



Palo Verde Nuclear
Generating Station

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102-03949-JML/AKK/DLK
June 2, 1997

U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528/529/530
Reply to Notices of Violation 50-528/529/530/97-09-01,
50-528/529/530/97-09-02, and 50-528/529/530/97-09-03**

Arizona Public Service Company (APS) has reviewed NRC Inspection Report 50-528/529/530/97-09 and the Notices of Violation (NOV) dated May 1, 1997. Pursuant to the provisions of 10 CFR 2.201, APS' response is enclosed. Enclosure 1 to this letter is a restatement of the NOV's. APS' response is provided in Enclosure 2.

The depth of involvement by the PVNGS organization was evident during the response to the spent fuel level decrease event. Operations was able to identify and correct the situation responsively to ensure no safety significant condition existed. This situation was handled as a significant event for PVNGS with an aggressive post-event investigation. We have concluded that design and personnel errors occurred that contributed to the event. Overall, we believe the event was significant and actions beyond the issues noted in the inspection report were developed and are being implemented to ensure the spent fuel pool continues to be designed, operated and maintained in a safe manner.

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Should you have any further questions, please contact Ms. Angela K. Krainik at (602) 393-5421.

Sincerely,

Gregg A. Dunbar
for JML

JML/AKK/DLK/mah

Enclosures

1. Restatement of Notices of Violation
2. Reply to Notices of Violation

cc: E. W. Merschoff
K. E. Perkins
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ENCLOSURE 1

**RESTATEMENT OF NOTICES OF VIOLATION
50-528/529/530/97-09-01, 50-528/529/530/97-09-02, and
50-528/529/530/97-09-03**

**NRC INSPECTION CONDUCTED MARCH 11 THROUGH
APRIL 4, 1997**

INSPECTION REPORT NO. 50-528/529/530/97-09

RESTATEMENT OF NOTICE OF VIOLATION "A" (50-528/529/530/97-09-01)

During an NRC inspection conducted on March 11 through April 4, 1997, three violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

Technical Specification 6.8, "Procedures and Programs," states, in part, "Written procedures shall be established, implemented, and maintained covering the activities referenced below: ... Refueling Operations."

Procedure 31MT-9IA01, "Installation and Removal of Temporary Air/Nitrogen Supply for Fuel Transfer Canal Gate," Revision 2, Step 4.1, states, in part, "Obtain a full nitrogen bottle ... as described in Appendix 'A'" Appendix A describes the nitrogen bottle as 2500 psi, Stock Code No. 27, and that no substitutions are allowed without prior engineering approval. Appendix A refers to Engineering Evaluation Request EER 93-IA-001 dated August 10, 1993, which shows that Stock Code 27 has a 330 cubic foot volume.

Section 3.7 in Procedure 30DP-9MP01, "Conduct of Maintenance," Revision 21, requires work instructions to be documented and statused, including signing off verification steps to show that work has been performed, accepted, and verified.

Step 4.1.14, a verification step in Procedure 31MT-9IA01, is required to be signed-off upon completion of Section 4.1, "Installation of Backup Nitrogen System."

Administrative Control Procedure 40AC-0ZZ06, "Locked Valve, Breaker, and Component Control," Revision 11, provides requirements to assure that components, identified as having locking provisions, are properly controlled and locked. Appendix A to implementing Departmental Procedure 40DP-9OP19, "Locked Valve, Breaker, and Component Tracking," Revision 39, states that the basis or justification for valve PCE-V125 to be locked closed, is to prevent an inadvertent drainage of the fuel transfer canal during refueling.

Preventive Maintenance Program Master instruction PMM09535, "Spent Fuel Pool Gates," and Preventive Maintenance Task 082288, "Spent Fuel Pool Gates," Revision 0, (in effect through December 1994) require the replacement of spent fuel pool/cask loading pit gate seals every 4 years.

