

April 14, 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, UNIT 2 - EVALUATION OF
REQUESTS FOR RELIEF ASSOCIATED WITH THE FIRST 10-YEAR INSERVICE
INSPECTION INTERVAL (TAC NO. MA5008)

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 requests for relief associated with the first 10-year inservice inspection interval for the Palo Verde Nuclear Generating Station, Unit 2. APS provided additional information on these requests for relief in its letter dated October 6, 1999, and two letters dated March 20, 2000.

The staff notes that the information provided in the letter dated March 17, 1998, did not provide suitable bases for granting relief or authorizing alternatives. The bases were very brief and in many cases did not provide sufficient information for the staff to evaluate the request for relief. The staff was required to issue a request for additional information in order to obtain information needed to evaluate the licensee's relief requests. APS's response dated October 6, 1999, was not completely satisfactory and several phone calls and one additional letter were required to clarify the information provided.

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 No. STN 50-529

Enclosures: 1. Safety Evaluation
2. Technical Letter Report

cc w/encls: See next page

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August 18, 1999

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FIRST 10-YEAR INTERVAL INSERVICE INSPECTION PLAN

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION, UNIT 2

DOCKET NO. STN 50-529

1.0 INTRODUCTION

By letter dated March 17, 1998, the Arizona Public Service Company (the licensee) submitted requests for relief for the first 10-year interval inservice inspection (ISI) for Palo Verde Nuclear Generating Station (Palo Verde or PVNGS), Unit 2. The licensee provided additional information in its letter dated October 6, 1999, and two letters dated 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 Unit 2 first 10-year ISI interval is the 1980 Edition through Winter 1981 Addenda of Section XI of the ASME B&PV Code.

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 letter dated October 6, 1999. The staff included in its final evaluation the information provided in the two licensee letters dated 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 of the requests for relief, and the staff concurs with these findings, with the exception of Request for Relief No. 7(b).

3.1 Request for Relief No. 7(a)

ASME Code, Section XI, Table IWC-2500-1, Examination Category C-H, requires a VT-2 visual examination during system pressure testing for all Class 2 pressure-retaining components. The code requires a VT-2 visual examination to be performed during system pressure testing for all Class 2 pressure-retaining piping, including those segments that penetrate primary containment.

The licensee proposed to perform an Appendix J testing in accordance with the condition in Code Case N-522 in Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability*, Revision 12, (May 1999), in lieu of the code-required examinations for the Class 2 containment penetrations listed in the contractor's TLR in Section 2.2.

In a meeting between the licensee and the NRC on February 24, 2000 (see meeting summary, dated March 14, 2000), the licensee indicated that it would detect and locate leakage if the tested leakage for a penetration exceeds its specified allowable limit. However, the condition on the use of Code Case N-522 in Regulatory Guide 1.147, Revision 12, states the test should be conducted at the peak calculated containment pressure and the test procedure should permit the detection and location of through-wall leakage in containment isolation valves (CIVs) and pipe segments between the CIVs. The procedures used by the licensee do not preclude the possibility that some small amount of through-wall leakage could occur without being located. While the procedures would ensure such leakage would be within Appendix J limits, they would not address the possibility that such a through-wall defect could exist without a proper code evaluation.

Leakage measured during an Appendix J test is much more likely to occur through valve seats which are periodically replaced than through a pipe wall or valve body which is designed, fabricated, and inspected to maintain structural integrity through the life of the plant. In the unlikely event that a through-wall defect were to occur, the low level of penetration leakage that is allowed under Appendix J could only be a result of a very small through-wall flaw. It is unlikely that the environmental conditions or loading on these containment penetrations could lead to a significantly larger flaw prior to the next Appendix J test. The licensee's successful completion of several Appendix J tests during the first 10-year period on each of the penetrations included in this relief request provides an adequate level of assurance that no significant through-wall defects existed in the piping between the containment isolation valves. Therefore, for the first 10-year interval, the staff concludes that the testing performed provided

an acceptable level of quality and safety. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

However, for any continued use of this alternative in subsequent 10-year intervals, the licensee will need to address the possibility of leakage past through-wall flaws verses seat leakage in a more quantitative fashion. While INEEL also recommended approval of this request for relief, the staff's basis for approving this request for relief differs from the reasoning provided in the TLR. The contractor based its recommendation on the fact that Code Case N-522 has been approved for general use as evidenced by incorporation into RG 1.147, Revision 12. In addition to this information, the staff also considered the information presented by the licensee during the February 24, 2000, meeting, regarding the successful completion of several Appendix J tests during the first 10-year period. The staff considers this information relevant to resolve the issue of locating possible through-wall defects in the piping for the first 10-year ISI interval.

3.2 Request for Relief No. 7(b)

ASME Code, Section XI, Table IWC-2500-1, Examination Category C-H, requires a VT-2 visual examination during system pressure testing for all Class 2 pressure-retaining components. The code requires a VT-2 visual examination to be performed during system pressure testing for all Class 2 pressure-retaining piping, including those segments that penetrate primary containment.

The licensee proposed to perform Appendix J testing in accordance with the condition in Code Case N-522 in Regulatory Guide 1.147, Revision 12, in lieu of the code requirements for the Class 2 containment penetrations listed in the contractor's TLR in Section 2.3.

In a meeting between the licensee and the NRC on February 24, 2000, the licensee indicated that it would detect and locate leakage if the tested leakage for a penetration exceeds its specified allowable limit. However, the condition on the use of Code Case N-522 in Regulatory Guide 1.147, Revision 12, states the test should be conducted at the peak calculated containment pressure and the test procedure should permit the detection and location of through-wall leakage in CIVs and pipe segments between the CIVs. The procedures used by the licensee do not preclude the possibility that some small amount of through-wall leakage could occur without being located. While the procedures would ensure such leakage would be within Appendix J limits, they would not address the possibility that such a through-wall defect could exist without a proper code evaluation.

