Entergy

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Ralph A. Dodds, III
Director, Nuclear Safety Assurance

January 23, 2012

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

Revised Pilgrim Relief Request (PRR)-21, Revision 3, Contingency Repair Plan for Reactor Pressure Vessel (RPV) Standby Liquid Control Nozzle Weld, RPV-N14-1.

REFERENCE:

1. Entergy Letter No. 2.12.028, Revised Pilgrim Relief Request PRR-21, for Reactor Pressure Vessel (RPV) Standby Liquid Control Nozzle Weld, RPV-N14-1, dated August 5, 2011
2. NRC Request for Additional Information Regarding Pilgrim Nuclear Power Station- Relief Request No. PRR-21 (TAC NO. ME5788), dated November 22, 2011

LETTER NUMBER: 2.12.003

Dear Sir or Madam:

This submittal revises the previously submitted Pilgrim Relief Request (PRR)-21 (Reference 1) in response to NRC Request for Additional Information (RAI) (Reference 2). The revised PRR-21, Rev. 3 (Attachment 1) applies to the Standby Liquid Control (SLC) safe end to nozzle weld RPV-N14-1 and proposes an alternative contingency repair plan in the event flaw indications are detected during in-service inspection.

Accordingly, pursuant to 10 CFR 50.55a(a)(3)(i), Entergy requests NRC approval to use the proposed alternative contingency repair plan discussed in Attachment 1 to repair RPV-N14-1 if flaw indications are detected during in-service inspection.

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Pilgrim is in the fourth In-Service Inspection (ISI) Interval that began on July 1, 2005, and the code of record for the current fourth ISI interval is the 1998 Edition with 2000 Addenda of ASME Code Section XI. However, Pilgrim has currently committed to use ASME XI 2001 Edition with 2003 Addenda, which was approved by the NRC by letter dated June 29, 2006 (Pilgrim Relief Request NO. PIL-05-R-001, NRC TAC NO. MC8299).

During refueling outage (RFO)-18 Entergy inspected the SLC safe end to nozzle weld RPV-N14-1 as part of the in-service examination program and no indications were discovered. This weld is part of the reactor pressure boundary and falls within the scope of ASME Code Section XI requirements for repair if flaws were discovered during the inspection. Prior inspections have identified no flaws.

Attachment 1 provides the proposed alternative contingency repair plan, SLC nozzle repair configuration, material composition, and past inspection results for NRC review and approval of PRR-21, Rev. 3.

The alternative repair plan consists of a weld overlay (WOL) using the ASME Code Case N-504-3, "Alternative Rules for Repair of Class 1, 2, and Austenitic Stainless Steel Piping, Section XI, Division 1".

NRC Regulatory Guide 1.147, Revision 16, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division I" includes in Table 2, the later version of ASME Code Cases, N-504-4, as "Conditionally Acceptable Section XI Code Cases".

Entergy has evaluated the differences between N-504-3 and N-504-4, and has determined that Entergy would comply with the alternative repair plan using ASME Code Case N-504-3, based on the discussion included in Regulatory Guide 1.147, Revision 16, 3rd paragraph on page 3, which states the following:

> *"If a Code Case is implemented by a licensee and a later version of the Code Case is incorporated by reference into 10 CFR 50.55a and listed in Table 1 and 2 during the licensee's present 120-month ISI program interval, that licensee may use either the later version or the previous version. An exception to this provision would be the inclusion of a limitation or condition on the use of the Code Case that is necessary, for example, to enhance safety. Licensees who choose to continue use of the Code Case during the subsequent 120-month ISI program interval will be required to implement the latest version incorporated by reference into 10 CFR 50.55a and listed in Tables 1 and 2."*

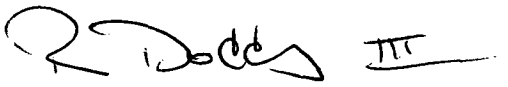
Thus, the implementation of the proposed alternative repair plan incorporates the additional conditions set forth in Table 2 for ASME Code Case N-504-4, dated July 14, 2006; therefore, the proposed alternative repair plan provides an acceptable level of quality and safety.

