



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

102-05576-CE/SAB/JAP/REB  
September 28, 2006

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

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Unit 2  
Docket No. STN 50-529  
License No. NPF 51  
Licensee Event Report 2006-004-00**

Attached please find Licensee Event Report (LER) 50-529/2006-004-00 that has been prepared and submitted pursuant to 10 CFR 50.73. This LER reports a condition prohibited by technical specifications related to actions not completed for a feedwater isolation valve that became inoperable two weeks prior to its discovery.

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 James A. Proctor, Section Leader, Regulatory Affairs, at (623) 393-5730.

Arizona Public Service Company makes no commitments in this letter.

Sincerely,

CE/SAB/JAP/REB/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

IE22

**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 2	<b>2. DOCKET NUMBER</b> 05000529	<b>3. PAGE</b> 1 OF 5
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**4. TITLE**  
Unit 2 Feedwater Isolation Valve Inoperability Results in Condition Prohibited by Technical Specification

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
07	17	2006	2006	- 004 -	00	09	28	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§: (Check all that apply)</b>									
<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)(vii)(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 - Compliance	TELEPHONE NUMBER (Include Area Code) 623 393 5730
------------------------------------------------------------------------------------	------------------------------------------------------

**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
X	JJ	FSV	T103	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)**

On July 27, 2006, station personnel discovered that the hydraulic accumulator for Feedwater Isolation Valve #174 (FWIV #174) would not recharge because a failed four-way valve became lodged in the center blocked position. Further evaluation concluded that the condition would have prevented fast closure of the FWIV upon receipt of a main steam isolation signal and had existed since approximately 21:09 Mountain Standard Time (MST) on July 13, 2006. This exceeded the technical specification required action time. The four way valve was replaced and the FWIV was declared operable on July 28, 2006.

The preliminary cause of exceeding the technical specification action time was that the failed condition of the four-way valve was not known to operators until the accumulator failed to recharge on July 27, 2006. Corrective action included revision of the depressurizing procedure to verify the respective four-way valve returns to its required position and is not lodged in the blocked position.

A non-reportable failure of FWIV #174 occurred in Unit 2 on May 13, 2003 when the four-way valve became lodged in the standby position which did not adversely impact the FWIV operability.

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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 (MST) unless otherwise noted.

1. REPORTING REQUIREMENT(S):

This LER (50-529/2006-004-00) is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B), to report a condition prohibited by technical specifications. Specifically, on July 17, at 03:09, Unit 2 exceeded the required action time to place the plant in Mode 3 as required by Technical Specification 3.7.3, action C for an inoperable feedwater isolation valve (FWIV) that had not been closed or isolated within 72 hours, as required by action A. This condition was discovered on August 3, 2006.

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

The Main Feedwater Isolation Valves (FWIV) (EIIIS – JJ) for the steam generator (SG) economizer (EIIIS – AB) feedwater system (EIIIS – SJ) lines are 24 inch, electro-hydraulic actuated, double-disc wedge-gate manufactured by Anchor/Darling Valve Company. FWIV #174 is one of two, in series, economizer FWIVs for steam generator #1. Each FWIV provides containment isolation between the feedwater system and the steam generator for postulated accidents. The valves “emergency fast-close” within 9.6 seconds upon receipt of a Main Steam Isolation Signal (MSIS) (EIIIS – JE). These valves are located in the main steam support structure (EIIIS – NM) at the 120’ elevation.

A pressurized hydraulic fluid stored in an accumulator provides the energy required for fast closure of the FWIV upon receipt of an MSIS. The actuation of the FWIV is controlled by the position of two four-way directional control valves that operate together to direct hydraulic fluid as needed to change valve position. The “N” four-way valve controls the flow of hydraulic fluid to and from the pressurized hydraulic fluid accumulator while the “M” four-way valve controls the flow of hydraulic fluid to either side of the FWIV actuator hydraulic piston (bottom for opening, top for closing). When either four-way valve slide is in mid-position, hydraulic flow through the four-way valve is blocked. If either four-way valve becomes stuck in mid-position, the FWIV becomes inoperable because high pressure accumulator hydraulic fluid will not be able to flow to the top of the actuator piston in order to complete the fast closure actuation sequence during an MSIS.

The accumulators are filled with a nitrogen precharge. To verify the precharge, the valve operating procedure requires the operator to turn the FWIV exercise/accumulator charge test switch to “ACC CH TEST” which shuttles the “N” four-way valve to bleed off accumulator hydraulic fluid to the sump. After verifying the pre-charge, the operator turns the switch back to normal which causes the actuator air operated hydraulic pump to recharge the accumulator.