Leakage measured during an Appendix J test is much more likely to occur through valve seats which are periodically replaced than through a pipe wall or valve body which is designed, fabricated, and inspected to maintain structural integrity through the life of the plant. In the unlikely event that a through-wall defect were to occur, the low level of penetration leakage that is allowed under Appendix J could only be a result of a very small through-wall flaw. It is unlikely that the environmental conditions or loading on these containment penetrations could lead to a significantly larger flaw prior to the next Appendix J test. The licensee's successful completion of several Appendix J tests during the first 10-year period on each of the penetrations included in this relief request provides an adequate level of assurance that no significant through wall defects existed in the piping between the containment isolation valves. Therefore, for the first 10-year interval, the staff concludes that the testing performed provided an acceptable level of quality and safety. The licensee's proposed alternative is authorized

pursuant to 10 CFR 50.55a(a)(3)(i). However, for any continued use of this alternative in subsequent 10-year intervals, the licensee will need to address the possibility of leakage past through-wall flaws verses seat leakage in a more quantitative fashion.

INEEL recommended that this request for relief not be granted, stating that the piping on either side of the systems in question is not non-classed piping, and therefore not explicitly covered by Code Case N-522. The contractor stated that the use of this code case should not be allowed until the licensee has adequately described the burden associated with meeting the code requirements. The staff disagrees with the contractor's contention that the burden associated with meeting the code requirements needs to be addressed by the licensee. The staff approved the licensee's request for relief pursuant to 10 CFR 50.55a(a)(3)(i), which does not require burden to be addressed.

3.3 Request for Relief No. 10

ASME Code, Section XI, Examination Category C-B, Item C2.22 requires 100% volumetric examination of the nozzle inside radius sections of those nozzles selected for examination under Examination Category C-F, as defined by Figure IWC-2500-4(a) or (b).

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the code-required volumetric examination of steam generator main steam nozzle inner radius sections.

Access to the inner radius sections from the vessel exterior is not possible because the nozzle extension section protrudes beyond the vessel shell inner surface. As an alternative to the code's volumetric examination requirements, the licensee proposed to perform a direct surface examination of the subject inner radius sections (access to the vessel interior is provided via a secondary side man-way). The licensee's proposed surface examination is capable of detecting any significant patterns of degradation on the inner radius sections and therefore provides an acceptable level of quality and safety. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3.4 Request for Relief No. 11

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.

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has requested authorization to use Code Case N-498-1, *Alternate Rules for 10-Year Hydrostatic Pressure Testing for Class 1, 2, and 3 Systems, Section XI, Division 1*.

The NRC staff recently reviewed Code Case N-498-1 and found the code case acceptable for general use as evidenced by incorporation into Regulatory Guide 1.147, Revision 12. Therefore, the licensee's proposed alternative to use Code Case N-498-1 is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3.5 Request for Relief 12

The ASME Code, Section XI, for 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 during the system leakage test. The boundary subject to test pressurization during the system leakage test shall extend to all Class 1 pressure-retaining components within the system boundary.

The licensee proposed to perform the code-required VT-2 visual examination of the pipe segments with the first isolation valve closed. These components are listed in Section 2.6 of the contractor's TLR.

The subject lines are small diameter (the majority are ≤ 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 normally 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 reseal correctly.

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. Requiring the licensee to cycle the first isolation valve to test limited portions of these small-diameter vent and drain lines imposes a hardship without a compensating increase in quality and safety. The licensee's proposed alternative provides reasonable assurance of structural integrity of the subject components. The proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

3.6 Request for Relief No. 13

ASME Code, Section XI, Examination Category B-A, Item B1.22 requires that the accessible length of all meridional head welds be examined during the first 10-year interval as defined by Figure IWB-2500-3.

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the code-required volumetric examination of reactor pressure vessel meridional closure head and bottom head welds.

Access to these welds is restricted by the control element drive mechanism penetrations, in-core instrumentation penetrations, and the vessel support skirt. As a result, the code examination requirements are impractical for these welds. Design modifications would be required to provide access for the code-required examinations. Imposition of this requirement would cause a significant burden on the licensee.

The licensee has examined approximately 31% of the closure head and 22% of the bottom head meridional welds. These examinations to detect any ongoing degradation mechanisms, in conjunction with the periodic system pressure tests and the code-required volumetric

examination of other similar reactor pressure vessel welds, provides reasonable assurance of structural integrity of the subject components. Relief is granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.7 Request for Relief No. 14A

ASME Code, Section XI, Examination Category B-G-1, Item B6.190 requires a VT-1 visual examination of reactor coolant pump (RCP) flange mating surfaces when the pump is disassembled. The examination includes the 1-inch annular surface of the flange surrounding each stud hole.

Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee proposed to perform the VT-1 visual examination of two of the four pump flange ligaments in lieu of the code-required examination of all four pumps.

The licensee disassembled all four pumps in the first period of the first 10-year interval and examined two of the four pump flanges. The remaining two pumps were not examined due to as low as reasonably achievable (ALARA) concerns. No indications were detected on the flanges that were examined, and the ability to examine for leakage and boric acid accumulation through the piping penetrations of the motor support stand provide reasonable assurance of structural integrity of the subject pumps.

In addition, the Unit 1 pumps were disassembled and examined during refueling outage U1R7, as reported in the licensee's July 15, 1999, letter. There were no abnormal indications noted during this inspection activity. The examinations performed, along with the examination of the Unit 1 pumps, provide reasonable assurance of structural integrity for the subject pumps. Requiring the licensee to visually inspect the remaining two RCP flange mating surfaces would result in a hardship without a compensating increase in quality or safety. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

3.8 Request for Relief No. 14B

ASME Code, Section XI, Examination Category B-H, Item B8.20 requires 100% volumetric or surface examination, as applicable, of the pressurizer skirt weld as defined by Figure IWB-2500-13, 14, and 15.

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the code-required examination of the inside surface area of the pressurizer skirt weld.

Access to the inside surface is restricted by design, pressurizer heaters, drain/instrumentation lines, insulation, and ALARA concerns. The surface examination is impractical to perform to the extent required by the code. To examine this weld from the inside, as required by the code, the pressurizer support skirt would have to be redesigned and modified, causing a significant burden on the licensee.

The licensee examined the subject weld from the outside surface as required by the code. In addition, the licensee performed a supplemental volumetric examination using a technique that is capable of detecting service-induced degradation initiating from the inside surface of the

support skirt weld. These examinations provide a reasonable assurance of structural integrity of the subject components. Relief is granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.9 Request for Relief No. 14C

ASME Code, Section XI, Examination Category B-B, Item B2.12 requires volumetric examination of 1 foot of all pressurizer longitudinal welds that intersect the circumferential welds.

For Examination Category B-G-1, Item B6.10 requires 100% surface examination of all closure head nuts, Item B6.30 requires 100% surface and volumetric examination of all closure head studs when removed, and Item B6.50 requires VT-1 visual examination of closure washers and bushings.

