April 10, 2000

Mr. Gregg R. Overbeck
Senior Vice President, Nuclear
Arizona Public Service Company
P. O. Box 52034
Phoenix, AZ 85072-2034

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3 - EVALUATION OF REQUESTS FOR RELIEF ASSOCIATED WITH THE SECOND 10-YEAR INSERVICE INSPECTION INTERVAL (TAC NOS. MA3559, MA3560, MA3561)

Dear Mr. Overbeck:

The staff, with technical assistance from its contractor, the Idaho National Engineering and Environmental Laboratory (INEEL), has reviewed and evaluated the information provided by Arizona Public Service Company (APS) by letter dated March 17, 1998, proposing its second 10-year interval inservice inspection requests for relief for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3. APS provided additional information on these requests for relief in its letters dated July 2, August 24, October 12, and November 23, 1999, and March 9 and March 20, 2000.

Enclosure 1 provides the staff's evaluation and conclusions on the proposed requests for relief from code requirements. Enclosure 2 is the INEEL technical letter report.

Sincerely,

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-528, STN 50-529,
and STN 50-530

Enclosures: 1. Safety Evaluation
2. Technical Letter Report

cc w/encls: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SECOND 10-YEAR INTERVAL INSERVICE INSPECTION PLAN

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3

DOCKET NOS. STN 50-528, STN 50-529, AND STN 50-530

1.0 INTRODUCTION

By letter dated March 17, 1998, the Arizona Public Service Company (the licensee) submitted its second 10-year interval inservice inspection (ISI) requests for relief for Palo Verde Nuclear Generating Station (Palo Verde or PVNGS), Units 1, 2 and 3. The licensee provided additional information in its letters dated July 2, August 24, October 12, and November 23, 1999, and March 9 and March 20, 2000. The Idaho National Engineering and Environmental Laboratory (INEEL) assisted the staff in its evaluation of the subject requests for relief, and INEEL's conclusions are presented in the technical letter report (TLR) (Enclosure 2).

2.0 BACKGROUND

ISI of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Paragraph 50.55a(a)(3) of 10 CFR Part 50 states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12-months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. Based on this, the required code of record for the Palo Verde second 10-year ISI interval, which began August 1998 for Unit 1, May 1997 for Unit 2, and January 1998 for Unit 3,

is the 1989 Edition of Section XI of the ASME B&PV Code. As discussed below in the staff's evaluation of Request for Relief No. 1, the approved code of record for the second 10-year ISI interval is now the 1992 Edition with 1992 Addenda.

3.0 EVALUATION

The staff and INEEL have evaluated the information provided by the licensee in support of each of the requests for relief from code requirements contained in the March 17, 1998, submittal, as supplemented by letters dated July 2, August 24, October 12, and November 23, 1999, and March 9 and March 20, 2000. A summary of each request for relief, and the basis for disposition is documented below. The TLR prepared by INEEL provides a more detailed discussion of the basis for approval or denial of the requests for relief, and the staff concurs with these findings.

3.1 Request for Relief No. 1

Pursuant to 10 CFR 50.55a(b), the required code of record for the Palo Verde second 10-year ISI interval, which began August 1998 for Unit 1, May 1997 for Unit 2, and January 1998 for Unit 3, is the 1989 Edition of Section XI of the ASME B&PV Code.

The licensee requested approval to use the 1992 Edition, 1992 Addenda of ASME Section XI as the code of record for the second 10-year interval ISI program for the Palo Verde units, pursuant to 10 CFR 50.55a(g)(4)(iv).

> **Note:** In the October 12, 1999, response to the NRC request for additional information (RAI), the licensee withdrew Request for Relief No. 1 in response to amended regulations issued in the September 22, 1999, *Federal Register*. The licensee initially interpreted this rulemaking, effective November 22, 1999, to allow generic use of later code editions/addenda. Therefore, the licensee withdrew this request for relief proposing the use of the 1992 code with the 1992 Addenda. However, as a result of telecommunication with the staff that clarified the regulatory requirements for use of later code editions, the licensee reinstated its request to use the 1992 Edition with 1992 Addenda in a letter dated November 23, 1999.

In the rulemaking dated September 22, 1999, the NRC approved later editions and addenda of ASME Section XI, including the 1992 Edition/Addenda with certain limitations. This rulemaking became effective on November 22, 1999. The staff has found the 1992 Edition/Addenda, as requested by the licensee, to be acceptable for use, with the limitations listed in the rulemaking. Pursuant to 10 CFR 50.55a(g)(4)(iv), the licensee's request is approved.

The remaining requests for relief evaluated below are from the requirements of the 1992 Edition/Addenda of Section XI to the ASME Code.

3.2 Request for Relief No. 2

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-P, Table IWC-2500-1, Examination Category C-H, and Table IWD-2500-1, Examination Categories D-A, D-B, and D-C, require system hydrostatic testing of pressure-retaining components in accordance with IWA-5000 once each 10-year interval.

The licensee proposed to use Code Case N-498-1, *Alternative Rules for 10-Year Hydrostatic Pressure Testing for Class 1, 2, and 3 Systems, Section XI, Division 1*.

