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**Unofficial Redline of the NRC's  
Proposed Rule:  
American Society of Mechanical Engineers  
2021–2022 Code Editions  
Incorporation by Reference  
NRC-2018-0289; RIN 3150-AK21**

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**U.S. Nuclear Regulatory Commission**  
Office of Nuclear Reactor Regulation

[July 2023]



**Introduction**

The Nuclear Regulatory Commission (NRC) is releasing this unofficial, informal redline to assist industry and other stakeholders in reviewing the changes that the proposed rule titled “American Society of Mechanical Engineers 2021–2022 Code Editions” would make to the regulatory text of 10 CFR 50.55a, “Codes and standards.” The NRC published the proposed rule in August of 2023, in the *Federal Register* for public comment with a 75-day public comment period.

The underlying (unmarked) text in this document reflects the text of the rule. The changes that the proposed rule would make to NRC’s regulations, if the NRC were to adopt the changes as proposed, are marked in red.

This redline is not a substitute for reviewing the proposed rule. If any conflicts exist between this redline and the text of the proposed rule, the documents published in the *Federal Register* are the controlling documents.

## § 50.55a Codes and standards.

(a) ***Documents approved for incorporation by reference.*** The standards listed in this [paragraph \(a\)](#) have been approved for incorporation by reference by the Director of the Federal Register pursuant to [5 U.S.C. 552\(a\)](#) and [1 CFR part 51](#). The standards are available for inspection, by appointment, at the NRC Technical Library, which is located at Two White Flint North, 11545 Rockville Pike, Rockville, Maryland 20852; telephone: 301-415-7000; email: [Library.Resource@nrc.gov](mailto:Library.Resource@nrc.gov); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov) or go to [www.archives.gov/federal-register/cfr/ibr-locations.html](http://www.archives.gov/federal-register/cfr/ibr-locations.html).

(1) ***American Society of Mechanical Engineers (ASME)***, Three Park Avenue, New York, NY 10016; telephone: 1-800-843-2763; <https://www.asme.org/Codes/>.

(i) ***ASME Boiler and Pressure Vessel Code, Section III.*** The editions and addenda for Section III of the ASME Boiler and Pressure Vessel Code (excluding Nonmandatory Appendices) are listed in this [paragraph \(a\)\(1\)\(i\)](#), but limited by those provisions identified in [paragraph \(b\)\(1\)](#) of this section.

(A) “Rules for Construction of Nuclear Vessels:”

- (1) 1963 Edition,
- (2) Summer 1964 Addenda,
- (3) Winter 1964 Addenda,
- (4) 1965 Edition,
- (5) 1965 Summer Addenda,
- (6) 1965 Winter Addenda,
- (7) 1966 Summer Addenda,
- (8) 1966 Winter Addenda,
- (9) 1967 Summer Addenda,
- (10) 1967 Winter Addenda,
- (11) 1968 Edition,
- (12) 1968 Summer Addenda,
- (13) 1968 Winter Addenda,

- (14) 1969 Summer Addenda,
- (15) 1969 Winter Addenda,
- (16) 1970 Summer Addenda, and
- (17) 1970 Winter Addenda.

(B) “Rules for Construction of Nuclear Power Plant Components:”

- (1) 1971 Edition,
- (2) 1971 Summer Addenda,
- (3) 1971 Winter Addenda,
- (4) 1972 Summer Addenda,
- (5) 1972 Winter Addenda,
- (6) 1973 Summer Addenda, and
- (7) 1973 Winter Addenda.

