



Palo Verde Nuclear  
Generating Station

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**EA-03-009**  
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102-04910-GRO/SAB/RJR  
March 21, 2003

Secretary  
Office of Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
ATTN: Rulemakings and Adjudications Staff  
Washington, DC 20555-0001

Reference: Letter 102-04894-GRO/SAB/RJR, "20-Day Answer to NRC Order  
Establishing Interim Inspection Requirements for Reactor Pressure Vessel  
Heads," dated February 28, 2003.

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Docket Nos. STN 50-528, 50-529 and 50-530  
License Nos. NPF-41, NPF-51 and NPF-74  
Additional Information Regarding Relaxation Request  
to NRC Order EA-03-009**

In the referenced letter, Arizona Public Service Company (APS) provided consent to the NRC Order EA-03-009 establishing interim inspection requirements for reactor pressure vessel (RPV) heads. APS also included a request for relaxation from performing ultrasonic testing of each RPV head control element drive mechanism (CEDM) penetration nozzle to the bottom of the nozzle. On March 14, 2003, members of the NRC staff and APS had a telephone conversation and based on those discussions, APS has attached the additional information requested in support of the relaxation request.

The next examination of a PVNGS reactor pressure vessel head is scheduled for completion on April 12, 2003. Therefore, APS requests review of this relaxation by April 12, 2003, to support the Unit 3 refueling outage.

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

Sincerely,

A member of the **STARS** (Strategic Teaming and Resource Sharing) Alliance

Callaway • Comanche Peak • Diablo Canyon • Palo Verde • South Texas Project • Wolf Creek

U. S. Nuclear Regulatory Commission  
Office of Secretary of the Commission  
Additional Information Regarding Relaxation Requests to NRC Order EA-03-009

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GRO/SAB/RJR/kg

Attachment: Revised Request for Relaxation of Order Requirements

cc:

S. J. Collins (w/attachment)  
E. W. Merschoff (w/attachment)  
N. L. Salgado (w/attachment)  
J. N. Donohew (w/attachment)

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U.S. Nuclear Regulatory Commission  
Washington, DC 20555

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Rockville, MD. 20852

STATE OF ARIZONA        )  
  ) ss.  
COUNTY OF MARICOPA    )

I, Gregg R. Overbeck, represent that I am Senior Vice President – Nuclear, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, and that to the best of my knowledge and belief, the statements made therein are true and correct.

  
Gregg R. Overbeck

Sworn To Before Me This 21<sup>st</sup> Day Of March, 2003.

  
Notary Public



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Notary Commission Stamp

**ATTACHMENT**

**Revised Request for Relaxation of Order Requirements**

## **Revised Relaxation Request to Order EA-03-09**

Request for relaxation from performing ultrasonic testing of each CEDM penetration to the bottom of the nozzle.

### **I. ASME Code Component(s) Affected**

Applicable Unit: 1, 2 and 3  
Component number: B4.12  
Description: Control Element Drive Mechanism (CEDM) nozzle penetrations  
Code Class: 1

### **Expected Unit Susceptibility Categories**

Unit 3 Refueling Outage 10 – spring 2003 – Moderate  
Unit 2 Refueling Outage 11 – fall 2003 – Moderate  
Unit 1 Refueling Outage 11 – spring 2004 – High

### **II. Applicable Code Addition and Addenda**

Second 10-year inservice inspection interval code for Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3: The American Society of Mechanical Engineers (ASME) Code, Section XI, 1992 Edition, 1992 Addenda.

Construction code for PVNGS Units 1, 2, and 3: ASME Section III, 1971 Edition, 1973 Winter Addenda.

Installation code for PVNGS Units 1, 2, and 3: ASME Section III, 1974 Edition, 1975 Winter Addenda.

### **III. Applicable Order Requirement**

#### **IV.C(1)(b)(i) and IV.C(2)(b)(i)**

Ultrasonic testing of each reactor pressure vessel (RPV) head penetration nozzle (i.e., nozzle base material) from two (2) inches above the J-groove weld to the bottom of the nozzle.

### **IV. Proposed Alternative**

Ultrasonic testing (UT) of each RPV head CEDM penetration nozzle (i.e., nozzle base material) from 2 inches above the J-groove weld to approximately 0.6 inches above the top of the nozzle's chamfer face.

**V. Basis of Alternative for Providing Acceptable Level of Quality and Safety**

Due to the design of the funnel attachment to the CEDM nozzles (i.e., threaded connection with plug weld, see Figure 1), APS is unable to fully comply with the requirement to perform UT to the bottom of the nozzle. APS is planning to comply with the requirement to perform UT to two (2) inches above the J-groove weld and is not seeking relaxation from this requirement.