The staff has found Code Case N-498-1 acceptable for general use, and has incorporated this code case into Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability*, Revision 12, (May 1999). This general acceptance of Code Case N-498-1 by the NRC occurred after the licensee had submitted this request for relief (March 17, 1998). Code Case N-498-1 is, therefore, acceptable for use at Palo Verde.

3.3 Request for Relief No. 3

The licensee withdrew Request for Relief No. 3 by letter dated October 12, 1999.

3.4 Request for Relief No. 4

ASME Code, Section XI, Examination Category F-A, Items F1.10, F1.20, F1.30, and F1.40, require VT-3 visual examination, as defined by Figure IWF-1300-1. The extent of examination is 25%, 15%, and 10% of the non-exempt Class 1, 2 and 3 piping supports, respectively; and 100% of all other non-piping supports.

As an alternative to the code requirements, the licensee proposed that mechanical and weld attachments be visually examined to the extent practical and that insulation be removed around the support attachment for further examination whenever an abnormality is detected.

As defined by Figure IWF-1300-1, the examination surface includes the entire length of the support from building structure attachment to pressure boundary attachment. As an alternative, the licensee proposed to visually examine mechanical and welded supports to the extent practical without removal of the insulation. Insulation will be removed only from around the support attachment for further examination whenever an abnormality is detected.

The licensee will implement an expanded examination sample to include all supports on all non-exempt systems and lines. The licensee's proposed examinations to exam the accessible portions of component supports provides an acceptable level of quality and safety. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3.5 Request for Relief No. 5

The licensee withdrew Request for Relief No. 5 by letter dated July 2, 1999.

3.6 Request for Relief No. 6, Revision 1

The licensee withdrew Request for Relief No. 6, Revision 1, by letter dated March 9, 2000.

3.7 Request for Relief No. 7

The 1992 Addenda of ASME Section XI requires ultrasonic examinations to be performed in accordance with Mandatory Appendix I, which imposes Appendix VIII, *Performance Demonstration for Ultrasonic Examination Systems*.

As an alternative to the code requirements, the licensee proposed to utilize the 1989 Edition of ASME, Section XI, to perform all ultrasonic examinations, except that the personnel certification and qualification requirements and the evaluation criteria of the 1992 Edition including the 1992 Addenda will be utilized.

The 1992 Addenda of the ASME Section XI Code imposes Appendix VIII for ultrasonic examination of piping, bolts, and studs. The new requirements for ultrasonic examination in Appendix VIII would take considerable time to implement in an ISI program. The 1989 Edition of the ASME Section XI code was the latest code approved in 10 CFR 50.55a(b)(2) prior to the final rule change issued in the September 22, 1999, *Federal Register* (64 FR 51370) and effective November 22, 1999.

Although there are ultrasonic exam requirements in the 1992 Edition, 1992 Addenda, that do not impose the new requirements of Appendix VIII, programmatically it would be prudent to have all the ultrasonic examinations comply with the 1989 Edition rather than have some elements comply with the 1992 Edition, 1992 Addenda, and other elements comply with the 1989 Edition. As stated earlier, personnel certification and qualification requirements and the evaluation criteria of the 1992 Edition, 1992 Addenda, will be utilized.

New rulemaking effective November 22, 1999, imposes mandatory accelerated implementation schedules for the requirements listed in supplements of Appendix VIII of the 1995 Edition through 1996 Addenda of ASME Section XI. The required accelerated implementation is applicable to all licensees regardless of the code of record for a particular operating plant. These supplements, the applicable component examinations, and required implementation dates are shown in Section 2.7 of the contractor's TLR.

The licensee has stated its intention to comply with the implementation requirements of 10 CFR 50.55a(g)(6)(ii)(C). As Appendix VIII Supplements are phased in, Relief Request No. 7 will no longer be relevant for those program areas and components covered by the applicable supplements.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative to use the 1989 Edition of Section XI for ultrasonic examinations is authorized until such time(s) as the mandatory dates for implementation of various Appendix VIII supplements become effective.

3.8 Request for Relief No. 8

ASME Section XI, Examination Category C-B, Item C2.22, requires 100% volumetric examination, as defined by Figure IWC-2500-4(a) or (b), for nozzle inner radius (IR) sections in nozzles without reinforcing plates in vessels greater than ½-inch nominal wall thickness.

The licensee proposed to perform a surface examination of the steam generator main steam nozzle IR sections in lieu of the code-required volumetric examination.

The ultrasonic access to the IR sections from the vessel exterior is impractical due to the nozzle design and to the way the nozzle protrudes into the vessel.

The licensee proposed to perform a direct surface examination of the IR sections (the IR section surfaces may be accessed from the interior of the steam generator via secondary side man ways). The staff concludes that the proposed surface examinations provide reasonable assurance of structural integrity. The licensee's proposed examination is granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.9 Request for Relief No. 9

ASME Code, Section XI, Examination Category B-P, Items B15.11, B15.21, B15.31, B15.41, B15.51, B15.61, and B15.71, require a system hydrostatic pressure test on the entire Class 1 system once each interval in accordance with IWB-5222. In accordance with Code Case N-498-1, the pressure test can be performed at system operating pressure.

