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10 CFR 50.73

Palo Verde Nuclear  
Generating Station

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102-05354-CE/CKS/DLK  
October 7, 2005

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 2005-004-00**

Attached please find Licensee Event Report (LER) 50-528/2005-004-00 prepared and submitted pursuant to 10 CFR 50.73. This LER reports a shutdown required by Technical Specifications based on the inability to return "B" Emergency Diesel Generator to operable status following a failed routine surveillance test within the required action completion time.

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 Senior Resident Inspector. If you have questions regarding this submittal, please contact Daniel G. Marks, Section Leader, Regulatory Affairs, at (623) 393-6492.

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/ca

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](mailto: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 Unit 1	2. DOCKET NUMBER 05000528	3. PAGE 1 OF 4
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4. TITLE Technical Specification Required Reactor Shutdown on EDG "B" Voltage Regulator Failure
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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	12	2005	2005	- 004 -	00	10	07	2005	None	05000
									None	05000

9. OPERATING MODE  1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (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)								
10. POWER LEVEL  94	<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)(vii)(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 checked="" 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 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 Daniel G. Marks, Section Leader, Regulatory Affairs	TELEPHONE NUMBER (Include Area Code) (623) 393-6492
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## 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
B	EK	DG	C634	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 August 12, 2005 at 0019 Palo Verde Unit 1 was in Mode 1 (Power Operations), operating at approximately 94 percent power, when Control Room personnel commenced a reactor shutdown required by Technical Specification 3.8.1.

Prior to the event, on August 9, 2005, Emergency Diesel Generator "B" failed to maintain proper steady state output voltage during the performance of a routine monthly surveillance test. Engineering and Maintenance personnel were unable to identify and correct the cause of the fluctuating generator output voltage within the 72 hour required action completion time associated with Limiting Condition for Operation 3.8.1 which would have expired August 12, 2005 at 0420. At 0216 on August 12, 2005 Control Room personnel manually tripped the reactor from 23 percent reactor power. At 0217, Palo Verde Unit 1 entered Mode 3 (Hot Standby), completing a reactor shutdown required by Technical Specification 3.8.1. At 2237 on August 12, 2005, Unit 1 entered Mode 5 (Cold Shutdown) and exited LCO 3.8.1.

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

In the past three years, Palo Verde reported reactor shutdowns required by Technical Specifications but none associated with the same root cause.

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		2005 --	004 --	00	

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

## 1. REPORTING REQUIREMENT(S):

This LER (50-528/2005-004-00) is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(A), to report the completion of a reactor shutdown required by Technical Specifications. Specifically, on August 12, 2005 Control Room personnel completed a reactor shutdown to avoid exceeding the 72 hour required action completion time associated with Technical Specification Limiting Condition for Operation (LCO) 3.8.1 condition "B". LCO 3.8.1 condition "B" requires two Emergency Diesel Generators (EDG) (EIS code: EK, DG), each capable of supplying one train of the onsite class 1E alternating current (ac) power distribution system, be operable. On August 12, 2005 at 0026 a 4-hour NRC notification was made per 10 CFR 50.72 to report a plant shutdown required by Technical Specifications (re: ENS 41913).

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

The standby power supply (EIS code: EK) for each safety-related load group consists of one EDG, complete with its accessories and fuel storage and transfer systems. The standby power supply functions as a source of alternating current (ac) power for safe plant shutdown in the event of loss of preferred power and for post-accident operation of engineered safety feature (ESF) loads.

## 3. INITIAL PLANT CONDITIONS:

On August 12, 2005 Palo Verde Unit 1 was in Mode 1 (Power Operations), operating at approximately 94 percent power. At the start of the event EDG "B" was inoperable. No other major structures, systems, or components were inoperable that contributed to the event.

## 4. EVENT DESCRIPTION:

Prior to the event, on August 9, 2005, voltage anomalies (steady state voltage fluctuations) were observed immediately after EDG "B" was started for a routine monthly surveillance. At 0420 on August 9, Control Room personnel declared EDG "B" inoperable and entered Technical Specification 3.8.1 condition "B." EDG "B" was quarantined and a work mechanism was initiated to troubleshoot the voltage anomalies.

Technical Specification 3.8.1 condition "B" requires the following actions to be completed with one EDG inoperable:

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

B.1 Perform SR 3.8.1.1 for the operable required offsite circuit(s) within 1 hour and once per 8 hours thereafter and,

B.2 Declare required feature(s) supported by the inoperable DG inoperable when its redundant required feature(s) is inoperable within 4 hours from discovery of condition B concurrent with inoperability of redundant required feature(s) and,

B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure within 24 hours (or)

B.3.2 Perform SR 3.8.1.2 for OPERABLE DG within 24 hours and,

B.4 Restore DG to OPERABLE status within 72 hours and within 6 days from discovery of failure to meet LCO.

Engineering and Maintenance personnel developed an action plan to troubleshoot EDG "B" and correct the voltage anomalies but were not successful in identifying the cause of the problem within the 72 hour required action completion time allowed by Technical Specification 3.8.1. Unable to restore EDG "B" to operable status within 72 hours, at 0019 on August 12, 2005 Control Room personnel entered LCO 3.8.1 condition "H" and commenced a normal reactor shutdown. LCO 3.8.1 condition "H" requires Unit 1 to be in Mode 3 (Hot Standby) within 6 hours and Mode 5 (Cold Shutdown) within 36 hours. At 0216 on August 12, 2005, Control Room personnel performed a manual reactor trip from 23 percent reactor power. At 0217, Unit 1 entered Mode 3. On August 12, 2005, at 2237, Unit 1 entered Mode 5 and exited LCO 3.8.1.

## 5. ASSESSMENT OF SAFETY CONSEQUENCES:

With one EDG inoperable, the remaining operable EDG and offsite circuits are adequate to supply electrical power to the onsite class 1E ac power distribution system. The 72 hour required action completion time takes into account the capacity and capability of the remaining ac sources, a reasonable time for repairs, and the low probability of a Design Basis Accident.

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.

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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 and 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 cause of the event was the inability to return EDG "B" to operable status within the 72 hour required action completion time allowed by LCO 3.8.1 condition "B."

The root cause of the EDG "B" voltage anomalies was a failed Automatic Voltage Regulator (AVR) (EIS code: EK, DG, RG). The AVR manufacturer is NEI Peebles/Portec, model number 72-08300-100.

The engineering action plan to troubleshoot the voltage anomalies attempted to first rule out possible causes not associated with the AVR in part because replacement of the AVR would require post maintenance load rejection surveillance testing in accordance with Technical Specification Surveillance Requirement (SR) 3.8.1.9. Performance of this surveillance is prohibited in Modes 1 through 4.

## 7. CORRECTIVE ACTIONS:

On August 12, 2005 the reactor was manually shutdown. The AVR on EDG "B" was replaced and all retests were completed satisfactorily. On August 14, 2005, at 1232, EDG "B" was returned to operable status.

A significant investigation into the EDG "B" voltage anomalies is currently in progress. If results from the significant investigation identify substantial information that would change the reader's perception of the event or corrective actions described in this LER, a supplemental LER will be submitted.

## 8. PREVIOUS SIMILAR EVENTS:

In the past three years, Palo Verde reported reactor shutdowns required by Technical Specifications but none associated with the same root cause.