Experience gained from the previous two UT examinations of the CEDM nozzles completed at PVNGS (Unit 2 Refueling Outage 10 and Unit 1 Refueling Outage 10 in the spring and fall of 2002, respectively) has shown that scanning becomes impractical and ineffective from approximately 0.6 inches above the top of the nozzle's chamfer face to the bottom of the nozzle (see Figure 1, Detail G). Ultrasonic scans in this area do not yield useful data because of the geometry of the nozzle and funnel and the multiple signals reflected back by the threaded surfaces.

APS proposes a UT examination of each RPV head CEDM penetration nozzle (i.e., nozzle base material) to approximately 0.6 inches above the top of the nozzle's chamfer face. This inspection technique is consistent with the inspections performed in response to NRC Bulletins 2001-01, 2002-01, and 2002-02. The CEDM nozzle inspection includes multiple inspections from the nozzle inner surface. The primary inspection, which was demonstrated through the MRP/EPRI protocol, uses a dual element ultrasonic tip diffraction technique. The examination inspects from 2" above the J-groove weld to the lowest possible point on the nozzle. The probe design has a transmitter and receiver that are in close proximity to each other. In order to operate, both crystals must be in contact with the inner surface. Inherently, there is approximately 0.6" above the nozzle to funnel threaded joint interface that can not be inspected due to the configuration of the equipment (see Figure 1). In addition to the requirement of NRC Order Section IV.C(1)(b)(i) and IV.C(2)(b)(i), eddy current (ET) examination of the inside diameter (ID) of the CEDM nozzle is also performed as part of the PVNGS CEDM inspection program. This technique is capable of detecting ID initiated flaws. This technique operates beyond the range of the UT examination almost down to the chamfered edge between the nozzle and funnel (approximately 0.06" above the chamfer). This technique was also demonstrated through the MRP/EPRI protocol.

The examination proposed by Arizona Public Service Company (APS) would include the entire heat-affected zone on either side of the J-groove weld. A dimensional study was performed for the CEDM nozzles to determine the limits of coverage relative to the bottom of the J-groove weld.

The inspection method employed at PVNGS provides coverage from 2 inches above the J-groove weld to 1.3 inches below the J-groove weld. The area not covered by this exam has been evaluated and determined to be a low stress zone. The area of the CEDM nozzles that is not inspected is more than 1.3 inches below the J-groove weld. Indications in this area, by themselves, can not result in an unacceptable condition resulting in reactor coolant leakage into the interference fit zone, reactor coolant leakage onto the RPV head, or ejection of a control element assembly.

The CEDM nozzles at PVNGS are all installed into the RPV head with an interference fit. The APS proposed alternative examination is sufficient to reliably detect cracking of RPV head nozzles which could cause corrosion of the RPV head or pose a safety concern because of the possibility of a nozzle ejection or loss-of-coolant accident. The proposed alternative provides an acceptable level of quality and safety.

## **VI. Assessment of Order Inspection Options**

APS is seeking relaxation from the requirements of IV.C(1)(b)(i) and IV.C(2)(b)(i) since it is unable to perform a UT to the bottom of the CEDM nozzles.

### **Inspection Option IV.C(2)(a)**

Order inspection option IV.C(2)(a) specifies that a bare metal visual examination of 100% of the RPV head surface (including 360° around each RPV head penetration nozzle) may be performed to satisfy the requirements for a moderate susceptibility plant. The PVNGS Units are provided with reflective contoured vessel head insulation. Vendor drawings, DR-4338A-9 through 12, were provided in Attachment 1 to APS letter 102-04603-CDM/SAB/RJR, dated September 4, 2001 (Reference 1). This attachment shows that this type of insulation configuration cannot be readily removed without significant modification to allow complete inspection access. In previous inspections, APS has been successful in performing a top-of-the-head visual inspection of the reactor vent line nozzle and 24 CEDM nozzles on the outer perimeter of the RPV head. The next outage at PVNGS is due to start on March 29, 2003, without proper planning for insulation removal and modification, the dose for this type of inspection could not be kept ALARA.

An extensive insulation modification is currently being planned for Unit 2 refueling outage 11, scheduled for the fall of 2003. The modification is being performed to allow complete access for the top-of-the-head visual examinations. The modification is very complex, requiring a re-design of the insulation, taking as-built measurements for access and clearances, development of specific tooling and mock-ups, and detailed training to

implement the modification. Dose estimate for the planned modification is approximately 30 man-rem. The modification project has a lead-time of a minimum of 20 weeks. The insulation modification is planned to be implemented for Units 1 and 3 in 2004. Therefore, it is not practical to perform a bare metal visual examination during 3R10 since the necessary plant modification will not be in place at that time.

