



10 CFR 50.73

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102-07068-DCM/SPD

June 26, 2015

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

Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station (PVNGS) Unit 3**
Docket No. STN 50-530 / License No. NPF 74
Licensee Event Report 2015-002-00

Enclosed please find Licensee Event Report (LER) 50-530/2015-002-00 that has been prepared and submitted pursuant to 10 CFR 50.73. This LER reports a condition prohibited by Technical Specification Limiting Condition for Operation 3.0.4 resulting from an inoperable Atmospheric Dump Valve which was discovered during plant startup activities following refueling.

In accordance with 10 CFR 50.4, copies of this LER are being forwarded to the Nuclear Regulatory Commission (NRC) Regional Office, NRC Region IV, and the Senior Resident Inspector.

Arizona Public Service Company makes no commitments in this letter. If you have questions regarding this submittal, please contact Mark McGhee, Nuclear Regulatory Affairs Department Leader, at (623) 393-4972.

Sincerely,

W. M. Mims FOR DC MIMS

DCM/SPD/hsc

Enclosure

cc:	M. L. Dapas	NRC Region IV Regional Administrator
	M. M. Watford	NRC NRR Project Manager
	C. A. Peabody	NRC Senior Resident Inspector PVNGS

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**LICENSEE EVENT REPORT (LER)**(See Page 2 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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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 3

2. DOCKET NUMBER

05000530

3. PAGE

1 OF 6

4. TITLE

Condition Prohibited by Technical Specification 3.0.4 Due to an Inoperable Atmospheric Dump Valve (ADV)

5. EVENT DATE

MONTH	DAY	YEAR
05	01	2015

6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2015	002	00

7. REPORT DATE

MONTH	DAY	YEAR
06	26	2015

8. OTHER FACILITIES INVOLVED

FACILITY NAME	DOCKET NUMBER
FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE**11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)**

4

☐ 20.2201(b)☐ 20.2203(a)(3)(i)☐ 50.73(a)(2)(i)(C)☐ 50.73(a)(2)(vii)☐ 20.2201(d)☐ 20.2203(a)(3)(ii)☐ 50.73(a)(2)(ii)(A)☐ 50.73(a)(2)(viii)(A)☐ 20.2203(a)(1)☐ 20.2203(a)(4)☐ 50.73(a)(2)(ii)(B)☐ 50.73(a)(2)(viii)(B)☐ 20.2203(a)(2)(i)☐ 50.36(c)(1)(i)(A)☐ 50.73(a)(2)(iii)☐ 50.73(a)(2)(ix)(A)**10. POWER LEVEL**

0

☐ 20.2203(a)(2)(ii)☐ 50.36(c)(1)(ii)(A)☐ 50.73(a)(2)(iv)(A)☐ 50.73(a)(2)(x)☐ 20.2203(a)(2)(iii)☐ 50.36(c)(2)☐ 50.73(a)(2)(v)(A)☐ 73.71(a)(4)☐ 20.2203(a)(2)(iv)☐ 50.46(a)(3)(ii)☐ 50.73(a)(2)(v)(B)☐ 73.71(a)(5)☐ 20.2203(a)(2)(v)☐ 50.73(a)(2)(i)(A)☐ 50.73(a)(2)(v)(C)☐ OTHER☐ 20.2203(a)(2)(vi)☒ 50.73(a)(2)(i)(B)☐ 50.73(a)(2)(v)(D)Specify in Abstract below or in
NRC Form 366A**12. LICENSEE CONTACT FOR THIS LER****LICENSEE CONTACT**

Mark McGhee, Nuclear Regulatory Affairs Department Leader

TELEPHONE NUMBER (Include Area Code)

623-393-4972

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
A	SB	XCV	C600	Y					

14. SUPPLEMENTAL REPORT EXPECTED☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

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

On May 1, 2015, following completion of refueling activities, PVNGS Unit 3 entered Mode 4 and continued to Mode 3 in preparation for plant startup. On May 2, 2015, when plant conditions needed to test atmospheric dump valves (ADV) with steam were achieved, testing of ADVs was initiated. At 1739 on May 2, 2015, testing determined that ADV SGB-HV-178 (ADV-178) would not stroke more than approximately 13 percent open. Operations personnel declared ADV-178 inoperable and entered Technical Specification Limiting Condition of Operation (LCO) 3.7.4, Atmospheric Dump Valves, Condition A. An investigation determined ADV-178 was inoperable when Unit 3 entered Mode 4.

Inspection of ADV-178 determined internal sealing rings were improperly installed during maintenance performed in the refueling outage. The valve was repaired and tested and declared operable at 0853 on May 7, 2015. The causes of the event were human error by maintenance personnel and inadequacies with the procedure used to perform the valve maintenance. Corrective actions will revise work instructions to provide detailed guidance for valve re-assembly and to require verifications of proper re-assembly.

