



102-07780-MLL/TNW  
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U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station Units 1, 2, and 3**  
**Docket Nos. STN 50-528, 50-529, and 50-530**  
**Relief Request 62 - Third and Fourth 10-Year Inservice Inspection (ISI)**  
**Intervals, Proposed Alternative – Pressurizer Heater Sleeve Repairs**

Pursuant to 10 CFR 50.55a(z)(1), Arizona Public Service Company (APS) hereby requests Nuclear Regulatory Commission (NRC) authorization to renew an element of the previously authorized Relief Request (RR) 29 that proposed an alternative to Section XI of the American Society of Mechanical Engineers (ASME) Code that addressed the repair of pressurizer heater sleeves. Specifically, RR 29 authorized an alternative for the original remnant half-sleeves for each of the PVNGS units for the second 10-year ISI interval and this request is for authorization in the third and fourth 10-year ISI intervals. Relief Request 62 is the replacement for the previously authorized RR 29 regarding the remnant half-sleeves, and is provided as the Enclosure to this letter.

A half-sleeve repair of the pressurizer heater sleeves was implemented in all three units. This repair replaced the lower half of the original Inconel 600 heater sleeves with an Inconel 690 half-sleeve and relocated the pressure boundary to the outer surface of the pressurizer vessel in conjunction with an Inconel 52 temper bead weld pad. The upper half of the Inconel 600 heater sleeves remains in place with the original partial penetration weld at the inner surface of the pressurizer vessel. This repair was submitted by APS and authorized by the NRC in RR 23 and implemented in each of the units at Palo Verde. Relief Request 23 did not include alternatives for flaw characterization or for successive examinations.

Relief Request 29 was submitted for the second 10-year ISI and requested an alternative to the flaw characterization and successive examinations for the remnant half-sleeves pursuant to 10 CFR 50.55a(a)(3)(i), to the 1992 edition / 1992 addenda of the ASME Code. APS is using the 2001 edition / 2003 addenda of the ASME Code for the third 10-year ISI interval and the 2013 edition of the ASME Code for the fourth 10-year ISI interval. There have been only minor changes between the 1992 edition / 1992 addenda and 2013 ASME Code edition, which do not alter the basis for the proposed alternative.

The alternative authorized in RR 29 was inadvertently not submitted for the third 10-year ISI interval. This oversight has been entered into the site corrective action program. There is no operability or safety significance to this issue, as the underlying technical evaluations that support RR 29 justified continued plant operation for the original plant life plus 20 years.

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Third and Fourth ISI Intervals – Proposed Alternative – Pressurizer Heater Sleeve Repairs

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

Should you need further information regarding this relief request, please contact Matthew S. Cox, Licensing Section Leader, at (623) 393-5753.

Sincerely,

Thomas N. Weber... for  
Maria L. Lacal

MLL/TNW/MDD/CJS/sma

Enclosure: Relief Request 62 – Proposed Alternative – Pressurizer Heater Sleeve Repairs

cc:	K. M. Kennedy	NRC Region IV Regional Administrator
	M. D. Orenak	NRC NRR Project Manager for PVNGS
	M. M. O'Banion	NRC NRR Project Manager
	C. A. Peabody	NRC Senior Resident Inspector for PVNGS

**Enclosure**

**Relief Request 62**

**Proposed Alternative**

**Pressurizer Heater Sleeve Repairs**



**Enclosure  
Relief Request 62  
Proposed Alternative  
Pressurizer Heater Sleeve Repairs**

Arizona Public Service Company (APS)  
Palo Verde Nuclear Generating Station (PVNGS) – Units 1, 2 and 3  
Proposed Alternative in Accordance with 10 CFR 50.55a(z)(1)  
Third and Fourth 10-Year Inservice Inspection (ISI) Interval  
Pressurizer Heater Sleeve Repairs

**1.0    Description**

A half-sleeve repair of the pressurizer heater sleeves has been implemented in all three PVNGS units. This repair replaced the lower half of the original Inconel 600 heater sleeves with an Inconel 690 half-sleeve and relocated the pressure boundary to the outer surface of the pressurizer vessel in conjunction with an Inconel 52 temper bead weld pad. The upper half of the Inconel 600 heater sleeves remains in place with the original partial penetration weld at the inner surface of the pressurizer vessel. Authorization of an alternative is requested for the potential flaws that remain in the original partial penetration welds at the inner surface of the pressurizer vessel.