The licensee proposed to perform the code-required VT-2 visual examination of the pipe segments listed in Section 2.9 of the TLR, with the first isolation valve closed.

The subject lines are small diameter (the majority are $\leq$1 inch in diameter; there are five lines that are 2 inch diameter lines) drain and vent lines with no piping down stream from the second isolation valve. To test these lines, the first isolation valves, which operate only in Mode 5 (cold shutdown), must be opened to pressurize the short section of piping beyond the valve. Cycling these valves for the sole purpose of performing the 10-year hydrostatic test could result in a forced unit shutdown or cooldown if the valves do not reseat correctly. Imposition of the code hydrostatic pressure testing requirements on the subject lines could result in an undue hardship on the licensee without a compensating increase in quality and safety.

The licensee's proposed visual examination will be extended to include the small portion of pipe and downstream valve or blind flange with the first valve closed once each period during the system leakage test. Since these lines are not used while the plant is at power, the proposed testing provides reasonable assurance of the structural integrity of the subject components. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

3.10 Request for Relief No. 10

The licensee withdrew Request for Relief No. 10 by letter dated August 24, 1999.

3.11 Unnumbered Relief Request - Proposed Code Alternative

ASME Code, Section XI, Examination Category F-A, Items F1.10, F1.20, F1.30, and F1.40 require 100% VT-3 visual examination, as defined by Figure IWF-1300-1. Note 1 states that item numbers shall be categorized to identify support types by component support function.

In its letter dated July 2, 1999, the licensee proposed to examine 100% of the component supports on all non-exempt systems and lines as an alternative to the code requirements to categorize component supports. The licensee stated:

> In lieu of categorizing component supports and performing VT-3 examinations on a select percentage of each category as specified in ASME, Section XI, Table IWF-2500-1, PVNGS will perform VT-3 examinations on 100% of the component supports on all non-exempt systems and lines.

The licensee proposed to perform the VT-3 visual examination on the entire population of mechanical and welded supports to the extent practical without categorizing the supports by type. By examining all non-exempt supports, categorization as required by the code becomes irrelevant as all supports will be examined regardless of functional category. The staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

4.0 CONCLUSION

For Request for Relief No. 1, the licensee's proposal to use the 1992 Edition, 1992 Addenda of ASME Section XI as the code of record for the second 10-year interval ISI program for the Palo Verde units is authorized pursuant to 10 CFR 50.55a(g)(4)(iv).

For Request for Relief No. 2, the licensee proposes to use Code Case N-498-1. The staff has found this code case acceptable for general use and has incorporated it into Regulatory Guide 1.147, Revision 12. Therefore, Code Case N-498-1 is acceptable for use at Palo Verde.

Requests for Relief Nos. 3, 5, 6, and 10 were withdrawn by the licensee.

For Request for Relief No. 4 and the unnumbered proposed code alternative dated July 2, 1999, the licensee's proposed alternatives provide an acceptable level of quality and safety. The proposed alternatives contained in these requests are authorized pursuant to 10 CFR 50.55a(a)(3)(i).

For Request for Relief No. 7, the licensee's proposed alternative to use the 1989 Edition of Section XI for ultrasonic examinations provides an acceptable level of quality and safety. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i), until such time(s) as the mandatory dates for implementation of various Appendix VIII supplements become effective.

For Request for Relief No. 8, the code requirements are impractical to perform. To perform the code-required examinations the licensee would have to redesign the steam generator steam IR

sections. If the code requirements were imposed it would cause a significant burden on the licensee. The licensee's proposed alternative provides reasonable assurance of structural integrity of the steam generator steam IR sections. Relief is granted pursuant to 10CFR50.55a(g)(6)(i).

For Request for Relief No. 9, the code requirements would result in a significant burden without a compensating increase in the level of quality and safety. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Principal Contributor: Thomas McLellan

Date: April 10, 2000

TECHNICAL LETTER REPORT

ON SECOND 10-YEAR INTERVAL INSERVICE INSPECTION

REQUESTS FOR RELIEF

FOR

ARIZONA PUBLIC SERVICES COMPANY

PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3

DOCKET NUMBERS: 50-528, 50-529, AND 50-530

1. INTRODUCTION

By letter dated March 17, 1998, the licensee, Arizona Public Services Company, submitted the inservice inspection (ISI) program for the Palo Verde Nuclear Generating Station (Palo Verde or PVNGS), Units 1, 2, and 3, second 10-year inservice inspection (ISI) interval. The program contained requests for relief from ASME Section XI requirements for the second 10-year ISI interval. The Idaho National Engineering and Environmental Laboratory (INEEL) staff's evaluation of the subject requests for relief is in the following section.

