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10 CFR 50.73

Palo Verde Nuclear
Generating Station

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102-06222-DCM/RAB/DFH
July 21, 2010

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs:


**Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528, 50-529 and 50-530
License No. NPF 41, NPF 51 and NPF 74
Licensee Event Report 2007-005-01**

Attached, please find Licensee Event Report (LER) 50-528/2007-005-01, which supplements a previously reported condition prohibited by Technical Specifications due to an inadequate procedure for Surveillance Testing. This supplement is being submitted to report the results of the root cause analysis.

In accordance with 10 CFR 50.4, copies of this LER supplement are being forwarded to the NRC Regional Office, NRC Region IV and the Senior Resident Inspector. If you have questions regarding this submittal, please contact Ray Buzard, Section Leader, Regulatory Affairs, at (623) 393-5317.

Arizona Public Service Company makes no commitments in this letter.

Sincerely,



FOR D.C. MIMS

DCM/TNW/DFH/gat

Attachment

cc: E. E. Collins Jr. NRC Region IV Regional Administrator
J. R. Hall NRC NRR Senior Project Manager - (send electronic and paper)
L. K. Gibson NRC NRR Project Manager
R. I. Treadway NRC Senior Resident Inspector for PVNGS

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(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Palo Verde Nuclear Generating Station (PVNGS) Unit 1						2. DOCKET NUMBER 05000528			3. PAGE 1 OF 7					
4. TITLE Inadequate Surveillance Test Procedure Resulted in Failure to Meet Surveillance Requirement														
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME		DOCKET NUMBER			
08	21	2007	2007	- 005 -	01	07	21	2010	PVNGS Unit 2		05000529			
									FACILITY NAME		DOCKET NUMBER			
									PVNGS Unit 3		05000530			
9. OPERATING MODE 1 / 1 / 1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFRs: (Check all that apply)											
10. POWER LEVEL 100 / 100 / 100			<input type="checkbox"/> 20.2201(b)			<input type="checkbox"/> 20.2203(a)(3)(i)			<input type="checkbox"/> 50.73(a)(2)(i)(C)			<input type="checkbox"/> 50.73(a)(2)(vii)		
			<input type="checkbox"/> 20.2201(d)			<input type="checkbox"/> 20.2203(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(ii)(A)			<input type="checkbox"/> 50.73(a)(2)(viii)(A)		
			<input type="checkbox"/> 20.2203(a)(1)			<input type="checkbox"/> 20.2203(a)(4)			<input type="checkbox"/> 50.73(a)(2)(ii)(B)			<input type="checkbox"/> 50.73(a)(2)(viii)(B)		
			<input type="checkbox"/> 20.2203(a)(2)(i)			<input type="checkbox"/> 50.36(c)(1)(i)(A)			<input type="checkbox"/> 50.73(a)(2)(iii)			<input type="checkbox"/> 50.73(a)(2)(ix)(A)		
			<input type="checkbox"/> 20.2203(a)(2)(ii)			<input type="checkbox"/> 50.36(c)(1)(ii)(A)			<input type="checkbox"/> 50.73(a)(2)(iv)(A)			<input type="checkbox"/> 50.73(a)(2)(x)		
			<input type="checkbox"/> 20.2203(a)(2)(iii)			<input type="checkbox"/> 50.36(c)(2)			<input type="checkbox"/> 50.73(a)(2)(v)(A)			<input type="checkbox"/> 73.71(a)(4)		
<input type="checkbox"/> 20.2203(a)(2)(iv)			<input type="checkbox"/> 50.46(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(v)(B)			<input type="checkbox"/> 73.71(a)(5)					
<input type="checkbox"/> 20.2203(a)(2)(v)			<input type="checkbox"/> 50.73(a)(2)(i)(A)			<input type="checkbox"/> 50.73(a)(2)(v)(C)			<input type="checkbox"/> OTHER					
<input type="checkbox"/> 20.2203(a)(2)(vi)			<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)			<input type="checkbox"/> 50.73(a)(2)(v)(D)			Specify in Abstract below or in NRC Form 366A					
12. LICENSEE CONTACT FOR THIS LER														
FACILITY NAME Ray Buzard, Section Leader, Regulatory Affairs									TELEPHONE NUMBER (Include Area Code) 623-393-5317					
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT														
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX					
14. SUPPLEMENTAL REPORT EXPECTED						15. EXPECTED SUBMISSION DATE			MONTH	DAY	YEAR			
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)						<input checked="" type="checkbox"/> NO								
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)														
<p>On August 21, 2007, with Palo Verde Units 1, 2 and 3 in Operating Mode 1 (Power Operations), at approximately 100 percent rated thermal power; during performance of a Component Design Basis Review of the Auxiliary Feedwater (AF) System, station personnel determined that the existing Surveillance Test Procedures (STP) did not verify that Technical Specification (TS) Surveillance Requirement (SR) 3.3.5.4 was met for certain AF valves. TS SR 3.3.5.4 requires that the Engineered Safety Feature response time be verified every 18 months. The existing STPs did not include the response times of certain valve actuation relays and did not account for full valve stroke time.</p> <p>Subsequent investigation for extent of condition identified similar issues with response time testing STPs for the Main Steam Isolation Valves (MSIV), the Feedwater Isolation Valves (FWIV) and the steam admission valves to the AF System turbine driven pump. All affected valves were assessed and, when the expected additional time associated with all relay actuations and the full valve stroke were accounted for, the total response time did not exceed the TS SR limits for any of the valves. Control Room personnel entered TS SR 3.0.3 to allow a delay in the requirement for declaring the LCO not met.</p> <p>The cause of this event was inadequate oversight of TS required testing where testing requirements are satisfied by sequential or overlapping STPs. STPs have been revised to test the actuation and buffer relays for the affected valves. A review of TS SRs that are met through the performance of more than one test has been conducted to ensure that the TS SRs were met.</p> <p>There have been two previously reported conditions within the last three years where existing STPs did not verify that existing TS SRs were met.</p>														