PVNGS Unit 2 was first repaired as authorized in Relief Request (RR) 23 (References 5 and 6). The original remnant half-sleeves were not specifically addressed in RR 23. It was subsequently proposed to repair Units 1 and 3, using a mid-wall repair method for the Inconel 690 half-sleeves as explained in RR 29. Unlike RR 23, RR 29 authorized an alternative for the original remnant half-sleeves for each of the PVNGS units. It was thought at the time, that the mid-wall repair technique authorized in RR 29 would involve less personnel dose than the method authorized in RR 23.

The mid-wall repair method authorized in RR 29 was not implemented for PVNGS Units 1 and 3. Instead, the repair method authorized in RR 23 was implemented for PVNGS Units 1 and 3, as it had been previously done in Unit 2. The original remnant Inconel 600 half-sleeves and potential flaws at the original partial penetration welds remain in-service for all three units.

The proposed alternative regarding the requirements for the potential flaws and subsequent examinations of the remnant sleeves was submitted as part of RR 29 (Reference 2) and only authorized by the NRC for the second ISI interval (Reference 3). Relief Request 62 requests NRC authorization of this proposed alternative for the third and fourth 10-year ISI intervals.

The alternative authorized in RR 29 was inadvertently not submitted for the third 10-year ISI interval. This oversight has been entered into the site corrective action program.

**2.0    ASME Code Components Affected**

The affected component is the pressurizer vessel, specifically the original partial penetration welds at the associated remnant heater sleeves for each operating unit. The pressurizer is an American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV) Class 1 component.

**3.0    Applicable Code Edition and Addenda**

The initial request for authorization of an alternative was submitted for the second ISI interval which applied the 1992 edition and 1992 addenda of Section XI of the ASME B&PV Code. The 2001 edition, 2003 addenda of Section XI of the ASME B&PV Code is applicable to the third ISI interval. The 2013 edition of the ASME B&PV Code, Section XI (Reference 1), is applicable to the fourth ISI interval.

The applicable installation Code for all three operating units is Section III of the 1974 edition, through winter 1975 addenda of the ASME B&PV Code.

#### 4.0 Applicable Code Requirement

The applicable Code requirements for which an alternative is requested are as follows:

Section XI, Article IWA-4000 provides requirements for repair/replacement activities.

IWA-4421 states, in part:

Defects shall be removed or mitigated in accordance with the following requirements...

IWA-4422.1(a) states, in part:

A defect is considered removed when it has been reduced to an acceptable size...

IWA-4422.1(b) states, in part:

Alternatively, the defect removal area and any remaining portion of the defect may be evaluated and the component accepted in accordance with the appropriate flaw evaluation provisions of Section XI...

Section XI, Article IWA-3000 provides standards for examination evaluation.

IWA-3100(a) states, in part:

Evaluation shall be made of flaws detected during an inservice examination as required by IWB-3000 for Class 1 pressure retaining components...

IWA-3300(b) states, in part:

Flaws shall be characterized in accordance with IWA-3310 through IWA-3390, as applicable.

Section XI, Article IWB-3000 provides acceptance standards for Class 1 components.

IWB-3420 states:

Each detected flaw or group of flaws shall be characterized by the rules of IWA-3300 to establish the dimensions of the flaws. These dimensions shall be used in conjunction with the acceptance standards of IWB-3500.

Section XI, Article IWB-2000 provides examination and inspection requirements for Class 1 components.

IWB-2420(b) states, in part:



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If a component is accepted for continued service in accordance with IWB-3132.3 or IWB-3142.4, the areas containing flaws or relevant conditions shall be reexamined during the next three inspection periods listed in the schedule of the inspection program of IWB-2400...

#### 5.0 Reason for Request

During the preparation and review of ISI program documents for the fourth 10-year ISI interval, it was determined that RR 29 had only been previously authorized for the second interval. This submittal requests the use of the same identified alternative(s) related to the remaining potential flaws for the third and fourth ISI intervals for Units 1, 2, and 3. Relief Request 29 and its supporting documentation were submitted in the documents itemized below.

