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SUBJECT: Responds to NRC 910219 ltr re violations noted in Insp Rept  
 50-528/90-54 on 901202-910105. Corrective actions: Quality  
 Deficiency Rept (QDR 90-0485) issued to document deficiency  
 in Operating Procedure 41OP-1CH02. Procedure revised.

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WILLIAM F. CONWAY  
EXECUTIVE VICE PRESIDENT  
NUCLEAR

102-01998-WFC/TRB/JJN  
March 28, 1991

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Mail Station: Pl-37  
Washington, DC 20555

- Reference: A) Letter from R. P. Zimmerman, Director Division of Reactor Safety and Projects, NRC to W. F. Conway, Executive Vice President Nuclear, Arizona Public Service, dated February 19, 1991
- B) Letter from W. F. Conway, Executive Vice President Nuclear, Arizona Public Service, to J. B. Martin, Regional Administrator, NRC, dated March 21, 1991

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Unit 1, 2, and 3  
Docket No. STN 50-528 (License No. NPF-41)  
Docket No. STN 50-529 (License No. NPF-51)  
Docket No. STN 50-530 (License No. NPF-74)  
Reply to Notice of Violation 50-528/90-54-03  
File: 91-070-026

This letter is provided in response to the inspection conducted by Messrs. D. Coe, J. Ringwald, and J. Sloan from December 2, 1990 through January 5, 1991. Based upon the results of the inspection, one apparent violation of NRC requirements was identified. A restatement of the violation and APS's response are provided in Appendix A and Attachment 1, respectively, to this letter. An extension to the reply to the subject violation was requested and approved as documented in reference (B).

In response to your request in the cover letter of reference (A), Attachment 2 provides additional information and corrective action regarding the event cited in the Notice of Violation.

Should you have any questions regarding this response, please contact me.

Very truly yours,

*James M. Levine for WFC*

WFC/TRB/JJN

Attachments

cc: J. B. Martin  
D. H. Coe  
A. H. Gutterman  
A. C. Gehr

APPENDIX A

NOTICE OF VIOLATION

Arizona Public Service Company  
Palo Verde Unit 1

Docket Number 50-528  
License Number NPF-41

During an NRC inspection conducted on December 2, 1990-January 5, 1991, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1990), the violation is listed below:

10 CFR Part 50, Appendix B, Criterion V, states in part that activities affecting quality shall be prescribed by documented instructions or procedures of a type appropriate to the circumstances.

Contrary to the above, on December 6, 1990, licensee procedure 41OP-1CH02, "Purification System," was not appropriate to the circumstances in that the procedure did not provide adequate instructions to preclude an inadvertent dilution of the reactor coolant system boron concentration, which resulted in the reactor exceeding 101% power during a period of about 14 to 26 minutes.

This is a Severity Level IV violation applicable to Unit 1 (Supplement I).

ATTACHMENT 1

REPLY TO NOTICE OF VIOLATION 50-528/90-54-03

I. REASON FOR THE VIOLATION

The reason for the violation was the incorporation of data into an operating procedure from undocumented and informal communications between the operations procedure writers and chemistry technical personnel. The operations procedure writers revised the procedure "Purification System", 41OP-1CH02 to provide guidance for placing a new purification ion exchanger bed in service. The guidance included a requirement for flushing the ion exchanger bed which was based on conversations with chemistry technical personnel. These conversations were not documented nor was there any follow-up written basis. Additionally, the basis for the flush of the ion exchanger was miscommunicated. The chemistry technical personnel believed that the flush was required to re-establish equilibrium to an ion exchanger bed that had been previously borated and subsequently isolated. However, the operations procedure writers were concerned with placing a new bed (unborated) of resin in service. As a result, the time to flush the ion exchanger bed and reach equilibrium was underestimated.

Contributing to the issuance of a deficient procedure was the insufficient cross disciplinary review. The proposed revision was sent to the Chemistry technical department for review. This review did not identify the deficiency in the procedure. The initial assumption that the basis for the flush was to re-establish equilibrium in part contributed to the insufficient review.

II. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

As immediate corrective action, on December 6, 1990, reactor operators isolated the ion exchanger, initiated boration, and inserted CEAs to reduce reactor power to 100 percent power. An investigation into the event was initiated in accordance with plant procedures.