Examination Category B-M-1, Item B12.40 requires volumetric examination of all valve body welds as defined by Figure IWB-2500-17.

Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee proposed to perform the examinations that were not completed before closeout of the first ISI interval during the first refueling outage in the second interval.

The first ISI interval for Palo Verde, Unit 2, ended March 17, 1997. It is not possible for the licensee to meet first 10-year interval requirements. In all cases, the licensee has performed a significant amount of the subject examinations and identified no degradation mechanisms in the subject components. Additionally, the licensee has committed to perform the subject examinations during the next refueling outage in the second 10-year interval. This refueling outage occurred in the spring 1999, and as reported in the licensee's letter dated March 20, 2000, there were no abnormal indications noted during this inspection activity.

Considering the examinations performed during the first 10-year interval, reasonable assurance of structural integrity of the components was provided. Requiring the licensee to take the unit off line for the purpose of performing the subject examinations prior to the scheduled refueling outage would pose a significant hardship on the licensee without a compensating increase in safety. This position is further supported by the successful completion of the remaining examination requirements during the first refueling outage in the second 10-year interval. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

3.10 Request for Relief No. 14D

ASME Code, Section XI, Examination Category C-C, Item C3.20 requires 100% surface examination of each welded attachment.

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the code-required surface examination for the integrally welded attachment for SG-52-H5.

Due to the proximity of the associated structural steel and concrete, the surface examination of the subject weld is impractical to perform. Examination of this weld to the extent required by the code would require redesign and modification, causing a significant burden on the licensee. The licensee proposed an alternative surface examination on an adjacent integrally welded

attachment during the next outage. This refueling outage occurred in the spring 1999, and as reported in the licensee's letter dated March 20, 2000, there were no abnormal indications noted during this inspection activity. In addition, other similar welded attachments have been examined during the first interval. These examinations provide reasonable assurance of structural integrity of the subject welds. Relief is granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.11 Request for Relief No. 14E

ASME Code, Section XI, Examination Categories F-A, F-B, and F-C require a VT-3 visual examination of the spray pond piping supports.

The licensee proposed to perform the examination by looking for signs of damage (e.g., indications of bent, missing, or broken components). If damage is found, the support would be cleaned to enable a thorough examination of the welds.

The licensee's proposed alternative is to clean the supports and perform a thorough examination of the welds only when signs of damage are found. The staff recognizes that there is a significant burden involved in cleaning sediment from all the supports. However, this proposed alternative does not address all the conditions intended to be examined by a VT-3. These conditions include clearances, settings, physical displacements, loose or missing parts, debris, corrosion, wear, erosion, or the loss of integrity at bolted or welded connections. The purpose of the code-required examination is to monitor for such degradation and to take appropriate corrective action should degradation occur. The licensee's proposal to perform a visual exam, without removing the layer of sediment, would be able to detect some of these conditions but would not detect signs of corrosion or wear and may not detect abnormalities in clearances or settings.

The staff considers the limited examination method proposed by the licensee to be acceptable since erosion/corrosion of spray pond piping supports, as well as significant alterations in clearances or settings, would not be expected to occur during early plant life. In addition, corrective actions would occur if the supports were showing evidence of damage. Requiring the licensee to clean sediment from all the supports for the purpose of performing the code-required examinations would result in hardship or unusual difficulty without a compensating increase in safety. Therefore, the proposed visual examination is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

However, for the staff to find this alternative acceptable for subsequent 10-year ISI intervals, the licensee will need to supplement the alternative with the code-required VT-3 examination of some percentage of the supports to ensure that all the conditions detectable by a VT-3 are properly monitored. These actions are considered necessary by the staff to accomplish the long-term monitoring objectives of the code requirements to assure that these components will perform their intended safety functions for the remainder of plant life.

3.12 Request for Relief No. 15, Revision 1

ASME Code, Section XI, Examination Category B-P, Item B15.51 requires a system hydrostatic pressure test on the entire Class 1 system once each interval in accordance with IWB-5200. In accordance with Code Case N-498-1, the pressure test can be performed at system operating pressure during the system leakage test. The boundary subject to test pressurization

during the system leakage test shall extend to all Class 1 pressure-retaining components within the system boundary. Table IWC-2500-1, Examination Category C-H, C7.40, requires a VT-2 visual examination during system pressure testing for all Class 2 pressure-retaining components.

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed to defer the VT-2 system leakage test and system pressure test examinations of the ASME Class 1 and Class 2 reactor head vent system lines to the first refueling outage of the second 10-year interval. The affected portions of the vent lines are listed in Section 2.13 of the contractor's TLR.

The licensee did not perform the required examinations during the first ISI interval for Palo Verde, Unit 2, or within the 1-year extension allowed by the code. It is not possible for the licensee to meet first 10-year interval requirements.

The licensee has performed the required examinations for Unit 3 and identified no degradation mechanisms; the licensee has had no failures associated with the subject components. Additionally, the containment building is monitored continuously and any significant leakage would be detected by the ongoing monitoring systems. The licensee performed the subject examinations for Unit 2 during the first refueling outage in the second 10-year interval, which occurred in the spring 1999. As reported in the licensee's letter dated March 20, 2000, there were no abnormal indications noted during this inspection activity.

The ongoing containment monitoring systems and examinations performed in Unit 3 provide reasonable assurance of operational readiness of the subject components. Requiring the licensee to take the unit off line for the purpose of performing the subject examinations prior to the scheduled refueling outage would pose a significant hardship on the licensee without a compensating increase in safety. This position is further supported by the successful completion of the remaining examination requirements during the first refueling outage in the second 10-year interval. The licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

4.0 CONCLUSION

For Request for Relief Nos. 7A, 7B, and 10, the staff concludes that the licensee's proposed alternatives provide an acceptable level of quality and safety. The licensee's proposed alternatives contained in these requests are authorized pursuant to 10 CFR 50.55a(a)(3)(i).

For Requests for Relief Nos. 12, 14A, 14C, 14E and 15 (Revision 1), the staff concludes that compliance with the specified code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The examinations performed and the licensee's commitment to perform the remaining examinations during the next refueling outage of the second interval provide reasonable assurance of structural integrity of the components. The licensee's proposed alternatives are authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

For Requests for Relief Nos. 13, 14B, and 14D, the staff concludes that the code requirements are impractical and the examinations performed provide reasonable assurance of structural integrity of the subject components. Relief is granted pursuant to 10 CFR 50.55a(g)(6)(i). This relief is authorized by law and will not endanger life or property or the common defense and

security and is otherwise in the public interest giving due consideration to the burden that could result if the requirements were imposed on the facility.