Contrary to the above, the following are examples in which these procedural requirements were not met:

1. On February 23, 1997, a refueling and mechanical services team leader failed to comply with Procedure 31MT-9IA01 requirements by installing, without obtaining prior engineering approval, a substitute nitrogen cylinder that differed from that specified. This resulted in an unreviewed, undocumented, and unapproved condition different from what was evaluated and specified in Procedure 31MT-9IA01 and Engineering Evaluation Request EER 93-IA-001.
2. On March 4, 1997, operations personnel isolated the instrument air system from the fuel transfer canal gate seal and placed the backup nitrogen cylinder in service, without documenting or statusing the work, or without signing off verification Step 4.1.14 in Procedure 31MT-9IA01 to show that the work had been performed and accepted. This oversight resulted in a loss of configuration control of the pressurization supply for the Unit 3 spent fuel pool transfer canal gate seal and was a contributing cause to the subsequent inadvertent partial drain down of the spent fuel pool.
3. While refueling operations were in progress on March 13, 1997, the inspectors observed fuel canal drain isolation to Cleanup Header Valve PCE-V125 in a closed but unlocked position. In addition, the valve was incorrectly statused as "open" in the record book. Operator logs showed that valve PCE-V125 remained unlocked for a total time of 19 days between February 22 and March 13, 1997.
4. The gate seals were not replaced every 4 years. None of the Unit 3 gate seals have ever been replaced, and the Unit 1 decontamination pit gate seal has never been replaced. With the exception of the Unit 1 fuel transfer canal gate seal, all other gate seals were replaced at a frequency that exceeded 4 years.

These examples constitute a Severity Level IV violation (Supplement 1) (50-528;-529;-530/9709-01).

RESTATEMENT OF NOTICE OF VIOLATION "B" (50-528/529/530/97-09-02)

Criterion III of Appendix B to 10 CFR Part 50 requires, in part, that measures shall be established to assure that the design basis for safety-related structures, systems, and components is correctly translated into procedures and instructions. Measures shall also be established for the selection and review for suitability of application of parts or equipment that are essential to the safety-related function of the structures, systems, or components.

Contrary to the above, measures were inadequate to assure that the design bases of the gate seals (classified as safety-related components) were translated into applicable

procedures and instructions, and no provisions were established to assure that their safety-related function would not be lost. Measures did not assure selection and review for suitability of application of parts or equipment that were essential to the safety-related function of the gate seals, in that, the gate seal air supply sources, (instrument air system, plant service gas (nitrogen) system, temporary nitrogen cylinders) and connecting hardware were non-safety-related.

This is a Severity Level IV violation (Supplement 1) (50-528;-529;-530/9709-02).

RESTATEMENT OF NOTICE OF VIOLATION "C" (50-528/529/530/97-09-03)

Criterion V of Appendix B to 10 CFR Part 50 states in part, "Activities affecting quality shall be prescribed by documented instructions, procedures ... and shall be accomplished in accordance with these instructions, procedures Instructions, procedures ... shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

Procedure 78MT-9ZF01, "Removal and Installation of Spent Fuel Pool Gates," Revision 4, addresses removal, inspection, replacement, and installation of the spent fuel pool gates seals.

Contrary to the above, Procedure 78MT-9ZF01 did not include appropriate qualitative acceptance criteria for determining under what conditions the spent fuel pool gates should be replaced. The procedure failed to prescribe a specific inspection technique or method, inspection conditions (i.e., lighting, visual aids, and scope or area of seal to be inspected), or the training/qualifications of the personnel who perform the inspection.

This is a Severity Level IV violation (Supplement 1) (50-528;-529;-530/9709-03).

