UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
OFFICE OF NEW REACTORS
WASHINGTON, DC 20555-0001

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DRAFT NRC REGULATORY ISSUE SUMMARY 2014-xx:
APPLICABILITY OF ASME CODE CASE N-770-1 AS CONDITIONED IN 10 CFR50.55a, "CODES AND STANDARDS," TO BRANCH CONNECTION BUTT WELDS

ADDRESSEES

All holders of an operating license or construction permit for a pressurized water nuclear power reactor under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to inform addressees about reactor coolant system (RCS) Alloy 82/182 branch connection dissimilar metal nozzle welds that may be of a butt weld configuration and, therefore; require inspection under 10 CFR 50.55a(g)(6)(ii)(F). This RIS also informs addressees of a licensee's recent misclassification and missed inspections of RCS Alloy 82/182 dissimilar metal butt welds in branch connections of primary coolant loop piping. This RIS requires no action or written response on the part of an addressee.

BACKGROUND INFORMATION

Inspection of all Class 1 piping and nozzle dissimilar metal butt welds is mandated in 10 CFR 50.55a(g)(6)(ii)(F). This regulation incorporates American Society of Mechanical Engineers (ASME) Code Case N-770-1, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities." Code Case N-770-1 sets alternative examination requirements and acceptance standards to those included in the ASME Code, Section XI, Table IWB-2500-1, "Examination Category B-F and Examination Category B-J," for Class 1 pressurized-water reactor (PWR) piping and vessel nozzle butt welds fabricated with Alloy 82/182 weld filler metal. This nickel alloy material is susceptible to primary water stress corrosion cracking (PWSCC), which, if undetected, can challenge the leak tightness and structural integrity of the reactor coolant pressure boundary.

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10 CFR 50.55a(g)(6)(ii)(F) and Code Case N-770-1 pertain to butt welds, irrespective of whether the butt weld is circumferential or a branch connection. These regulatory requirements call for volumetric inspection of all butt welds of nominal pipe size (NPS) 2 or larger. Subsection NB-3643.2 of Section III of the ASME Code defines acceptable joints for branch connections, including branch components that are attached to the main piping run by welding per NB-4244 or NB-4246. Full-penetration nozzle branch welds constructed in accordance with NB-4244(a) or NB-4246(a) are butt welds, as shown in Figures NB-4244(a)-1 and NB-4246(a)-1, respectively.

Additional guidance concerning the susceptibility of branch connection butt welds to PWSCC is contained in several nuclear industry documents including: Materials Reliability Program (MRP)-126NP, "Generic Guidance for Alloy 600 Management", (Agencywide Documents Access and Management System (ADAMS) Accession No. ML051100195); MRP-113NP, "Alloy 82/182 Pipe Butt Weld Safety Assessment for US PWR Plant Designs", (ADAMS Accession No. ML042080193); and MRP-139, Revision 1, "Primary System Piping Butt Weld Inspection and Evaluation Guideline", (ADAMS Accession No. ML100970671). These documents collectively provide the following:

1. guidance on the establishment of a nickel alloy program
2. guidance concerning the location of nickel alloy welds
3. identification of some branch connection welds as welds of interest
4. guidance for the establishment and periodic review of a nickel alloy inspection program