For Request for Relief No. 11, the NRC staff found Code Case N-498-1 acceptable for general use as evidenced by incorporation into Regulatory Guide 1.147, *Inservice Inspection Code Case cceptability*, Revision 12, (May 1999). Since the licensee's alternative provides an acceptable level of quality and safety, pursuant to 10 CFR 50.55a(a)(3)(i), it is authorized for use at Palo Verde.

Principal Contributor: Thomas McLellan

Date: April 14, 2000

TECHNICAL LETTER REPORT
ON FIRST 10-YEAR INTERVAL INSERVICE INSPECTION
REQUESTS FOR RELIEF NO. 7 AND 10 THROUGH 15
FOR
ARIZONA PUBLIC SERVICES COMPANY
PALO VERDE NUCLEAR GENERATING STATION, UNIT 2
DOCKET NUMBER: 50-529

1. INTRODUCTION

By letter dated March 17, 1998, the licensee, Arizona Public Service Company, submitted Requests for Relief Nos. 7 and 10 through 15, seeking relief from the requirements of the ASME Code, Section XI, for the Palo Verde Nuclear Generating Station, Unit 2, first 10-year inservice inspection (ISI) interval. In a response to an NRC Request for Additional Information (RAI), the licensee provided further information in a letter dated October 6, 1999. 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 Service Company in support of the requests for relief from Code requirements has been evaluated and the bases for disposition are documented below. The Code of record for the Palo Verde Nuclear Generating Station, Unit 2, first 10-year ISI interval, which began on September 19, 1986, is the 1980 Edition through Winter 1981 Addenda of Section XI of the ASME Boiler and Pressure Vessel Code.

2.1 Request for Relief No. 7, Examination Category C-H, Items C7.40, C7.70, and C7.80, Pressure Testing of Containment Penetrations

Note: In the October 6, 1999, response to the NRC RAI, the licensee revised Request for Relief No. 7 by separating it into two relief requests. Relief Request 7(a) is for penetrations for which Code Case N-522 is accepted for use in Regulatory Guide 1.147, Revision 12. Relief Request 7(b) is for penetrations that have Code-class piping on either side for the penetration (i.e., where Code Case N-522 does not apply).

2.2 Request for Relief No. 7(a), Examination Category C-H, Item C7.40, Pressure Testing of Containment Penetrations

Code Requirement: Table IWC-2500-1, Examination Category C-H, requires a VT-2 visual examination during system pressure testing for all Class 2 pressure-retaining components.

Licensee's Proposed Alternative:

The licensee proposed to perform an Appendix J Leak Rate test in lieu of the Code required examinations for the Class 2 containment penetrations listed in the table below.

<u>Penetration No.</u>	<u>System</u>	<u>Line No.</u>	<u>P&ID</u>
6	DW	055	DWP-002
7	FP	095	FPP-006
9	RD	259	RDP-001
25A/B	HC	008	HCP-001
29	GA	009	GAP-001
30	GA	002	GAP-001
31	IA	069	IAP-001
33	NC	135	NCP-003
34	NC	135	NCP-003
44	CH	283	CHP-003
45	CH	275	CHP-003
50	PC	073	PCP-001
51	PC	072	PCP-001
52	GR	001	GRP-001
56	CP	005	CPP-001
57	CP	007	CPP-001
58	CL	001	CLP-001
59	IA	080	IAP-002
60	WC	039	WCP-001
61	WC	042	WCP-001
62B	CL	009	CLP-001
62C	CL	008	CLP-001
78	CP	006	CPP-001
79	CP	008	CPP-001

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

"Pursuant to 10 CFR 50.55a(a)(3)(i), relief is request from the Code requirements stated above on the basis that the proposed alternative would provide an acceptable level of quality and safety.

"Code Case N-522, which has been incorporated into Regulatory Guide 1.147, Revision 12, states that using 10CFR50, Appendix J testing is an acceptable alternative to pressure testing piping that penetrates containment when the

piping and isolation valves that are part of the containment system are Class 2, but the balance of the piping system is outside the scope of Section XI. The NRC Staff has deemed this acceptable provided the following conditions are met:

'The test should be conducted at the peak containment pressure and the test procedure should permit the detection and location of through-wall leakage in containment isolation valves (CIVs) and pipe segments between CIVs.'

"The PVNGS Appendix J testing meets these conditions. Therefore PVNGS believes that the proposed alternative provides an acceptable level of quality and safety.

Evaluation:

The Code requires a VT-2 visual examination to be performed during system pressure testing for all Class 2 pressure-retaining piping, including those segments that penetrate primary containment. As an alternative, the licensee proposed to implement the requirements of Code Case N-522, *Pressure Testing of Containment Penetration Piping*. Code Case N-522 allows 10 CFR 50, Appendix J testing as an alternative to Section XI pressure tests for containment penetration piping that is non-class beyond the inboard and outboard containment isolation valves (CIVs).

The NRC staff reviewed Code Case N-522 and found it acceptable for general use as evidenced by incorporation into Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability*, Revision 12, (May 1999) with the following conditions:

"The test should be conducted at the peak containment pressure and the test procedure should permit the detection and location of through-wall leakage in containment isolation valves (CIVs) and pipe segments between CIVs."

The licensee has committed to adopt the Code Case in its entirety, including the conditions set forth in Regulatory Guide 1.147. Therefore, the proposed alternative provides an acceptable level of quality and safety. Consequently, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.3 Request for Relief No. 7(b), Examination Category C-H, Item C7.40, Pressure Testing of Containment Penetrations

Code Requirement: Table IWC-2500-1, Examination Category C-H, requires a VT-2 visual examination during system pressure testing for all Class 2 pressure-retaining components.

Licensee's Proposed Alternative:

The licensee proposed to perform Appendix J testing in lieu of the Code requirements for the Class 2 containment penetrations listed in the table below.