ENCLOSURE 2

**REPLY TO NOTICES OF VIOLATION 50-528/529/530/97-09-01,
50-528/529/530/97-09-02, and 50-528/529/530/97-09-03**

NRC INSPECTION CONDUCTED MARCH 11 THROUGH

APRIL 4, 1997

INSPECTION REPORT NO. 50-528/529/530/97-09

REPLY TO NOTICE OF VIOLATION "A" (50-528/529/530/97-09-01)

Reason For The Violation

On March 4, 1997, Unit 3 experienced a loss of spent fuel pool inventory while in Mode 6. The subsequent APS significant investigation and NRC inspection (97-09) identified four examples of failing to follow procedure: (1) Substituting a different size nitrogen (N₂) cylinder without an adequate engineering evaluation, (2) Performing work steps without signing the steps off in the working copy of the procedure, (3) Returning a valve to the closed position without properly re-locking or statusing the position of the valve, and (4) Waiving or canceling periodic replacement of the spent fuel pool gate seals without proper documented justification. The examples listed above contributed to the cause or increased the significance of the event. The spent fuel pool transfer canal gate seal is serviced by Instrument Air (IA). Prior to removing the blind flange located between the transfer tube and the transfer canal, a temporary N₂ backup system is required to be installed. The procedure that installs the temporary system requires the use of a specific size cylinder of ultra pure N₂. A N₂ cylinder that complied with the procedural specifications was not available. The maintenance team leader in charge of installing the temporary N₂ cylinder authorized the installation of a substitute cylinder without an adequate engineering evaluation. Substituting the N₂ cylinder without an adequate engineering evaluation was a procedural deviation and violation of Technical Specification 6.8.1. The reason for the violation was cognitive personnel error on the part of the maintenance team leader.

The procedure used to install and operate the temporary N₂ cylinder is a maintenance procedure, controlled by the maintenance organization. Administrative controls on maintenance procedures require procedure steps to be signed off as they are performed. When the temporary N₂ cylinder was needed, the Work Control Senior Reactor Operator (SRO) directed operations personnel to place the temporary N₂ cylinder in service - maintenance personnel were not notified. The administrative controls for operating procedures differ from maintenance procedures in that procedure step sign-offs are not always required and reference procedures used are not always retained. The operators who placed the temporary cylinder in service, used a reference procedure and discarded the procedure when the task was complete. No record of the task was documented. Performing steps in a maintenance procedure without documenting the activity is a procedural deviation and a violation of Technical Specification 6.8.1. The reason for the violation was the Work Control SRO directed operations personnel to perform a maintenance task without informing the maintenance organization or informing the operators about the administrative controls governing the task.

The above two examples of failing to follow procedures directly contributed to the cause of the loss of spent fuel pool inventory, while the following two examples indirectly contributed to the significance of the event.

Subsequent to the loss of inventory in the spent fuel pool, a fuel canal drain isolation valve (PCE-V125) was found in a closed but unlocked condition. PCE-V125 is controlled by the station's locked valve and breaker program as a locked closed valve. The reason the valve is controlled as a locked closed valve is to prevent inadvertent draining of the transfer canal during refueling. Valves controlled by the locked valve and breaker program have administrative controls placed on them that include additional review requirements. Based on interviews with operations personnel, enforcement and oversight of the administrative controls on locked valves and breakers had been less rigorous when the plant is in Modes 5, 6 or defueled than when the plant is in Modes 1 through 4. Relaxation of the administrative controls is a procedural deviation and a violation of Technical Specification 6.8.1. The reason for the violation is lack of operational rigor and attention to detail by operations personnel.

The spent fuel pool gates are equipped with inflatable seals. Prior to 1994, the preventive maintenance (PM) requirements on the seals included periodic replacement in accordance with the preventive maintenance program. In 1991, an Engineering Evaluation Request (EER) concluded that periodic seal replacement was not required because engineering had determined the seals had a qualified service life of 40 years. The EER was not formally factored into the PM Basis. However, the PM tasks for replacing the seals at the periodic frequency were waived or canceled. In 1994, the PM basis was revised. Because of the 40 year service life, seal replacement requirements were changed from a periodic interval to an "inspect and replace as needed" criteria. No documentation could be found that justified or authorized the waivers or

cancellations of the PM tasks prior to 1994. Failure to properly document the justification and approval to waive or cancel the PM tasks was a procedural deviation and a violation of Technical Specification 6.8.1. The reason for the violation was personnel error on the part of maintenance personnel responsible for planning and scheduling preventive maintenance.

