

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

January 29, 2015

**NRC REGULATORY ISSUE SUMMARY 2015-01
QUALIFICATION REQUIREMENTS FOR BOLT AND STUD
NON-DESTRUCTIVE EXAMINATIONS**

ADDRESSEES

All holders of an operating license for a light-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 certified that they have permanently ceased operations and that fuel has been permanently removed from the reactor vessel.

All holders of and applicants for a power reactor combined license under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to inform addressees that on January 16, 2015, the NRC issued Enforcement Guidance Memorandum (EGM) 14-003 concerning bolt and stud non-destructive examinations (NDE) conducted using procedures, equipment, and personnel qualified by the Performance Demonstration Initiative (PDI) to meet the requirements of Supplement 8 to Appendix VIII to Section XI of the American Society of Mechanical Engineers (hereinafter "ASME") *Boiler and Pressure Vessel Code* (hereinafter "the Code" or "the ASME Code"). No specific action or written response is required.

BACKGROUND INFORMATION

The requirements for examination and acceptance of ASME Class 1 and 2 pressure-retaining bolts greater than 2.0 inches in diameter (50 millimeters) are listed in Articles IWB-2500 and IWC-2500 of Section XI of the ASME Code, which is incorporated by reference in 10 CFR 50.55a(b). The ASME Code requires volumetric examination of 100 percent of the specified bolts and studs during each inspection interval. Volumetric examinations of these bolts and studs are performed with ultrasonic examination techniques (UT). Article I-2000 of Section XI of the ASME Code requires that UT procedures, equipment, and personnel used to detect flaws in bolts and studs be qualified by performance demonstration in accordance with Supplement 8. Supplement 8 requires blind testing on full-scale section bolts or studs with similar chemical compositions, tensile properties, and metallurgical structure as the bolts or studs to be examined in the field.

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The PDI bolting program, administered by the Electric Power Research Institute (EPRI), is used by licensees to satisfy the requirements defined in Appendix VIII Supplement 8. The NRC staff performed an assessment of the PDI program, documented in a letter dated August 11, 1995 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML070790372), and found, with a few exceptions that have since been resolved, the PDI program meets Appendix VIII requirements. The assessment in 1995 also found that personnel and procedures that pass PDI testing meet the requirements of Appendix VIII. The program was reviewed again by the NRC in 1998, and the results of this review were documented in a revision to 10 CFR 50.55a, "Codes and Standards," titled "Industry Codes and Standards; Amended Requirements" and published in the Federal Register on September 22, 1999 (64 FR 51370).

SUMMARY OF ISSUE

As a result of an internal program audit by the PDI staff in fall of 2013, inconsistencies were discovered between the bolt and stud NDE qualification methods used at PDI and those required by the ASME Code. Specifically, the PDI bolting qualification specimen sets may not meet the detailed specimen, notch location, and scanning surface requirements outlined in paragraph 1.1(b) and 1.1(c) of Supplement 8, for all bolts and studs at all sites due to the large variety of bolts and studs found at each site. Additionally, the PDI qualified procedures do not specifically require the on-site performance demonstration of procedures be "blind tests" as required by paragraph 2.0 of Supplement 8. Furthermore, the PDI program specifies acceptance criteria for personnel qualification that differ from those specified in paragraph 3.1 of Supplement 8. These discrepancies between the PDI program and the ASME Code mean most, if not all, licensees of nuclear power plants are currently not in compliance with the requirements of the ASME Code for bolt examinations, and thus they are out of compliance with 10 CFR 50.55a(g).

The issue was initially described to the NRC staff on December 16, 2013 by industry representatives. This disclosure prompted more detailed discussions between NRC staff and industry's NDE leaders. Public meetings were held on January 8 and 9, 2014, to address this issue (ADAMS Accession No. ML14014A343). In a letter dated February 5, 2014 (ADAMS Accession No. ML14049A237), the chairman of the industry's NDE Action Plan Committee further articulated the issue, provided detailed background information, and asked for NRC assistance.

To formally address the concerns brought about by the renewed interest in bolt and stud NDE qualification, the ASME Code Committee recently approved Code Case N-845, "Qualification Requirements for Bolts and Studs", as well as a change for the 2015 Edition of the Code to update the requirements for bolt and stud NDE qualification in Supplement 8. In conjunction with these changes, industry NDE leaders developed PDI guidance for consistent implementation of the site demonstrations in compliance with the PDI bolting program, including Nuclear Energy Institute (NEI) 03-08 implementation requirements. The NRC staff will continue to monitor and assess developments concerning this issue through attendance at quarterly ASME Code meetings and periodic meetings with industry NDE leadership. Licensees are encouraged to review the ASME Code and industry guidance changes as well as their bolt and stud NDE qualification program to ensure compliance.

