

June 16, 2011

MEMORANDUM TO: John W. Lubinski, Director
Division of Component Integrity
Office of Nuclear Reactor Regulation

FROM: Timothy R. Lupold, Chief */RA/*
Piping and NDE Branch
Division of Component Integrity
Office of Nuclear Reactor Regulation

SUBJECT: REVIEW OF CHANGES BETWEEN AMERICAN SOCIETY OF
MECHANICAL ENGINEER'S BOILER AND PRESSURE VESSEL
CODE CASES N-770 AND N-770-1 TO SUPPORT 10 CFR
50.55A FINAL RULE

On May 4, 2010, the Nuclear Regulatory Commission (NRC) published the proposed rule for Title 10, Code of Federal Regulation, Part 50.55a (10 CFR 50.55a) to incorporate by reference the 2005 and 2006 addenda, 2007 edition and 2008 addenda of the ASME Boiler and Pressure Vessel Code (ASME Code) [FR 75 24324 or NRC 2008-0554]. The proposed rule also incorporated by reference ASME Code Case N-770, "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 Section XI, Division 1," with conditions.

In order to address several public comments on the proposed rule, NRC will incorporate, by reference, Code Case N-770-1 in the final rule for 10 CFR 50.55a in 2011. NRC reviewed the changes between the original Code Case N-770 and N-770-1, with the assistance from Pacific Northwest National Laboratories. The purpose of the review was to ensure that all technical changes between the documents were identified for disposition in the final rule statement of considerations. The enclosed document summarizes the changes between the versions of Code Case N-770, the NRC categorization of the change, whether the change was addressed by public comment, and finally the resolution of each change.

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In order to address several public comments on the proposed rule, NRC will incorporate, by reference, Code Case N-770-1 in the final rule for 10 CFR 50.55a in 2011. NRC reviewed the changes between the original Code Case N-770 and N-770-1, with the assistance from Pacific Northwest National Laboratories. The purpose of the review was to ensure that all technical changes between the documents were identified for disposition in the final rule statement of considerations. The enclosed document summarizes the changes between the versions of Code Case N-770, the NRC categorization of the change, whether the change was addressed by public comment, and finally the resolution of each change.

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REVIEW OF CHANGES BETWEEN
AMERICAN SOCIETY OF MECHANICAL ENGINEER'S BOILER AND PRESSURE VESSEL
CODE CASES N-770 AND N-770-1
TO SUPPORT 10 CFR 50.55A FINAL RULE
DIVISION OF COMPONENT INTEGRITY

On January 26, 2009, American Society of Mechanical Engineers (ASME) published Code Case N-770, "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 Section XI, Division 1." On December 25, 2009, ASME modified ASME Code Case N-770 and issued version 1 of the code case as N-770-1.

On May 4, 2010, the NRC published the proposed rule for Title 10, Code of Federal Regulation, Part 50.55a (10 CFR 50.55a) to incorporate by reference the 2005 and 2006 addenda, 2007 edition and 2008 addenda of the ASME Boiler and Pressure Vessel Code (ASME Code) [FR 75 24324 or NRC 2008-0554]. The proposed rule also incorporated by reference ASME Code Case N-770 with conditions.

In order to address several public comments on the proposed rule, the NRC plans to incorporate, by reference, Code Case N-770-1 in the final rule for 10 CFR 50.55a in 2011. NRC reviewed the changes between the original Code Case N-770 and N-770-1, with the assistance from Pacific Northwest National Laboratories. The purpose of the review was to ensure that all technical changes between the documents were identified. Technical changes would require a NRC condition against the use of such change, until a period of public review and comment could be completed.