Pursuant to 10 CFR 50.55a(a)(3)(i), Entergy requests NRC approval to include Reactor Pressure Vessel SLC safe end to nozzle weld RPV-N14-1 in the Contingency Repair Plan for the reminder of fourth ISI interval.

There are no commitments contained in this letter.

If you have any questions or require additional information, please contact me at (508) 830-7800.

Sincerely,



Ralph A. Dodds, III
Director, Nuclear Safety Assurance

Attachment 1: Pilgrim Relief Request, (PRR)-21, Rev. 3 (11 pages)

cc: With Attachments

Regional Administrator, Region 1
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ATTACHMENT 1
TO ENTERGY LETTER NO. 2.12.003

Pilgrim Relief Request (PRR)-21, Rev. 3

I. ASME CODE COMPONENTS AFFECTED

Components: ISI Weld RPV-N14-1 Standby Liquid Control (SLC) Safe-End Nozzle Weld

Code Class: 1

References:

1. ASME Section XI, 2001 Edition/2003 Addenda
2. ASME Section III, 1965 Edition/Winter 1966 Addenda
3. ASME/ANSI B31.1, 1989 Edition/No Addenda
4. SEP-ISI-PNPS-001, *Fourth Ten Year Interval ASME XI ISI Program Plan,* Rev. 0, dated October 12, 2011
5. EPRI Report BWRVIP-75-A, *Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules (1012621),* dated October 11, 2005
6. ASME Code Case N-504-3, *Alternate Rules for Repair of Classes 1, 2, and 3 Austenitic Stainless Steel Piping,* dated August 4, 2004
7. Pilgrim Relief Request PPR-9, *Relief from ASME Section XI Appendix VIII, Supplement 11 Requirements for Structural Overlay Welds (PDI Examination*), dated March 26, 2006
8. NRC Generic Letter 88-01, *NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel Piping,* dated January 25, 1988
9. NUREG-0313, *Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping*, Rev. 2, dated January 1988
10. Pilgrim Relief Request NO. PIL-05-R-001, as approved by NRC Letter (TAC NO. MC8299) dated June 29, 2006

Unit / Inspection Interval Applicability: Pilgrim Nuclear Power Station (PNPS) / Fourth (4^{th}) 10-Year Interval

II. APPLICABLE CODE REQUIREMENT

ASME Section XI, IWA-4421(a) and IWA-4520 require that repair/replacement activities be performed and examined in accordance with the Owner's Requirements and the original Construction Code of the component or system. Alternatively, IWA-4421(b) and (c) allow use of later Editions/Addenda of the Construction Code (or a later different Construction Code such as ASME Section III) and revised Owner Requirements. IWA-4430 and IWA-4600(b) provide alternative welding methods such as temper bead welding when the requirements of Subsection IWA-4421 cannot be met. IWA-4520 requires that welds and weld repairs be performed in accordance with the Construction Code identified in the Repair/Replacement Plan. IWA-4530(a) requires the performance of pre-service examinations based on Subsection IWB-2200 for Class 1 components. Table IWB-2500 prescribes in-service inspection requirements for Class 1 butt welds in piping.

As an alternative to the above, ASME Section XI Code Cases N-504-3 specifies requirements for performing the following:

- Code Case N-504-3 provides alternative requirements to reduce a defect to a flaw of acceptable size in austenitic stainless steel materials by deposition of a structural weld overlay (WOL) on the outside surface of the pipe or component. The NRC has conditionally approved this Case in Regulatory Guide 1.147 with the following condition:

  "The provisions of Section XI, Nonmandatory Appendix Q, *Weld Overlay Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping Weldments*, must be met."

III. REASON FOR PROPOSED ALTERNATIVE

Intergranular stress corrosion cracking (IGSCC) in boiling water reactor (BWR) piping was identified as a problem in the United States in the early 1970s. Initially, cracking was only observed in small-bore piping. However, in 1982 cracking caused by IGSCC was also identified in large-bore piping. PNPS manages this condition by performing routine inservice inspections in accordance with ASME Section XI and the inspection requirements of BWRVIP-75-A.