<u>Pen No.</u>	<u>System</u>	<u>Line No.</u>	<u>P&ID</u>
35	Hydrogen Control System Exhaust	A-001-HCBA-2	HPP-001
36	Hydrogen Control System Exhaust	B-002-HCBA-2	HPP-001
38	Hydrogen Control System Supply	A-003-HCBA-2	HPP-001
39	Hydrogen Control System Supply	A-004-HCBA-2	HPP-001

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

"Pursuant to 10 CFR 50.55a(a)(3)(i), relief is request from the Code requirements stated above on the basis that the proposed alternative would provide an acceptable level of quality and safety.

"Code Case N-522, which has been incorporated into Regulatory Guide 1.147, Revision 12, states that using 10CFR50, Appendix J testing is an acceptable alternative to pressure testing piping that penetrates containment when the piping and isolation valves that are part of the containment system are Class 2, but the balance of the piping system is outside the scope of Section XI. The NRC Staff has deemed this acceptable provided the following conditions are met:

'The test should be conducted at the peak containment pressure and the test procedure should permit the detection and location of through-wall leakage in containment isolation valves (CIVs) and pipe segments between CIVs.'

"The PVNGS Appendix J testing meets these conditions.

"Code Case N-522 cannot be applied in this case without a request for relief because it only allows for penetrations that have non-class piping on either side of the penetration.

"However, in this specific case APS believes that it is reasonable to apply the same philosophy used for Code Case N-522. The Hydrogen Control System (HP) is designed to monitor the hydrogen concentrations in the containment building following a LOCA. The penetration isolates on a Containment Isolation Actuation Signal (CIAS) and is then reopened remotely by the control room operators. As such, the highest pressure the system would be subjected to would be less than containment peak pressure. These penetrations receive an Appendix J test. The test is performed at higher than containment peak pressure and is performed using procedures and techniques capable of detecting and locating through-wall leakage. PVNGS feels that this test meets or exceeds the requirements of any inservice inspection pressure test that could be performed.

"Therefore PVNGS believes that the proposed alternative provides an acceptable level of quality and safety. In accordance with 10 CFR

50.55a(a)(3)(i), relief is requested from the Code requirements on the basis that the proposed alternative would provide an acceptable level of quality and safety.

Evaluation:

The Code requires that a VT-2 visual examination be performed during system pressure testing for all Class 2 pressure-retaining piping, including those segments that penetrate primary containment. As an alternative, the licensee proposed to perform Appendix J testing for the subject piping penetrations.

The subject penetration piping is fabricated and designated as Class 2. As stated by the licensee, the piping on either side of these penetrations is not non-classed, therefore, Code Case N-522, *Pressure Testing of Containment Penetration Piping*, is not applicable. The function of Appendix J testing is to ensure containment integrity and it may provide an acceptable alternative for those portions of piping systems made Safety Class solely because they penetrate the containment vessel. However, Safety Class piping systems that extend beyond the inboard and outboard containment isolation valves (CIVs) may serve different functions not related to containment isolation. These systems are required to be tested hydrostatically (or pneumatically, as applicable) to ensure their intended safety function. Therefore, portions of these systems that penetrate containment can be tested in conjunction with the remainder of the system.

Consequently, the INEEL staff does not believe Appendix J testing to be appropriate for the containment penetration portions of entire safety class piping systems. The license has not described the burden associated with meeting the Code requirements, nor have they identified the Class of the surrounding piping and why the penetration segment cannot be tested with the balance of the system. Therefore, it is concluded that the proposed alternative has not been adequately justified and recommends that the alternative not be authorized.

2.4 Request for Relief No. 10, Examination Category C-B, Item C2.22, Steam Generator Main Steam Nozzle Inner Radius Section

Code Requirement: Examination Category C-B, Item C2.22 requires 100% volumetric examination of the nozzle inside radius sections of those nozzles selected for examination under Examination Category C-F, as defined by Figure IWC-2500-4(a) or (b).

Licensee's Code Relief Request:

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examination of Steam Generator Main Steam nozzle inner radius sections.

Licensee's Basis for Requesting Relief (as stated):

"Due 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 which is not suitable for ultrasonic examination. This area is

accessible during outages through the secondary side manway. . . . A surface exam of this area is more sensitive.”

Licensee’s Proposed Alternative Examination (as stated):

“A surface examination was performed on the nozzles selected for examination.”

Evaluation:

The Code requires 100% volumetric examination of the subject steam generator nozzle IR sections. However, access to the IR sections from the vessel exterior is not possible because of the nozzle design, i.e., the nozzle extension section protrudes beyond the vessel shell inner surface.

As an alternative to the Code’s volumetric examination requirements, the licensee proposed to perform a direct surface examination of the subject IR sections (access to the vessel interior is provided via a secondary side man-way). The INEEL staff concludes that the proposed surface examination is capable of detecting any significant patterns of degradation on the IR sections and, therefore, provides an acceptable level of quality and safety. Consequently, it is recommended that the licensee’s proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.5 Request for Relief No. 11, Use of Code Case N-498-1, Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems

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:

Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee has requested authorization to use Code Case N-498-1, *Alternate Rules for 10-Year Hydrostatic Pressure Testing for Class 1, 2, and 3 Systems, Section XI, Division 1.*

The licensee stated:

“System Leakage Tests for Class 1 and System Pressure Tests for Class 2 and 3 were performed in accordance with the requirements of N498-1.”

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

“Code Case N498 includes all ASME Class 1 and 2 systems and has been accepted by the USNRC in Regulatory 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 recently reviewed Code Case N-498-1 and found the Code Case acceptable for general use as evidenced by incorporation into Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability*, Revision 12, (May 1999). Therefore, Code Case N-498-1 is acceptable for use at PVNGS.

2.6 Request for Relief 12, 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 during the system leakage test. The boundary subject to test pressurization during the system leakage test shall extend to all Class 1 pressure- retaining components within the system boundary.