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17. NARRATIVE

Note: All times listed in this event report are approximate and Mountain Standard Time (MST) unless otherwise indicated.

1. REPORTING REQUIREMENT(S):

This LER (50-528/2007-005-01) is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) to report operation in a condition prohibited by Technical Specifications (TS). Specifically, TS Surveillance Requirement (SR) 3.3.5.4 requires verification every 18 months that Engineered Safety Features (ESF) response times are within limits. Contrary to this requirement, the existing surveillance test procedures (STP) did not verify that the TS SR for response time testing was met for certain Auxiliary Feedwater (AF) System valves (EIS Code: BA), the Main Steam Isolation Valves (MSIV) (EIS Code: SB), the Feedwater Isolation Valves (FWIV) (EIS Code: SJ), and the AF pump steam admission valves.

2. DESCRIPTION OF STRUCTURE(S), SYSTEM(S) AND COMPONENT(S):

Equipment Description:

Valves identified within the scope of this condition are as follows:

- Eight AF System flow regulating and isolation valves for all three units: AFAHV0032, AFCHV0033, AFCUV0036, AFAUV0037, AFBHV0030, AFBHV0031, AFBUV0034, and AFBUV0035
- Four MSIVs for all three units: SGEUV0170, SGEUV0171, SGEUV0180, and SGEUV0181
- Four FWIVs for all three units: SGBUV0132, SGBUV0137, SGAUV0174, and SGAUV0177
- Four AF pump steam admission valves for all three units: SGAUV134, SGAUV138, SGAUV134A, and SGAUV138A

The AF regulating and isolation valves provide water to the Steam Generators (SG) upon receipt of an Auxiliary Feedwater Actuation System (AFAS) signal, and serve to isolate the AF system upon receipt of a SG differential pressure signal indicative of a ruptured SG. The AF valves also automatically cycle open and closed based on SG water levels after AFAS is initiated.

The AF system steam admission valves supply steam to the turbine driven AF pump, which supplies feedwater to the SG.

The AF system provides an independent means of supplying feedwater to the SG during normal shutdown, startup, and emergency or accident conditions. The AF system functions to maintain water inventory for reactor decay heat removal during those phases of plant operation when the Main FW system is unavailable.

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The control circuitry for the AF valves and the steam admission valves uses relays AX and AY to control automatic valve operation (open and closed) during events that require an auxiliary feedwater actuation.

The MSIVs isolate the Main Steam (MS) System (EIS Code: SB) upon receipt of an actuation signal in response to a High Energy Line Break (HELB) inside containment, a MS line break, a SG tube rupture, or a feedwater line break.

