



102-07658-MLL/TNW
March 9, 2018

U. S. Nuclear Regulatory Commission
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Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station Unit 2
Docket No. STN 50-529
Relief Request 59 - Unit 2 Third 10-Year Inservice Inspection (ISI)
Interval, Request for Relief from the American Society of Mechanical
Engineers (ASME) Code Inspection Item B13.50 Extension**

Pursuant to 10 CFR 50.55a(z)(2), Arizona Public Service Company (APS) hereby requests Nuclear Regulatory Commission (NRC) approval to extend the interval for performing the ISI Program required visual examination of the reactor pressure vessel (RPV) interior attachments within the beltline region (ASME examination Category B-N-2, Item B13.50).

If approved, the visual examinations will coincide with the volumetric examination for ASME examination Categories B-A and B-D reactor vessel welds supported by approved Relief Request 40 and the visual examinations of B-N-2 (B13.60), the interior attachments beyond the beltline region, and B-N-3 (B13.70), the core support structure, supported by approved Relief Request 44. In accordance with 10 CFR 50.55a(z)(2), the proposed relief is requested as an alternative based on hardship because compliance with the specified requirements would result in hardship without a compensating increase in the level of quality and safety. Discussion of the specific hardship that supports this request is included in the enclosure to this letter.

By letter number 102-07604 [Agency Documents Access and Management System (ADAMS) Accession number ML17318A472], dated November 10, 2017, APS submitted Relief Request 56, which sought an extension to the third 10-year ISI interval for Palo Verde Nuclear Generating Station (PVNGS) Unit 2, as an alternative that provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1). The extension would be beyond the one year extension permitted in ASME Code, Section XI, IWA-2430.

As stated in Relief Request 56, APS had completed the planned third 10-year ISI interval examinations for Unit 2 and the interval closeout review was in progress. During the course of the closeout review, a limited number of ISI examinations were identified that were either not included in a previous relief request or were not performed during the third ISI interval for Unit 2. These items were entered into the site corrective action program and were discussed with the NRC staff on February 15, 2018. This relief request addresses one of these discovery items. The remaining examination discovery items will be examined in the next Unit 2 refueling outage, as described in APS letter number 102-07657, dated March 2, 2018 (ADAMS Accession number ML18056A132), which was a supplemental letter regarding Relief Request 56.

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Approval of the proposed ASME Code relief is requested by March 17, 2018, if Relief Request 56 is not approved by that date, or October 31, 2018, if Relief Request 56 is approved.

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,

MLL/TNW/MDD/sma

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

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Arizona Public Service Company (APS)
Palo Verde Nuclear Generating Station (PVNGS) – Unit 2
Proposed Alternative in Accordance with 10 CFR 50.55a(z)(2)
Third 10-Year Inservice Inspection (ISI) Interval
Request for Relief from the American Society of Mechanical Engineers (ASME) Code
Inspection Item B13.50 Extension

1.0 Description

By letter number 102-07604 [Agency Documents Access and Management System (ADAMS) Accession number ML17318A472], dated November 10, 2017 [Ref. 9.6], Arizona Public Service Company (APS) submitted Relief Request (RR) 56, which sought an extension to the third 10-year Inservice Inspection (ISI) interval for Palo Verde Nuclear Generating Station (PVNGS) Unit 2, as an alternative that provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1). The extension would be beyond the one year extension permitted in American Society of Mechanical Engineers (ASME) Code, Section XI, IWA-2430.

As stated in RR 56, APS had completed the planned third 10-year ISI interval examinations for Unit 2 and the interval closeout review was in progress. During the course of the closeout review, a limited number of ISI examinations were identified that were either not included in a previous relief request or were not performed during the third ISI interval for Unit 2, which ends on March 17, 2018. This enclosure addresses one of these discovery items. The remaining examination discovery items will be examined in the next Unit 2 refueling outage, as described in APS letter number 102-07657, dated March 2, 2018 (ADAMS Accession number ML18056A132), which was a supplemental letter regarding Relief Request 56 [Ref. 9.6].

Approval of RR 59 is requested by March 17, 2018, if RR 56 is not approved by that date, or October 31, 2018, if RR 56 is approved.

2.0 ASME Code Components Affected

Code Class: 1

Examination Category	Item No.	Description
B-N-2	B13.50	Interior Attachments Within Beltline Region

3.0 Applicable Code Edition and Addenda

The third 10-year Interval Inservice Inspection (ISI) Program Plan was prepared to comply with the 2001 Edition and 2003 Addenda of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code (hereafter Code)[Ref. 9.1].