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:”

<u>Line No.</u>	<u>Description</u>	<u>Line No.</u>	<u>Description</u>
CH026	2PCHNV848	RC200	2PRCNV900
CH024	2PCHNV849	RC203	2PRCNV903
CH022	2PCHNV859	RC024	2PRCNVR30
CH020	2PCHNV860	RC024	2PRCNV753
CH026	2PRCNV752	RC022	2PRCNV754
CH520	2PCHEVM41	RC112	2PRCNV869
CH001	2PCHEV853	RC106	2PRCNV868
RC091	2PRCEV061	RC118	2PRCNV871
RC091	2PRCEV063	RC124	2PRCNV870
RC089	2PRCEV332	SI207	2PSIEV882
RC096	2PRCEV333	SI217	2PSIEV974
RC062	2PRCEV001	SI223	2PSIEV883
RC017	2PRCEV062	SI240	2PSIAV892
RC099	2PRCEV057	SI248	2PSIAV902

<u>Line No.</u>	<u>Description</u>	<u>Line No.</u>	<u>Description</u>
RC005	2PCHEV939	SI248	2PSIAV055
RC005	2PCHEVM42	SI248	2PSIAV906
RC005	2PCHEV096	SI156	2PSIAV880
RC098	2PRCEV056	SI156	2PSIAV804
RC098	2PRCEV060	SI179	2PSIEV881
RC069	2PRCEV214	SI175	2PSIEV803
RC070	2PRCEV215	SI193	2PSIBV879
RC060	2PRCEV334	SI225	2PSIEV975
RC018	2PRCEV058	SI203	2PSIEV064
RC179	2PRCEV392	SI199	2PSIBV057
RC058	2PRCEV335	SI248	2PSIAV056
RC020	2PRCNV755	SI221	2PSIEV063
RC202	2PRCNV902	SI199	2PSIBV907
RC201	2PRCNV901	SI240	2PSIAV801

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 6, 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 than 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 a system hydrostatic test of the entire Class 1 system boundary once each 10-year ISI interval. The subject lines are small diameter (<1 inch) drain and vent lines with no piping downstream from the second isolation valve. To test these lines, the first isolation valves, which normally 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, performing the proposed testing provides reasonable assurance that these small diameter vent and drain lines will remain leaktight during conditions required by the plant operation. If leakage is detected during the system leakage test, both valves will have to be repaired and tested. Requiring the licensee to cycle the first isolation valve to test limited portions of these small-diameter vent and drain lines imposes a hardship without a compensating increase in quality and safety. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.7 Request for Relief No. 13, Examination Category B-A, Item B1.22, RPV Meridional Head Welds

Code Requirement: Examination Category B-A, Item B1.22 requires that the accessible length of all meridional head welds be examined during the first 10 year interval as defined by Figure IWB-2500-3.

Licensee's Code Relief Request:

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examination of RPV meridional closure head and bottom head welds.

Licensee's Basis for Requesting Relief (as stated):

"These examinations are both limited by physical constraints. The sketches attached attempt to depict each limitation."¹

Licensee's Proposed Alternative Examination (as stated):

"The ultrasonic examinations of both the Closure Head and Bottom Head Meridional weld was performed to the extent possible. . . . The total coverage is estimated to be 31% for the closure head and 22% for the bottom head welds."

Evaluation:

The Code requires 100% volumetric examination for the subject RPV meridional head welds. However, access to these welds is restricted by the control element drive mechanism penetrations, in-core instrumentation penetrations, and the vessel support skirt. As a result, the Code examination requirements are impractical for these welds. Design modifications would be required to provide access for the Code-required

Sketches provided in the licensee's submittal are not included in this report.

examinations. Imposition of this requirement would cause a significant burden on the licensee.

The licensee has examined approximately 31% of the closure head and 22% of the bottom head meridional welds. These examinations, in conjunction with the periodic system pressure tests and the complete Code-required volumetric examination of other RPV welds, should detect any significant patterns of degradation and provide reasonable assurance of continued structural integrity. Therefore, based on the impracticality of meeting the Code coverage requirements, it is recommended that relief be granted, pursuant to 10 CFR 50.55a(g)(6)(i).

2.8 Request for Relief No. 14A, Examination Category B-G-1, Item B6.190, Reactor Coolant Pump Flange Ligaments

Code Requirement: Examination Category B-G-1, Item B6.190 requires a VT-1 visual examination of RCP flange mating surfaces when the pump is disassembled. The examination includes the 1-inch annular surface of the flange surrounding each stud hole.

Licensee's Proposed Alternative:

In accordance with 10 CFR 50.55a(a)(3)(ii), the licensee proposed to perform the VT-1 visual examination of two of the four pump flange ligaments in lieu of the Code-required examination of all four pumps.

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

"All four of the Unit 2 Reactor Coolant Pumps were disassembled during the first period, two of the required visual examinations were performed at that time. The other pumps were not examined due mainly to ALARA concerns. Further basis for not examining two of the pumps, is the lack of any indication being detected during the examinations that were performed and the ability to examine for leakage and boric acid accumulation through the piping penetrations of the motor support stand. In addition these disassemblies were performed early in the plant life. All four of the Unit 1 RCPs will be disassembled during the upcoming U1R7 outage and the flange examinations will all be performed. The results of these examinations will be evaluated for potential impact for Unit 2."

Evaluation:

The Code requires that the 1-inch annular surface around each stud hole in the RCP flanges receive a VT-1 visual examination when the pumps are disassembled. The licensee disassembled all four pumps in the first period of the first 10-year interval and examined two of the four pump flanges. The remaining two pumps were not examined due to ALARA concerns. No indications were detected on the flanges that were examined, and the ability to examine for leakage and boric acid accumulation through the piping penetrations of the motor support stand will provide reasonable assurance of structural integrity of the subject pumps.

The licensee has examined the flange surfaces on two of the four RCP's. In addition, the Unit 1 pumps are scheduled to be disassembled and examined during refueling outage U1R7. The results of these examinations will be evaluated for potential impact to the Unit 2 pumps. The examinations performed, along with the examination of the Unit 1 pumps, will provide reasonable assurance of structural integrity for the subject pumps. Requiring the licensee to visually inspect the remaining two RCP flange mating surfaces would result in a hardship without a compensating increase in quality or safety. Therefore, it is recommended that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.9 Request for Relief No. 14B, Examination Category B-H, Item B8.20, Pressurizer Integrally Welded Attachments

Code Requirement: Examination Category B-H, Item B8.20 requires 100% volumetric or surface examination, as applicable, of the pressurizer skirt weld as defined by Figure IWB-2500-13, 14, and 15.

Licensee's Code Relief Request:

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required examination of the inside surface area of the pressurizer skirt weld.

Licensee's Basis for Requesting Relief (as stated):

"Limitations were noted for the Pressurizer Skirt weld due mainly to the design. The attached sketch identifies the limitations for both volumetric and surface examinations. It should be noted that the ASME Code requires either volumetric or surface examinations be performed as applicable. Both examination techniques were applied to the weld from the outside. The inside surface area is considered inaccessible due to the pressurizer heaters, drain/instrumentation lines, insulation, and ALARA concerns. A volumetric examination was performed to augment the surface exam, but it also is limited to scans from the skirt side of the weld only."

