Palo Verde Nuclear
Generating Station

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10 CFR 50.55a

102-04668-CDM/TNW/RJR
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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

Reference Westinghouse letter LTR-NRC-01-41, dated December 13, 2001, ASME Section XI Inservice Inspection Program Relief Requests – Alternative Repair Techniques, from H. A. Sepp, Manager Regulatory and Licensing Engineering, Westinghouse Electric Company, LLC. to S. J. Collins, NRC.

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528/529/530
Proposed Alternative Repair Methods for Reactor Vessel Head Penetrations – Relief Requests No. 20 and No. 21

During the upcoming PVNGS Unit 2 refueling outage, Arizona Public Service Company (APS) will be conducting inspections of the reactor vessel head penetrations (VHP) in accordance with NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles."

Pursuant to 10 CFR 50.55(a)(3)(i), APS is submitting Relief Requests 20 and 21 to the requirements of Section XI of the ASME Code requesting authorization to use the embedded flaw repair technique transmitted to the NRC in the referenced letter. This technique would be used as an alternative to the requirements in the ASME Code, Section XI, that preclude welding over or embedding an existing flaw.

The first relief request (RR 20) proposed alternative would allow use of an embedded flaw repair technique to repair cracks on the inside diameter (ID) of control element drive mechanisms (CEDM). The second relief request (RR21) proposed alternative would allow use of an embedded flaw repair technique to repair cracks on the outside diameter (OD) of the CEDM as well as repair cracks on the J-groove attachment welds on VHPs. The proposed alternative method of embedded flaw repair has shown to provide an acceptable level of quality and safety.

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The enclosure to this letter includes the PVNGS component identification information as well as the PVNGS plant specific information as it applies to the Westinghouse relief request. APS requests the Staff's review and response to support the PVNGS Unit 2 spring refueling outage which includes the VHP inspections required by NRC Bulletin 2001-01, Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles. Should APS identify the need perform repairs using the embedded flaw repair technique, APS may request expedited approval of these Code alternative requests.

No commitments are being made to the NRC in this letter.

Should you have any questions, please contact Thomas N. Weber at (623) 393-5764.

Sincerely,

CDM/TNW/RJR/kg

Enclosure:

cc: E. W. Merschoff (NRC Region IV)
J. N. Donohew (NRR Project Manager)
J. H. Moorman (NRC Resident Inspector)

ENCLOSURE

Proposed Alternative Repair Method for Reactor Vessel Head Penetrations

Relief Request No. 20 and Relief Request No. 21

Proposed Alternative Repair Method for
PVNGS Reactor Vessel Head Penetrations

Relief Request No. 20 and Relief Request No. 21

Code Class: 1

Code References: 1992 Edition, 1992 Addenda of The American Society of Mechanical Engineers (ASME) Code, Section III, NB-4450, Section XI, IWA-4170, IWA-4310.

Examination Category: B-E

Item Numbers: B4.12

System/Component: Control element drive mechanisms (CEDM) nozzles (97 penetrations)
Reactor head vent nozzle (1 penetration)

PVNGS Units: All

Inspection Interval: Second 10-Year ISI Interval

Code Requirement:

PVNGS Unit 2 is in the second ten-year inservice inspection interval using the 1992 Edition, 1992 Addenda of ASME Code, Section XI.

ASME Section XI, IWA-4170, "Code Applicability," states in part:

> (b) "Repairs shall be performed in accordance with the Owner's Design Specification and the original Construction Code of the component or system. Later Editions and Addenda of the Construction Code or of Section III, either in their entirety or portions thereof, and Code Cases may be used...."

ASME Section XI, IWA-4310, "Defect Removal Procedure," states in part:

> "Defects shall be removed or reduced in size in accordance with this Paragraph...."

ASME Code, Section XI, sub-sections IWA-4170 and IWA-4310, do not allow welding over or embedding an existing flaw.

Proposed Alternative:

As an alternative to the rules contained in the 1992 ASME Code, Section XI, sub-sections IWA-4170 and IWA-4310, which do not allow welding over or embedding an existing flaw, it is requested that the NRC approve the use of the proposed alternative method presented to the NRC by Westinghouse Electric Company, LLC. on December 13, 2001 (Reference 1).

Proposed Alternative Repair Method for
PVNGS Reactor Vessel Head Penetrations

Relief Request No. 20 and Relief Request No. 21

Basis for Alternative Requirements:

APS will be performing inspections of the vessel head penetrations (VHP) in accordance with the commitments made in response to NRC Bulletin 2001-01. In the event that any of these inspections indicate flaws in these penetrations, it will be necessary to repair such flaws. Pursuant to 10 CFR 50.55a(a)(3)(i), the alternative is proposed on the basis that it will provide an acceptable level of quality and safety.

The embedded flaw repair technique is considered a permanent repair for the following reasons:

1. As long as a Primary Water Stress Corrosion Cracking (PWSCC) flaw remains isolated from the primary water (PW) environment, it cannot propagate. Since Alloy 52 weldment is considered highly resistant to PWSCC, a new PWSCC crack cannot initiate and grow through the Alloy 52 overlay to reconnect the PW environment with the embedded flaw. Structural integrity of the affected VHP J-groove attachment weld will be maintained by the remaining unflawed portion of the weld.

2. The residual stresses produced by the embedded flaw technique have been measured and found to be relatively low. This was documented in the attachment to a letter from E. E. Fitzpatrick, Indiana Michigan Power Company (I&M), to the Nuclear Regulatory Commission (NRC) Document Control Desk, "Reactor -Vessel Head Penetration Alternate Repair Techniques," letter AEP:NRC:1218A, dated March 12, 1996. The low residual stresses indicate that no new cracks will initiate and grow in the area adjacent to the repair weld.

3. There are no other known mechanisms for significant crack propagation in this region since cyclic fatigue loading is negligible.

Precedent:

APS understands that the NRC has verbally approved a similar alternative for North Anna Power Station Unit 2 which were transmitted and supplemented by Virginia Electric and Power Company on October 18, November 9, and November 16, 2001. Additionally, the NRC previously approved a similar alternative for Cooper Nuclear Plant, Units 1 and 2 on April 9, 1996. Although the alternative was applied to the VHP tube base metal rather than VHP welds, both alternatives use an embedded flaw repair technique. Most recently, DC Cook received approval to use an embedded flaw alternative repair technique on December 12, 2001.

Conclusion:

APS considers the embedded flaw repair technique to be an alternative to Code requirements that provides an acceptable level of quality and safety, as required by 10 CFR 50.55a(a)(3)(i).