4.0 Applicable Code Requirement

Table IWB-2500-1, examination category B-N-2, item number B13.50, requires a VT-1 visual examination of the accessible interior attachments within the beltline region of the RPV once each

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ten-year interval. The Palo Verde Unit 2 third 10-Year Inservice Inspection (ISI) interval ended on March 17, 2017 and has been extended by one year in accordance with IWA-2430(d)(1).

Relief Request 56 [Ref. 9.6] has been submitted and is under review to extend the Unit 2 third Interval to October 31, 2018. Unless RR 56 is approved, the extended third Interval in Unit 2 will end on March 17, 2018.

5.0 Reason for Request

5.1 Background

5.1.1 Relief Request 40

The volumetric examinations of categories B-A and B-D RPV welds are addressed in APS RR 40 [Ref. 9.2], wherein APS proposed deferral of the volumetric examinations based upon WCAP-16168-NP-A, Revision 2. In RR 40, APS proposed 2016, 2027 and 2028, plus or minus one outage, as the years in which future inspections of the examination categories B-A and B-D RPV welds would be performed in Units 1, 2, and 3, respectively. The Relief was approved on February 22, 2010 [Ref. 9.3].

5.1.2 Relief Request 44

The VT-3 visual examinations of categories B-N-2 (B13.60), interior attachments beyond the beltline region, and B-N-3 (B13.70), the core support structure, are addressed in RR 44 [Ref. 9.4], wherein APS proposed deferral of the VT-3 visual examinations based upon RR 40. In RR 44, APS proposed 2027 and 2028, plus or minus one outage, as the years in which future inspections of the examination categories B-N-2 (B13.60) and B-N-3 (B13.70) RPV interior attachments beyond the beltline region and the core support structure would be performed in Units 2 and 3, respectively. The Relief was approved on August 27, 2010 [Ref. 9.5]. The B-N-2 (B13.50), VT-1 examination was not included in the scope of RR 44.

5.1.3 Relief Request 56

APS submitted RR 56 [Ref. 9.6], which seeks an extension to the third 10-year ISI interval for PVNGS Unit 2 pursuant to 10 CFR 50.55a(z)(1), as an alternative that provides an acceptable level of quality and safety. The relief request will permit better coordination of the ISI programs at the PVNGS site. This relief request will also permit the Code required repair/replacement program for the fourth 10-year ISI interval to begin on a common date coincident with the proposed first implementation of the fourth 10-year ISI interval, currently targeted for June 1, 2018, for PVNGS Unit 3. During the course of the third 10-year ISI interval closeout review described in RR 56, a limited number of ISI examinations were identified that were either not included in a previous relief request or were not performed during the third ISI interval for Unit 2, which ends on March 17, 2018. Relief Request 59 addresses one of these discovery items. The remaining examination discovery items are addressed as a supplement to RR 56 in APS letter number 102-07657, dated March 2, 2018 (ADAMS Accession number ML18056A132), which is under NRC staff review.

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5.2 Reason for Request

APS is requesting approval to extend the interval for performing the Palo Verde Unit 2 ISI Program required visual examinations of the reactor pressure vessel (RPV) because compliance with the specified requirements would result in hardship without a compensating increase in the level of quality or safety. The extended inspection interval would align the visual examinations of the interior attachments within the beltline region (Category B-N-2, Item B13.50) with the volumetric examinations of categories B-A and B-D RPV welds and the visual examinations of Categories B-N-2 (B13.60) and B-N-3 (B13.70).

The core support barrel must be removed to facilitate the B-N-2 (both B13.50 and B13.60) and B-N-3 (B13.70) visual examinations. APS has historically performed all B-N-2 and B-N-3 visual examinations during the same outage as categories B-A and B-D volumetric weld examinations. Performing the visual and volumetric examinations during the same refueling outage will result in a significant reduction in radiation exposure since the RPV internals will only be removed once to accommodate both examinations. Approval of this relief request will also result in significant savings in outage duration since the equipment and personnel used for the Category B-A and B-D volumetric examinations and Category B-N-2 (B13.60) and B-N-3 (B13.70) visual examinations can be used for the B-N-2 (B13.50) visual examinations

In accordance with 10 CFR 50.55a(z)(2), this interval extension is requested on the basis that performing the examination of the RPV interior attachments within the beltline region (B13.50) separate in time from the RPV shell welds, head welds, nozzle welds, interior attachments beyond the beltline, and core support structure would result in hardship or unusual difficulty without a compensating increase in quality and safety. The full scope examination required by ASME examination categories B-N-2 and B-N-3 requires the removal of all the fuel and the core barrel from the RPV. An unnecessary risk is created by removal of the core barrel to perform a visual examination without a compensating increase in quality or safety. Further, the radiation exposure to establish the conditions for, and perform, the ASME examination categories B-N-2 and B-N-3 examinations would essentially double if the subject examinations were performed separate in time from the RPV shell, lower head, and nozzle weld examinations.