Licensee's Proposed Alternative Examination:

The licensee examined the subject weld from the outside surface.

Evaluation:

The Code requires 100% volumetric or surface examination, as applicable, for the pressurizer skirt weld. As depicted in the sketches provided by the licensee, the joint configuration is similar to Figure IWB-2500-13, which requires 100% surface examination of the inside and outside surfaces of the pressurizer skirt weld. Access to the inside surface is restricted by design, pressurizer heaters, drain/instrumentation lines, insulation, and ALARA concerns. Therefore, the surface examination is impractical to perform to the extent required by the Code. To examine this weld from the inside, as required by the Code, the pressurizer support skirt would have to be redesigned and modified, causing a considerable burden on the licensee.

The licensee examined the subject weld from the outside surface as required by the Code. In addition, the licensee performed a supplemental volumetric examination using a technique that is capable of detecting service-induced degradation initiating from the inside surface of the support skirt weld. These examinations should detect any significant patterns of degradation, if present, and provide reasonable assurance of structural integrity. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.10 Request for Relief No. 14C, Examination Categories B-B, B-G-1, and B-M-1, Items B2.12, B6.10, B6.30, B6.50, and B12.40, End of Interval Closeout

Code Requirement: Examination Category B-B, Item B2.12 requires volumetric examination of 1 foot of all pressurizer longitudinal welds that intersect the circumferential welds.

For Examination Category B-G-1, Item B6.10 requires 100% surface examination of all closure head nuts, Item B6.30 requires 100% surface and volumetric examination of all closure head studs when removed, and Item B6.50 requires VT-1 visual examination of closure washers and bushings.

Examination Category B-M-1, Item B12.40 requires volumetric examination of all valve body welds as defined by Figure IWB-2500-17.

Licensee's Proposed Alternative:

In accordance with 10 CFR 50.55a(a)(3)(ii), the licensee proposed to perform the examinations that were not completed before closeout of the first ISI interval during the first refueling outage in the second interval.

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

“During a detailed review and closeout of the 1st interval, it was also discovered that 1 inch of one, and 12 inches of another Pressurizer Longitudinal weld were not examined. These will both be examined during the next refueling outage.

“During a detailed review and closeout of the 1st interval, it was discovered that 100% of the reactor vessel closure head studs, nuts and washers were not examined. Several of these items were examined twice, while a number were not examined at all. The required examinations will be completed during the next refueling outage.

“While performing review of the radiographs performed to satisfy the requirements of B12.40 for valve UV654 it was noted that an area of the weld did not meet the required Code density requirements. This examination will be rescheduled for the next refueling outage in Unit 2. In addition, if full coverage cannot be attained, an additional valve(s) will be examined so that more than 100% of one of the welds is performed.”

Evaluation:

Examination Category B-B, Item B2.12 requires volumetric examination of 1 foot of all pressurizer longitudinal welds that intersect the circumferential welds. For Examination Category B-G-1, Item B6.10 requires 100% surface examination of all closure head nuts, Item B6.30 requires 100% surface and volumetric examination of all closure head studs when removed, and Item B6.50 requires VT-1 visual examination of closure washers and bushings. Examination Category B-M-1, Item B12.40 requires volumetric examination of all valve body welds. The licensee performed an end-of-interval review and realized that the subject examinations were not performed to the extent required by the Code.

The first ISI interval for Palo Verde, Unit 2, ended March 17, 1997. Consequently, it is not possible for the licensee to meet first 10-year interval requirements. In all cases, the licensee has performed a significant amount of the subject examinations and identified no degradation mechanisms or had any failures associated with the subject components. Additionally, the licensee has proposed/committed to perform the subject examinations during the next refueling outage in the second 10-year interval.

Considering the examinations performed, and the licensee's commitment to perform the remaining examinations during the first refueling outage of the second interval, reasonable assurance of structural integrity of the subject components should be provided. Requiring the licensee to take the unit off line for the purpose of performing the subject examinations prior to the scheduled refueling outage would be a significant hardship on the licensee without a compensating increase in safety. Therefore, the INEEL staff recommends that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.11 Request for Relief No. 14D, Examination Category C-C, Item C3.20, Integrally Welded Attachments in Piping

Code Requirement: Examination Category C-C, Item C3.20 requires 100% surface examination of each welded attachment.

Licensee's Code Relief Request:

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required surface examination for the integrally welded attachment for SG-52-H5.

Licensee's Basis for Requesting Relief (as stated):

"The integrally welded attachment for SG-52-H5 is limited due to proximity with structural steel and concrete."

Licensee's Proposed Alternative Examination (as stated):

"Due to this physical limitation, an adjacent integrally welded attachment (<3/4") will be examined next outage."

Evaluation:

Examination Category C-C, Item C3.20, requires 100% surface examination of integrally welded attachments whose base material design thickness is 3/4 inch or greater. Due to the proximity of the associated structural steel and concrete, the licensee is unable to perform this examination on the subject component. Surface examination of this weld is, therefore, impractical to perform. Examination of this weld to the extent required by the Code would require redesign and modification, causing a considerable burden on the licensee.

The licensee has proposed an alternative surface examination on an adjacent integrally welded attachment during the next outage. In addition, other similar welded attachments have been examined during the first 10-year interval. These examinations would have detected any significant patterns areas of degradation, if present, and provide reasonable assurance of continued structural integrity. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.12 Request for Relief No. 14E, Examination Categories F-A, F-B, and F-C, Spray Pond Piping Supports

Code Requirement: Examination Categories F-A, F-B, and F-C require a VT-3 visual examination of the Spray Pond Piping Supports.

Licensee's Proposed Alternative:

In accordance with 10 CFR 50.55a(a)(3)(ii), the licensee proposed to perform the examination by looking for signs of damage (e.g., indications of bent, missing or broken components) if damage is found, the support would be cleaned to enable a thorough examination of the welds.

The licensee stated:

“...due to the environment in the spray ponds, a deposit layer covers a majority of the examination area.”

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

“The examination of the Spray Pond (Ultimate Heat Sink) piping supports was performed utilizing trained and certified divers. However, due to the environment in the spray ponds, a deposit layer covers a majority of the examination area. If these examinations reveal indications of bent, missing, broken, etc. components; then that support was cleaned to enable a thorough examination of the welds.