#### **Inspection Options IV.C(1)(b)(ii) and IV.C(2)(b)(ii)**

Order inspection options IV.C(1)(b)(ii) and IV.C(2)(b)(ii) require ET or PT of the wetted surface of each J-groove weld and RPV head penetration nozzle base material at least two (2) inches above the J-groove weld. Due to the location and proximity of the funnels to each other (see Figure 2), APS is unable to fully comply with the requirement to perform ET or PT of the wetted surfaces near the bottom of the nozzle. In order for APS to comply with this requirement, APS would need to develop new remote tooling or remove and reinstall a large number of funnels. Personnel radiation exposure for performing a manual PT would be excessive. The next outage is due to start on March 29, 2003, and there is not sufficient time for planning this inspection option. APS estimates the exposure for this examination method to be at least 30 times the dose of the proposed UT/ET examination discussed in Section V above. Therefore, it is not practical to perform ET or PT of the wetted surface of each J-groove weld.

#### **VII. Duration of Proposed Alternative**

APS requests relaxation of the following requirements for the upcoming Unit 3 10<sup>th</sup> refueling outage and for all subsequent refueling outages in Units 1, 2 and 3 where ultrasonic examination techniques are used to inspect the inside diameter of the CEDM nozzle.

IV.C(1)(b)(i) Alternative - Ultrasonic testing (UT) of each RPV head CEDM penetration nozzle (i.e., nozzle base material) from 2 inches above the J-groove weld to approximately 0.6 inches above the top of the nozzle's chamfer face.

IV.C(2)(b)(i) Alternative - Ultrasonic testing (UT) of each RPV head CEDM penetration nozzle (i.e., nozzle base material) from 2 inches above the J-groove weld to approximately 0.6 inches above the top of the nozzle's chamfer face.

#### **VIII. Conclusion**

Section IV.F of the Order states that conditions may be relaxed or rescinded upon demonstration by the Licensee of good cause. A request

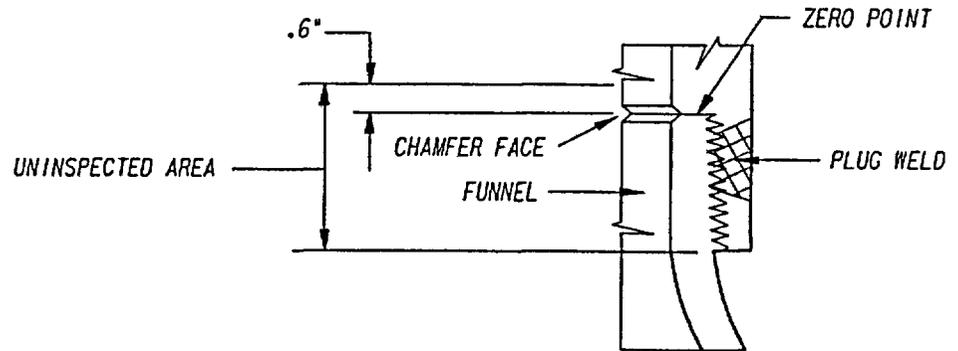
for relaxation regarding inspection of specific nozzles shall also address the following criteria:

1. The proposed alternative(s) for inspection of specific nozzles will provide an acceptable level of quality and safety, or
2. Compliance with this Order for specific nozzles would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.”

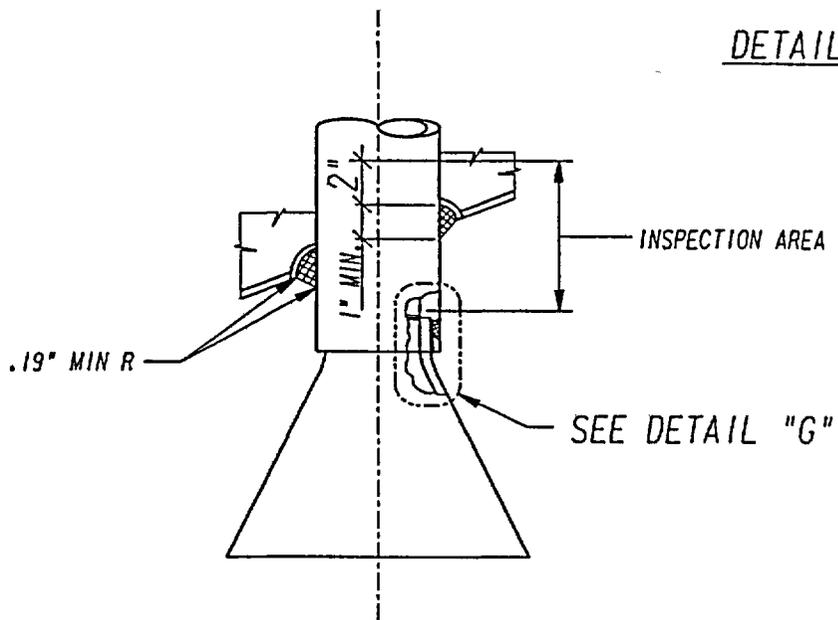
APS believes that the proposed alternative presented in Section IV and discussed in Section V provides an acceptable level of quality and safety. Therefore, we request that the proposed alternative be authorized pursuant to Order Section IV.F.