10 CFR 50.55a(z), *Alternatives to codes and standards requirements*, states:

Alternatives to the requirements of paragraphs (b) through (h) of this section or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation, or Director, Office of New Reactors, as appropriate. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

Acceptable level of quality and safety. The proposed alternative would provide an acceptable level of quality and safety; or

Hardship without a compensating increase in quality and safety. Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Deferring the inspection of the B-N-2 interior attachments within the beltline region as proposed reduces the frequency that the RPV lower internals need to be removed and is requested on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

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6.0 Proposed Alternative and Basis for Use

The category B-N-2, Item B13.50 and B13.60 interior attachments were last examined:

- Unit 1 Fall 2017
- Unit 2 Spring 2008
- Unit 3 Fall 2013

APS completed the Unit 1 category B-N-2 (B13.50 and B13.60) and B-N-3 (B13.70) visual examinations in conjunction with the category B-A and B-D volumetric examination in the Fall of 2017. No relief is required for the Unit 1 examination since it was performed within the required ASME Code interval. The next scheduled examination for Unit 1 is 2026, which falls in the fourth 10-year ISI interval.

APS completed the Unit 3 category B-N-2 (B13.50 and B13.60) visual examinations as opportunistic examinations in conjunction with the Bottom Mounted Instrumentation (BMI) repair in the Fall of 2013. The B-N-3 (B13.70) examination was not performed during that time because relief had been granted in RR 44 to extend the examination until 2028, which falls in the fourth 10-year ISI interval.

As the B13.50 examinations have been performed within the required ASME Code interval for PVNGS Units 1 and 3, this relief request is limited to Unit 2.

APS is proposing to perform the next Unit 2 B-N-2, Item B13.50, visual examination in conjunction with the category B-A and B-D volumetric examinations and the category B-N-2 (B13.60) and B-N-3 (B13.70) visual examinations scheduled in 2027, which falls in the fourth 10-year ISI interval.

The B13.50 attachments in Palo Verde Unit 2 are the surveillance capsule holder assembly attachment welds. The surveillance capsule holders are attached to the cladding of the reactor vessel and are not major load-bearing components.

Each surveillance holder is attached to the vessel cladding by two end brackets (support brackets) and seven intermediate brackets (gussets). The end brackets restrain the axial growth of the holder relative to the vessel wall during operating transients. The intermediate brackets increase the natural frequency of the holder and reduce stress in the holder due to flow loads. The support bracket and gusset attachment welds are Inconel 600 welds. The RPV cladding is Type 304 austenitic stainless steel (P8) and the support bracket and gusset are SB-166 (P43). [Ref. 9.19, Ref. 9.20 and Ref. 9.21].

Design information about the support bracket and gusset attachment welds is provided in Table 1, which shows that design stresses are a fraction of allowable stresses.

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Table 1 – Unit 2 Surveillance Capsule Holder Assemblies Design Information

Locations	Part	No. Welds	Weld No.	Materials	Design Stress	Allowable Stress	Inservice Exam Results	
							2008	1997
Surveillance Capsule Holder Assemblies @ 38°	Support Bracket	4	103-171	N-DWPS-SMA-8.43-100	26.04 Ksi	69 Ksi	NI	NI
	Gusset	14	107-171	N-DWPS-SMA-8.43-100	7.15 Ksi	69 Ksi		
Surveillance Capsule Holder Assemblies @ 43°	Support Bracket	4	103-171	N-DWPS-SMA-8.43-100	26.04 Ksi	69 Ksi	NI	NI
	Gusset	14	107-171	N-DWPS-SMA-8.43-100	7.15 Ksi	69 Ksi		
Surveillance Capsule Holder Assemblies @ 137°	Support Bracket	4	103-171	N-DWPS-SMA-8.43-100	26.04 Ksi	69 Ksi	NI	NI
	Gusset	14	107-171	N-DWPS-SMA-8.43-100	7.15 Ksi	69 Ksi		
Surveillance Capsule Holder Assemblies @ 142°	Support Bracket	4	103-171	N-DWPS-SMA-8.43-100	26.04 Ksi	69 Ksi	NI	NI
	Gusset	14	107-171	N-DWPS-SMA-8.43-100	7.15 Ksi	69 Ksi		
Surveillance Capsule Holder Assemblies @ 230°	Support Bracket	4	103-171	N-DWPS-SMA-8.43-100	26.04 Ksi	69 Ksi	NI	NI
	Gusset	14	107-171	N-DWPS-SMA-8.43-100	7.15 Ksi	69 Ksi		
Surveillance Capsule Holder Assemblies @ 310°	Support Bracket	4	103-171	N-DWPS-SMA-8.43-100	26.04 Ksi	69 Ksi	NI	NI
	Gusset	14	107-171	N-DWPS-SMA-8.43-100	7.15 Ksi	69 Ksi		
Total Welds		108					NI – No Relevant Indications	