PNPS performs repair/replacement activities in accordance with the 1998 Edition/2000 Addenda of ASME Section XI. This Edition of ASME Section XI does not include requirements for application of full structural WOLs on Dissimilar Metal Welds (DMWs) and non-austenitic stainless steels. Moreover, requirements for installing full structural WOLs on DMWs and non-austenitic stainless steels are not presently included in any Edition/Addenda of ASME Section XI (including Code Cases) approved by the NRC. However, the NRC has conditionally approved Code Case N-504-3 in Regulatory Guide 1.147 for installation of WOLs on austenitic stainless steel materials.

Structural weld overlays have been used for years on piping of both BWRs and pressurized water reactors (PWRs) to arrest the growth of existing flaws while establishing a new structural pressure boundary. WOLs on DMWs and non-austenitic stainless steels in BWRs have generally been applied in accordance with various revisions of ASME Code Cases N-504 and N-638. At present, code case revisions N-504-3 is "conditionally accepted" by the NRC in Regulatory Guide 1.147. Application of these code cases to DMWs and non-austenitic stainless steels requires a relief request since Code Case N-504-3 was written specifically for austenitic stainless steel weldments.

Entergy has initiated this request to propose an alternative to the ASME Section XI Code. PNPS intends to use Code Cases N-504-3 to install a WOL. The modification will be performed using Alloy 52M (ERNiCrFe-7A) filler metal to facilitate performance of the required Appendix VIII, Supplement 11 UT examination. Figure 1 provides additional details.

IV. PROPOSED ALTERNATIVE

Pursuant to 10 CFR 50.55a (a) (3), Entergy proposes an alternative to specific ASME Section XI Code requirements in Code Cases N-504-3, as conditionally approved by the NRC in Regulatory Guide 1.147. The proposed alternatives for each ASME Section XI code case are specified below:

A. Code Case N-504-3 (as conditionally approved in Regulatory Guide 1.147)

1. Code Case N-504-3 and Appendix Q apply strictly to austenitic stainless steel piping and weldments. As an alternative, Entergy proposes to use Code Cases N-504-3 and Appendix Q to perform WOL welding on SB-166, Alloy 82 welds, and austenitic stainless steel using Alloy 52M (ERNiCrFe-7A) filler metals.

2. Code Case N-504-3, paragraph (b) and Appendix Q, paragraph Q-2000(a) require that weld metal used to fabricate WOLs be low carbon steel (0.035%) austenitic stainless steel. As an alternative, Entergy proposes to perform WOL welding using Alloy 52M (ERNiCrFe-7A). Therefore, this requirement does not apply.

3. Code Case N-504-3, paragraph (e) and Appendix Q, paragraph Q-2000(d) require that as-deposited austenitic weld metal used to fabricate WOLs have a delta ferrite content of at least 7.5 FN or 5 FN under certain conditions. As an alternative, Entergy proposes to perform WOL welding using Alloy 52M (ERNiCrFe-7A) that is purely austenitic. Therefore, this delta ferrite requirement does not apply.

4. Code Case N-504-3, paragraph (f)(1) and Appendix Q, paragraph Q-3000(b)(2) require that the end transition slope of the WOL "not exceed 45°". As an alternative, Entergy proposes to allow the end transition slope to exceed 45° provide the following condition is met:

   The as-built configuration of the WOL is analyzed by Finite Element Analysis to demonstrate compliance with the applicable stress limits of the Construction Code.

5. Code Case N-504-3, paragraph (h) requires that a system hydrostatic test be performed in accordance with IWA-5000. As an alternative, Entergy proposes to perform a system leakage test in accordance with IWA-5000 and UT acceptance examination in accordance with the requirements and acceptance criteria of Appendix Q, Section Q-4000.