The NRC staff reviewed the information provided by ASME, industry, and the current PDI bolting program, and found the PDI qualification program applies a similar or superior level of

rigor when compared to the Appendix VIII requirements. The PDI bolting qualification program, which was developed by the PDI utility members and is administered through EPRI, is based on a sound technical position, and is adequate to demonstrate examination systems (personnel, procedure, and equipment). The program is based on a blind qualification process, in a controlled testing environment, and uses a range of qualification specimens' representative of many of the actual bolts or studs found in nuclear power plants. This independent qualification process is consistent with other supplements to Appendix VIII. To ensure the effectiveness of the PDI qualified examination systems at each site, the PDI program relies on the use of on-site calibration standards representing the plant-specific material and geometric bolt conditions encountered during the bolt or stud examinations. This provides added assurance that the personnel are capable of resolving defects located in the expected examination volume, even though the PDI procedures do not require this on-site calibration test to be blind.

Therefore, examinations performed with PDI qualified procedures, personnel, and equipment provide licensees reasonable assurance that flaws of safety significance would be detected, and thus are consistent with the intent of the ASME Code requirements. Although the PDI qualification program does not strictly comply with Supplement 8 requirements, the PDI qualification program is at least as rigorous as the qualification program described in Supplement 8, and thus does not represent a safety hazard. As such, this issue was not reported under the provisions of 10 CFR Part 21, "Reporting of Defects and Noncompliance."

The NRC staff also finds that the discrepancies between the Supplement 8 requirements and the PDI qualification program noted above do not present a reduction in safety. However, the non-compliance issue would normally result in the issuance of a large number of violations across the industry. Therefore, to further address the issue of violations, the NRC developed EGM 14-003 in conjunction with this RIS.

The NRC staff concludes that licensees may continue to use the PDI qualification program for bolts and studs as a method to meet the regulatory safety intent in relation to the Supplement 8 requirements until the NRC approves for use the 2015 Edition of the ASME Code or an ASME Code Case addressing this issue. The NRC staff further concludes that issuing violations for the subject inconsistencies would redirect significant resources, both at the NRC and at licensee facilities, without a compensating safety benefit. Therefore, enforcement discretion will be applied in accordance with EGM 14-003.

BACKFITTING AND ISSUE FINALITY DISCUSSION

This RIS is addressed to holders of operating licenses for nuclear power plants (including holders of combined licenses issued under 10 CFR Part 52, but not including those Part 50 operating licenses who have certified that they have permanently ceased operations and that fuel has been permanently removed from the reactor vessel). The RIS informs those licensees that the NRC has issued Enforcement Guidance Memorandum (EGM) 14-003 concerning bolt and stud non-destructive examinations (NDE) which are subject to Articles IWB 2500 and IWC 2500 of Section XI of the ASME Code. The RIS sets forth the NRC staff (staff) position that NDE conducted using procedures, equipment, and personnel qualified by the Performance Demonstration Initiative (PDI) do not currently meet all the requirements of Supplement 8 to Appendix VIII to Section XI of the ASME Code, but have been determined by the staff to not be a safety-significant issue concerning their departure from Section XI of the ASME Code requirements. EGM 14-003 gives discretion for the use of PDI qualification methods, which the staff finds to be a superior qualification method, to meet ASME Code requirements. This interim

guidance is in effect until the NRC staff approves for use the 2015 Edition of the ASME Code or an ASME Code Case that addresses qualification for UT examinations for these bolts.

The RIS does not require any specific action or written response from the licensees to whom the RIS is addressed, and the NRC staff position in this RIS does not represent a new or changed position with respect to the need for such licensees to meet Articles IWB 2500 and IWC 2500 of Section XI of the ASME Code, or the manner in which they may meet the requirements of those ASME Code provisions. The staff may find methods or solutions that differ from those described in this RIS to be acceptable for the purpose of applying EGM 14-003 if those methods or solutions meet the examination requirements for bolts in Articles IWB 2500 and IWC 2500 of Section XI of the ASME Code.

For these reasons, this RIS does not represent backfitting as defined in 10 CFR 50.109(a)(1) and is not otherwise inconsistent with any issue finality provision in 10 CFR Part 52. Therefore, the NRC did not prepare a backfit analysis or further address the issue finality criteria in Part 52 with respect to this RIS.

FEDERAL REGISTER NOTIFICATION

The NRC did not publish a notice of opportunity for public comment on this RIS in the Federal Register in order to provide prompt notice to the addressees of the NRC's intent to provide enforcement discretion with respect to certain requirements in Supplement 8. The NRC staff has been engaged with members of EPRI and PDI on the issue described herein and has discussed this issue in several public meetings, as described in the Summary of Issue. For these reasons, the staff is issuing this RIS without an opportunity for public comment on a draft version of the RIS. The NRC intends to continue working with stakeholders in consideration of updates to the ASME Code related to these matters.

CONGRESSIONAL REVIEW ACT

This RIS is not a rule as defined in the Congressional Review Act (5 U.S.C. 801 through 808).

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 numbers 3150-0011 and 3150-0151.

Public Protection Notification

This RIS does not contain information collections and, therefore, is not subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.).

CONTACT

Please direct any questions about this matter to the technical contact(s) or the Lead Project Manager listed below, or to the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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Note: NRC generic communications may be found on the NRC public Web site, <http://www.nrc.gov>, under "NRC Library" > "Document Collections."

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