



Palo Verde Nuclear  
Generating Station

Gregg R. Overbeck  
Senior Vice President  
Nuclear

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192-01130-GRO/SAB/DJS  
November 12, 2003

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Mail Station P1-37  
Washington, DC 20555-0001

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)**  
**Unit 1, 2, 3**  
**Docket No. STN 50-528, 50-529, 50-530**  
**License No. NPF-41, NPF-51, NPF-74**  
**Licensee Event Report 2003-003-00**

Attached please find Licensee Event Report (LER) 50-528/2003-003-00 that has been prepared and submitted pursuant to 10CFR50.73. This LER reports the discovery and corrective actions taken as a result of an operation or condition which was prohibited by PVNGS' Technical Specifications and that could have prevented fulfillment of a Safety Function. Preparations for Unit 2 Steam Generator Replacement Outage (U2R11) revealed that the temporary Containment Pedestal Crane (CPC) was not seismically qualified. The CPC is installed on a Q-class structure during MODE 5 at the beginning of an outage, and is removed prior to MODE 4 at the end of an outage. The non-qualified CPC has been placed in service in all three units, the first application being Unit 1 in May 1995. With the CPC in operation with a load on the hook, and if a seismic event were to occur PVNGS may not have been able to meet the TS action statements for MODE 5 and MODE 6 Shutdown Cooling.

In accordance with 10CFR50.4, a copy of this LER is being forwarded to the NRC Regional Office, NRC Region IV and the Resident Inspector. If you have questions regarding this submittal, please contact Daniel G. Marks, Section Leader, Regulatory Affairs, at (623) 393-6492.

A member of the **STARS** (Strategic Teaming and Resource Sharing) Alliance

Callaway • Comanche Peak • Diablo Canyon • Palo Verde • South Texas Project • Wolf Creek

IE22

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

Sincerely,

*David Mauldin*  
for G.R. Overbeck

GRO/SAB/DJS/kg

Attachment

cc: B. S. Mallett  
M. B. Fields  
N. L. Salgado

NRC Region IV Regional Administrator  
NRC NRR Project Manager + (send electronic and paper)  
NRC Senior Resident Inspector for PVNGS

## LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory information 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 Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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 7

## 4. TITLE

Technical Specification Violation for Failure to meet Shutdown Cooling Trains OPERABLE Action Statements

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
09	19	2003	2003	003	00	11	12	2003	Palo Verde Unit 2	05000529
									Palo Verde Unit 3	05000530
9. OPERATING MODE		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)								
1										
10. POWER LEVEL		98								
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## 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 7
		2003	-- 003	-- 00	

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

## 1. REPORTING REQUIREMENT(S):

This LER 530/2003-003-00 is submitted to report events that resulted in an operation or condition prohibited by the plant's Technical Specifications (TS) as specified in 10CFR50.73(a)(2)(i)(B).

Specifically, on September 19, 2003, during preparations for the Steam Generator Replacement Outage U2R11, review of the strategy to use 4 cranes (EIS: LP) inside of containment in support of the work associated with the Steam Generators (SG) (EIS: AB) replacement, several constraints were identified. In particular, during review of proposed use of the two auxiliary cranes which will be installed and utilized by Bechtel, concerns arose regarding the seismic qualification of the cranes. This review went further and it was discovered that there was also an issue with the Containment Pedestal Crane (CPC), which is installed over steam generator #1 during mode 5, and removed prior to mode 4 of each outage. The CPC is a "Non-Seismic" crane installed on a Q-class structure.

Technical Specification 3.4.7 RCS Loops - MODE 5, Loops Filled

LCO 3.4.7 One Shutdown Cooling (SDC) train shall be OPERABLE and in operation, and either:

- One additional SDC train shall be OPERABLE; or
- The secondary side water level of each Steam Generator (SG) shall be  $>$  or  $=$  to 25%.

And

Technical Specification 3.9.4 Shutdown Cooling (SDC) and coolant circulation — high water level — MODE 6

LCO 3.9.4 One SDC loop shall be OPERABLE and in operation.

And

Technical Specification 3.9.5 Shutdown Cooling (SDC) and coolant circulation — low water level — MODE 6

LCO 3.9.5 Two SDC loops shall be OPERABLE, and one SDC loop shall be in operation.

**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	3 OF 7
		2003	-- 003	-- 00	

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

With the CPC in operation over the Train "A" SDC, it violates the Seismic Category IX requirement and the Train "A" SDC and/or Reactor Coolant System (RCS) (EIS: AB) can not be considered operable, and the applicable ACTION STATEMENTS were not met.

This LER also reports a condition that could have prevented the fulfillment of a Safety Function as specified in 10CFR50.73(a)(2)(v)(B) and 10CFR50.73(a)(2)(vi).

Specifically, with the Train "B" of SDC inoperable due to maintenance activities, and if a seismic load failure of the CPC were to occur over Train "A," the SDC may have been prevented from the fulfillment of its safety function to remove residual heat during and after a safe shutdown earthquake (SSE). The use of the non-seismically qualified CPC meets the reporting threshold of 10CFR50.73(a)(2)(vi); "discovery of design, analysis, fabrication, construction, and/or procedural inadequacies."

The CPC was not in service at the time of discovery, therefore no notification was made under 10CFR50.72(b)(3)(v)(B).