The visual examinations of the PVNGS Unit 2 RPV interior attachments within the beltline region were performed in 1997 and 2008 with no relevant indications noted during the examinations. Should the Unit 2 lower internals be removed for another reason before 2027, the B13.50 examination would be performed.

An unnecessary risk is created by removal of the lower internals (core barrel) more than once within an inspection interval for the sole purpose of performing a visual examination. Further, the radiation exposure to perform the ASME Examination Category B-N-2 would essentially double if the subject examinations were performed at a time different from the RPV shell, lower head, and nozzle weld examinations.

7.0 Duration of Proposed Alternative

This request proposes deferral of the B13.50 visual examination requirement for the Palo Verde Unit 2 until 2027, plus or minus one refueling cycle.

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8.0 Precedent

ANO Unit 2 proposed in November 2009 to defer their B13.50, B13.60, and B13.70 visual examinations to the same time as their B-A and B-D RPV examinations [Ref. 9.7]. Relief was granted on September 23, 2010 [Ref. 9.8].

Calvert Cliffs Nuclear Power Plant proposed in February 2009 to defer their B13.50, B13.60, and B13.70 visual examinations to the same time as their B-A and B-D RPV examinations [Ref. 9.9]. Relief was granted on November 9, 2009 [Ref. 9.10].

San Onofre Nuclear Generating Station proposed in January 2011 to defer their B13.50, B13.60, and B13.70 visual examinations to the same time as their B-A and B-D RPV examinations [Ref. 9.11]. Relief was granted on November 4, 2011 [Ref. 9.12].

The Beaver Valley Power Station proposed in December 2015 to defer similar examinations [Ref. 9.13 and 9.14]. Relief was granted on December 27, 2016 [Ref. 9.15].

The Vogtle Electric Generating Plant proposed in 2017 to defer similar examinations [Ref. 9.16 and Ref. 9.17]. Relief was granted on June 27, 2017 [Ref. 9.18].

9.0 References

- 9.1 ASME Boiler and Pressure Vessel Code, Section XI, 2001 Edition with the 2003 Addenda
- 9.2 APS Letter to NRC, dated July 1, 2009, *Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3 Docket Nos. STN 50-528, 50-529, and 50-530 Request for Relief from the American Society of Mechanical Engineers (ASME) Code, Section XI, Reactor Vessel Weld Inspection Frequency – Relief Request No. 40* (ADAMS Accession number ML091870432)
- 9.3 NRC Letter to APS, dated February 22, 2010, *Palo Verde Nuclear Generating Station, Units 1, 2, and 3 - Relief Request No. RR-40, Reactor Vessel Weld Examination Internal Extension* (ADAMS Accession number ML100290415)
- 9.4 APS Letter to NRC, dated September 29, 2009, *Palo Verde Nuclear Generating Station (PVNGS) Units 2 and 3 Docket Nos. STN 50-529 and 50-530 Request for Relief from the American Society of Mechanical Engineers (ASME) Code, Section XI, Reactor Vessel Weld Inspection Frequency - Relief Request No. 44* (ADAMS Accession number ML092810228)
- 9.5 NRC Letter to APS, dated August 27, 2010, *Palo Verde Nuclear Generating Station, Units 2 and 3 - Relief Request No. RR-44, Reactor Vessel Weld Visual Examination Internal Extension* (ADAMS Accession number ML102160487)
- 9.6 APS Letter to NRC number 102-07604, dated November 10, 2017, *Palo Verde Nuclear Generating Station Units 1, 2, and 3 Docket Nos. STN 50-528/529/530 Relief Request 56 - Unit 2 Third 10-Year Inservice Inspection (ISI) Interval Extension and Request to Adopt 2013 Edition of Section XI of the American Society of Mechanical Engineers (ASME) Code for the Fourth 10-Year Interval for Units 1, 2 and 3* (ADAMS Accession number ML17318A472) and APS Letter to NRC number 102-07657, dated March 2, 2018 (ADAMS Accession number ML18056A132)
- 9.7 Arkansas Nuclear One (ANO) Letter to NRC, dated November 4, 2009, *Request to Extend the Inservice Inspection Interval for the Visual Examination of Accessible Interior to Reactor Vessel Attachment Weld Arkansas Nuclear One, Unit 2 Docket No. 50-368 License No. NPF-6* (ADAMS Accession number ML093090314)
- 9.8 NRC Letter to ANO, dated September 23, 2010, *Arkansas Nuclear One, Unit 2 –Request*