Table 1 below summarizes the changes between the versions of Code Case N-770, the NRC categorization of the change, whether the change was addressed by public comment, and finally the resolution of each change. Editorial changes not addressed by public comments or previous NRC conditions to the proposed rule, were considered acceptable changes that would not require a period of additional public review and comment. Similarly, clarifications, which did require some change to the document but had no technical significance, were considered acceptable changes that would not require a period of additional public review and comment. Technical changes that were addressed by public comment and NRC condition are addressed in the final rulemaking which will implement Code Case N-770-1 in lieu of N-770. Technical changes that were not addressed by public comment and NRC condition were conditioned in the final rule to prevent implementation under Code Case N-770-1. These last items will be provided for review of the next rulemaking activity to update 10 CFR 50.55a, expected to be published in early 2012.

ENCLOSURE

Table 1: ASME Code Case Version Changes from N-770 to N770-1

Overview of Changes to ASME Code Case N-770 in ASME Code Case N-770-1

Changes to ASME Code Case N-770 (Revision 0) were made in ASME Code Case N-770-1 (Revision 1) to address proposed conditions 5, 6, 7, 8, 9, 10, 11, 13, and 14. A number of editorial changes had to be made in Revision 1 because of the technical changes to address the NRC imposed conditions in the proposed rule.

One technical addition was made in Revision 1 that is not covered by the proposed rule. A new condition will be included in the final rule to indicate that this addition may not be applied when using Code Case N-770-1.

Several editorial changes and clarifications were made to improve the utility of Code Case N-770-1.

Detailed Evaluation of Changes

Code Case Paragraph	Description of Change	Type of Change/Purpose	Addressed by Proposed Condition/Public Comment	Final Rule Resolution
-1100	Words “, and surface examination where applicable,” added to Revision 1 after “...case provides ...standards for volumetric examination”.	Editorial change that clarifies that the scope of the Code Case noting that it includes volumetric as well as surface examination requirements.	No	Incorporated in Final Rule with no other action.
-1210 and multiple other locations throughout the Code Case	Terms “corrosion resistant cladding” and “cladding” in Revision 0 replaced with the term “onlay” in Revision 1.	Editorial change made to avoid confusion with requirements in other code documents that use the word “cladding” in different applications.	No	Incorporated in Final Rule with no other action.
Table 1, Items C and F, Extent and Frequency of Examination	Sentence added to Revision 1 on inspecting prior to exceeding the life of the overlay.	Technical change. Sentence added to address proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(13).	Yes	Staff agrees that change in Revision 1 satisfies Proposed Condition 13. Incorporate N-770-1 in the final rule to address proposed condition. Discussion in statement of consideration for Final Rule.

Code Case Paragraph	Description of Change	Type of Change/Purpose	Addressed by Proposed Condition/Public Comment	Final Rule Resolution
Table 1, Items D and E, Parts Examined	Note (20) in Revision 0 renumbered as Note (18) in Revision 1.	Clarification as Notes (18) and (19) were removed because the requirements of Note (18), that were not overlapping with Notes (4) and (16), were no longer needed because of change discussed in next row of this table. Requirements of Notes (19) were relocated.	No	Incorporated in Final Rule with no other action.
Table 1, Items G, H, J, and K, Extent and Frequency of Examination	Wording changed in Revision 1 to require a surface exam and a volumetric exam.	Technical change. Wording changed to address the first of two parts of proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(7).	Yes	Staff agrees that change in Revision 1 satisfies first of two parts of Proposed Condition 7. Incorporate N-770-1 in the final rule to address proposed condition. Discussion in statement of consideration for Final Rule.
Table 1, Items G and J, Parts Examined	Term "Alloy 52/152 inlay material" in Revision 0 replaced with "an inlay" in Revision 1.	Editorial change. Glossary in Code Case defines that a corrosion resistant barrier (Alloy 52/152) is to be used for inlays.	No	Incorporated in Final Rule with no other action.
Table 1, Notes (6)(b), (12)(e)	Reference to Note (19) in Notes (6)(b) and (12)(e) of Revision 0 removed and requirements of Note (19) relocated to the end of Notes (6)(b) and (12)(e) in Revision 1.	Editorial change. Rearranging location of information in notes to add clarity.	No	Incorporated in Final Rule with no other action.
Table 1, Note (6)(b) and (12)(e)	Words "extent E-F of Figure 1," added in Revision 1.	Clarification for the extent of the surface examination included in notes of Revision 0.	No	Incorporated in Final Rule with no other action.

