



10 CFR 50.73

*A subsidiary of Pinnacle West Capital Corporation*

Palo Verde Nuclear  
Generating Station

Cliff Eubanks  
Vice President  
Nuclear Operations

Tel (623) 393-6116  
Fax (623) 393-6077

Mail Station 7602  
PO Box 52034  
Phoenix, Arizona 85072-2034

102-05496-CE/CKS/DLK  
May 18, 2006

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

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Unit 1  
Docket No. STN 50-528  
License No. NPF 41  
Licensee Event Report 2006-002-00**

Attached please find Licensee Event Report (LER) 50-528/2006-002-00 prepared and submitted pursuant to 10 CFR 50.73. This LER reports a condition prohibited by Technical Specifications where Unit 1 entered Mode 3 (Hot Standby) without the required number of Pressurizer Heaters Operable.

In accordance with 10 CFR 50.73(d), copies of this LER are being forwarded to the NRC Regional Office, NRC Region IV and the PVNGS Senior Resident Inspector. If you have questions regarding this submittal, please contact James Proctor, Section Leader, Regulatory Affairs, at (623) 393-5730.

The corrective actions described in this LER are not necessary to maintain compliance with regulations. Arizona Public Service Company makes no commitments in this letter.

Sincerely,

CE/CKS/DLK/gt

Attachment

cc: B. S. Mallett NRC Region IV Regional Administrator  
M. B. Fields NRC NRR Project Manager - (send electronic and paper)  
G. G. Warnick NRC Senior Resident Inspector for PVNGS

JE22

# 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 Unit 1	<b>2. DOCKET NUMBER</b> 05000528	<b>3. PAGE</b> 1 OF 6
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**4. TITLE**  
Mode 3 Entry without the Required Number of Pressurizer Heater Groups Operable

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
03	21	2006	2006	- 002 -	00	05	18	2006	None	05000
									FACILITY NAME	DOCKET NUMBER
									None	05000

<b>9. OPERATING MODE</b>  3	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:</b> (Check all that apply)									
<b>10. POWER LEVEL</b>  0	<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 James A. Proctor, Section Leader, Regulatory Affairs	TELEPHONE NUMBER (Include Area Code) (623) 393-5730
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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	AB	EHTR	C490	Y					

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

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

All times in this report are approximate and Mountain Standard Time unless noted otherwise.

On March 22, 2006 at 0645, while in the process of a reactor startup, Unit 1 was in Mode 3 (Hot Standby) when Control Room personnel discovered that circuit breaker PGBL32E3, which supplies power to the "B" class pressurizer (Pzr) heaters, was in a tripped open condition. This condition would have prevented operation of the "B" class Pzr heaters. Unit 1 had entered Mode 3 the previous day. Technical Specification (TS) 3.4.9 requires two groups of Pzr heaters be Operable in Mode 3. On March 21, at 0117, Unit 1 entered Mode 3 with only one group of Pzr heaters Operable in violation of TS 3.0.4. On March 22, at 0645 Control Room personnel entered TS Limiting Condition for Operation 3.4.9.

Troubleshooting revealed a ground on Pzr backup heater A05. A temporary modification was installed to isolate backup heater A05 and connect in its place backup heater B04. Following a successful retest, the "B" class heaters were returned to Operable status.

The cause of the event was human error.

In the past three years, Palo Verde reported four violations of TS 3.0.4 on separate Licensee Event Reports.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Palo Verde Nuclear Generating Station Unit 1	05000528	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 6
		2006	-- 002	-- 00	

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

All times in this report are approximate and Mountain Standard Time unless noted otherwise.

1. REPORTING REQUIREMENT(S):

This Licensee Event Report (LER) (50-528/2006-002-00) is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B), to report a condition prohibited by Technical Specifications. Specifically, on March 21, 2006 at 0117, Control Room personnel (utility, licensed) completed a Mode change from Mode 4 (Hot Shutdown) to Mode 3 (Hot Standby) with only the "A" class pressurizer (Pzr) heaters (EIS: AB) Operable. Technical Specification 3.4.9, Pressurizer, requires two groups of Pzr heaters be Operable in Mode 3. Contrary to Technical Specification 3.0.4, a Mode change was completed without meeting the Limiting Condition for Operation (LCO) for Technical Specification 3.4.9. This event is a condition prohibited by Technical Specifications and reportable under 10 CFR 50.73(a)(2)(i)(B).

