involving APS' failure to maintain portions of the Palo Verde emergency core cooling system (ECCS) in accordance with the design bases. APS has evaluated the final significance determination and does not contest the violation or dispute the basis for the severity level of the finding.

Pursuant to the provisions of 10 CFR 2.201, APS hereby submits the response to the Notice of Violation (NOV). Enclosure 1 to this letter is a restatement of the NOV and APS' response is provided in Enclosure 2. As directed, APS' response describes: (1) the reason for the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and, (4) the date when full compliance will be achieved.

As noted in the referenced letter, APS previously acknowledged that voided ECCS suction piping was contrary to the original design intent and was an unanalyzed condition. Accordingly, APS conducted an investigation of the condition and concluded that the design requirement to maintain the ECCS suction piping in a filled configuration was not correctly translated to station procedures. The translation error led to the development of operating and testing procedures that did not include requirements for maintaining the Containment ECCS sump suction piping in a filled condition.

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Reply to a Notice of Violation; EA-04-221
Page 2

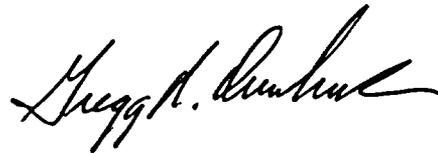
APS' investigation also identified missed opportunities that should have revealed the plant configuration error.

APS is implementing both interim and long-term corrective actions to correct the design control violation and strengthen the corrective action program. While some of the corrective actions remain to be fully implemented, APS is confident that the interim and long-term corrective actions will correct the violation and will be sufficient to maintain compliance with the regulations and prevent recurrence of the condition.

The April 8, 2005 Notice of Violation (NOV) required a reply within 30 days of the NOV. However, in a letter to APS dated May 9, 2005, the NRC approved a request for a 30-day extension to reply to the NOV.

Should you have questions regarding this matter, please contact Craig K. Seaman at (623) 393-5421.

Sincerely,



GRO/RAS/ca

Enclosure 1 Restatement of Notice of Violation
Enclosure 2 Reply to a Notice of Violation; EA-04-221

cc: B. S. Mallett, Regional Administrator, Region IV
G. G. Warnick, Sr. Resident Inspector, PVNGS
M. B. Fields, Project Manager, PVNGS

(all w/attachment)

Enclosure 1
Restatement of Violation

During an NRC inspection completed December 8, 2004, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

10 CFR Part 50, Appendix B, Criterion III, Design Control states, in part, that measures shall be established to assure that the design basis is correctly translated into specifications, procedures, and instructions. The design basis for the Palo Verde Nuclear Generating Station (PVNGS) is specified, in part, in the plant Updated Final Safety Analysis Report (UFSAR). Section 6.3 of the UFSAR, "Emergency Core Cooling System," states, in part, that the safety injection piping will be maintained filled with water, and that during recirculation mode, the available net positive suction head for the containment spray and high pressure safety injection pumps is 25.8 feet and 28.8 feet, respectively (values that assume the pump suction piping is filled with water.)

Contrary to the above, from initial plant licensing until July 2004, the design control measures established by the licensee were not adequate to assure that the design basis for the PVNGS emergency core cooling system (ECCS) was appropriately translated into specifications, procedures, and instructions. The licensee had no specifications, procedures or instructions in place to assure that the design basis for the ECCS system was maintained. Specifically, except for limited periods of time following ECCS leak testing prior to 1992, the licensee failed to maintain portions of the containment sump safety injection recirculation piping filled with water in accordance with the UFSAR, a nonconformance that affected the available net positive suction head for the containment spray and high pressure safety injection pumps as described in the UFSAR. This condition existed at Units 1, 2 and 3 of the PVNGS facility from initial plant operation (1985, 1986 and 1987, respectively) until August 2004, at which time corrective actions were taken to fill the affected piping.

This violation is associated with a Yellow SDP finding.

Enclosure 2
Reply to Notice of Violation; EA-04-221

1. Reason For the Violation

The investigation into the root cause of this violation is ongoing. At this time, the preliminary reasons identified for the violation are a combination of human performance errors and inadequate procedures, as follows:

The design requirement to maintain the piping filled with water was not translated into the ECCS operating and/or testing procedures, for the time period from startup to when Unit 1 first entered Mode 4. This translation error resulted in the development of operating and testing procedures that did not include directions or requirements for filling the Containment ECCS sump suction lines.

Additionally, because of a breakdown in communicating the design requirements, PVNGS technical specifications and UFSAR failed to explicitly identify the requirement to maintain the ECCS suction piping filled for the purpose of protecting the ECCS pumps.

Finally, PVNGS personnel overlooked or did not consider information in the UFSAR, System 80 Interface Requirements, letter CE-19540, the Independent Design Review, and other documents that indicated that the suction lines should be maintained filled and should not contain air.

Other factors that contributed to the violation included:

- The Containment ECCS sump suction lines were incorrectly considered to be self-venting by some Operations and Engineering personnel. The system design did not readily facilitate filling the ECCS sump suction line or maintaining the sump suction line in a filled configuration during operations.

APS' investigation also identified missed opportunities that should have revealed the plant configuration error. Some of these missed opportunities included the following:

- In June 1992, Engineering personnel raised a question regarding the impact of the unfilled piping on the ECCS pumps, but did not formally document the question in the corrective action program or through an Engineering Evaluation Request (EER). Palo Verde procedure, 90AC-0IP04, "Condition Reporting," was inadequate in that it did not specify that the condition reporting process provided a means to request technical clarification and/or evaluation. Similarly, Palo Verde procedure 70AC-0EE02, "Engineering Evaluation Request," was inadequate in that it allowed technical questions or concerns to be resolved by normal work control channels and not be documented in an EER.
- In November 1992, Operations personnel initiated an Instruction Change Request (ICR) that questioned the acceptability of leaving the suction piping unfilled during operation due to a potential for air binding of containment spray pumps. Operations personnel failed to initiate a CRDR to identify and resolve this question. Palo Verde procedure 03GB-0AP01, "Instruction Change Request," was inadequate in that it allowed questions and responses regarding operability to be provided in an ICR.