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

The functions of the Shutdown Cooling System (EIS: BP) are:

- Supplements other heat rejection equipment as necessary to reduce the temperature of the RCS in post-shutdown periods from approximately 350°F to the refueling temperature and to maintain the refueling temperature for extended periods of time.
- Supplement other heat rejection equipment in cooling the plant and bringing it to cold shutdown operation following a steam line break or small break LOCA.
- Remove heat from containment (EIS: NH) following a LOCA by shifting heat exchangers to the recirculation mode.
- Supplement the cooling capacity of the fuel pool cooling system (EIS: DA) during refueling operations.
- Transfer water between the refueling water tank and refueling pool when filling and draining the refueling pool.

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

**3. INITIAL PLANT CONDITIONS:**

On September 19, 2003, at approximately 16:00 Mountain Standard Time (MST), Palo Verde Unit 1, Unit 2 and Unit 3 were in Mode 1 (POWER OPERATION), operating at approximately 98 percent power. There were no major structures, systems, or components that were inoperable at the start of the event that contributed to the event. There were no failures that rendered a train of a safety system inoperable and no failures of components with multiple functions were involved.

**4. EVENT DESCRIPTION:**

At approximately 16:00 MST on September 19, 2003, during preparation for the Steam Generator Replacement Outage (U2R11), review of the implementation strategy for use of 4 cranes inside of containment in support of the work associated with the SG replacement, several constraints were identified. In particular, during review of proposed use of the two auxiliary cranes which will be installed and utilized by Bechtel, concerns arose regarding the seismic qualification of the cranes. This review went further and it was discovered that there was also an issue with the Containment Pedestal Crane (CPC) which is installed over steam generator #1 during mode 5, and removed prior to mode 4 of each outage. The CPC is a "Non-Seismic" crane installed on a Q-class structure, which has been evaluated in Legacy Work Order # 694496 as follows:

1. Seismic (SSE) during operation (with no crane installed).
2. Seismic Category IX during outage with crane installed but with no load on the hook.
3. Non-seismic during operation of the crane (load on the hook).

Use of the CPC in the third condition is a violation of the seismic category IX requirement for RCS integrity and safe shutdown / operability requirements in place during modes 5 and 6.

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**5. ASSESSMENT OF SAFETY CONSEQUENCES:**

The temporary Containment Pedestal Crane (CPC) had been used in all three Units during refueling outages since May, 1995. Palo Verde had not experience a recordable seismic event during any of the refueling outages during this time frame; May, 1995 through September, 2003.

This condition did not adversely affect the safe operation of the plant or health and safety of the public.

However, the CPC is classified as "non-seismic" during operation of the crane (load on the hook). Use of the CPC in this condition is a violation of the Seismic Category IX requirement for RCS integrity and safe shutdown / operability requirements in place during MODE 5 and 6. With the CPC in operation over the Train "A" SDC it violates the Seismic Category IX requirement and the Train "A" SDC and/or RCS cannot be considered operable, and the applicable action statements of TS 3.4.7 "RCS loops – MODE 5, loops filled," TS 3.9.4 "Shutdown Cooling (SDC) and coolant circulation — high water level – MODE 6" and TS 3.9.5 "Shutdown Cooling (SDC) and coolant circulation — low water level – MODE 6" were not met.

With the Train "B" of SDC inoperable due to maintenance activities, and if a seismic load failure of the CPC were to occur over Train "A," the SDC may have been prevented from the fulfillment of its safety function to remove residual heat during and after a safe shutdown earthquake (SSE).

No recordable seismic event is known to have occurred during any of the outages where the CPC cranes were placed in service, therefore the impact to safety consequences is considered minimal.

**6. CAUSE OF THE EVENT:**

APS has concluded that the design basis information used to qualify the CPC did not contain sufficient information to clearly define crane use criteria. The Design Basis Manual (DBM) guidance for qualification requirements for cranes with respect to seismic

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design and live loads was inadequate. Specifically DBM C6 Section 5.13.1.4.c (Crane Loads) states "With the exception of the Fuel Building Overhead Crane, lift loads were not combined with seismic loads. Crane lift loads shall not be combined with tornado loads". The lack of adequate seismic qualification was caused by poor guidance in the civil seismic DBM and a misinterpretation by engineers with respect to NUREG-0612 and crane design requirements. Contributing causes include time pressure and miscommunication, which are attributed to the modification process in place during the 1995 time frame.

No unusual characteristics of the work location (e.g., noise, heat, poor lighting) directly contributed to this event.

**7. CORRECTIVE ACTIONS:**

The CPC was not used during U2R11 (September through December 2003) while Shutdown Cooling or RCS integrity would be compromised or required to be operable.

Also, the Design Basis Manual will be revised to clarify guidance for qualification requirements for cranes with respect to seismic design and live loads.

Any additional corrective actions taken as a result of the investigation of this event will be implemented in accordance with the APS 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.

**8. PREVIOUS SIMILAR EVENTS:**

The non-qualified CPC has been placed in service in all three units, the first application being Unit 1 in May 1995. With the CPC in operation and with a load on the hook, and if a seismic event were to occur PVNGS may not have been able to meet the TS action statements for modes 5 and 6 - Shutdown Cooling.



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9. ADDITIONAL INFORMATION:

The Containment Pedestal Crane (CPC) placed in service during the Unit 1 outage in May of 1995 replaced the Reactor Coolant Pump bay jib cranes. The jib cranes were used from the initial plant startup until May 1995. Like the CPC, the jib cranes were installed at the beginning of an outage and removed prior to the end of the outage. The jib cranes were installed without seismic qualifications. The conditions specifically addressed in this LER would have also applied during the time line when the non-seismic qualified jib cranes were in service.

No recordable seismic event is known to have occurred during any of the outages where the jib cranes were placed in service, therefore the impact to safety consequences is considered minimal.