#### **IX. References**

1. APS letter 102-04603-CDM/SAB/RJR, “Response to NRC Bulletin 2001-01: Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles,” dated September 4, 2001.
2. APS Letter 102-04703-GRO/SAB/RJR, “APS’ Response to Information Requested by NRC Bulletin 2001-01, Items 4a, 5a, and 5b, and NRC Bulletin 2002-01, Items 2.A and 2.B,” dated May 17,2002.



DETAIL "G"



TYPICAL PENETRATION NO'S 1 THRU 97

**Figure 1**

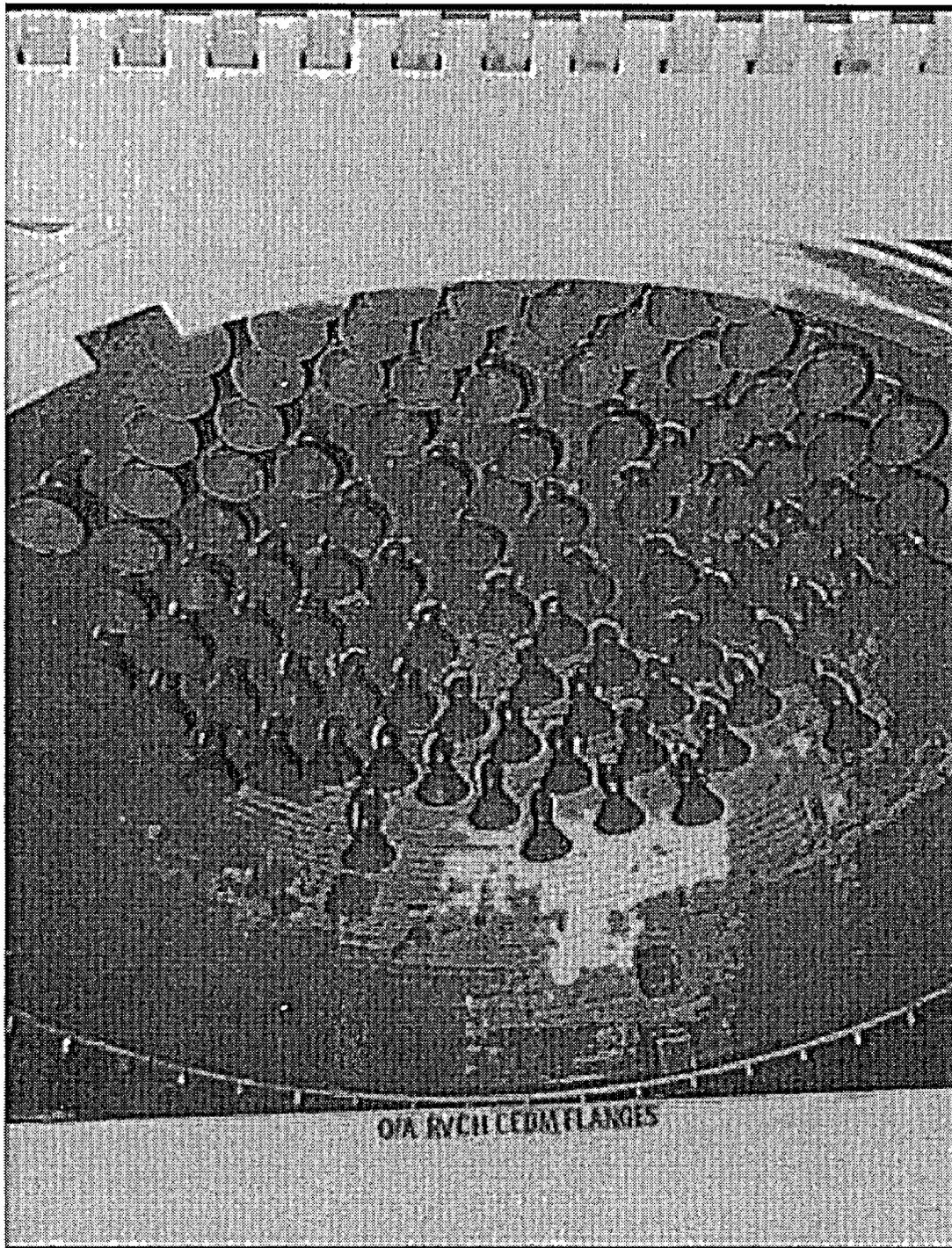


Figure 2