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

The Pzr provides a point in the Reactor Coolant System (RCS) (EIS: AB) where liquid and vapor are maintained in equilibrium under saturated conditions for pressure control purposes to prevent bulk boiling in the remainder of the RCS. Key functions include maintaining required primary system pressure during steady state operation and limiting the pressure changes caused by reactor coolant thermal expansion and contraction during normal load transients. The Pzr pressure control elements addressed by Technical Specification 3.4.9 include the Pzr water level, the required heaters and their backup heater controls, and emergency power supplies. The Pzr heaters are single unit, direct immersion heaters that protrude vertically into the Pzr through sleeves welded in the lower head. There are 36 Pzr heaters in Unit 1.

A number of the heaters are connected to proportional controllers, which adjust the heat input to account for steady-state losses and to maintain the desired steam pressure in the Pzr. The remaining heaters are connected to on-off controllers. These heaters are normally de-energized but are automatically turned on by a low Pzr pressure signal or a high level error signal. This latter feature is provided since load increases result in an in-surge of relatively cold coolant into the Pzr, thereby decreasing the bulk water temperature. The Chemical and Volume Control System (EIS: CA) acts to restore level, resulting in a transient pressure below normal operating pressure. To minimize the extent of this transient, the backup heaters are energized, contributing more heat to the water. Backup heaters are de-energized in the event of concurrent high-level error and high-Pzr pressure signals. A low-low Pzr water level signal de-energizes all heaters before they are uncovered to prevent heater damage.

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**3. INITIAL PLANT CONDITIONS:**

On March 21, 2006 at 0117 Palo Verde Control Room personnel (utility, licensed) were preparing to return Unit 1 to power operation following a short notice outage (SNO) and changed Modes from Mode 4 to Mode 3. At the start of the event circuit breaker (EIS: ANSI – 52) PGBL32E3, which supplies power to the “B” class Pzr heaters, was in a tripped open condition because of a ground on the A05 Pzr heater. With PGBL32E3 tripped open, the “B” class Pzr heaters were inoperable. Control Room personnel were unaware that PGBL32E3 was open. No other major structures, systems, or components were inoperable that contributed to the event.

**4. EVENT DESCRIPTION:**

Prior to the event, on March 20, 2006 at 0230 operations and electrical maintenance personnel were conducting a retest on a non-class Pzr heater bank. The testing required jumpers to be applied and then removed to simulate the control signal. Heaters energized when the jumper was landed and de-energized when the jumper was lifted as expected. The PZR Trouble Plant Annunciator System (RK) (EIS: ALM) alarm was locked in and placed in “fast flash” based on plant conditions at the time. At 0249 PGBL32E3 tripped open. The circuit breaker trip alarm was not announced due to the alarm being in fast flash and was not recognized by the night shift Control Room personnel (licensed, utility). Additionally, subsequent rounds performed by three different Area Operators (utility, non-licensed) and two routine shift alarm typer summary reviews performed by Control Room personnel (utility, licensed) failed to identify that PGBL32E3 was in a tripped open condition.

During the night shift to day shift turn over on March 22, following a detailed alarm typer summary review, the “PZR BACKUP HTRS 5 ELEC PROT TRIP” (PT ID RCYS1005) was recognized as being in alarm. Control Room personnel initiated the applicable alarm response actions. A local inspection of PGBL32E3 revealed that the circuit breaker had a tripped “86” lockout relay. On March 22 at 0645, Control Room personnel declared the “B” class Pzr heaters inoperable and entered Technical Specification LCOs 3.4.9 (B), 3.3.11 (B), Remote Shutdown System, and Technical Requirements Manual LCO 3.8.101 (A), Containment Penetration Conductor Overcurrent Protection Devices. Based on further review of the alarm typer summaries, the alarm condition was determined to have occurred on March 20, 2006 at 0249. Control Room logs indicated that Unit 1 changed Modes from Mode 4 to Mode 3 on March 21, 2006 at 0117 with only the “A” class Pzr heaters Operable. This Mode change was a violation of Technical Specification 3.0.4 (completion of a Mode change without meeting the LCO for Technical Specification 3.4.9.)