Corrective Steps That Have Been Taken and Results Achieved

On March 27, 1997, personnel performance issues related to the installation of the substitute N₂ cylinder were addressed with the responsible team leader in accordance with APS human resource policies.

On March 13, 1997, a night order was issued to clarify management expectations regarding operator performance of maintenance procedures. The night order included a discussion on the need to document actions when components are manipulated.

On March 13, 1997 the fuel canal drain valve PCE-V125 was locked in the closed position and properly statused.

The preventive maintenance program currently being used at Palo Verde includes control measures that did not exist prior to 1994. PM tasks are now "owned" and controlled by teams, whereas prior to 1994, PM tasks were controlled by different

organizations during the scheduling and implementation of the task. Additionally, waived or canceled PMs are currently subjected to a periodic management review to verify the action was justified. Because steps have already been taken to address this type of procedural deviation, no additional corrective action is needed.

Corrective Steps That Will Be Taken To Avoid Further Violations

Actions taken to date sufficiently address the procedure deviations associated with installing the substitute N₂ cylinder and failing to properly document the justification and approval for waiving or canceling PM tasks prior to 1994.

Management expectations regarding operator performance of maintenance procedures and proper documentation of component manipulations will be reinforced during industry events training for operators. The industry event training is expected to be completed by November 1, 1997.

Training will be provided to the Control Room Supervisors (CRS), and Shift Supervisors to reinforce the Mode change checklist and CRS shift turnover review requirements associated with valves and breakers in the locked valve and breaker program. This training is expected to be completed by November 1, 1997.

Date When Full Compliance Will Be Achieved

Full compliance was achieved in increments:

Compliance with the PM task requirement to replace the spent fuel pool gate seals was achieved in 1994 when requirement was changed from a periodic replacement criteria to an "inspect and replace as needed" criteria.

On March 6, 1997, IA was restored to the transfer canal gate seal which eliminated the need for the temporary N₂ cylinder and restored IA to a normal system line-up.

On March 13, 1997, PCE-V125 was locked in the closed position and properly statused.

REPLY TO NOTICE OF VIOLATION "B" (50-528/529/530/97-09-02)

Reason For The Violation

The "as-built" instrument air system (IA) is classified as a non-safety related system. IA interfaces directly with the safety related spent fuel pool transfer canal gate at the inflatable seal without an isolation barrier. This design deficiency was introduced in 1982 (prior to initial licensing) when Architect/Engineering (A/E) field personnel recognized the fuel transfer canal gate seal design did not provide a means to maintain or monitor gate seal pressure and issued a Field Change Request (FCR) to connect the IA system to the gate seals. Since the FCR was minor in scope and was initiated by an on-site resident engineer, the technical review was performed by on-site A/E personnel. A formal technical review by the A/E's off-site design engineering group was not performed. Based on discussions with former A/E personnel, on-site engineering reviews were based on engineering experience and good engineering judgement, formal review checklists or 10 CFR 50.59 screenings/evaluations were not used. The on-site technical reviewer did not recognize the need to provide an isolation barrier between the non-safety related IA system and the safety related transfer canal gate seal. The reason for the violation was inadequate technical review by the A/E.

When the FCR discussed above was implemented, changes to the applicable vendor drawing were made. However, the changes or details specifically noting the quality classification break were not identified on the "key" drawings. This oversight was the

primary contributing factor to APS engineering's failure to recognize and correct the design deficiency.

