



A subsidiary of Pinnacle West Capital Corporation

Palo Verde Nuclear  
Generating Station

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102-05852-DCM/GAM  
April 30, 2008

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  
Response to Request for Additional Information Regarding Request  
for Amendment to Technical Specification 3.5.5, Refueling Water  
Tank (RWT), to Increase the RWT Minimum Water Level for Unit 2  
Under Exigent Circumstances**

In an email from Michael Markley, NRC, to Thomas Weber, Arizona Public Service Company (APS), dated April 22, 2008, the NRC provided a request for additional information (RAI) concerning APS letter no. 102-05844, "Request for Amendment to Technical Specification 3.5.5, Refueling Water Tank (RWT), to Increase the RWT Minimum Water Level for Unit 2 Under Exigent Circumstances," dated April 10, 2008. This submittal provides responses to the NRC RAI.

### **NRC Question 1**

Calculation Methodology: Provide documentation (including sample calculations) of the methodology used for establishing the limiting RWT minimum water level and corresponding volume acceptable values for the As-Found and As-Left settings as measured in periodic surveillance testing. Indicate the related Analytical Limits and other limiting design values (and the sources of these values) for the RWT minimum water level and corresponding volume.

### **APS Response**

For consistency of terminology, APS does not consider the volume specified in SR 3.5.5.2 to be the equivalent of an Allowable Value determined by a setpoint calculation. This License Amendment Request (LAR) is not proposing any changes to the recirculation actuation signal (RAS) trip setpoint or any changes to as-found values associated with RAS or any other instruments of the RWT level channels. APS does,

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however, acknowledge the fact that the RWT minimum water level and corresponding volume are associated with the RAS setpoint due to the inherent relationship of the design function to transfer the required volume prior to RAS.

The method for establishing RWT minimum water level involves the three major steps described below. These are all described in Calculation 13-JC-CH-0209, Revision 8, "Refueling Water Tank Level Measurement."

(1) Minimum Delivered Volume Determination

The determination of minimum volumes required to be delivered to the reactor coolant system (RCS) and/or containment, includes consideration of where the water is located in the tank (i.e., above or below the boric acid makeup pump [BAMP] suction line). The minimum volumes of water to be delivered to the RCS and/or containment are determined by consideration of all of the associated design functions of the RWT. Their location in the RWT and any other considerations such as net positive suction head (NPSH) are also included in the analysis. These are included as references in Calculation 13-JC-CH-0209, Revision 8.

(2) Instrument Uncertainty Determination

The instrument uncertainty is based on ISA 67.04 and is consistent with Regulatory Guide (RG) 1.105. Palo Verde is committed to Revision 1 of RG 1.105 (see UFSAR section 1.8, Conformance to NRC Regulatory Guides). The random uncertainties are combined using square-root-sum-of-squares method. The bias uncertainties are added, negative with negative and positive with positive so there is no cancellation of bias uncertainties. For the water volumes that must be delivered between the TS minimum level and the RAS, the uncertainties of both the RAS bistable and the control board indicator have been considered. For water volumes above the BAMP suction line, the uncertainties of the indicators and their upstream devices were considered. In all cases the effect of potential temperature variations on the instruments and the potential instrument drift between channel calibrations is included.

(3) Minimum Required Level Determination

The minimum required level is determined by adding each of the volumes, with its associated level, to the instrument uncertainty and using the most demanding as the minimum required level. The most demanding volume and level requirement, including applicable uncertainty, as presently analyzed, is to provide sufficient water to cover the containment recirculation sump strainers. This volume is located between the TS minimum level and the RAS setpoint. The highest required level is at hot RCS conditions, and decreases as RCS average

temperature decreases and the corresponding volume requirements for RCS contraction decrease. However, for ease of use by Operations, the level is held constant at the highest level (rounded up to integer value) for the range of RCS temperatures during normal power operations. The required level then decreases consistent with the decrease in volume required for RCS contraction.

The As-Found and As-Left tolerances for the calibration of the indicators used to verify adequate RWT level are determined in Calculation 13-JC-CH-0209, Revision 8. The as-left tolerances are the base accuracy of the instruments. The as-found tolerances include basic instrument accuracy, maintenance and testing equipment accuracy, potential drift, and temperature effect.

## **NRC Question 2**

**Measures to Ensure Operability:** Describe the measures to be taken to ensure that the associated instrument channel is capable of performing its specified safety functions in accordance with applicable design requirements and associated analyses. Include in your discussion information on the controls you employ to ensure that the As-Left setting after completion of periodic surveillance is consistent with your methodology. Also, discuss the plant corrective action processes (including plant procedures) for restoring channels to operable status when channels are determined to be "inoperable" or "operable but degraded." If the controls are located in a document other than the TS (e.g., plant test procedure), describe how it is ensured that the controls will be implemented.

## **APS Response**

The measures taken to ensure that the associated instrument channel is capable of performing its specified safety functions in accordance with applicable design requirements and associated analyses are anchored in the Palo Verde surveillance program. TS SR 3.3.5.1 requires the RWT level channels to have a CHANNEL CHECK performed every 12 hours, TS SR 3.3.5.2 requires the RWT level channels to have a CHANNEL FUNCTIONAL TEST performed every 92 days, and TS SR 3.3.5.3 requires the RWT level channels to have a CHANNEL CALIBRATION performed every 18 months. The expected instrumentation performance criteria is developed in design engineering setpoint and uncertainty calculations and used to establish acceptance criteria in the associated surveillance test procedures.

The As-Left tolerance bands required by the design engineering setpoint and uncertainty calculations are documented in the surveillance test procedures as being the required acceptance criteria for the As-Left values. The Impact Review Process is the configuration management tool used to ensure alignment between surveillance test As-Left acceptance criteria and that required by the associated calculation methodology. Any values found to be outside the As-Left acceptance criteria must be

reset to a value within the As-Left acceptance criteria for the surveillance test to be completed satisfactorily.

Acceptance criteria bands are derived from the design engineering setpoint and uncertainty calculation methodology. If the As-Found value, associated with a setpoint with an Allowable Value (AV) in TS, exceeds the AV then the channel is inoperable and the associated action requirements are followed. If any channel instrument or instrument group As-Found value exceeds the predefined expected performance limit (As-Found band), but the instrument channel is functioning as expected and can be reset to within the As-Left band, then the channel is returned to service and the event is entered into the Corrective Action Program (CAP) for further evaluation and trending. Anytime that it cannot be determined that the instrument is functioning as required, then the instrument is declared inoperable. When a channel is placed in bypass for testing purposes, it is declared inoperable until testing is completed satisfactorily and the channel is removed from bypass.

Both the Surveillance Testing procedure and the Out of Tolerance Program Controls procedure establish controls for the above requirements to identify and document out of tolerance conditions and to enter the CAP.

No commitments are being made to the NRC by this letter. If there are any questions or if additional information is needed, please contact Glenn Michael at (623) 393-5750.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 4/30/08  
(Date)

Sincerely,



DCM/SAB/GAM/gat

cc:	E. E. Collins Jr.	NRC Region IV Regional Administrator
	M. T. Markley	NRC NRR Project Manager
	R. I. Treadway	NRC Senior Resident Inspector for PVNGS
	A. V. Godwin	Arizona Radiation Regulatory Agency (ARRA)
	T. Morales	Arizona Radiation Regulatory Agency (ARRA)