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Troubleshooting efforts for the tripped "86" lockout relay on PGBL32E3 revealed a ground on Pzr backup heater A05. A temporary modification (T-Mod 2878166) was installed to isolate backup heater A05 and connect in its place backup heater B04. On March 24, 2006 at 1731, after a satisfactory retest of temporary modification 2878166, Control Room personnel declared the "B" class Pzr heaters Operable and exited Technical Specification LCOs 3.4.9 (B), 3.3.11 (B) and Technical Requirements Manual LCO 3.8.101 (A).

On March 22, 2006 a corrective action document was initiated to identify and investigate the violation of Technical Specification 3.0.4 that occurred on March 21, 2006 at 0117 (completion of a Mode change without meeting the LCO for Technical Specification 3.4.9.)

**5. ASSESSMENT OF SAFETY CONSEQUENCES:**

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

The "A" class heaters were available throughout the event and capable of performing the same functions. The condition would not have prevented the fulfillment of the safety function and did not result in a safety system functional failure as defined by 10CFR50.73(a)(2)(v).

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

**6. CAUSE OF THE EVENT:**

The root cause of the event was attributed to human error in that operational fundamentals were not consistently applied for controlling and monitoring plant parameters to ensure compliance with license conditions.

A contributing cause was identified in that the class backup Pzr heater hand switch green light intensity was not distinguishable when in "86" lockout. When equipment experiences an "86" lockout, the indicator light will burn more brilliantly (higher intensity) that alerts the operator of an electrical fault.

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**7. CORRECTIVE ACTIONS:**

A significant investigation was conducted and resulted in the following actions.

Operation's personnel involved in this event were coached.

Work Order 2879002 was initiated on 03/27/06 to address the green light intensity on back up PZR Heater hand switch. The intensity was adjusted to maximum to be distinguishable for "86" lockout and the green lens replaced.

Operations Management will reinforce Operations Fundamentals as described in Institute of Nuclear Power Operations Significant Event Report 3-05, Weaknesses in Operator Fundamentals. Actions will include both individual task and crew performance observations while on shift and in training settings. The intent of this action is to improve individual and team performance in the monitoring and control of the power plant.

**8. PREVIOUS SIMILAR EVENTS:**

In the past three years, four LERs were submitted to report violations of Technical Specifications 3.0.4.

LER 529/2003-004 reported a condition in Unit 2 in which a Mode change occurred with one Auxiliary Feed Water pump inoperable. The cause of this event was attributed to an inadequate understanding of surveillance testing requirements by Engineering and Operations personnel.

LER 528/2004-002 reported a condition in which power was increased above 20 percent with axial shape index outside TS limits. The cause of this event was attributed to an inadequate understanding of TS 3.2.5 by the involved Operations personnel.

LER 529/2005-002 reported a condition in which a Mode change occurred with one of two required Low Pressure Safety Injection (LPSI) trains being inoperable due to a degraded mechanical pump seal. The cause of this event was attributed to an equipment problem.

LER 528/2005-002 reported a condition in which a Mode change occurred with a safety injection valve out of position. The cause of the event was attributed to cognitive personnel error.

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The causes for these previously reported events were different than the root cause of the event discussed in this LER. As such, the corrective actions taken as a result of these previously reported events would not have prevented the event discussed in this LER.

This LER (50-528/2006-002-00) is related to the violation of Technical Specification 3.0.4 reported in LER 50-528/2006-001-00 in that the events described in both LERs had the same root cause and occurred during the same Unit 1 start up.