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10 CFR 50.73

Palo Verde Nuclear  
Generating Station

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**102-05761-DCM/REB**  
**October 22, 2007**

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 2007-005-00**

Attached, please find Licensee Event Report (LER) 50-528/2007-005-00 which reports operation in a condition prohibited by Technical Specifications due to an inadequate procedure for Surveillance Testing.

In accordance with 10 CFR 50.4, copies of this LER 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 E. Buzard, Section Leader, Regulatory Affairs, at (623) 393-5317.

Arizona Public Service Company makes no commitments in this letter.

Sincerely,

DCM/REB/gat

Attachment

cc: E. E. Collins Jr. NRC Region IV Regional Administrator  
M. T. Markley NRC NRR Project Manager - (send electronic and paper)  
G. G. Warnick NRC Senior Resident Inspector for PVNGS

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NRR

**LICENSEE EVENT REPORT (LER)**

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

Estimated burden per response to comply with this mandatory collection request: 50 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.

<b>1. FACILITY NAME</b> Palo Verde Nuclear Generating Station (PVNGS) Unit 1	<b>2. DOCKET NUMBER</b> 05000528	<b>3. PAGE</b> 1 OF 7
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**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 -	00	10	22	2007	PVNGS Unit 2	05000529
									FACILITY NAME	DOCKET NUMBER
									PVNGS Unit 3	05000530

<b>9. OPERATING MODE</b>  1 / 1 / 1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:</b> (Check all that apply)									
	<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)						
<b>10. POWER LEVEL</b>  100 / 100 / 100	<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 E. Buzard, Section Leader, Regulatory Affairs - Compliance	TELEPHONE NUMBER (Include Area Code) (623) 393-5317
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
<input checked="" type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input type="checkbox"/> NO		12	15	2007

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

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; however, the existing STPs did not include the response times of certain valve actuation relays.

Subsequent investigation for extent of condition identified a similar issue with response time testing for the Main Steam Isolation Valves (MSIV), the Feedwater Isolation Valves (FWIV) and the AF pump steam admission valves.

All affected valves were assessed and, when the expected additional time associated with all relay actuations was 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.

The STPs will be corrected to include verification of response time testing for the affected relays prior to the next scheduled performance of SR 3.3.5.4.

There have been two previously reported conditions within the last three years where existing STPs did not verify that TS SRs were met.

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Palo Verde Nuclear Generating Station Unit 1	05000528	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 7
		2007	-- 005	-- 00	

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

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

1. REPORTING REQUIREMENT(S):

This LER (50-528/2007-005-00) 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 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 valves (regulating and isolation) 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 system provides an independent means of supplying feedwater to the SG during normal shutdown, startup, and emergency or accident conditions.

The AF system flow valves are motor operated and provide a water path to the Steam Generators (SG) upon receipt of an Auxiliary Feedwater Actuation System (AFAS) signal. They also function to isolate flow 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 pump steam admission valves supply steam to the turbine driven AF pump, which supplies feedwater to the SGs. A one inch solenoid operated bypass valve is provided to

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allow the feed pump turbine controller to establish speed control prior to the main steam valve opening. The main steam valve is a six inch motor operated valve.

The control circuitry for the AF system flow valves and the AF pump 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 are hydraulically operated and function to 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, a high SG level, or a feedwater line break.

The FWIVs are hydraulically operated and function to 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, referred to as a buffer relay, to provide isolation from transient noise which could 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 the condition being reported in this LER.

4. EVENT DESCRIPTION:

On August 21, 2007, during performance of a Component Design Basis Review (CDBR) of the AF system flow valves, station personnel determined that the STPs for the AF system flow 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.)”

Contrary to this requirement, 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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On August 21, 2007, Control Room personnel were notified of the condition for the AF system flow 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 and the Shift Managers for all three units concluded that there was a reasonable assurance of operability for the identified valves. TS SR 3.0.3 was invoked in all three units to allow a delay for compliance with the requirement to declare the limiting condition for operation (LCO) not met.

During the investigation of the condition, as part of the extent of condition analysis, station personnel completed a review of components in each unit which require ESF response time testing. The review revealed the following additional components that were impacted by the condition as follows:

- On September 7, 2007, Control Room personnel were notified that the AY relays were also not tested for the AF system flow valves. In addition, the scope of valves impacted increased to include the AF pump steam admission valves. The Shift Managers for all three units again concluded that there was a reasonable assurance of operability for these additional components. However, it was not recognized at this time that TS SR 3.0.3 should have been invoked for the AF pump steam admission valves.

On September 18, 2007, Control Room personnel were notified that the scope of valves impacted 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 invoked for the 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 above were based on the following information:

- For the AF system flow 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 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), yields a revised response time of 13.31 seconds, which is within the limit of 15 seconds. Note that the AY relay and not the AX relay is used for automatic closure of the valve.

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- 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 buffer relay (25 milliseconds), yields a revised response time of 3.8 seconds, which is within the TS limit of 4.6 seconds. Note that the STP acceptance criterion for the MSIVs is 3.8 seconds to account for the valves being tested in a static versus dynamic condition.
- 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 buffer relay (25 milliseconds), yields a revised response time of 6.97 seconds, which is within the TS limit of 9.6 seconds. Note that the STP acceptance criterion for the FWIVs is 7.6 seconds to account for the valves being tested in a static versus dynamic condition.
- For the AF pump steam admission valves, 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), yields a revised response time of 7.8 seconds, which is within the limit of 10 seconds.

5. ASSESSMENT OF SAFETY CONSEQUENCES:

Risk assessments were performed as required by TS SR 3.0.3. These assessments considered the safety functions of the components, the previous test data for performance, and the timing requirements for actuation signals. The summation of these assessments 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 buffer relays in the MSIV and FWIV actuation circuitry, data indicates an expected response time of 25 milliseconds. These relays are functionally tested, but not time tested, in the STP "Class 1E Diesel Generator and Integrated Safeguards Test Train A (/B)".

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- When adding the additional time for relay response 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 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 would add to the a valve response time was not significant compared to the risk critical timing which is significantly longer than design response time and therefore, risk was not adversely impacted.

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 EVENT:

The direct cause of the failure to perform the required testing of the AX and AY relays in the affected MOV actuation circuitry was inadequate STPs.

The root cause of the failure to adequately perform the time response testing is under review and will be reported in a supplement to this LER.

7. CORRECTIVE ACTIONS:

The AX, AY, and buffer relays will be added to calculations, or separate calculations will be developed to address expected response times.

STPs will be revised, or new STPs will be issued prior to their next scheduled performance, to test the AX, AY, and buffer relays for the affected valves.

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Should additional corrective actions, including actions to prevent recurrence, be established following the completion of the root cause analysis review, they will be included in the supplement to this LER.

8. PREVIOUS SIMILAR EVENTS:

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 nor would the extent of condition from the 004 LER have been expected to identify the condition in the current LER.

LER 1-2004-005-01 reported a condition where a revision to existing STPs resulted in the 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.