2. EVALUATION

The information provided by Arizona Public Services Company in support of the requests for relief from Code requirements has been evaluated and the bases for disposition are documented below. The required Code of record for the Palo Verde second 10-year ISI interval, which began August 1998 for Unit 1, May 1997 for Unit 2 and January 1998 for Unit 3, is the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code. The licensee requested the use of the 1992 Edition with 1992 Addenda for all three units. It is the intent of the Staff to allow more recent editions/addenda of ASME Section XI, as indicated by new rulemaking published in the Federal Register on September 22, 1999. However, in accordance with the Regulations, licensees may use subsequent Code editions and addenda that are incorporated by reference into 10 CFR 50.55a, with specific limitations and modifications contained in the Regulations, and subject to Commission approval. Therefore, licensees are required to submit for approval requests to use subsequent Code editions/addenda. This issue has been evaluated as Request No. 1 below.

2.1 Request for Relief No. 1, Proposed Alternative to use the 1992 Edition with the 1992 Addenda

Note: In the October 12, 1999, response to the NRC RAI, the licensee withdrew Request for Relief No. 1 in response to amended regulations issued in the September 22, 1999, Federal Register. The licensee initially interpreted this rulemaking, effective November 22, 1999, to allow generic use of later Code editions/addenda. Therefore, the licensee

withdrew this request for relief proposing the use of the 1992 Code with the 1992 Addenda. However, as a result of telecommunication with the Staff that clarified the regulatory requirements for use of later Code editions, the licensee reinstated their request to use the 1992 Edition with 1992 Addenda in a letter dated November 23, 1999.

Regulatory Requirement: 10 CFR 50.55a requires that a licensee's inservice inspection program be based on the latest Edition of ASME Code Section XI incorporated by reference in Paragraph (b) of the Regulations published twelve months prior to the start date of the licensee's inservice inspection interval. For Palo Verde, Units 1, 2 and 3, the 1989 Code Edition is required for the second 10-year interval.

Licensee's Proposed Alternative (as stated):
"Pursuant to 10 CFR 50.55a(g)(4)(iv), Arizona Public Service Company (APS) hereby requests NRC Staff approval to change from the 1989 Edition to the 1992 Edition, 1992 Addenda of ASME Section XI for the second 10-year interval ISI program for PVNGS Units 1, 2, and 3 after the amended regulations become effective."

Licensee's Basis for Proposed Alternative:

None stated. It is assumed that, since the 1992 Edition/Addenda has been approved for use by rulemaking effective November 22, 1999, this forms the licensee's basis.

Evaluation: As specified in 10 CFR 50.55a, the Code of record for the second 10-year interval ISI at Palo Verde, Units 1, 2, and 3 is the 1989 Edition of ASME Section XI. The licensee has requested the use of the 1992 Edition with 1992 Addenda in lieu of that required by CFR.

In proposed rulemaking dated September 22, 1999, the NRC approved later editions and addenda of ASME Section XI, including the 1992 Edition/Addenda with certain limitations. This rulemaking becomes effective on November 22, 1999. The Staff has found the 1992 Edition/Addenda, as requested by the licensee, to be acceptable for use, with the limitations listed in the rulemaking. Therefore, pursuant to 10 CFR 50.55a(g)(4)(iv), it is recommended that the licensee's request be approved.

2.2 Request for Relief No. 2, Use of Code Case N-498-1, *Alternative Rules for 10 Year Hydrostatic Pressure Testing for Class 1, 2, and 3 Systems, Section XI, Division 1*

Code Requirement: Table IWB-2500-1, Examination Category B-P, Table IWC-2500-1, Examination Category C-H, and Table IWD-2500-1, Examination Categories D-A, D-B, and D-C, require system hydrostatic testing of pressure-retaining components in accordance with IWA-5000 once each 10-year interval.

Licensee's Proposed Alternative: The licensee proposed to use Code Case N-498-1, *Alternative Rules for 10-Year Hydrostatic Pressure Testing for Class 1, 2, and 3 Systems, Section XI, Division 1*. The licensee stated:

"Perform a System Leakage Test for Class 1 and a System Pressure Test for Class 2 and 3 in accordance with the requirements of N498-1."

Licensee's Basis for Proposed Alternative (as stated):

"Code Case N-498 includes all ASME Class 1 and 2 systems and has been accepted by the USNRC in Regulator Guide 1.147. The N498-1 Code Case is essentially identical to the accepted Code Case, with the exception that it includes ASME Class 3 Systems. Therefore the basis for acceptance would be the same."

Evaluation: The Code requires a system hydrostatic test once per interval in accordance with the requirements of IWA-5000 for Class 3 pressure-retaining systems. In lieu of the Code-required hydrostatic testing, the licensee has requested authorization to use Code Case N-498-1*, Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems*, dated May 11, 1994.

The NRC staff has reviewed Code Case N-498-1 and has found the Code Case acceptable for general use by incorporating it into Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability*, Revision 12, (May 1999). Therefore, Code Case N-498-1 should be found acceptable for use at Palo Verde.