ADAMS Accession No. ML041750296, as APS letter dated June 15, 2004 (Reference 2)

ADAMS Accession No. ML042450041, as APS letter dated August 24, 2004 (Reference 4)

It should be noted that the mid-wall interior weld discussed in RR 29 for the Inconel 690 half-sleeve repair was not implemented in any of the units. The repair method implemented in all three units is explained in RR 23 (References 5 and 6). The pressure boundary was relocated to the outside surface of the pressurizer at the heater sleeve penetrations. Previously authorized RR 23, RR 23, Revision 1, and RR 28, do not need to be renewed for the third and fourth 10-year ISI intervals as they related to the implementation methods of the replacement Inconel 690 half-sleeves, and not the subsequent operating life and examination requirements of the ASME Code.

#### 6.0 Proposed Alternative and Basis for Use

Pursuant to 10 CFR 50.55a(z)(1), APS requests NRC authorization of RR 62, which proposes an alternative to the ASME Code requirements of Section XI related to potential flaws in the original heater sleeve partial penetration welds in all 36 penetrations of each pressurizer. Authorization was previously granted by the NRC for the flaw evaluation as an alternative to the ASME Section XI requirements for flaw removal IWA-4421, flaw characterization of IWA-3300, and successive examinations of IWB-2420 (Reference 3). The original remnant sleeve and penetration welds remain as evaluated in RR 29.

The flaw evaluation submitted with RR 29 and associated corrosion analysis (Reference 7) have been analyzed for the 60-year licensed operating life of the plant and have previously been determined to provide an acceptable level of quality and safety (Reference 3).

The applicable Code edition and addenda for ASME Section XI activities at the time that RR 29 was submitted was the 1992 edition, 1992 addenda. Pressurizer heater penetration welds were listed as B4.20 inspection items in Table IWB-2500-1. The B4.20 examination item is no longer listed in Table IWB-2500-1 for the applicable Code editions/addenda for the successive third and fourth 10-year ISI intervals. The pressurizer heater penetrations are leak tested every refueling outage as part of a system leakage test as B15.10 items. Since the time of the half-sleeve repairs there have been no indications of leaks identified in the new welds at the heater sleeve penetrations. Examinations will continue as required per IWB-2500 of the ASME Code.

## 7.0 Duration of Proposed Alternative

The duration for this request for authorization of an alternative is for the third and fourth 10-year ISI intervals for all three units. The fourth 10-year ISI intervals are currently scheduled as follows:

Fourth ISI interval for Unit 1 - June 1, 2019 to July 17, 2028  
Fourth ISI interval for Unit 2 - November 1, 2018 to October 31, 2028  
Fourth ISI interval for Unit 3 - June 1, 2018 to January 10, 2028

## 8.0 Precedent

- NRC Letter dated November 5, 2004, *Palo Verde Nuclear Generating Station, Units 1, 2, and 3 – Relief Request No. 29 RE: Remnant Sleeves Flaw Evaluation (TAC Nos. MC3606, MC3607, and MC3608)*, Agencywide Documents Access and Management System (ADAMS) Accession No. ML043130170

## 9.0 References

1. ASME B&PV Code, Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*, 2013 Edition
2. APS Letter No. 102-05112, dated June 15, 2004, *10 CFR 50.55a Alternative Repair Requests for the PVNGS Pressurizers: Relief Requests 28 and 29*, ADAMS Accession No. ML041750296
3. NRC Letter dated November 5, 2004, *Palo Verde Nuclear Generating Station, Units 1, 2, and 3 – Relief Request No. 29 RE: Remnant Sleeves Flaw Evaluation (TAC Nos. MC3606, MC3607, and MC3608)*, ADAMS Accession No. ML043130170
4. APS Letter No. 102-05141, dated August 24, 2004, *Response to Request for Additional Information – Relief Requests 28 and 29*, ADAMS Accession No. ML042450041
5. APS Letter No. 102-04941, dated May 15, 2003, *10 CFR 50.55a Alternative Repair Request for the Second 10-Year Interval of the Inservice Inspection Program: Relief Request 23, Pressurizer Heater Sleeves*, ADAMS Accession No. ML031400051
6. NRC Letter dated July 30, 2003, *Palo Verde Nuclear Generating Station, Units 1, 2, and 3 – Relief Request No. 23 RE: Alternative to Temper Bead Welding Requirements for Inservice Inspection Program (TAC Nos. MB8973, MB8974, and MB8975)*, ADAMS Accession No. ML032110542
7. WCAP-15973-P, Revision 1, *Low Alloy Steel Component Corrosion Analysis Supporting Small Diameter Alloy 600/690 Nozzle Repair/Replacement Programs*