A similar event was reported in LER 50-529/2012-003-00 which resulted when testing in Mode 3 following refueling activities identified an inoperable steam supply valve for the steam driven auxiliary feedwater pump.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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.

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NARRATIVE

All times are Mountain Standard Time and approximate unless otherwise indicated.

1. REPORTING REQUIREMENT(S):

This Licensee Event Report (LER) is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(b) as a condition prohibited by Technical Specification (TS) Limiting Condition for Operation (LCO) 3.0.4, due to entry into a Mode or other specified condition in the applicability for LCO 3.7.4, Atmospheric Dump Valves, while the LCO was not met.

The condition was discovered in Palo Verde Nuclear Generating Station (PVNGS) Unit 3 during planned testing of atmospheric dump valve SGB-HV-178 (ADV-178). Following completion of refueling activities, Unit 3 entered Mode 4 and continued to Mode 3 on May 1, 2015. On May 2, 2015, when the plant conditions needed to perform ADV stroking with steam were achieved, testing of ADV-178 was performed which determined the ADV would not stroke more than approximately 13 percent open and the ADV was declared inoperable.

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

The PVNGS design includes two steam generators (SGs) (EIS: AB), each with two main steam lines (EIS: SB) and an ADV (EIS: SB) for each of the four main steam lines. Each ADV line consists of one normally closed ADV and an associated, normally open, block valve. The ADV block valves permit testing and maintenance of the ADVs while a unit is at power.

The ADVs (Control Components International, Model B3G9-10-12P8-31NA51) are located outside the containment in the main steam support structure, upstream of the main steam isolation valves (MSIVs) (EIS: SB) and are used to remove reactor decay heat via the SGs by venting steam in the event that the main condenser (EIS: SG) becomes unavailable, including a loss of electrical power. The ADVs have the capacity to achieve and maintain safe shutdown conditions following design basis accidents involving a loss of offsite power and/or closure of the MSIVs. Each ADV is sized to accommodate plant cooldown in the event of a steam line break or SG tube rupture which may render one SG unavailable for heat removal.

The ADV (Figure 1) is an angled flow control valve designed with a rising internal plug that exposes flow passages in a disk stack as the plug is moved up through the valve stroke length. The disk stack consists of a number of circular disks which form a

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cylinder when stacked. Each disk is machined with labyrinth flow passages. As the valve is opened the plug rises up within the disk stack cylinder and steam flow passes from the valve inlet through the exposed labyrinth flow passages in the disk stack into the bore area and then to the outlet port on the valve body. The position of the plug within the disk stack bore determines flow by exposing more or less disk passages of the disk stack as the valve is positioned. This configuration permits relatively linear changes in steam flow rate relative to valve position.

The ADV is held closed by a combination of spring pressure and steam pressure (in the valve bonnet area) acting on the upper surface of the plug. An internal pilot valve is installed in the upper part of the plug which allows for depressurization of the valve bonnet area during valve opening. To limit steam leakage into the bonnet area of the valve, a set of sealing rings is installed in the upper part of the bore area between the plug and the valve body.

Each ADV is normally remotely operated using a pneumatic valve actuator in response to a control signal from a valve controller located in the control room or the remote shutdown panels. The valves may also be positioned by a local manual operator. The pneumatic valve actuator is normally supplied from the plant instrument air system and is provided with a backup supply of pressurized nitrogen that, on a loss of pressure in the normal instrument air supply, automatically supplies nitrogen to operate the ADVs.

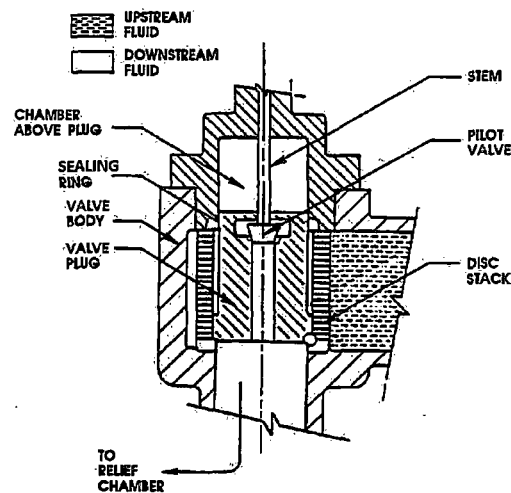


Figure 1

TS LCO 3.7.4 requires that four ADV lines shall be operable when the unit is in Modes 1, 2, and 3, or Mode 4 when the SG is being relied upon for heat removal. With one required ADV inoperable, the ADV must be restored to operable status within 7 days or the unit must be placed in Mode 3 within 6 hours and then must be in Mode 4 without reliance on the SG for heat removal within 24 hours.