Corrective Steps That Have Been Taken and Results Achieved

Prior to the last Unit 3 refueling outage, a plant modification was installed that eliminated the safety function of the spent fuel pool gate seals by welding closed the washdown pit gate. (The modifications were installed in Units 1 and 2 prior to their last refueling outage.) Engineering personnel have reviewed the design basis of the spent fuel pool gates seals, and have concluded that, based on the recently performed plant modification and current administrative controls on the fuel transfer tube isolation valve (PC-V-118), the gate seals could be re-classified as non-quality related (NQR). Re-classification of the spent fuel pool gate seals will be completed prior to the next refueling outage (2R7) in accordance with Palo Verde's design modification program. As part of the design modification process, the appropriate configuration management documents will be revised to reflect the spent fuel pool gate seals as NQR.

Corrective Steps That Will Be Taken To Avoid Further Violations

Based on the plant modification process currently being used at Palo Verde (i.e. the use of detailed checklists, thorough 10 CFR 50.59 screenings and evaluations, and extensive independent verification), the error that occurred in 1982 is not likely to recur today. No further action is planned.

Date When Full Compliance Will Be Achieved

Full compliance will be achieved by September 6, 1997 (2R7), when the Palo Verde configuration management documents are revised to reflect spent fuel pool gate seal classification as NQR.

REPLY TO NOTICE OF VIOLATION "C" (50-528/529/530/97-09-03)

Reason For The Violation

Preventive maintenance is performed on the spent fuel pool gate seals to ensure the seals are capable of performing their intended function. The applicable procedure contains a step to visually inspect the seal for damage after the spent fuel pool gate is removed. If mechanical damage is identified, a work request is written to replace the seal. The applicable procedure however, does not include detailed acceptance criteria or specific inspection guidance.

Prior to 1994, the applicable preventive maintenance tasks required periodic replacement of the seals. In 1994, the tasks were revised to incorporate system engineering recommendations to eliminate the periodic replacement interval based on engineering evaluations that concluded the qualified service life of the seal was greater than 40 years (the life of the plant). The procedure and tasks which prescribe seal inspections had not been revised to include additional acceptance criteria or inspection guidance to detect seal degradation. The purpose and intent of the inspection is to identify mechanical damage to the seal during movement of the spent fuel pool gate. The spent fuel pool gate seals are expected to perform satisfactorily in the plant for more than forty years. Age related degradation is not a major consideration when determining the need to replace the seals.

No special training or qualification requirements were imposed on team members responsible for performing the inspections; however, based on interviews, the seal inspections were being conducted in a consistent manner. The visual inspections were performed at a distance of approximately 24 inches from the seal to identify any obvious damage, including any nicks, cuts, abrasions, or folds. When the gates were reinstalled, seal integrity was visually checked by looking for air/gas bubbles in the vicinity of the seal and performing a pressure decay check.

While the procedure lacks the inspection specificity necessary to satisfy a conservative interpretation of 10 CFR 50 Appendix "B," Criterion V requirements, the current procedural guidance and inspections performed to date have been effective in detecting seal damage.

The reason for the violation is a differing interpretation on the level of detail needed in procedures to satisfy 10 CFR 50 Appendix "B," Criterion V requirements.

Corrective Steps That Have Been Taken and Results Achieved

An investigation was performed to evaluate the adequacy of the applicable procedure. As discussed above, specific inspection guidance was not included in the procedure, however, the seals were being visually inspected in a consistent manner. Additionally, post installation checks were being performed. When seal damage was identified, work

requests were written and the damaged seals were replaced. Based on the most recent visual inspections and satisfactory post installation checks, the investigation has concluded that currently installed seals are capable of performing their intended function.

Corrective Steps That Will Be Taken To Avoid Further Violations

The applicable procedure will be revised to include the additional inspection criteria and guidance necessary to identify degradation during the life of the seal. The procedure will be revised prior to September 6, 1997 (2R7).

To assure continued successful seal inspections, new members assigned to the refueling team will be provided training on spent fuel pool gate seal inspections during orientation. The training will be developed prior to September 6, 1997 (2R7).

Date When Full Compliance Will Be Achieved

Full compliance will be achieved by September 6, 1997, when the applicable procedure is revised.