SUMMARY OF ISSUE

As a result of a request for relief submitted on February 25, 2014 (ADAMS Accession No. ML14056A533), the NRC became aware that the design of Palisades Nuclear Plant includes nine Alloy 600 branch connection nozzles of NPS 2 and greater that are joined to carbon steel primary coolant loop piping using Alloy 82/182 weld material. Of these nozzles, four are primary coolant loop drain nozzles, two are nozzles for pressurizer spray lines, two are nozzles for charging lines, and one is a combined primary coolant loop drain and letdown nozzle. The joint configuration of these welds was consistent with ASME Code, Section III, Figure NB-4244(a)-1, "Nozzles Joined by Full Penetration Butt Welds." However, the licensee failed to classify these welds as butt welds. As a result, the licensee did not complete the volumetric inspections required by 10 CFR 50.55a(g)(6)(ii)(F). Specifically, 10 CFR 50.55a(g)(6)(ii)(F)(1) states that "Licensees of existing, operating PWRs as of July 21, 2011, shall implement the requirements of ASME Code Case N-770-1, subject to the conditions specified in paragraphs (g)(6)(ii)(F)(2) through (g)(6)(ii)(F)(10) of this section, by the first refueling after August 22, 2011." The NRC issued a noncited violation to Palisades Nuclear Plant for failure to thoroughly evaluate the scope of welds susceptible to PWSCC and perform the volumetric examinations as required by NRC regulations. Additional details are provided in Palisades Nuclear Plant Integrated Inspection Report 05000255/2014002 (ADAMS Accession No. ML14127A543). On March 12, 2014, the NRC granted verbal authorization for Relief Request RR-4-18 to the licensee (ADAMS Accession No. ML14073A274) and stated that the licensee could implement the proposed alternative to 10 CFR 50.55a(g)(6)(ii)(F). The proposed alternative requires that the licensee perform enhanced leakage monitoring during the current operating cycle and perform the required volumetric examinations during the next refueling outage.

By letter dated September 4, 2014, the NRC staff issued the formal safety evaluation for Relief RR-4-18 (ADAMS Accession No. ML14223B226).

Subsequent to the issuance of the noncited violation to the licensee, the licensee requested from ASME an interpretation of Code Case N-770-1. By letter dated March 10, 2014, (under record number 14-382) the ASME Standards Committee interpreted Code Case N-770-1 as applying only to circumferential butt welds.

By letter dated June 23, 2014, (ADAMS Accession No. ML14169A094), the NRC staff responded to ASME concerning its interpretation of Code Case N-770-1. In that letter, the NRC staff reiterated that the inspection requirements in 10 CFR 50.55a(g)(6)(ii)(F) apply to all Class 1 piping and nozzle dissimilar metal butt welds, including branch connection butt welds. The NRC staff's letter also referenced the history of Code Case N-722, "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials." In the letter, the NRC found ASME Code Case Record Number 09-1143 to be of particular importance. The subject of this Code Case Record was the removal of inspection requirements for all hot leg and cold leg full penetration Alloy 82/182 welds from the scope of Code Case N-722-1. ASME's basis for this action was that the "treatment of butt welds is more thoroughly addressed in N-770." Contrary to ASME's March 10, 2014, interpretation, this action indicates that by removing inspection requirements for all hot leg and cold leg full penetration Alloy 82/182 welds in Code Case N-722 in favor of Code Case N-770-1, ASME intended that the subject welds be inspected under Code Case N-770-1.

The NRC expects that licensees will review this information for applicability to their Alloy 600 management plan to ensure all applicable butt welds are being inspected as required by NRC regulations. In accordance with 10 CFR 50.55a(g)(6)(ii)(F) and Code Case N-770-1, the NRC requires all butt welds using Alloy 82/182 material that are NPS 2 or greater, including branch connection butt welds, to be volumetrically inspected.

BACKFITTING AND ISSUE FINALITY DISCUSSION

This RIS informs the addressees of the NRC staff's position with respect to the volumetric inspection of RCS Alloy 82/182 dissimilar metal butt welds, and of recent events concerning the misclassification and missed inspection of such welds under 10 CFR 50.55a(g)(6)(ii)(F). This RIS does not impose a new or different regulatory staff position interpreting the Commission's regulations pertaining to such welds. The RIS requires no written response or action beyond that already required by NRC regulations. Therefore, this RIS does not represent backfitting as defined in 10 CFR 50.109(a)(1), nor is it otherwise inconsistent with any issue finality provision in 10 CFR Part 52. Consequently, the NRC staff did not perform a backfit analysis.

FEDERAL REGISTER NOTIFICATION

The NRC will publish a notice of opportunity for public comment on this draft RIS in the Federal Register.

CONGRESSIONAL REVIEW ACT

[Discussion to be provided in final RIS.]

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain new or amended information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget (OMB), approval number 3150-0011.

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CONTACT

Please direct any questions about this matter to the technical contacts listed below or to the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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