3. INITIAL PLANT CONDITIONS:

On May 2, 2015, PVNGS Unit 3 was in Mode 3 with plant startup in progress following completion of refueling activities. Reactor coolant system temperature and pressure were being increased in preparation for planned equipment testing at normal operating temperature and pressure. There were no other systems, structures or components out of service which contributed to this event.

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4. EVENT DESCRIPTION:

At 0258 on May 1, 2015, following completion of refueling activities, PVNGS Unit 3 entered Mode 4 and continued to Mode 3 in preparation for plant startup. Earlier in the refueling outage, on April 10, 2015, with Unit 3 in a cold shutdown condition, maintenance personnel started a planned activity to rebuild the valve internals for ADV-178. This maintenance activity was completed, the ADV was reassembled and testing was performed and completed with the unit in a cold shutdown condition with no issues or problems identified. However, additional testing of the four ADVs which required normal hot standby steam pressure conditions was performed when the plant entered Mode 3.

On May 2, 2015, when plant conditions needed to perform ADV stroking with steam were achieved, the additional testing of ADV-178 was initiated. The testing consisted of a 30 percent partial stroke test with steam flow (block valve open). At 1739 on May 2, 2015, the testing determined that ADV-178 would not stroke open greater than approximately 13 percent and Operations personnel declared the valve inoperable and entered TS LCO 3.7.4 Condition A. Engineering and maintenance personnel then conducted a series of troubleshooting activities to identify the cause of the problem.

On May 6, 2015, ADV-178 was isolated and disassembled to allow inspection of the valve internals. This inspection identified that internal sealing rings had been improperly installed during the valve maintenance performed in April during the refueling outage. Therefore, when Unit 3 entered Mode 4 on May 1, 2015, the valve was inoperable. The valve was reassembled in the proper configuration and post maintenance testing, including the 30 percent partial stroke test with steam flow, was successfully completed. At 0853 on May 7, 2015, ADV-178 was declared operable and Unit 3 exited TS LCO 3.7.4 Condition A.

5. ASSESSMENT OF SAFETY CONSEQUENCES:

This event did not result in a potential transient more severe than those analyzed in the Updated Final Safety Analysis Report (UFSAR) or result in the release of radioactive materials to the environment. There were no actual safety consequences as a result of this event and the event did not adversely affect the health and safety of the public.

The safety function of the ADVs is to provide a safety grade method for cooling the unit to shutdown cooling entry conditions, should the preferred heat sink not be available, as discussed in the PVNGS UFSAR, Section 10.3. During the period while ADV-178 was inoperable with Unit 3 in a condition which required four operable ADVs, the three remaining operable ADVs were capable of performing the safety function. Therefore, the event did not result in potential safety consequences beyond those analyzed in the UFSAR. The safety significance associated with the subject condition was very

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associated with the subject condition was very small. The Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP) associated with the period of unavailability of ADV-178 were estimated to be $1.3\text{E-}8$ and $1.2\text{E-}9$, respectively, using the PVNGS at-power probabilistic risk assessment model developed for 10 CFR 50.65(a)(4) risk evaluations. These contributions to risk are considered "very small" per NRC Regulatory Guide 1.174, *An Approach for using Probabilistic Risk Assessment in Risk Informed Decisions on Plant Specific Changes to the Licensing Basis*.

The condition would not have prevented the fulfillment of the safety function; and the condition did not result in a safety system functional failure as defined by 10 CFR 50.73(a)(2)(v).

6. CAUSE OF THE EVENT:

The event resulted from improperly installed sealing rings on the valve internals which created excessive friction between internal valve components when the valve was stroked with steam pressure applied.

The causes of the event were determined to be human error by maintenance personnel during re-assembly of valve internals and inadequacies with the procedure used to perform the valve maintenance.

7. CORRECTIVE ACTIONS:

To correct the problem with improperly installed sealing rings, ADV-178 was disassembled and a new valve plug and new sealing rings were installed in their proper configuration. Post maintenance testing was successfully completed to verify valve function.

To prevent recurrence, corrective actions will revise work instructions to provide detailed guidance for valve re-assembly and to require verifications of proper re-assembly.

Any additional corrective actions taken as a result of this event will be implemented in accordance with the PVNGS corrective action program. If information is subsequently developed that would significantly affect a reader's understanding or perception of this event, a supplement to this LER will be submitted.

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8. PREVIOUS SIMILAR EVENTS:

A similar event was reported in LER 50-529/2012-003-00 which resulted when testing in Mode 3 following refueling activities identified an inoperable steam supply valve for the steam driven auxiliary feedwater pump. The corrective actions taken as a result of the event reported in LER 50-529/2012-003-00, were to revise valve specific work instructions and would not have prevented the event discussed in this LER (50-530/2015-002-00).