Code Case Paragraph	Description of Change	Type of Change/Purpose	Addressed by Proposed Condition/Public Comment	Final Rule Resolution
Table 1, Note (8)(b)	Revision 0 words “stress corrosion cracking in” replaced with “having flaw extension into” in Revision 1.	Clarification to reflect that inservice examination is capable of determining flaw extension rather than of characterizing a flaw as stress corrosion cracking.	No	Incorporated in Final Rule with no other action.
Table 1, Note (11)(b)	Word “originally” added in Revision 1 between words “welds” and “classified”.	Editorial change. Meaning in Revision 0 was obvious from context.	No	Incorporated in Final Rule with no other action.
Table 1, Note (11)(b)	Words added to explicitly permit deferral of Inspection Item C in Revision 1.	Editorial change. Deferral of Inspection Item C was allowed in Revision 0.	No	Incorporated in Final Rule with no other action.
Table 1, Note (11)(b)	Words added to Revision 1 to prohibit deferral of Inspection Items D, G and H.	Technical change. Sentence added to address proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(8). Multiple commenters requested that an “unnecessary penalty” in the inspection requirements for Inspection Item D in Revision 0 and Revision 1 be removed in the final rule. Requested change is related to the proposed condition.	Yes	Staff agrees that change in Revision 1 satisfies Proposed Condition 8. Staff agrees with commenters that requirements for Item D are inequitable and constitute an unnecessary penalty. Incorporate Revision 1 in final rule and revise condition to address requested change to Item D requirements. Discussion in statement of consideration for Final Rule.
Table 1, Note (14)	Words in Revision 0 on the flaw growth assumption removed from Revision 1.	Editorial change. Words removed pertain to design assumptions, which are the purview of a different code case.	No	Incorporated in Final Rule with no other action.

Code Case Paragraph	Description of Change	Type of Change/Purpose	Addressed by Proposed Condition/Public Comment	Final Rule Resolution
Table 1, Note (16)	Sentence added to Revision 1 on reclassification of cracked inlays or onlays.	Technical change. Sentence added to address proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(6).	Yes	Staff agrees that change in Revision 1 satisfies Proposed Condition 6. Incorporate N-770-1 in the final rule to address proposed condition. Discussion in statement of consideration for Final Rule.
Table 1, Note (18)	Note (18) in Revision 0 deleted from Revision 1.	Editorial change. Note (18) was no longer needed because of its overlap with Note (16) and changes to Table 1, Items G, H, J, and K, Extent and Frequency of Examination, made to address the first of two parts of proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(7).	No	Incorporated in Final Rule with no other action.
Figure 1	General Note on examination boundaries added to Figure 1 in Revision 1.	Clarification that incorporates NRC approved rules in Section XI, IWB-2500 which are used for the same purpose, i.e., determining examination boundaries.	No	Incorporated in Final Rule with no other action.
Figure 2(b)	The "½-inch" distance shown on both sides of the weld in Revision 0 changed to distances "X" and "Y" and defined in a note below Figure 2(b) in Revision 1.	Technical change. Change made to address proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(14).	Yes	Staff agrees that change in Revision 1 satisfies Proposed Condition 14. Incorporate N-770-1 in the final rule to address proposed condition. Discussion in statement of consideration for Final Rule.