V. BASIS FOR PROPOSED ALTERNATIVE

A. Proposed Alternative for Modifying the WOL

Entergy intends to apply WOL on SLC RPV-N14-1 weld in accordance with ASME Section XI Code Case N-504-3 (as supplemented by Nonmandatory Appendix Q) using the proposed alternatives specified in Section IV of this Request. As previously mentioned, the NRC in Regulatory Guide 1.147, Revision 16, has conditionally approved the code case.

The modification of the nozzle with WOL provides an acceptable methodology for preventing potential failures of susceptible materials due to IGSCC. This position is based on several facts. First, WOL will be applied with Alloy 52M weld metal, which is resistant to IGSCC, as shown on Figure 1. The WOL modification should result in improved compressive residual stress profiles in the underlying weld and base materials. However, due to the complexities associated with the modification, this assumption will be validated by finite element analysis. Post-overlay preservice and in-service inspection requirements will ensure that structural integrity is maintained for the life of the plant. The proposed weld overlays will also meet the applicable stress limits from ASME Section III. Crack growth evaluations of conservatively postulated flaws, considering IGSCC and fatigue, will demonstrate that structural integrity of the component will be maintained.

As stated above, WOL will be applied using Alloy 52M filler metal. However, Alloy 52M weld metal has a demonstrated sensitivity to certain impurities, such as sulfur, when deposited onto austenitic stainless steel base materials. Therefore, if the impurity level is sufficiently high, it may become necessary to deposit an austenitic buffer layer prior to installation of the WOL. While this condition has been limited to PWR applications, Entergy has developed a contingency to install a buffer layer should this unexpected condition occur. If required, a buffer layer of ER308L austenitic stainless steel filler metal will be deposited across the austenitic stainless steel materials. While the balance of this layer could be deposited with Alloy 52M weld metal, an Alloy 82 bridge bead (or transitional bead) would be deposited over the fusion line between the existing Alloy 82 weld and stainless steel safe-end. The bridge bead will be deposited with ERNiCrFe-3 filler metal. The ER308L filler metal will have a delta ferrite content of 5 – 15 FN as reported on the CMTR. It will be deposited with a welding procedure and welders that have been qualified in accordance with ASME Section XI. Liquid penetrant (PT) examinations will be performed prior to and after deposition of the buffer layer. The second PT examination is performed to ensure that the completed buffer layer is free from cracks and other unacceptable indications prior to deposition of the Alloy 52M WOL. The austenitic stainless steel buffer layer, if required, will not be credited toward the design thickness of the structural WOL.

1. WOL Design and Verification

The fundamental design basis for full structural WOLs is to maintain the original design margins with no credit taken for the underlying IGSCC-susceptible weldments. The assumed design basis flaw for the purpose of structural sizing of the WOL is a flaw completely around the circumference (360°) and 100% through the original wall thickness of the dissimilar metal and stainless steel welds. The specific analyses and verifications to be performed are summarized as follows:

- A nozzle-specific stress analysis will be preformed to establish a residual stress profile in the WOL and the underlying welds and base materials. The analyses will simulate application of the existing WOL and the current modification to determine the final residual stress profile. Entergy believes that the post-WOL residual stress profile will be improved due to the WOL modification.

- Fracture mechanics analyses will also be performed to predict crack growth of all postulated and previously detected flaws. Crack growth due to IGSCC and fatigue will be analyzed. The crack growth analyses will consider all design loads and transients, plus the post-WOL and through-wall residual stress distributions. The analyses should demonstrate that postulated flaws will not degrade the design basis for the WOL.
- The analyses will demonstrate that applying the weld overlays does not impact the conclusions of the existing nozzle stress reports. The ASME Code, Section III primary stress criteria will continue to be met.
- Shrinkage will be measured during the WOL application. Shrinkage stresses at other locations in the piping systems arising from the WOL will be demonstrated not to have an adverse effect on the systems. Clearances of affected supports and restraints will be checked after the overlay repair and will be reset within the design ranges if required.
- The total added weight on the piping systems due to the WOL will be evaluated for potential impact on piping system stresses and dynamic characteristics.
- The as-built dimensions of the WOL will be measured and evaluated to demonstrate that they meet or exceed the minimum design dimensions of the WOL.