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- for Relief AN02-ISI-005, Request to Extend the Inservice Inspection Interval for the Visual Examination of Accessible Interior to Reactor Vessel Attachment Weld (ADAMS Accession number ML102500128)*
- 9.9 Calvert Cliffs Letter to NRC, dated February 18, 2009, *Calvert Cliffs Nuclear Power Plant Unit No. 1; Docket No. 50-317 Request to Extend the Inservice Inspection Interval for Reactor Vessel Weld Examinations - Relief Requests (ISI-022 and ISI-023)* ADAMS Accession number ML090540062)
- 9.10 NRC Letter to Calvert Cliffs, dated November 9, 2009, *Relief Requests Inservice Inspection (ISI)-022 & ISI-023 to Extend Reactor Vessel and Reactor Vessel Internal Weld Examinations - Calvert Cliffs Nuclear Power Plant, Unit No. 1* (ADAMS Accession number ML093030052)
- 9.11 San Onofre Nuclear Generating Station (SONGS) Letter to NRC, dated January 7, 2011, *Docket Nos. 50-361 and 50-362 Third Ten-Year Inservice Inspection (ISI) Interval 10 CFR 50.55a Requests 151-3-32, 151-3-33, and 151-3-34 San Onofre Nuclear Generating Station, Units 2 and 3* (ADAMS Accession number ML110100732)
- 9.12 NRC Letter to SONGS, dated November 4, 2011, *San Onofre Nuclear Generating Station, Units 2 and 3 - Relief Requests ISI-3-32, ISI-3-33, and ISI-3-34, Relief From Third 10-Year Interval Inservice Inspection for Category B-A, B-D, B-N-2, and B-N-3 Welds* (ADAMS Accession number ML112730074)
- 9.13 Beaver Valley Power Station Letter to NRC, dated December 22, 2015, *Beaver Valley Power Station, Unit No. 2 Docket No. 50-412, License No. NPF-73 Request to Extend Certain Reactor Vessel Inspections From 10 to 20 Years (Requests 2-TYP-3-BA-01 and 2-TYP-3-BN-01)* (ADAMS Accession number ML15356A340)
- 9.14 Beaver Valley Power Station Letter to NRC, dated August 5, 2016, *Beaver Valley Power Station, Unit No. 2 Docket No. 50-412, License No. NPF-73 Supplement to Request to Extend Certain Reactor Vessel Inspections From 10 to 20 Years (Request 2-TYP-3-BN-01)* (ADAMS Accession number ML16221A180)
- 9.15 NRC Letter to Beaver Valley Power Station, dated December 27, 2016, *Beaver Valley Power Station, Unit 2 - Relief from the Requirements of the ASME Code* (ADAMS Accession number ML16190A133)
- 9.16 Vogtle Electric Generating Plant Letter to NRC, dated January 26, 2017, *Vogtle Electric Generating Plant, Units 1 and 2 Proposed Alternative VEGP-ISI-AL T-13 in Accordance with 10 CFR 50.55a(z)(2)* (ADAMS Accession number ML17026A438)
- 9.17 Vogtle Electric Generating Plant Letter to NRC, dated April 20, 2017, *Vogtle Electric Generating Plant - Units 1 and 2 Response to Request for Additional Information Regarding VEGP-ISI-ALT -13 Category B-N-2 and B-N-3 Examination Extension from 10 to 20 Years* (ADAMS Accession number ML17110A135)
- 9.18 NRC Letter to Vogtle Electric Generating Plant Units 1 and 2, dated June 27, 2017, *Vogtle Electric Generating Plant, Units 1 and 2- Inservice Inspection Alternative Regarding Category B-N-2 and B-N-3 Welds (VEGP-ISI-ALT-13)* (ADAMS Accession number ML17171A102)
- 9.19 *Palo Verde Nuclear Generating Station Updated Final Safety Analysis Report (UFSAR), Revision 19, Section 3.1.28*
- 9.20 *Palo Verde Design Document Number N001-0301-00199, Rev. 7, Analytical Report Arizona Public Service Company Unit 2*
- 9.21 *Palo Verde Design Document Number N001-0603-00212, Rev. 2, Vessel Final Assembly Drawing*