2.3 Request for Relief No. 3, Proposed Alternative to use the 1992 Edition with the 1992 Addenda for Repair and Replacements

Note: In the October 12, 1999, response to the NRC RAI, and the amended regulations published in the September 22, 1999, Federal Register the licensee withdrew Request for Relief No. 3

2.4 Request for Relief No. 4, Examination Category F-A, Items F1.10, F1.20, F1.30, and F1.40, Visual Examination of Component Supports

Code Requirement: Examination Category F-A, Items F1.10, F1.20, F1.30, and F1.40, require VT-3 visual examination, as defined by Figure IWF-1300-1. The extent of examination is 25%, 15% and 10% of the non-exempt Class 1, 2 and 3 piping supports, respectively; and 100% of all other non-piping supports.

Licensee's Proposed Alternative: As an alternative to the Code requirements, the licensee proposed the following:

"The mechanical and weld attachments will be visually examined to the extent practical. The insulation will be removed from around the support attachment for further examination whenever an abnormality is detected."

Licensee's Basis for Proposed Alternative (as stated):

"The visual examinations of the mechanical or welded attachments will be performed to the extent practical. The insulation will not be removed to perform these examinations. It has been our experience that any loss of support capability or adequate restraint can usually be detected through the examination of

uninsulated portions of the support, the accessible portions of the attachments through the insulations gaps, and/or surrounding insulation. This Request for Relief was accepted for the 1st 10 Year Inspection Interval in the USNRC letter dated October 21, 1987, from E. A. Licitra, NRC, to E. E. Van Brunt, Jr., 'Inservice Inspection Programs Palo Verde, Unit 1, 2, 3'".

In the October 12, 1999, response to the NRC RAI, the licensee stated:

> "The requirements of ASME Section XI implicitly assume that insulation will be removed, as necessary, to perform volumetric and surface examinations. Removal of insulation generally is not required to perform visual examinations unless the results of in-service inspections detect unacceptable conditions that require corrective measures. The objective of the VT-3 visual examinations required for the subject examination categories is to determine the general mechanical and structural conditions of components and their supports, such as the presence of loose parts, debris, or abnormal corrosion products, wear, erosion, corrosion, and the loss of integrity at bolted or welded connections.
>
> "The staff's interpretation for APS' first interval ISI program approval of the same Relief Request [reference letter dated October 21, 1987, from E. A. Licitra, NRC, to E. E. Van Brundt, Jr., APS, Inservice Inspection Programs – Palo Verde, Units 1, 2 and 3 (TAC Nos. 56661, 62797, and 64909)] was that the ASME Council did not intend for insulation to be removed to conduct VT-3 visual examinations. The requirements of ASME Section XI do not require removal of insulation that would result in a violation of the Technical Specification, such as solid fire-resistant foam assemblies or insulation located at fire stops. For component supports, subparagraph IWF-1300 (e) contains the following definition: "Where the mechanical connection of a non-integral support is buried within the component insulation, the support boundary may extend from the surface of the component insulation provided the support either carries the weight of the component or serves as a structural restraint in compression".
>
> "The staff previously evaluated APS's conservative program for the examination of component supports, and determined that this program provides an acceptable level of quality and safety and is an acceptable alternative to an analysis based on IWF-1300 (e). Therefore, relief should be granted as requested permitting APS to examine the support components and integral attachments without removing insulation."

In the July 2, 1999, submittal, the licensee stated that It will perform VT-3 examinations on all of the component supports on all non-exempt systems and lines (Item Numbers F1.10, F1.20, F1.30 and F1.40).

Evaluation: The Code requires VT-3 visual examination of a sample of Class 1, 2, and 3 piping supports, and 100% of all other supports other than piping supports. As defined by Figure IWF-1300-1, the examination surface includes the entire length of the support from

building structure attachment to pressure boundary attachment. As an alternative, the licensee proposed to visually examine mechanical and welded supports to the extent practical without removal of the insulation. Insulation will only be removed from around the support attachment for further examination whenever an abnormality is detected. As stated in the July 2, 1999, submittal, the licensee will implement an expanded examination sample to include all supports on all non-exempt systems and lines. Although the licensee is only examining accessible portions of component supports, any significant deformation is expected to be detected without removing the insulation. Furthermore, by examining all component supports, existing patterns of degradation and deformation will be identified. Therefore, the INEEL staff concludes that the alternative provides an acceptable level of quality and safety and recommends that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.5 Request for Relief No. 5, Examination Category F-A, Items F1.10, F1.20, F1.30, and F1.40, Visual Examination of Component Supports

Note: Request for Relief No. 5 was withdrawn by the licensee in response to the NRC request for additional information.

2.6 Request for Relief No. 6, Revision 1, Examination Category C-H, Item C7.40, Pressure Testing of Containment Penetrations

Note: Request for Relief No. 6, Revision 1, was withdrawn by the licensee's letter dated March 9, 2000.

2.7 Request for Relief No. 7, Performance Demonstrations in Accordance with Appendix VIII

Code Requirement: The 1992 Addenda of ASME Section XI requires ultrasonic examinations to be performed in accordance with Mandatory Appendix I, which imposes Appendix VIII, *Performance Demonstration for Ultrasonic Examination Systems*.