2. Suitability of Proposed Alternatives to ASME Section XI Code Case N-504-3 and Appendix Q.

WOLs have been used for repair and mitigation of cracking in BWRs since the early 1980s. In Generic Letter (GL) 88-01, *NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel Piping*, the NRC approved the use of ASME Section XI acceptance standards for determining the acceptability of installed WOLs. Accordingly, the existing WOL associated with nozzle will be modified in accordance with ASME Section XI Code Case N-504-3 and Appendix Q. Compliance with Appendix Q is required by Regulatory Guide 1.147. However, as described in Section IV of this Request, Entergy has proposed several alternatives to Code Case N-504-3 and Appendix Q that are necessary to support the modification of the existing WOL associated with nozzle. The suitability of the proposed alternatives is provided below.

(a) Code Case N-504-3 and Appendix Q apply strictly to austenitic stainless steel piping and weldments. As an alternative, Entergy has proposed to use Code Cases N-504-3 and Appendix Q to perform WOL welding on SB-166, Alloy 82 welds, and austenitic stainless steel using Alloy 52M (ERNiCrFe-7A) filler metals. This proposed alternative is acceptable because the WOL design, fabrication, examination, and preservice/in-service inspection requirements of Code Case N-504-3 and Appendix Q may also be applied to nickel alloy WOLs of non-asustenitic stainless steels such as low alloy steels and nickel alloys. While some material requirements in Code Case N-504-3 and Appendix Q may only apply to austenitic stainless steels, Entergy has identified these requirements and proposed alternatives to appropriately address them.

(b) Code Case N-504-3, paragraph (b) and Appendix Q, paragraph Q-2000(a) require that weld metal used to fabricate WOLs be low carbon steel (0.035%) austenitic stainless steel. This requirement was included in Code Case N-504-3 and Appendix Q to reduce the sensitization potential of the austenitic stainless steel WOL, thereby reducing its susceptibility to IGSCC. As an alternative, Entergy has proposed to perform WOL welding using Alloy 52M (ERNiCrFe-7A) weld metal. While carbon content is not a critical factor in assessing resistance of nickel alloys to IGSCC, the chromium content is. This point has been clearly documented in Section 2.2 of EPRI Technical Report MRP-115.

> "The only well explored effect of the compositional differences among the weld alloys on IGSCC is the influence of chromium. Buisine, et al. evaluated the IGSCC resistance of nickel-based weld metals with various chromium contents ranging from about 15% to 30% chromium. Testing was performed in doped steam and primary water. Alloy 182, with about 14.5% chromium, was the most susceptible. Alloy 82 with 18-20% chromium took three or four times longer to crack. For chromium contents between 21 and 22%, no stress corrosion crack initiation was observed..."

To conclude, Alloy 52M weld metal has high chromium content (28 – 31.5%); therefore, it has excellent resistance to IGSCC.

(c) Code Case N-504-3, paragraph (e) and Appendix Q, paragraph Q-2000(d) require that as-deposited austenitic weld metal used to fabricate WOLs have a delta ferrite content of at least 7.5 FN or 5 FN under certain conditions. This requirement was included in Code Case N-504-3 and Appendix Q to reduce the sensitization potential of the austenitic stainless steel WOL, thereby reducing its susceptibility to IGSCC. As an alternative, Entergy has proposed to perform WOL welding using Alloy 52M (ERNiCrFe-7A) weld metal which has a purely austenitic microstructure. Therefore, the requirement to measure delta ferrite does not apply in this application. The susceptibility of nickel alloys to IGSCC is dependant on its chromium content as explained above. Furthermore, the chromium content of the first layer of Alloy 52M weld metal could be reduced due to dilution with the underlying base and weld materials. Because this case, Entergy has self-imposed the following restriction on the first layer of the WOL:

