



Palo Verde Nuclear  
Generating Station

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102-05363-CDM/TNW/GAM  
October 21, 2005

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
11555 Rockville Pike  
Rockville, Maryland 20852

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2 and 3  
Docket Nos. STN 50-528, 50-529, and 50-530  
Proposed License Condition to Implement Changes Associated with  
10 CFR 50.63, Station Blackout**

By letter no. 102-05116, dated July 9, 2004, Arizona Public Service Company (APS) submitted a request for an operating license amendment to support steam generator replacement (SGR) and power uprate (PUR) in PVNGS Units 1 and 3. By letter no. 102-05313, dated July 19, 2005, in response to an NRC request for additional information regarding the proposed amendment, APS committed to conservatively change the PVNGS four-hour station blackout (SBO) coping to 16-hour coping, and committed to submit the revised SBO evaluations and implementation schedule to the NRC by October 31, 2005.

During discussions with the NRC staff regarding the proposed Units 1 and 3 SGR/PUR operating license amendments, the staff indicated that implementation of the changes needed for 16-hour SBO coping is a vital element of the staff's approval of the SGR/PUR license amendment. Therefore, APS proposes the following license condition to be imposed along with other legally binding aspects of the SGR/PUR amendment (e.g., when the amendment is effective and when it must be implemented) on the amendment page that is signed by the NRR staff (as discussed in NRC Office Instruction LIC-101, Revision 3, License Amendment Review Procedures, Section 4.4):

APS will implement the changes needed to revise from a four hour station blackout coping duration to a 16 hour coping duration within six months following NRC approval of the proposed coping changes.

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APS committed to submit the revised SBO evaluations by October 31, 2005. Based on discussions with the NRC staff, APS anticipates that NRC review and approval of the proposed SBO coping changes will take approximately six months. Therefore, implementation of the SBO coping changes is anticipated to be completed by October 31, 2006 provided NRC approval of the SBO coping changes is received by April 30, 2006. A safety basis for the implementation schedule for the SBO coping changes is provided below.

### **1. Improvements in Grid Reliability Since the June 14, 2004 Loss Of Offsite Power**

The June 14, 2004 loss of offsite power event at PVNGS involved a fault on the 230 kV system that did not clear due to a malfunctioning relay. Subsequent to the June 14, 2004 event, a number of actions have been taken to improve the reliability of the PVNGS offsite power system. Redundant relays were added to the 230 kV protection circuits to ensure that failure of any one relay would not prevent proper protective actuation at the 230 kV level. Later, these relays and the associated protective devices were replaced with microprocessor-type protective relays that further improve the reliability of these functions. To provide an additional level of protection, overcurrent protection was added to the 525 to 230 kV transformers at the Westwing switchyard. With these changes in place, two or more levels of protection exist for all fault scenarios (e.g., phase-to-phase and phase-to-ground faults) for the high voltage transmission systems that could affect PVNGS. In addition, the design and operation of the transmission system has been reviewed by (1) APS, (2) the Western Electricity Coordinating Council (WECC) Disturbance Report Task Force, and (3) the North American Electric Reliability Council (NERC), who performed readiness audits of the transmission system operators (Arizona Public Service and Salt River Project).

### **2. Conservatism in the Current Four-Hour SBO Coping Analysis**

The current PVNGS SBO analysis assures that PVNGS can cope with an SBO for a minimum of four hours. However, since the analysis contains a number of conservatisms, the actual expected SBO coping capability would be greater than four hours. Some of the conservatisms are described below.

#### **Heat Removal**

The main steam atmospheric dump valves (ADVs) are credited to cool down the steam generators and remove decay heat during an SBO. A quality-class nitrogen accumulator is provided for each ADV. The nitrogen accumulators have more than adequate capacity to provide compressed gas for ADV operation during an SBO to enter shutdown cooling conditions. In addition, ADVs can be manually operated if necessary.

Makeup water to the steam generators following an SBO would be provided by the turbine driven auxiliary feedwater (AFW) pump. Technical Specification 3.7.6 establishes a minimum condensate storage tank (CST) level. The minimum CST level would assure sufficient volume to maintain the plant at mode 3 for 8 hours, followed by a cooldown to shutdown cooling entry conditions at the design cooldown rate.

### RCS Inventory

The current four-hour PVNGS SBO coping analysis assumes a constant leakage of 25 gallons per minute (gpm) from each of the four reactor coolant pumps for four hours. This is very conservative since the leak across the seals would be significantly reduced due to reduction of RCS temperature and pressure during the event.

### Alternate AC Source

The PVNGS SBO analysis credits only a single gas turbine generator (GTG) for SBO alternate AC (AAC) power. However, PVNGS maintains two GTGs that would be expected to be available following an SBO. Their operation is not limited to four hours.

### **3. Risks Associated with SBO**

The current 95<sup>th</sup> percentile frequency for loss of offsite power for grid-centered events at PVNGS is 2.68E-2 per year, or once in 37 years. This is well below the NUMARC 87-00 criteria of an expected loss of offsite power frequency of once in 20 years or greater that would result in a plant being in the P3 category and needing 16-hour SBO coping.

The contribution of SBO to total core damage frequency (CDF) at PVNGS is 1.9E-6 per year. NUREG-1032, "Evaluation of Station Blackout Accidents at Nuclear Power Plants," June 1988, estimated that a "typical" CDF was on the order of 1E-5 per year. Therefore, the current PVNGS SBO CDF contribution is below the typical value estimated by the NRC in 1988.

These values were calculated with the PVNGS probabilistic risk assessment (PRA) model which has been updated to reflect the June 14, 2004 PVNGS loss of offsite power and the loss of the eastern United States grid in 2003.

In addition, in the Statements of Consideration for the 10 CFR 50.63 station blackout final rule (53 FR 23203, June 21, 1988), the NRC stated that station blackout does not pose an undue risk to the public and that no undue risk exists with, or without, the promulgation of the station blackout rule.

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Conclusion

APS has voluntarily agreed to change the present four hour SBO coping duration to a 16 hour coping duration as a conservative action. Implementation of the associated plant and procedure changes will take up to six months following NRC approval of the proposed SBO coping changes. However, the combination of improvements in grid reliability, conservatisms in the current four-hour SBO coping analysis, and the low risks associated with SBO justify continuing operation until the SBO coping changes can be implemented.

No commitments are being made to the NRC by this letter. If you have any questions, please contact Thomas N. Weber at (623) 393-5764.

Sincerely,

A handwritten signature in cursive script that reads "David Maulden".

CDM/TNW/GAM

cc:	B. S. Mallett	NRC Region IV Regional Administrator
	M. B. Fields	NRC NRR Project Manager
	G. G. Warnick	NRC Senior Resident Inspector for PVNGS