Licensee's Proposed Alternative: As an alternative to the Code requirements, the licensee proposed to perform all ultrasonic examinations utilizing the 1989 Edition of ASME Section XI. The licensee stated:

> "Utilize the 1989 Edition of the ASME Section XI Code to perform all ultrasonic examinations. The personnel certification and qualification requirements and the evaluation criteria of the 1992 Edition including the 1992 Addenda will be utilized."

Licensee's Basis for Proposed Alternative (as stated):

> "Relief Request No. 7 proposed to utilize the 1989 Edition of the ASME Section XI Code to perform all ultrasonic examinations, in lieu of utilizing the 1992 Edition to perform the ultrasonic examinations. The basis for that relief request, as described in the submittal, was that it would be an undue burden to perform ultrasonic examinations with the additional requirements of Appendix VIII of the 1992 Edition. In recent telephone calls, the NRC requested further clarification for the basis of Relief Request No. 7.

"In reference 1 [APS letter dated March 17, 1998], APS proposed Relief Request No. 1 to use the 1992 Edition of the ASME Section XI Code with the 1992 Addenda in lieu of the 1989 Edition. In reference 2 [APS letter dated October 12, 1999], APS withdrew Relief Request No. 1, believing that pending changes to 10 CFR 50.55a(b)(2) rendered the relief request unnecessary. Shortly thereafter, it was determined that the November 22, 1999 changes to 10 CFR 50.55a did not negate the need for NRC Staff approval to utilize the 1992 Edition, 1992 Addenda of the ASME Code. Therefore, in reference 3 [APS letter dated November 23, 1999], pursuant to 10 CFR 50.55a(g)(4)(iv), APS requested NRC Staff approval to change from the 1989 Edition to the 1992 Edition, 1992 Addenda of ASME Section XI for the second 10-year interval ISI programs for PVNGS Units 1, 2 and 3.

"The 1992 Edition of the ASME Section XI Code contains a number of mandatory requirements for ultrasonic examination in a new Appendix VIII that are beyond the requirements in the 1989 Edition. The new requirements for ultrasonic examination in Appendix VIII would take considerable time to implement in an ISI program. The 1989 Edition of the ASME Section XI code was the latest Code approved in 10 CFR 50.55a(b)(2) prior to the final rule change issued in the September 22, 1999 Federal Register (64 FR 51370) and effective November 22, 1999.

"Although there are ultrasonic exam requirements in the 1992 Edition, 1992 Addenda that do not impose the new requirements of Appendix VIII, programmatically it would be prudent to have all the ultrasonic examinations comply with the 1989 Edition rather than have some elements comply with the 1992 Edition, 1992 Addenda and other elements comply with the 1989 Edition. As stated in the relief request, personnel certification and qualification requirements and the evaluation criteria of the 1992 Edition, 1992 Addenda will be utilized. 10 CFR 50.55a, as amended, requires a phased implementation of Appendix VIII to Section XI of the 1995 Edition through the 1996 Addenda.

"APS intends to comply with the implementation requirements of 10 CFR 50.55a(g)(6)(ii)(C). As Appendix VIII Supplements are phased in, Relief Request No. 7 will no longer be relevant for those program areas and components covered by the applicable Supplements."

Evaluation: The 1992 Addenda of the ASME Section XI Code imposes Appendix VIII for ultrasonic examination of piping, bolts, and studs. The licensee proposed to perform ultrasonic examinations using the requirements of the 1989 Edition except for personnel certification and qualification requirements and the evaluation criteria where the requirements of the 1992 Edition with the 1992 Addenda will be used.

New rulemaking effective November 22, 1999, imposes mandatory accelerated implementation schedules for the requirements listed in supplements of Appendix VIII of the 1995 Edition through 1996 Addenda of ASME Section XI. These supplements, component examinations applicable, and required implementation dates are shown in the following table.

Appendix VIII Supplement	Applicable Components	Mandatory Implementation Date(s)
1	Ultrasonic System Evaluation	May 22, 2000
2	Wrought Austenitic Piping Welds	May 22, 2000
3	Ferritic Piping Welds	May 22, 2000
4	RPV Clad/Base Metal Interface	November 22, 2000
5	RPV Nozzle Inside Radius Section	November 22, 2002
6	RPV Welds	November 22, 2000
7	RPV Nozzle-to-Vessel Welds	November 22, 2002
8	Bolts and Studs	May 22, 2000
9	Cast Austenitic Piping Welds	N/A- In course of preparation
10	Dissimilar Metal Piping Welds	November 22, 2002
11	Austenitic Piping Welds with Structural Overlays	November 22, 2001
12	Coordinated use of Supplements 2, 3, 10, and 11	November 22, 2002
13	Coordinated use of Supplements 4, 5, 6, and 7	November 22, 2002

The required accelerated implementation is applicable to all licensees regardless of the Code of record for a particular operating plant. The licensee has acknowledged this requirement, and now states that, as Appendix VIII supplements are phased in, Relief Request No. 7 will no longer be relevant for those program areas and components covered by the applicable supplements. The INEEL staff finds the licensee's request to comply with the 1989 Edition for all the ultrasonic examinations (with the noted exception related to personnel certification and qualification requirements and the evaluation criteria) until Appendix VIII is phased in to be consistent with the implementation policy of the new rulemaking.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the INEEL staff recommends that the licensee's proposed alternative, to use the 1989 Edition of Section XI for ultrasonic examinations, be authorized until such time(s) as the mandatory dates for implementation of various Appendix VIII supplements become effective.

