APS

A subsidiary of Pinnacle West Capital Corporation

Palo Verde Nuclear
Generating Station

David Mauldin
Vice President
Nuclear Engineering

Tel: 623-393-5553
Fax: 623-393-6077

Mail Station 7605
PO Box 52034
Phoenix, Arizona 85072-2034

102-05575-CDM/SAB/RJR
September 28, 2006

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

References: APS letter 102-05398-CDM/SAB/RJR, "Proposed Alternative to PVNGS' ASME Section XI Inservice Inspection Program for ASME Code Category B-F, B-J, C-F-1, and C-F-2 Piping (Relief Request 32)," dated January 16, 2006.

APS letter 102-05515-CDM/SAB/RJR, "Response to the NRC Request for Additional Information Regarding Risk-Informed Inservice Inspection Program Request (TAC NOS. MC9627, MC9628, AND MC9629)," dated June 10, 2006.

APS letter 102-05559-CDM/SAB/RJR, "Response to the NRC Request for Additional Information Regarding Risk-Informed Inservice Inspection Program Request (TAC NOS. MC9627, MC9628, AND MC9629)," dated August 30, 2006.

SUBJECT: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. STN 50-528/529/530
Information in Response to the NRC Phone Call on
July 21, 2006 (TAC NOS. MC9627, MC9628, AND MC9629)

Dear Sirs:

In the letters referenced above, Arizona Public Service (APS) submitted a proposed alternative and responses to requests for additional information associated with a request for relief to section 50.55a(g) of Title 10 of the *Code of Federal Regulations* (10 CFR). Specifically, APS proposed using a risk-informed (RI) Inservice Inspection (ISI) program as an alternative to the current ISI program requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code of record for Palo Verde Nuclear Generating Station, Units 1, 2, and 3.

On July 21, 2006, APS and the NRC discussed the inspection frequency for nickel based alloy dissimilar metal welds currently listed in the risk-informed ISI Program relief request and the Risk Category 4 portion of the charging system. This letter documents the APS response to the questions asked by the NRC.

NRC Question 1:

How is APS going to address the inspection frequency for the nickel based alloy dissimilar metal welds currently listed in the risk-informed ISI Program relief request? Are the inspection frequencies for these welds going to be consistent with the EPRI guidance?

APS Response:

A plant augmented inspection program is being implemented at Palo Verde in response to MRP-139, "Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guidelines." The requirements of MRP-139 will be used for the inspection and management of PWSCC susceptible dissimilar metal welds and will supplement the RI-ISI Program selection process. The RI-ISI Program will not be used to eliminate any MRP-139 requirements.

NRC Question 2:

In the June 10, 2006 response to the NRC request for additional information, it is stated that the risk category 4 portion of the charging system is located just beyond the affected region of the charging line that is potentially subjected to thermal transients when flow is restored after a loss of charging event. Please provide the thermal transient analysis and the criteria used to identify the boundary between the risk category 2 segment and the risk category 4 segment.

APS Response:

The basis for the Thermal Transient analysis for the charging line is provided in EPRI document number EPRI TR-104534-V2, "EPRI Fatigue Management Handbook, Volume 2 – Screening Criteria," December 1994.

The site specific analysis can be summarized in the following manner. In the case of the charging line under conditions of interruption and restoration of charging flow, there are two distinct regions for Thermal Transient evaluation. When flow is interrupted, hot RCS cold leg fluid will conservatively be expected to fill that portion of the line (through turbulent penetration and convection) which is vertically upward or horizontal off the RCS cold leg. Let us call this Region 1. Beyond the point where the line turns vertically downward, the line would not be heated by convection, and it is also remote enough

(>90 ft. from RCS main loop) to not be within the effective range of turbulent penetration from the RCS cold leg, which is the only mechanism by which the line could potentially be heated in this configuration. Therefore, beyond the downward turn of the charging line, the piping would revert to approximately containment ambient temperature during any significant period of charging flow interruption. Let us call this Region 2. For purposes of conservatism, the weld on the vertical side of the first down-elbow is also included in Region 1.

Upon flow restoration, hot charging fluid would first enter the piping remote from the RCS (Region 2) at approximately containment ambient temperature, resulting in a thermal shock to this portion of the charging line. The region closer to the RCS cold leg (Region 1), heated to RCS cold leg temperature, would first encounter a "slug" of cold fluid from the containment ambient piping as it is forced ahead of the restored charging flow, and then almost immediately afterward would encounter the hot restored charging flow itself. This would result in a "double-shock" to Region 1. The Thermal Transient potential for each region must be evaluated separately.

Temperatures, flowrates and operating conditions are provided in the various plant references. The input parameters and calculated results for each of the two regions are provided below:

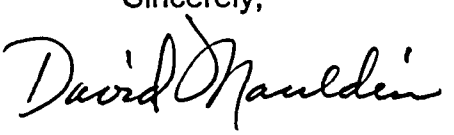
REGION	2	1
System	CH	CH/RC
Example Line No.	CH-E-005-BCAA-3"	CH-E-005-BCAA-3" (+ branch connection)
Line Description	Charging line	Charging line
Operating Condition	Flow restoration	Flow restoration
Hot Fluid Source	Charging flow	Cold leg/charging flow
Cold Fluid Source	Cold slug	Cold slug
Hot Fluid Temp. (F)	450	554/450
Cold Fluid Temp. (F)	120	120
Pipe Material	Stainless steel	Stainless steel
NPS (in)	3.0	3.0
Thickness (in)	0.438	0.438
Q allowable (gpm)	**69.5**	**21.7**
Q actual (gpm)	**62.0**	**62.0**
TT Concern	**NO**	**YES**

The results show that Region 1, also known as Risk Segment X-CH-005, is susceptible to the Thermal Transient degradation mechanism due to the "double-shock" it encounters upon flow restoration, while Region 2, also known as Risk Segment X-CH-004, is not susceptible to thermal transients (TT).

The Risk Informed – Inservice Inspection Program is in the process of being updated (Living Program Update). Verification of the degradation mechanisms, boundaries and selections will be revalidated and updated where required.

This letter contains no new commitments and no revisions to existing commitments. If you have any questions about this change, please telephone Thomas N. Weber at (623) 393-5764.

Sincerely,



CDM/SAB/RJR/gt

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