(d) Code Case N-504-3, paragraph (e) and Appendix Q, paragraph Q-2000(d) require that as-deposited austenitic weld metal used to fabricate WOLs have a delta ferrite content of at least 7.5 FN or 5 FN under certain conditions. This requirement was included in Code Case N-504-3 and Appendix Q to reduce the sensitization potential of the austenitic stainless steel WOL, thereby reducing its susceptibility to IGSCC. As an alternative, Entergy has proposed to perform WOL welding using Alloy 52M (ERNiCrFe-7A) weld metal which has a purely austenitic microstructure. Therefore, the requirement to measure delta ferrite does not apply in this application. The susceptibility of nickel alloys to IGSCC is dependant on its chromium content as explained above. Furthermore, the chromium content of the first layer of Alloy 52M weld metal could be reduced due to dilution with the underlying base and weld materials. Because this is the case, Entergy has self-imposed the following restriction on the first layer of the WOL:

> "The first layer of Alloy 52M weld metal deposited may not be credited toward the required thickness. Alternatively, a diluted layer may be credited toward the required thickness, provided the portion of the layer over the austenitic base material, austenitic weld, and the associated dilution zone from an adjacent ferritic base material contains at least 20% chromium. The chromium content of the deposited weld metal may be determined by chemical analysis of the production weld or from a representative coupon taken from a mockup prepared in accordance with the WPS (or a representative WPS) for the production weld."

(e) Code Case N-504-3, paragraph (f)(1) and Appendix Q, paragraph Q-3000(b)(2) require that the end transition slope of the WOL "not exceed 45°". It is Entergy's intent to comply with this requirement. However, the close proximity of the WOL to the instrument lines of the Jet Pump Instrument Penetration Seal Assembly limits Entergy's ability to lengthen the WOL along the penetration seal assembly. This interference could necessitate the design and installation of an end transition slope that exceeds 45°. Should this condition exists, Entergy will analyze the as-built configuration of the WOL using Finite Element Analysis to demonstrate compliance with the applicable stress limits of the Construction Code or ASME Section III.

(f) Code Case N-504-3, paragraph (h) requires that a system hydrostatic test be performed in accordance with IWA-5000 when a flaw penetrates the full thickness of the pressure boundary. For non-through-wall flaw conditions, Code Case N-504-3 allows performance of a system leakage test. Pressure testing is not addressed by Appendix Q. As an alternative, Entergy proposes to perform a system leakage test in accordance with IWA-5000. This proposal is consistent with the pressure testing requirements of IWA-4540 and Code Case N-416-3, except that, the NDE requirements of IWA-4540/N-416-3 would not apply to a WOL. The WOL acceptance examination will include both liquid penetrant and UT examinations. Liquid penetrant examinations will be performed in accordance with ASME Section III while the UT examination will be

performed in accordance with Appendix VIII, Supplement 11 of ASME Section XI as implemented by PDI. The UT acceptance standards are as specified in Tables IWB-3514-2 and 3.

3. Additional NDE Information

Entergy has proposed to perform the UT acceptance examination in accordance with the requirements and acceptance criteria of Appendix Q, Article Q-4000. The UT examination requirements and acceptance standards in Appendix Q, Article Q-4000 were developed specifically for WOLs. According to Article Q-4000, UT examination procedures and personnel are qualified in accordance with Appendix VIII of ASME Section XI. Supplement 11 of Appendix VIII specially addresses qualification requirements for WOLs. When UT examinations are performed in accordance with Appendix VIII, Supplement 11 (as implemented through PDI), the examinations are considered more sensitive for detecting fabrication and service-induced flaws than traditional radiographic and ultrasonic examination methods. Furthermore, construction-type flaws have been included in the PDI qualification sample sets for evaluating procedures and personnel. Appendix Q, Article Q-4100 also establishes UT acceptance standards for WOL examinations. Similar to NB-5330, the UT examination must assure adequate fusion with the base material and detect welding flaws such as interbead lack of fusion, inclusions, and cracks. Detected planar and laminar flaws are required to meet the acceptance standards of Tables IWB-3514-2 and 3, respectively. Paragraph Q-4100(c) also limits the reduction in coverage due to a laminar flaw to less than 10% while uninspectable volumes are assumed to contain the largest radial planar flaw that could exist within the volume. Therefore, the Article Q-4100 qualification requirements and acceptance standards are equivalent or more conservative than those specified in Regulatory Guide 1.147.