2.8 Request for Relief No. 8, Examination Category C-B, Item C2.22, Steam Generator Main Steam Nozzle Inside Radius Sections

Code Requirement: Examination Category C-B, Item C2.22, requires 100% volumetric examination, as defined by Figure IWC-2500-4(a) or (b), for nozzle IR sections in nozzles without reinforcing plates in vessels greater than ½-inch nominal wall thickness.

Licensee's Code Relief Request: The licensee proposed to perform a surface examination of the steam generator main steam nozzle IR sections in lieu of the Code-required volumetric examination. The licensee stated:

> "A surface examination will be performed on the nozzles selected for examination."

Licensee's Basis for Proposed Alternative (as stated):

> "Due to the design of the PVNGS Steam Generator Main Steam Nozzles the volumetric examination is not practical. The nozzles have a protrusion into the steam generator. This area is accessible during outages through the secondary side manway. A copy of the nozzle drawing is attached that illustrated the geometric conditions."

Evaluation: The Code requires 100% volumetric examination of the subject steam generator nozzle IR sections. However, ultrasonic examination of the IR sections from the vessel exterior is not possible due to the nozzle design, specifically, due to the way the nozzle protrudes into the vessel.

As an alternative to the Code volumetric examination requirements, the licensee proposed to perform a direct surface examination of the IR sections (the IR section surfaces may be accessed from the interior of the steam generator via secondary side manways). The INEEL staff concludes that the proposed surface examinations are capable of detecting any significant patterns of degradation on the IR sections and, therefore provides reasonable assurance of structural integrity. The licensee's proposed examination is recommended to be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.9 Request for Relief No. 9, Examination Category B-P, Items B15.11, B15.21, B15.31, B15.41, B15.51, B15.61, and B15.71, System Pressure Testing

Code Requirement: Examination Category B-P, Items B15.11, B15.21, B15.31, B15.41, B15.51, B15.61, and B15.71 require a system hydrostatic pressure test on the entire Class 1 system once each interval in accordance with IWB-5222. In accordance with Code Case N-498-1, the pressure test can be performed at system operating pressure.

Licensee's Proposed Alternative: The licensee proposed to perform the Code-required VT-2 visual examination of the pipe segments listed below with the first isolation valve closed. The licensee stated:

> "The visual examination performed during the System Leakage Test will be extended to include the small portion of pipe and downstream valve or blind flange. The first valve will not be opened. A list of these areas is as follows:"

Line No.	Description	Line No.	Description
CH026	1PCHNV848	RC200	1PRCNV900
CH024	1PCHNV849	RC203	1PRCNV903
CH022	1PCHNV859	RC024	1PRCNVR30
CH020	1PCHNV860	RC024	1PRCNV753
CH026	1PRCNV752	RC022	1PRCNV754
CH520	1PCHEVM41	RC112	1PRCNV869
CH001	1PCHEV853	RC106	1PRCNV868
RC091	1PRCEV061	RC118	1PRCNV871
RC091	1PRCEV063	RC124	1PRCNV870
RC089	1PRCEV332	SI207	1PSIEV882
RC096	1PRCEV333	SI217	1PSIEV974
RC062	1PRCEV001	SI223	1PSIEV883
RC017	1PRCEV062	SI240	1PSIAV892
RC099	1PRCEV057	SI248	1PSIAV902
CH005	1PCHEV939	SI248	1PSIAV055
CH005	1PCHEVM42	SI248	1PSIAV906
CH005	1PCHEV096	SI156	1PSIAV880
RC098	1PRCEV056	SI156	1PSIAV804
RC098	1PRCEV060	SI179	1PSIEV881
RC069	1PRCEV214	SI175	1PSIEV803
RC070	1PRCEV215	SI193	1PSIBV879
RC060	1PRCEV334	SI225	1PSIEV975
RC018	1PRCEV058	SI203	1PSIEV064
RC179	1PRCEV392	SI199	1PSIBV057
RC058	1PRCEV335	SI248	1PSIAV056
RC020	1PRCNV755	SI221	1PSIEV063
RC202	1PRCNV902	SI199	1PSIBV907
RC201	1PRCNV901	SI240	1PSIAV801

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Licensee's Basis for Proposed Alternative (as stated):

"The normal reactor pressure boundary is examined during each refueling outage and no pressure boundary leakage has been noted. Currently these valves are independently verified closed prior to plant start-up and are not manipulated during any procedurally guided plant evolutions while at power. Since these valves are not cycled at NOP/NOT, the opportunity to experience an incident where a valve will not reseat is increased. This can be due to several mechanisms, foreign material moving into the seating surface, stem failure while opening and closing, packing shifting, or valve binding. The opportunity for a packing leak will also present itself, with the added challenge of normal RCS pressure behind it. Cycling of these valves and the resulting compensatory actions due to a leak can easily result in leakage and a forced unit shutdown or cooldown. Current operating procedures require these valves to remain closed with no exceptions. Valves that need to be operated are specifically identified to manipulate only in mode 5 (to prevent RCP seal damage)."