The FWIVs isolate the Feedwater (FW) System (EIS Code: SJ) upon receipt of an actuation signal in response to a HELB inside containment, a MS line break, a SG tube rupture, or a feedwater line break.

The control circuitry for the MSIVs and the FWIVs uses an isolation relay, commonly referred to as a buffer relay, to provide isolation from transient noise which could otherwise cause a spurious actuation.

3. INITIAL PLANT CONDITIONS:

On August 21, 2007, Palo Verde Units 1, 2 and 3 were in Operating Mode 1 (Power Operations), at approximately 100 percent power. No other components were inoperable that contributed to this condition.

4. EVENT DESCRIPTION:

On August 21, 2007, during performance of a Component Design Basis Review (CDBR) of the AF system motor operated valves (MOV), station personnel determined that the existing STPs for the AF regulating and isolation valves did not ensure compliance with TS SR 3.3.5.4, verification of ESF response time. The TS definition of ESF response time is:

"The ENGINEERED SAFETY FEATURES RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.)."

There were two separate issues identified which impacted the existing test program's ability to meet SR 3.3.5.4 as follows:

- The complete circuit was not being properly time tested in that not all relays in the valve circuitry were included in the response time testing.

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- The stroke time measurement used a test method that measured the time from hand switch initiation to receipt of valve position indication, either in the closed or open direction. Depending on the position limit switch setting, the measured time can end prior to full travel of the valve.

On August 21, 2007, Control Room personnel were notified of the conditions noted above for the AF regulating and isolation valves. At this time, station personnel had identified that the AX relay was not included in the STPs for response time testing for these valves. Control Room personnel entered the Operability Determination process. The Shift Managers for all three units concluded that there was a reasonable assurance of operability for the identified valves, and entered TS SR 3.0.3 to allow a delay for compliance with the requirement to declare the limiting condition for operation (LCO) not met.

As part of the extent of condition analysis, a review of components in each unit which require ESF response time testing was completed. The analysis revealed the following additional components that were impacted by the two conditions identified above as follows:

- On September 7, 2007, Control Room personnel were notified that the AY relays were not tested for the AF regulating and isolation valves, and that the scope of valves impacted by the two conditions identified above had increased to include the steam admission valves to the steam driven AF pump. The Shift Managers for all three units again concluded that there was a reasonable assurance of operability for these additional components.
- On September 18, 2007, Control Room personnel were notified that the scope of valves impacted by the two conditions identified above had increased to include the MSIVs and the FWIVs. The buffer relays in the actuation circuitry for the MSIVs and FWIVs were not response time tested as part of any STP. The Shift Managers for all three units again concluded that there was reasonable assurance of operability for these additional valves.

TS SR 3.0.3 was entered for AF steam admission valves, MSIVs and FWIVs. In addition, at this time it was identified that entry into TS SR 3.0.3 should have been made on September 7, 2007, for the steam admission valves to the steam driven AF pump.

The operability determinations were based on the following information:

- For the AF regulating and isolation valves, licensing basis documents establish that the most limiting consideration for valve actuation is to close within 15 seconds of receipt of the actuation signal. The worst case for the latest response

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time testing for any of these valves was 13.13 seconds which, when added to the expected response time of the AY relay (180 milliseconds) and the additional travel time estimated to achieve closure following receipt of the closed indication (660 milliseconds), yields a revised response time of 13.97 seconds, which is within the limit of 15 seconds.

- For the MSIVs, licensing basis documents establish the most limiting consideration is to close within 4.6 seconds from receipt of an actuation signal. The worst case for the latest response time testing for any of the MSIVs was 3.78 seconds which, when added to the expected response time of the buffering relay (25 milliseconds), yields a revised response time of 3.8 seconds, which is within the limit of 4.6 seconds.
- For the FWIVs, licensing basis documents establish the most limiting consideration is to close within 9.6 seconds from receipt of an actuation signal. The worst case for the latest response time testing for any of the FWIVs was 6.94 seconds which, when added to the expected response time of the buffering relay (25 milliseconds), yields a revised response time of 6.97 seconds, which is within the TS limit of 9.6 seconds.
- For the steam admission valves to the steam driven AF pump, licensing documents establish the most limiting consideration is for the valves to open within 10 seconds from receipt of an actuation signal. The worst case for the latest response time testing for any of the valves was 7.62 seconds which, when added to the expected response time of the AX relay (180 milliseconds) and the additional travel time estimated to complete opening following receipt of the open indication (1.91 seconds), yields a revised response time of 9.71 seconds, which is within the limit of 10 seconds.

