10 CFR 50.55a

A subsidiary of Pinnacle West Capital Corporation

Palo Verde Nuclear Generating Station

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102-06109-DCM/RJR
December 21, 2009

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528, 50-529, and 50-530
Response to Request for Additional Information
Relief Request No. 40 (TAC Nos. ME1634, ME1635, and ME1636)

By letter no. 102-06029, dated July 1, 2009 (Agencywide Document Access and Management System [ADAMS] Accession No. ML091870432), Arizona Public Service Company (APS) submitted Relief Request No. 40 to the NRC. This relief would allow APS to increase the interval for performing inservice inspection program volumetric examinations of the reactor pressure vessel (RPV).

The enclosure to this letter contains the response to the Request for Additional Information (RAI) provided to APS by the NRC Project Manager on October 22, 2009. The RAI requested responses to questions regarding reactor vessel chemical compositions, flaw evaluation methods and heat up and cooldown cycles.

No commitments are being made to the NRC by this letter. Should you need further information regarding this response, please contact Russell A. Stroud, Licensing Section Leader, at (623)393-5111.

Sincerely,

D. C. Mims

DCM//RAS/RJR/gat

A047
NRR

Enclosure: Response to Request for Additional Information Relief Request No. 40

cc:

E. E. Collins, Jr.	NRC Region IV Regional Administrator
J. R. Hall	NRC NRR Project Manager
R. I. Treadway	NRC Senior Resident Inspector for PVNGS

ENCLOSURE

Response to Request for Additional Information
Relief Request No. 40

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
FOR RELIEF REQUEST NO. 40

NRC Question 1

In Tables 2.1-3, 2.2-3, and 2.3-3, of the Attachment to the July 1, 2009 relief request, values are given for Cu, Ni, and chemistry factor (CF). These compositions are not all consistent with Nuclear Regulatory Commission (NRC) records in the Reactor Vessel Integrity Database (RVID), or the Palo Verde UFSAR (specifically for the axial and circumferential welds). Please explain where the Cu, Ni, and CF values cited in the tables were previously accepted by the NRC, or provide new data.

APS Response

APS has confirmed that the values for copper (Cu), nickel (Ni), and chemistry factor (CF) for the axial and circumferential welds provided in Tables 2.1-3, 2.2-3, and 2.3-3, of Relief Request 40 are consistent with the original certified material test reports (CMTRs) received for the reactor vessel material. On August 17, 1995, APS sent letter 102-03448, Response to NRC Generic Letter 92-01, Rev. 1, Supplement 1, which contained the correct values for Cu, Ni, and CFs. On September 11, 1996, the NRC issued a letter accepting APS' August 17, 1995, submittal and closed TAC Numbers M92709, M92710, and M92711. For completeness, additional correspondence references between the NRC and APS about the RVID status are included in the Reference section.

On November 18, 2009, APS reviewed the current Reactor Vessel Integrity Database and confirmed that several values did not match our July 1, 2009, submittal. APS will work with the appropriate NRC staff to update the RVID to reflect the correct Cu, Ni and CF values.

With regard to the inconsistency between the Palo Verde UFSAR and Relief Request 40, APS has entered an action into the Palo Verde Corrective Action Program to review, and revise the chemical values reported in Chapter 5 of the UFSAR, as appropriate.

NRC Question 2

Table 2.1-2 indicates that a flaw was found in the Palo Verde Nuclear Generating Station, (PVNGS) Unit 1 reactor pressure vessel. Please cite the flaw evaluation as well as the calculation inputs that were used to determine that 29.83 flaws of similar size are acceptable per the proposed pressurized thermal shock rule, Title 10 of the Code of Federal Regulations 50.61a, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events."

APS Response

In accordance with IWB-3600, detailed flaw evaluations are typically performed for flaws exceeding the IWB-3510-1 acceptance standards. The single flaw under review was detected in the Unit 1 reactor vessel beltline region located in the inner 1" of the reactor vessel material, has a through-wall extent (*2a)* dimension of 0.174 inches and a length of 1 inch. The *S* dimension for this flaw was 0.775 inches. The flaw was located in the plate material inspected adjacent to the beltline weld. APS dispositioned the flaw during the inservice inspection in accordance with the acceptance standards of Table IWB-3510-1. Table IWB-3510-1 acceptance standards provides an allowable *a/t* of 2.5% and the *a/t* for this flaw was 1%. Since this particular flaw was below the Table IWB-3510-1 acceptance standards, APS did not perform a detailed flaw evaluation.

This flaw was also evaluated against the flaw criteria for proposed rule 10 CFR 50.61a, (72 FR 56275, October 3, 2007) which provides limits for the number of flaws in the reactor vessel beltline region. These limits are based on the through-wall extent of the flaw (*2a* dimension) and are expressed in terms of number of flaws allowed per 1000 inches of weld length (weld flaws) and the number of flaws allowed per 1000 square inches of plate surface inspected (plate flaws). These limits are depicted in Tables 2 and 3 of SECY-07-0104, "Proposed Rulemaking – Alternative Fracture Toughness Requirements for Protection against Pressurized Thermal Shock," June 25, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession number ML070570141), respectively.

For the flaw under review, the plate flaw limits apply and the *2a* dimension of 0.174 inches places it into the 0.125 inches to 0.175 inches size category. As shown in Table 3, the number of cumulative flaws of this size that are allowed for each 1000 square inches of plate area inspected is 3.146. Figures IWB-2500-1 and IWB-2500-2 of ASME Section XI require a width of plate material on each side of the weld to be inspected that is equal to 1/2 the thickness of the RV shell. Based upon this requirement, and the dimensions of the reactor vessel, the total area of plate inspected by APS was 9,481 square inches in the reactor vessel beltline region. Therefore, the number of allowed flaws in the 0.125 inches to 0.175 inches through-wall-extent (TWE) category is (3.146 flaws/1000in^2)(9481in^2) = 29.83 flaws.

NRC Question 3

Tables 2.1-1, 2.2-1, and 2.3-1 state that PVNGS, Units 1, 2, and 3 are bounded by 13 heatups/cooldowns per year. Please cite the plant design basis for heatup/cooldowns per year for each unit.

APS Response

Palo Verde UFSAR Section 3.8.1.5.4.B.2 is the basis for the heatup and cooldown cycles per year for each unit. The UFSAR states:

> "Thermal cycling due to variation in the interior temperature of the containment during the heatup and cooldown of the reactor system in which the number of cycles is assumed to be 500* cycles for plant life of 40 years
>
> * The reactor vessel studs shall be limited to 250 cycles"

Calculating heatup and cooldown cycles per year for each unit results in a limit of 12.5 cycles per year per unit which is bounded by the 13 heatup and cooldown cycles per year used for CE plants as specified in WCAP-16168 -NP-A (approved by the NRC on May 8, 2008).

References:

1. APS letter 102-03446, Response to NRC Generic Letter 92-01, Revision 1, Supplement 1, dated August 17, 1995.
2. NRC letter, Closeout of Generic Letter 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity" for the Palo Verde Nuclear Generating Station (TAC Nos. M92709, M92710, M92711), dated September 11, 1996.
3. APS letter 102-04139, Response to Request for Additional Information Regarding Reactor Pressure Vessel Integrity at Palo Verde Nuclear Generating Station, dated June 24, 1999.
4. NRC letter, Completion of Generic Letter 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity," for the Palo Verde Nuclear Generating Station (TAC Nos. MA0561, MA0562 and MA0563), dated July 12, 1999.