A Quality Deficiency Report (QDR 90-0485) was issued to document the deficiency in the operating procedure "Purification System" (41OP-1CH02). On December 26, 1990, 41OP-1CH02 was revised to include additional controls for placing ion exchangers into service. The procedure requires the flushing of the ion exchanger until the boron concentration is within 20 ppm of the RCS boron concentration. The ion exchanger is then placed in service with throttled flow until reactivity effects have stabilized. On January 3, 1991, the Unit 2 and 3 operating procedures were also revised.

A briefing was conducted with the chemistry technical personnel regarding this event and the lessons learned. The briefing specifically addressed formal documentation of the technical basis for qualitative and quantitative information in new and revised procedures and the importance of complete and accurate cross disciplinary reviews.

### III. CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID VIOLATIONS

APS will revise the administrative controls for procedure development, review, and approval to require:

- 1) An Engineering Evaluation Request when technical information from other departments is requested, and
- 2) That the cross disciplinary review sheet specify the scope of the change and state the reason for the cross disciplinary review. This will focus the reviewer's attention on the changes applicable to the reviewer's area of expertise.

Expected Completion Date: June 15, 1991

IV. DATE WHEN FULL COMPLIANCE WAS ACHIEVED

Full compliance was achieved on January 3, 1991, when the three unit operating procedures for the purification system were effective.



ATTACHMENT 2

As requested in the referenced letter, APS provides the following response to paragraph 6, items a. through d.

I. Inspection Report page 12:

- a. "There was inadequate technical basis for the 20 minutes specified in the procedure for the flush of the ion exchanger and an informal process was used to communicate the criteria in the development of the procedure."

Response:

APS concurs that the communication process was informal which led to the miscommunication, insufficient cross disciplinary review, and deficient procedure. As discussed in Attachment 1, the administrative controls for procedure development, review, and approval will be revised to formalize the communication process.

II. Inspection Report page 12:

- b. "Operations' initial concern with the adequacy of the time specified in the procedure for boron saturation of the ion exchanger prior to being placed in service was not pursued to conclusion. Operations discussion with chemistry personnel were not adequate to resolve the concern."

APS Response:

APS believes that the Unit 1 Shift Supervisor (SS) adequately resolved the concern with the chemistry personnel. Prior to placing the new ion exchanger in service, the Control Room Staff identified the potential for positive reactivity addition which could occur when placing the ion exchanger in service. The recently revised operating procedure required a twenty minute flush of the ion exchanger (in order to increase the ion exchanger boron concentration) prior to placing it in service. The SS contacted unit chemistry personnel regarding the potential for diluting the RCS. The discussions with chemistry personnel confirmed the potential for incomplete boron saturation after twenty minutes of flushing. Based on this uncertainty, the SS discussed the concern with the Control Room Staff and developed an action plan to address the potential for dilution. The SS contacted the Operations Supervisor to discuss the concerns and proposed plan of action.

The action plan was formalized into a special variance to the operations procedure for placing the ion exchanger in service. This variance was written to allow greater control of the evolution by opening the outlet

valve on the ion exchanger (CHN-D01A) only two turns and leaving the original ion exchanger (CHN-D02) in service. A pre-evolution briefing was held with control room personnel to discuss placing the CHN-D01A ion exchanger in service. The operating parameters to be maintained were established and contingency plans discussed to control any unexpected occurrences.

In summary, the SS was aware of the potential for diluting the RCS boron concentration, but after discussions with chemistry personnel and operations management the SS concluded that the administrative controls discussed above and the briefings conducted with the operations staff would provide adequate control of the evolution. Subsequent to the event, however, APS has determined that tighter administrative controls on actions to respond to temperature changes and pre-determined conditions to abort the special activity should have been utilized. In this regard, the shift supervisor has been counselled regarding tighter controls for plant evolutions, that briefings should include pre-determined conditions to halt the evolution, and that if uncertain about an evolution do not proceed until the uncertainty is resolved. Additionally, Unit 1, 2, and 3 operators were briefed on this event.