In the October 12, 1999, response to the NRC RAI, the licensee stated:

> "The functions of the subject piping segments are venting and draining. The piping between the first isolation valve and the second isolation valve/blind flange are all one inch or less NPS and extend less that two feet. None of these valves are procedurally required to be opened during normal operations at normal pressure. The valves are closed to achieve operational readiness. Therefore, the line segments downstream of the first isolation valve serve no operational function and do not impact the system operational readiness."

Evaluation: The Code requires system hydrostatic testing of the entire Class 1 system boundary once each 10-year ISI interval. The subject lines are small diameter (the majority are $\leq$1 inch in diameter; there are five lines that are 2 inch diameter lines) drain and vent lines with no piping down stream from the second isolation valve. To test these lines, the first isolation valves, which only operate in Mode 5 (cold shutdown), must be opened to pressurize the short section of piping beyond the valve. Cycling these valves for the sole purpose of performing the 10-year hydrostatic test could result in a forced unit shutdown or cooldown if the valves do not reseat correctly. Therefore, imposition of the Code hydrostatic pressure testing requirements on the subject lines could result in an undue hardship on the licensee.

In lieu of the Code requirements, the visual examination will be extended to include the small portion of pipe and downstream valve or blind flange with the first valve closed once each period during the system leakage test. Since these lines are not used while the plant is at power, the proposed visual examination provides reasonable assurance of the operational readiness. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.10 Proposed Alternative (dated 7/10/99), Examination Category F-A, Items F1.10, F1.20, F1.30, and F1.40, Visual Examination of Component Supports

Code Requirement: Examination Category F-A, Items F1.10, F1.20, F1.30, and F1.40 require 100% VT-3 visual examination, as defined by Figure IWF-1300-1. Note 1 states that Item numbers shall be categorized to identify support types by component support function.

Licensee's Proposed Alternative: As an alternative to the Code requirements to categorize component supports, the licensee proposed to examine 100% of the component supports on all non-exempt systems and lines. The licensee stated:

> "In lieu of categorizing component supports and performing VT-3 examinations on a select percentage of each category as specified in ASME, Section XI, Table IWF-2500-1, PVNGS will perform VT-3 examinations on 100% of the component supports on all non-exempt systems and lines."

Licensee's Basis for Proposed Alternative (as stated):

> "The intent of categorizing supports is to provide a methodology for selection of examination percentages. The proposed alternate examination of 100%

of supports eliminates the value of categorization. Examination of 100% of supports exceeds the Code required percentages."

Evaluation: The Code requires VT-3 visual examination of a sample of Class 1, 2, and 3 piping supports, and 100% of all other supports other than piping supports. As required by Note 1, Item numbers shall be categorized to identify support types by component support function. As an alternative, the licensee proposed to perform the VT-3 visual examination on the entire population of mechanical and welded supports to the extent practical without categorizing the supports by type.

It is unclear what purpose Code categorization of component supports serves. However, by examining all non-exempt supports, categorization becomes irrelevant as all supports will be examined regardless of functional category. Therefore, the INEEL staff concludes that the alternative provides an acceptable level of quality and safety and recommends that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3. CONCLUSION

The INEEL staff evaluated the licensee's proposed alternatives for the second 10-year interval ISI program at Palo Verde Nuclear Generating Station, Units 1, 2, and 3. For Request for Relief No. 4 and the unnumbered request dated July 10, 1999, it is concluded that the licensee's proposed alternatives provide an acceptable level of quality and safety. Therefore, it is recommended that the proposed alternatives contained in these requests be authorized pursuant to 10 CFR 50.55a(a)(3)(i). For Request for Relief No. 9, it is concluded that imposition of the Code requirements would result in a burden without a compensating increase in the level of quality and safety; therefore, it is recommended that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Requests for Relief Nos. 3, 5, and 6 were withdrawn by the licensee.

For Request for Relief No. 7, the INEEL staff recommends that, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative, to use the 1989 Edition of Section XI for ultrasonic examinations, be authorized until such time(s) as the mandatory dates for implementation of various Appendix VIII supplements become effective. It is further recommended that, as of the accelerated implementation dates specified by the new rulemaking, the licensee implement other applicable ultrasonic examination requirements listed in the 1992 Edition/1992 Addenda (in accordance with previous Relief Request No. 1).

For Request for Relief No. 8, the Code requirements are impractical to perform. To perform the Code required examinations the licensee would have to redesign the steam generator steam IR sections. If the Code requirements were imposed it would cause a significant burden on the licensee. The licensee's proposed alternative provides reasonable assurance of structural integrity of the steam generator steam IR sections. The INEEL staff recommends that Request for Relief No. 8 be granted pursuant to 10CFR50.55a(g)(6)(i).