The length, surface finish, and flatness requirements will be specified in the WOL overlay design to facilitate inspection of the examination volumes shown in Figures Q-4100-1 and Q-4300-1 of ASME Section XI, Appendix Q. Figure Q-4100-1 describes the examination volume for acceptance examinations while Figure Q-4300-1 describes the examination for preservice and in-service examinations. The examinations required by Code Case N-504-3/Appendix Q as amended by the proposed alternatives of this Request will provide adequate assurance that the integrity of the Nozzle N14 WOL is consistent with the structural integrity assumptions of the design. The following should also be noted:

- As discussed above, the modified WOL will be UT examined in accordance with Appendix VIII, Supplement 11 as implemented by PDI. Examination coverage for the acceptance examination has been estimated to be 100%. Examination coverage for the preservice/in-service examination has been estimated to be greater than 90%.

The EPRI PDI qualification program for full structural weld overlays does not comply with all provisions of Appendix VIII, Supplement 11 of ASME Section XI as endorsed by the NRC in 10CFR50.55a. However, PNPS has addressed this issued under Pilgrim Relief Request PRR-9, which was approved by the NRC in an SER dated March 22, 2006.

4. NRC Submittals

Entergy will submit the following information to the NRC within fourteen (14) days from completing the final ultrasonic examinations of the completed weld overlays:

- Weld overlay examination results including a listing of indications detected[1]
- Disposition of indications using the standards of ASME Section XI, Subsection IWB-3514-2 and/or IWB-3514-3 criteria and, if possible, the type and nature of the indications[2]
- A discussion of any repairs to the WOL material and/or base metal and the reason for the repairs.

Entergy will also submit to the NRC a stress analysis summary demonstrating that the SLC nozzle WOL perform its intended design function after WOL installation. The stress analysis report will include results showing that the requirements of NB-3200 and NB-3600 of the ASME Code, Section III are satisfied. The stress analysis will also include results showing that the requirements of Subsection IWB-3000 of the ASME Code, Section XI, are satisfied. The results will show that the postulated crack including its growth in the nozzles will not adversely affect the integrity of the overlaid welds. This information will be submitted to the NRC within 60 days of completing PNPS refueling outage.

VI. CONCLUSION

10 CFR 50.55a (a) (3) states:

"Proposed alternatives to the requirements of (c), (d), (e), (f), (g), and (h) of this section or portions thereof may be used when authorized by the Director of the Office of Nuclear Reactor Regulation. The applicant shall demonstrate that:

(i) The proposed alternatives would provide an acceptable level of quality and safety, or

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

Entergy believes that the proposed alternatives of this request provide an acceptable level of quality and safety. The proposed WOL will be installed using Nickel Alloy 52M filler metal that is resistant to IGSCC. While this is the case, the WOL is expected to create compressive residual stresses along the inside diameter of the original weld, which prevents the initiation of new IGSCC. Finally, preservice and in-service inspection of the weld overlay will be performed to ensure structural integrity is maintained. Therefore, Entergy requests that the NRC staff authorize the proposed alternative in accordance with 10 CFR 50.55a (a) (3).

VII DURATION OF PROPOSED ALTERNATIVE

The proposed alternative is applicable to the fourth (4^{th}) 10-Year ISI interval for PNPS (July 1, 2005 to June 30, 2015).

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[1] The recording criteria of the ultrasonic examination procedure to be used for the WOL examination requires that all indications, regardless of amplitude, be investigated to the extent necessary to provide accurate characterization, identity, and location. Additionally, the procedure requires that all indications, regardless of amplitude, that cannot be clearly attributed to the geometry of the overlay configuration be considered flaw indications.

[2] The ultrasonic examination procedure requires that all suspected flaw indications are to be plotted on a cross-sectional drawing of the weld and that the plots should accurately identify the specific origin of the reflector.