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Accumulator pressure fluctuates with ambient temperature changes. If pressure becomes too high, the FWIV operating procedure provides the method to reduce pressure by quickly cycling the exercise/accumulator charge test switch to "ACC CH TEST," which cycles the "N" four-way valve to bleed off a slight amount of pressure. The method should automatically return the four-way valve to its required standby position.

3. INITIAL PLANT CONDITIONS:

On July 27, 2006 at 08:41, the plant was in Mode 3 (Hot Standby) at normal operating temperature and pressure. Except for the FWIV components described in this LER, no other structures, systems, or components were inoperable that contributed to this condition.

4. EVENT DESCRIPTION:

On July 27, 2006 at 08:41, a Unit 2 reactor operator (utility – licensed) identified that the FWIV #174 accumulator would not increase in pressure while being recharged. Maintenance staff replaced the hydraulic pump, which historically resolved the problem, but in this instance did not. After further troubleshooting, maintenance staff determined that the "N" four-way valve most likely had not returned to its standby position and had become lodged in the center or "blocked" position. In this condition, the valve would not have been able to perform its safety function to close. This condition was identified to Operations and the valve was declared inoperable at 10:16 on July 27, 2006. Following replacement of the "N" four-way valve on July 28, the accumulators were recharged and the valve was subsequently declared OPERABLE on July 28, 2006 at 11:47. The elapsed time from discovery of the condition (when the valve was declared inoperable) until it was restored was 25 hours 31 minutes.

System and maintenance engineering staff reviewed accumulator pressure trends and concluded on August 3, 2006, that the "N" valve had been lodged in the blocked position since the last time that Operations personnel reduced accumulator pressure on July 13, 2006 at 21:09 hours. Engineering concluded the "N" four-way valve became lodged in the center blocked position when cycling the exercise/accumulator charge test switch to "ACC CH TEST" to reduce the pressure.

The failed directional four-way control valve was a Teledyne Republic Manufacturing valve model number 23104-7001-2853.

Engineering reviewed pressure trends of similarly actuated isolation valves and determined that several main steam (EIS – SB) and feedwater containment isolation valves could also be affected because pressure increases were not exhibited after completing pressure reduction using the

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"ACC CH TEST" method: Unit 2 "A" and "B" accumulators on main steam isolation valve 171 (MSIV #171) (EIS - SB), Unit 3 FWIV #132, Unit 3 MSIV #171 "A" accumulator and Unit 3 MSIV #181 "A" accumulator. Each of the above MSIVs and FWIVs was tested by operating the hydraulic pump to charge hydraulic fluid into the accumulators. In each case, accumulator pressure increased, indicating the respective "N" four-way valves were in their standby position.

5. ASSESSMENT OF SAFETY CONSEQUENCES:

While the safety function of the affected FWIV #174 was adversely affected, the condition would not have prevented the fulfillment of any safety function as defined by 10 CFR 50.73(a)(2)(v). The safety function of the FWIV is to provide containment isolation between the steam generators and the feedwater line in the event of a main steam line break, feedwater line break, or loss of reactor coolant accident. The redundant, operable FWIV #132 on the economizer feedwater line would have closed to provide the safety function if a MSIS actuated. The remaining FWIVs or MSIVs with similar four-way hydraulic control valves remained operable.

The plant remained within safety limits throughout the period that the FWIV was inoperable. The primary system and secondary pressure boundary limits were not approached and no violations of the specified acceptable fuel design limits (SAFDL) occurred. No engineered safety feature actuations occurred and none were required. Events requiring closure of the FWIVs did not occur during the period the valve was inoperable. The event 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 event and the event did not adversely affect the safe operation of the plant or health and safety of the public.

6. CAUSE OF THE EVENT:

The direct cause of the condition was the failure of the FWIV #174 "N" four-way valve to return to the standby position following accumulator pressure reduction. The cause of the four-way failure is under investigation.

The preliminary cause for the technical specification violation was the failed condition of the four-way valve was not known to operators until the accumulator failed to recharge on July 27, 2006.

If the cause of the four-way valve failure is identified or if any substantive changes are identified they will be provided in a supplement to this LER.

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7. CORRECTIVE ACTIONS:

The defective four-way has been replaced. In addition, the FWIV operating procedure has been revised to verify the respective four-way valve returns to its required position and is not lodged in the center blocked position.

Any substantive changes to the corrective actions will be provided in a supplement to this LER.

8. PREVIOUS SIMILAR EVENTS:

One previous non-reportable failure of the Unit 2 FWIV#174 "N" four-way valve occurred on May 13, 2003. In that instance, the four-way valve became lodged in the standby position. The four-way valve pistons became slightly cocked and the cylinder bore exhibited signs of rubbing. The valve body and piston were replaced as a result. Since the standby position permits fast-closure of the FWIV, the valve's safety function and operability were not impacted. No other similar failures of MSIV or FWIV hydraulic actuators were noted in the three years prior to this LER.