2. Corrective Steps That Have Been Taken and the Results Achieved

- A. The voided ECCS sump suction piping in all three PVNGS units was filled by August 4, 2004.
- B. In order to ensure the sump suction lines remain in a filled condition while the system is in operation, the following changes have been implemented:
 - Changes have been implemented in Revision 49 of procedure 40OP-9SI02, "Recovery from Shutdown Cooling to Normal Operating Lineup," to fill the ECCS suction lines with borated water prior to returning the system to a mode where it is required to be OPERABLE.

- Procedure 40ST-9SI09, "ECCS Systems Leak Test," has been changed to add a requirement to go to procedure 40OP-9SI02 to fill the ECCS suction line with borated water following the leak test.
 - Modifications have been completed in Units 2 and 3 to return the ECCS sump design configuration to the intended design—ECCS sump dry and the suction lines filled with water. The modifications added additional vent, drain and fill connections on the SI piping to facilitate filling and maintaining the lines in a filled condition. Procedure 40ST-9SI04, "Containment Spray Valve Verification," has been updated to vent the sump suction lines every 31 days in those units.
 - Procedures 73ST-9XI03 and 04, "SI Train A [B] Valves – Inservice Test," have been changed in accordance with 10 CFR 50.55a to revise the periodicity of the valve stroke timing surveillance for the inboard ECCS sump containment isolation valves in Units 2 and 3 from quarterly to every refueling outage so that the filled ECCS sump suction lines will not be drained to the sumps by cycling these valves when the ECCS is required to be operable.
- C. The Safety Injection (SI) Design Basis Manual (DBM) has been revised to document the requirement to fill ECCS sump lines.
- D. In 1992 the CRDR program was only approximately a year old and was still in the process of being anchored and reconciled with other plant processes. In the intervening years the CRDR program has become anchored and conflicts with other processes have been resolved. For example, the Palo Verde Engineering Evaluation Report (EER) process was cancelled in September 1994 and the Instruction Change Request process was superseded in October 1996. Today questions like those raised in 1992 are expected to be documented and evaluated in the corrective action or operability determination programs.

- E. An extent of condition review was completed by evaluating other sections of piping in selected systems to ensure they were filled as needed and to verify flow through the piping was achieved as part of a routine operational evolution or test. This review identified no additional sections of pipe maintained in an unfilled condition except where there was a clear design requirement that they be unfilled. Although four sections of pipe were identified that were not routinely used to flow water, procedures were in place to maintain the piping filled.

Additionally, a review was conducted to determine whether analogous conditions might exist in a portion of the electrical system (i.e., whether there might be a loss of continuity in electrical systems). This review of the electrical circuits confirmed that either the circuits are normally energized or, if not normally energized, are periodically tested.

- F. PVNGS LERs were reviewed to identify those associated with design control. This subset of LERs was initially reviewed to determine if there was a generic weakness in transmitting design requirements into the station's design/operating basis. No weakness was identified. Further review of these LERs is being performed to determine if there was a failure to incorporate design requirements into station procedures.

3. **Corrective Steps That Will Be Taken to Avoid Further Violations**

- A. APS will review the Independent Design Review Board documentation for Auxiliary Feedwater, Containment, and Class 1E AC Power systems to identify any other design requirements that may not have been correctly translated into station operating, maintenance, and test procedures. This review will be completed by June 30, 2005.
- B. In order to determine if other design requirements may have been missed in station procedures, a sample review of selected plant systems is being performed. This review will be completed by July 15, 2005. Any design

requirements that are not clearly maintained in station procedures will be addressed via the PVNGS corrective action program.

- C. The UFSAR description of the ECCS will be revised to explicitly state the ECCS suction piping will be filled with water. This UFSAR change will be completed by August 30, 2005, and included in the subsequent UFSAR update as required by 10 CFR 50.71(e).
- D. The Technical Requirements Manual (TRM) will be revised to include a requirement to periodically verify that the Containment ECCS sump safety injection recirculation piping is full of water. This TRM change will be completed by August 30, 2005.
- E. Operations personnel responsible for evaluating procedure change requests will be briefed on the lessons learned from the ICR 58646 event and instructed to provide adequate documentary evidence to support closure within the Site Work Management System (SWMS). This expectation and lessons learned briefing will be completed by September 1, 2005.
- F. A Unit 1 design modification similar to the modifications completed in Units 2 and 3 will be completed to add additional vent, drain and fill connections on the sections of SI piping between the inboard and outboard containment isolation butterfly valves and between the outboard containment isolation butterfly valve and the downstream check valve. This action will be completed prior to start up from the Unit 1 2005 outage.
- G. After all unit modifications are complete to return each unit to original ECCS sump design, an assessment of the effectiveness of these corrective actions will be performed to confirm that the Containment ECCS sump suction lines are being maintained in a filled condition as operability requirements dictate. This action will be completed by March 3, 2006.

The root cause investigation is ongoing and additional corrective steps to avoid further violations may be identified in the course of this investigation.

4. **Date when Full Compliance Will Be Achieved**

Full compliance was achieved on August 12, 2004, when procedure 40OP-9SI02, "*Recovery from Shutdown Cooling to Normal Operating Lineup*," was revised to include requirements for filling the containment recirculation sump with borated water and for adding demineralized water to the sump for makeup of evaporative losses.