5. ASSESSMENT OF SAFETY CONSEQUENCES:

Risk assessments were performed to determine potential adverse impact of the conditions as required by TS SR 3.0.3. These assessments considered the design safety functions of the components, the previous test data for performance, and the timing requirements for actuation signals. The summation of this assessment is as follows:

- For the AX and AY relays, data indicates an expected response time of 180 milliseconds. These relays are functionally tested, but not time tested, in the STP "ESFAS Train A (/B) Subgroup Relay Functional Test."
- For the buffering relays in the MSIV and FWIV actuation circuitry, commercial data indicates an expected response time of 25 milliseconds. These relays are

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functionally tested, but not time tested, in the STP "Class 1E Diesel Generator and Integrated Safeguards Test Train A (/B)".

- The additional time required for the valves to travel to their required position, after the position indication indicates the valve is at that position, was determined to be 660 milliseconds for the AF regulating and isolation valves, 1.91 seconds for the steam admission valves and negligible for the MSIVs and FWIVs.
- When adding the additional time for relay response time and the additional valve travel time to the latest response time testing for the valves affected by this condition, the revised overall response time for each of the valves is within limits.
- The risk assessments concluded that there was no increased risk from the failure to include the relays and additional valve travel time in response time testing. This conclusion was based on two considerations:
 1. The valves passed their most recent functional SR tests to demonstrate the relays were functional.
 2. The maximum time that the relay response and additional valve travel could possibly add to the response time was not significant compared to the required design response time. Additionally, the risk critical timing is significantly longer than design response time; therefore risk was not adversely impacted since the additional time would not result in exceeding the design response time.

The event did not result in any challenges to the fission product barriers or result in the release of radioactive materials. There were no adverse safety consequences or implications as a result of this event and the event did not adversely affect the safe operation of the plant or health and safety of the public.

The event did not result in a transient more severe than those analyzed in the updated Final Safety Evaluation Report Chapters 6 and 15. The event did not have any nuclear safety consequences or personnel safety impact.

The condition would not have prevented the fulfillment of any safety function of structures or systems as defined by 10 CFR 50.73(a)(2)(v).

6. CAUSE OF THE CONDITION:

The direct cause of the failure to perform the required testing of the AX, AY and buffer relays in the affected MOV actuation circuitry was inadequate STPs which did not contain steps to test

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the AX, AY and buffer relay response times as part of the overall component actuation response time testing.

The root cause of the failure to adequately perform the required testing of the subject components was inadequate oversight of the TS required testing, where testing requirements were satisfied by sequential or overlapping tests. Prior to initial plant startup, adequate hot functional testing was performed to meet the TS SRs for the subject components. However, in the transition to operational testing, not all TS SRs were captured in the sequential or overlapping tests.

7. CORRECTIVE ACTIONS:

STPs have been revised to test the AX, AY, and buffer relays for the affected valves.

A review of TS SRs that are met through the performance of sequential or overlapping STPs did not identify any other issues with meeting the TS SRs.

The Component Engineering Group was assigned the responsibility to act as the program owner for all required surveillance tests as defined in procedure 73DP-0AP05, Engineering Programs Management and Health Reporting.

Study 13-MS-C003 was conducted to evaluate available stroke time test data, design data and provide an adjustment factor, if required, for static stroke time testing using control room indicating lights. An evaluation of the study results is being performed on each valve to determine if test changes are required.

8. PREVIOUS SIMILAR CONDITIONS:

LER 1-2007-004-00 reported a condition where existing STPs did not adequately meet a TS SR to ensure the Containment Spray system headers were full of water. The corrective actions from the 004 LER could not have prevented the condition in the current LER due to the length of time the condition described in the current LER has existed.

LER 1-2004-005-01 reported a condition where a revision to existing STPs resulted in removal of required testing of Shutdown Cooling isolation valve interlocks. The cause of this event was personnel error during performance of the 10CFR 50.59 review for the STP revision. The corrective actions for that event would not have prevented this event due to the different nature of the cause.