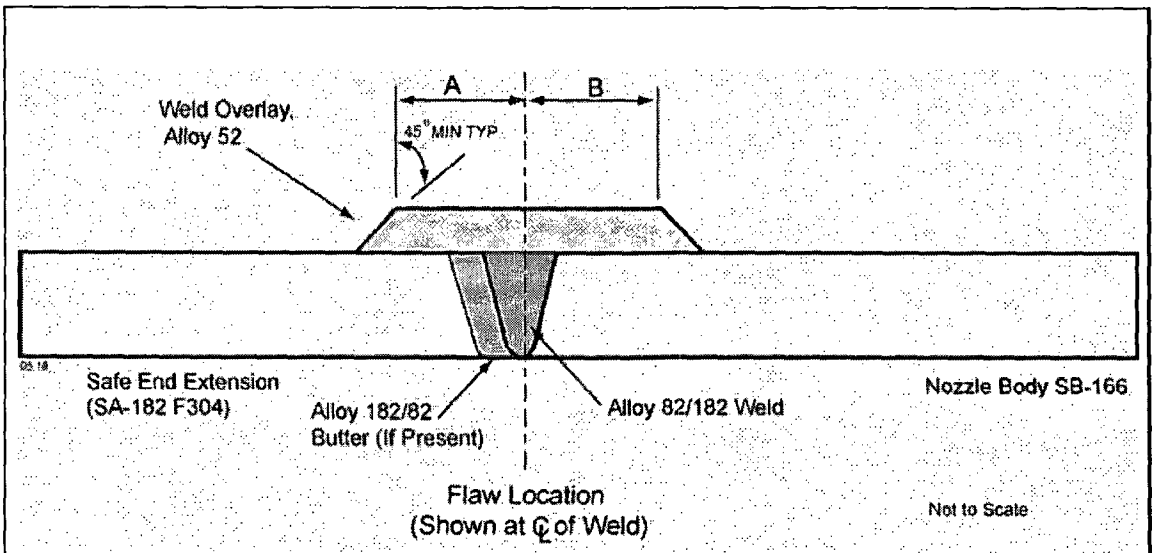
Table 1: Information Related to RPV SLC Nozzle, RPV-N14-1

Weld No.	Description	Drawing	Inspection History
RPV-N14-1	Standby Liquid Control safe end-to-nozzle weld	ISI-I-11-1	UT examination was performed per BWRVIP-27A in RFO 18 (then once every 10 years). Previous to RFO18 the following examinations were conducted: A PT examination was conducted every 2 outages per BWRVIP-27A until UT is done. EVT-2 was conducted every outage until UT is done. (EVT-2 was completed RFO 15, 16, and 17). PT was completed RFO 11, 15, and 17.
Nozzle Material	**Nozzle to Safe End Weld Material**	**Safe End Material**	**Partial Penetration Weld Material**
ASME SB-166 (Inconel)	Inconel 182	SA-182 F304 Stainless Steel	Inconel 182

Standby Liquid Control nozzle safe end-to-nozzle weld RPV-N14-1 is a 2.5 inch OD butt weld consisting of an Alloy 600 nozzle assembly welded to a 304 stainless steel safe end extension with Inconel 182 filler metal (ref. BWRVIP-27A Figure 2-1). Since this weld is less than 4 inches in diameter, the 1998 edition with 2000 addenda of the ASME Section XI code requires a surface examination every ten years. Pilgrim received approval to implement a Class 1 risk-informed inspection program in 2001 in lieu of ASME Section XI requirements. This weld is not included in the risk-informed program inspection sample but has been examined periodically with surface and visual examination methods and will be examined using ultrasonic methods during RFO18 and every ten years thereafter in accordance with BWRVIP-27A requirements.

Figure 1

RPV-N14-1 Weld Overlay Configuration



WELD NUMBER	FLAW CHARACTERIZATION	Design Dimensions			COMMENTS
		t	A	B	
SBLC Nozzle N-14 to safe end (pipe)	Through Wall Flaw SE to Nozzle Weld	0.12	0.75"	0.75"	