III. Inspection Report page 13:

- c. "The decision to concurrently perform high rate blowdowns of the steam generators also raised reactor power in addition to the dilution and caused the Core Operating Limits Supervisory System master alarm to annunciate. The operators expected the alarm due to the high rate blowdowns and therefore the alarm did not alert the operators to the dilution event."

APS Response:

It is not uncommon for several evolutions that could affect reactivity to occur at the same time during normal plant operations. The evolutions in progress at the time of this event were not unusual and were within the capability of the operators to perform safely.

Prior to performing the high rate SG blowdowns, the SS evaluated the progress of the evolution to place the ion exchanger in service. Based on the plant response and the control room staff's confidence that the evolution could be performed safely, permission was given to proceed with the high rate SG blowdowns. Three of four two-minute high rate blowdowns were performed. The high rate blowdowns caused a slight decrease in RCS temperature which resulted in increased power and the COLSS Master Alarm was received, as expected.

The operators were sensitive to the alarm and responded to the plant

conditions as evidenced by the fact that shortly after completing the third high rate blowdown, the operators decided to delay the last two-minute blowdown until RCS temperature stabilized. As established in the briefing for placing CHN-D01A ion exchanger in service, the CHN-D01A ion exchanger was bypassed and boration initiated to reduce the RCS temperature. Due to the time lag from boron injection until any measurable effect above nominal instrumentation variance, the operator monitored plant indications to determine if further remedial actions were necessary. A variable over power pre-trip (VOPT) alarm was received on channel "B" of the PPS. The pre-trip alarm alerted the operator that additional action was required. The primary operator immediately attempted to insert CEAs with the Control Element Drive Mechanism Control System (CEDMCS) in the manual sequence mode; however, the CEAs did not insert in manual sequential. Within 30 seconds of the initial attempt to insert CEAs, manual group mode of CEDMCS was selected and the CEAs were inserted. The VOPT cleared, reactor power was returned to 100 percent, and the COLSS master alarm cleared.

Regardless of the above however, APS recognizes that this event could have been avoided had the SS prescribed tighter controls on the evolution. As discussed above, the SS has been counselled regarding tighter controls for plant evolutions and that briefings should include pre-determined conditions to halt the evolution. Unit 1, 2, and 3 operators were briefed on this event.

IV. Inspection Report page 13:

- b. "Computer technicians failed to communicate to the operators the inability of the control element assemblies to move in sequential control mode which further complicated operator response to the event."

APS Response:

As a point of clarification, at the time of the event, the computer technicians troubleshooting the cause of a strip chart recorder malfunction did not know the effect of the malfunction on the ability to move the control rods in auto sequential.

There were several reasons that the effect of the strip chart recorder malfunction on the ability to move the control rods in auto sequential was not fully understood. The initial indications of the malfunction did not suggest that the problem extended beyond the strip chart recorders. The day after the malfunction was identified, troubleshooting determined that a relay had de-energized power to sections of Process Interface Unit (PIU) box 7 of Plant Computer. To correct the malfunction, the technicians recommended cycling the power to the PIU off and on and then down loading the software to the PIU.

Due to ongoing plant activities, the cycling of the power was postponed.

At this point, the operators should have reassessed the malfunction impact on the plant conditions. This did not occur because the operators were unaware that the plant computer could affect the plant control (e.g., control rod insertion). Secondly, the technicians did not pursue evaluating the impact on the plant since they believed that the problem was going to be resolved in the near future by cycling the power off and on and then down loading the software to the PIU.

This aspect of the event revealed the need for additional actions. Following the event, operations personnel and computer technicians were briefed on this event. Operator training on the interface between PMS and CEDMCS is under development and will be incorporated into licensed operator initial and continuing training. Additionally, briefings will be conducted with computer technicians regarding the necessity to communicate/investigate the impact of equipment malfunction/failure on plant operations during initial evaluation and subsequent troubleshooting. These briefings will be conducted by April 1, 1991. Finally, the procedure for the plant computer "PMS User's Manual" (720P-9RJ03) will be revised to include a note that a loss of control board chart drive may signify a loss of sequential CEA control. The computer technician will notify operations personnel when it is determined that the sequential control of CEAs is affected. The procedure revision is expected to be completed by May 1, 1991.