(C) “Division 1 Rules for Construction of Nuclear Power Plant Components:”

- (1) 1974 Edition,
- (2) 1974 Summer Addenda,
- (3) 1974 Winter Addenda,
- (4) 1975 Summer Addenda,
- (5) 1975 Winter Addenda,
- (6) 1976 Summer Addenda, and
- (7) 1976 Winter Addenda;

(D) “Rules for Construction of Nuclear Power Plant Components - Division 1”;

- (1) 1977 Edition,
- (2) 1977 Summer Addenda,

- (3) 1977 Winter Addenda,
- (4) 1978 Summer Addenda,
- (5) 1978 Winter Addenda,
- (6) 1979 Summer Addenda,
- (7) 1979 Winter Addenda,
- (8) 1980 Edition,
- (9) 1980 Summer Addenda,
- (10) 1980 Winter Addenda,
- (11) 1981 Summer Addenda,
- (12) 1981 Winter Addenda,
- (13) 1982 Summer Addenda,
- (14) 1982 Winter Addenda,
- (15) 1983 Edition,
- (16) 1983 Summer Addenda,
- (17) 1983 Winter Addenda,
- (18) 1984 Summer Addenda,
- (19) 1984 Winter Addenda,
- (20) 1985 Summer Addenda,
- (21) 1985 Winter Addenda,
- (22) 1986 Edition,
- (23) 1986 Addenda,
- (24) 1987 Addenda,
- (25) 1988 Addenda,

- (26) 1989 Edition,
- (27) 1989 Addenda,
- (28) 1990 Addenda,
- (29) 1991 Addenda,
- (30) 1992 Edition,
- (31) 1992 Addenda,
- (32) 1993 Addenda,
- (33) 1994 Addenda,
- (34) 1995 Edition,
- (35) 1995 Addenda,
- (36) 1996 Addenda, and
- (37) 1997 Addenda.

(E) “Rules for Construction of Nuclear Facility Components - Division 1:”

- (1) 1998 Edition,
- (2) 1998 Addenda,
- (3) 1999 Addenda,
- (4) 2000 Addenda,
- (5) 2001 Edition,
- (6) 2001 Addenda,
- (7) 2002 Addenda,
- (8) 2003 Addenda,
- (9) 2004 Edition,
- (10) 2005 Addenda,

- (11) 2006 Addenda,
- (12) 2007 Edition,
- (13) 2008 Addenda,
- (14) 2009b Addenda (including Subsection NCA; and Division 1 subsections NB through NH and Appendices),
- (15) 2010 Edition (including Subsection NCA; and Division 1 subsections NB through NH and Appendices),
- (16) 2011a Addenda (including Subsection NCA; and Division 1 subsections NB through NH and Appendices),
- (17) 2013 Edition (including Subsection NCA; and Division 1 subsections NB through NH and Appendices),
- (18) 2015 Edition (including Subsection NCA; and Division 1 subsections NB through NH and Appendices);
- (19) 2017 Edition (including Subsection NCA; and Division 1 subsections NB through NG and Appendices); ~~and~~
- (20) 2019 Edition (including Subsection NCA; and Division 1 subsections NB through NG and Appendices); ~~and~~
- (21) 2021 Edition (including Subsection NCA; and Division 1 subsections NB through NG and Appendices).

(ii) **ASME Boiler and Pressure Vessel Code, Section XI.** The editions and addenda for Section XI of the ASME Boiler and Pressure Vessel Code are listed in this [paragraph \(a\)\(1\)\(ii\)](#), but limited by those provisions identified in [paragraph \(b\)\(2\)](#) of this section.

(A) [Reserved]

(B) “Rules for Inservice Inspection of Nuclear Power Plant Components:”

- (1) 1974 Edition;
- (2) 1974 Summer Addenda;
- (3) 1974 Winter Addenda; and
- (4) 1975 Summer Addenda.

(C) “Rules for Inservice Inspection of Nuclear Power Plant Components - Division 1:”

(1)-(32) [Reserved]

(33) 1995 Edition;

(34) 1995 Addenda;

(35) 1996 Addenda;

(36) 1997 Addenda;

(37)-(40) [Reserved]

(41) 2001 Edition;

(42) 2001 Addenda;

(43) 2002 Addenda;

(44) 2003 Addenda;

(45) 2004 Edition;

(46) 2005 Addenda;

(47) 2006 Addenda;

(48) 2007 Edition;

(49) 2008 Addenda;

(50) 2009b Addenda;

(51) 2010 Edition;

(52) 2011a Addenda;

(53) 2013 Edition;

(54) 2015 Edition;

(55) 2017 Edition; ~~and~~

(56) 2019 Edition; ~~and-~~

(57) 2021 Edition.