Evaluation:

The Code requires a VT-3 visual examination of the Spray Pond piping supports. These components are subject to heavy deposition of sediment. As the divers are performing the Code-required examinations, deposits must be removed to perform 100% visual examinations. Removal of the deposits puts the sediment into the surrounding water,

degrading visibility and limiting the usefulness of the examination. Therefore, the burden associated with removal of the deposits would not provide a compensating increase in safety. The proposed visual examination should be sufficient to ensure the detection of significantly damaged supports and, therefore, provide reasonable assurance of operational readiness. Therefore, it is recommended that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.13 Request for Relief No. 15, Revision 1, Examination Categories B-P and C-H, Reactor Head Vent System Lines

Code Requirement: Examination Category B-P, Item B15.51 requires 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 during the system leakage test. The boundary subject to test pressurization during the system leakage test shall extend to all Class 1 pressure-retaining components within the system boundary. Table IWC-2500-1, Examination Category C-H, C7.40, requires a VT-2 visual examination during system pressure testing for all Class 2 pressure-retaining components.

Licensee's Proposed Alternative:

In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed to defer the VT-2 system leakage test and system pressure test examinations of the ASME Class 1 and Class 2 Reactor Head Vent System lines to the first refueling outage of the second 10-year interval.

The licensee stated:

“In accordance with IWB-2412, the one-year period extension for Unit 2 ends 03/17/98 and the U2R8 outage was scheduled from 03/27/99 to 05/02/99. This delayed the exams approximately 386 days beyond the ASME Section XI allowable extension. The deferral of these exams will not be credited toward the second interval. The affected portions of the vent lines are as follows:

ASME Class	System	Line No.	Line Size	P&ID No.	Valve No.
1	RC	RC-179	1"	RCP-001	HV108
1	RC	RC-179	1"	RCP-001	HV109
2	RC	RC-144 & RC146	1"	RCP-001	HV101
2	RC		1"	RCP-001	HV102
2	RC		1"	RCP-001	HV103
2	RC		1"	RCP-001	HV105
2	RC		1"	RCP-001	HV106
2	RC		1"	RCP-001	HV109

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

"Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested from the Code requirements stated above on the basis that the proposed alternative would provide an acceptable level of quality and safety.

"PVNGS believes that deferring this examination provides an acceptable level of quality and safety for the following reasons.

"Containment entries are typically made on a quarterly basis for other plant maintenance. A general inspection for leakage is performed during those entries per PVNGS's procedure 40DP-9ZZ01, Containment Entry in Modes 1 through 4. Furthermore, RCS pressure boundary leakage is monitored by the control room staff in several additional ways.

1. Containment atmosphere particulate radioactivity monitoring.
2. Containment atmosphere gaseous radioactivity monitoring.
3. Containment relative humidity monitoring.
4. Containment sump level rates of change and discharge monitoring.
5. RCS water inventory balance measurements.

Technical Specification 3.4.14, RCS Operational Leakage, allows for only one gpm unidentified leakage and no pressure boundary leakage. The first three methods of monitoring RCS leakage provide continuous monitoring with alarms. Sump levels are monitored every hour and the RCS water inventory balance is performed every three days. If greater than 1 gpm leakage is detected, the leakage must be reduced to within limits within four hours or action must be taken to be in Mode 5 within 36 hours.

"PVNGS believes that the system pressure monitoring and the several methods for detecting RCS leakage provided an adequate level of safety to justify deferring the pressure test for 386 days. Additionally, these required examinations were successfully completed in Unit 3 without any abnormal indications noted.

"APS is requesting relief to defer the first interval examinations to the first refueling outage of the second interval. Due to a long refueling outage in Unit 1, Unit 2 has become the lead Unit for implementing the ISI Program Plan. Prior to the end of Interval 1 for Unit 2, it was determined that it would require plant evolutions outside of normal operating practice to perform the required pressure test on the reactor head vent system. Therefore, Relief Request No. 15 was written for Unit 2. Subsequent evaluation determined that the examination could be accomplished. The test was subsequently performed at the next opportunity (Unit 3 Seventh Refueling Outage - U3R7). This relief request was then revised to reflect APS' ability to perform the exam and the exam for Unit 2 was completed at the earliest opportunity (U2R8).

Evaluation:

The Code requires a VT-2 visual examination during pressure testing of the subject Class 1 and Class 2 Reactor Head Vent System lines. However, the licensee did not perform the required examinations during the first ISI interval for Palo Verde, Unit 2, or within the one year extension allowed by the Code. Consequently, it is not possible for the licensee to meet first 10-year interval requirements.

The licensee has performed the required examinations for Unit 3 and identified no degradation mechanisms; the licensee has had no failures associated with the subject components. Additionally, the containment building is monitored continuously and any significant leakage would be detected by the ongoing monitoring systems. The licensee commits to perform the subject examinations for Unit 2 during the first refueling outage in the second 10-year interval.

Considering the ongoing containment monitoring systems, examinations performed in Unit 3, and the licensee's commitment to perform these examinations during the first refueling outage of the second 10-year interval, reasonable assurance of operational readiness of the subject components has been provided. Requiring the licensee to take the unit off line for the purpose of performing the subject examinations prior to the scheduled refueling outage would pose a significant hardship on the licensee without a compensating increase in safety. Therefore, the INEEL staff recommends that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

3. CONCLUSION

The INEEL staff evaluated the licensee's submittal and concluded that certain inservice examinations cannot be performed to the extent required by the Code at the Palo Verde Nuclear Generating Station, Unit 2. For Requests for Relief Nos. 7A and 10, 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 Requests for Relief Nos. 12, 14A, 14C, 14E, and 15, 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 alternatives be authorized pursuant to 10 CFR 50.55a(a)(3)(ii). For Requests for Relief Nos. 13, 14B, and 14D, the Code requirements are impractical; therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i). For Request for Relief No. 7B (Revision 1), it is recommended that authorization of the proposed alternative be denied. For Request for Relief No. 11, the NRC staff recently reviewed Code Case N-498-1 and found the Code Case acceptable for general use as evidenced by incorporation into Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability*, Revision 12, (May 1999). Therefore, the INEEL staff recommends that Code Case N-498-1 is acceptable for use at PVNGS.