Code Case Paragraph	Description of Change	Type of Change/Purpose	Addressed by Proposed Condition/Public Comment	Final Rule Resolution
Figures 2(b) and 5(b)	The volume A-B-C-D in Revision 0 was corrected in Revision 1 to be applicable to evaluation thicknesses, t1 and t2, to match requirements in notes.	Clarification such that the volume shown in figures of Revision 0 was incorrect, but the error had no technical significance as it was corrected to match the notes citing its use for evaluation thicknesses, t1 and t2, 9(b), 13(b), and 14(b).	No	Incorporated in Final Rule with no other action.
Figure 4	Location of point "D" in Revision 0 moved slightly away from end of onlay.	Clarification for the location of point "D" in Revision 0 as it may have been misleading, since "D" does not have to be at the toe of the cladding.	No	Incorporated in Final Rule with no other action.
Figure 5(a)	Note (2) to Figure 5(a) in Revision 1 added to define alternative inspection volumes.	Technical change. Change addresses a technical issue encountered with qualifying inspection techniques for weld overlays used as stress improvement.	No	Staff does not have a technical objection to this change, but this issue was not covered by the proposed rule. Incorporated in Revision 1 in final rule with a condition stating that Note (2) to Figure 5(a) may not be applied. Discussion in statement of consideration for Final Rule.
-3132.3	Wording in Revision 0 on when user is required to reevaluate previously-evaluated flaws was changed in Revision 1.	Technical change. Change made to address proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(5).	Yes	Staff agrees that change in Revision 1 satisfies Proposed Condition 5. Incorporate N-770-1 in the final rule to address proposed condition. Discussion in statement of consideration for Final Rule.

Code Case Paragraph	Description of Change	Type of Change/Purpose	Addressed by Proposed Condition/Public Comment	Final Rule Resolution
-9000	Definition of “cracked” weld expanded in Revision 1 to include vessel cold leg nozzle welds that may be mitigated before they are inspected.	Clarification made to address exceptions to considering welds cracked if mitigated before they are inspected. Exceptions already contained in Revision 0, Notes 6(b) and 12(e).	No	Incorporated in Final Rule with no other action.
-9000	Definition of “optimized weld overlay” (OWOL) added to the Glossary.	Clarification made for the term OWOL, which was used in Note (20) of Revision 0, but not defined. Definition in Revision 1 is widely used in industry and agreed upon by NRC. Definition is not controversial. No public comments were made on the lack of definition for the term.	No	Incorporated in Final Rule with no other action.
I-1.1 of Appendix I	Words “inside diameter” in Revision 0 replaced with “inside surface” in Revision 1.	Editorial change. Both sets of words have the same meaning.	No	Incorporated in Final Rule with no other action.
I-1.1 of Appendix I	Words “and extending for 360°” added in Revision 1.	Technical change. Change made to address proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(9).	Yes	Staff agrees that change in Revision 1 satisfies Proposed Condition 9. Incorporate N-770-1 in the final rule to address proposed condition. Discussion in statement of consideration for Final Rule.

Code Case Paragraph	Description of Change	Type of Change/Purpose	Addressed by Proposed Condition/Public Comment	Final Rule Resolution
I-2.1 of Appendix I	Words “cause plastic ratcheting” in Revision 0 replaced by “relieve stress due to shakedown” in Revision 1.	Technical change. Change made to address proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(10).	Yes	Staff agrees that change in Revision 1 satisfies Proposed Condition 10. Incorporate N-770-1 in the final rule to address proposed condition. Discussion in statement of consideration for Final Rule.
I-7	Words “combined residual and operating stresses, and shall be zero, ...” in Revision 0 replaced with “combined residual and steady-state operating stresses, and shall not be greater than zero” in Revision 1.	Technical change. Change made to address proposed condition 10 CFR 50.55a(g)(6)(ii)(F)(11).	Yes	Staff agrees that change in Revision 1 satisfies Proposed Condition 11. Incorporate N-770-1 in the final rule to address proposed condition. Discussion in statement of consideration for Final Rule.
I-7.1	Word “cause” in Revision 0 replaced with “result in” in Revision 1.	Editorial change.	No	Incorporated in Final Rule with no other action.