(iii) **ASME Code Cases: Nuclear Components -**

(A) **ASME BPV Code Case N-513-3 Mandatory Appendix I.** ASME BPV Code Case N-513-3, “Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1,” Mandatory Appendix I, “Relations for  $F_m$ ,  $F_b$ , and  $F$  for Through-Wall Flaws” (Approval Date: January 26, 2009). ASME BPV Code Case N-513-3 Mandatory Appendix I is referenced in [paragraph \(b\)\(2\)\(xxxiv\)\(B\)](#) of this section.

(B) **ASME BPV Code Case N-722-1.** ASME BPV Code Case N-722-1, “Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials, Section XI, Division 1” (Approval Date: January 26, 2009), with the conditions in [paragraph \(g\)\(6\)\(ii\)\(E\)](#) of this section.

(C) **ASME BPV Code Case N-729-6.** ASME BPV Code Case N-729-6, “Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds Section XI, Division 1” (Approval Date: March 3, 2016), with the conditions in [paragraph \(g\)\(6\)\(ii\)\(D\)](#) of this section.

(D) **ASME BPV Code Case N-770-~~75~~.** ASME BPV Code Case N-770-~~57~~, “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” (Approval Date: ~~December 4, 2020~~~~November 7, 2016~~), with the conditions in [paragraph \(g\)\(6\)\(ii\)\(F\)](#) of this section.

(E) [Reserved]

(F) **ASME BPV Code Case N-852.** ASME BPV Code Case N-852, “Application of the ASME NPT Stamp, Section III, Division 1; Section III, Division 2; Section III, Division 3; Section III, Division 5” (Approval Date: February 9, 2015). ASME BPV Code Case N-852 is referenced in [paragraph \(b\)\(1\)\(ix\)](#) of this section.

(G) [Reserved]

(H) **ASME OM Code Case OMN-28.** ASME OM Case OMN-28, “Alternative Valve Position Verification Approach to Satisfy ISTC-3700 for Valves Not Susceptible to Stem-Disk Separation.” Issued March 4, 2021. OMN-28 is referenced in [paragraph \(b\)\(3\)\(xi\)](#) of this section.

(iv) **ASME Operation and Maintenance Code.** The editions and addenda for the ASME Operation and Maintenance of Nuclear Power Plants are listed in this [paragraph \(a\)\(1\)\(iv\)](#), but limited by those provisions identified in [paragraph \(b\)\(3\)](#) of this section.



(A) “Code for Operation and Maintenance of Nuclear Power Plants:”

- (1) 1995 Edition;
- (2) 1996 Addenda;
- (3) 1997 Addenda;
- (4) 1998 Edition;
- (5) 1999 Addenda;
- (6) 2000 Addenda;
- (7) 2001 Edition;
- (8) 2002 Addenda;
- (9) 2003 Addenda;
- (10) 2004 Edition;
- (11) 2005 Addenda; and
- (12) 2006 Addenda.

(B) “Operation and Maintenance of Nuclear Power Plants, Division 1: Section IST Rules for Inservice Testing of Light-Water Reactor Power Plants:”

- (1) 2009 Edition.
- (2) [Reserved]

(C) Operation and Maintenance of Nuclear Power Plants, “Division 1: OM Code: Section IST”:

- (1) 2012 Edition, ~~“Division 1: OM Code: Section IST”~~;
- (2) 2017 Edition; ~~and~~
- (3) 2020 Edition; ~~and~~;
- (4) 2022 Edition.

(v) *ASME Quality Assurance Requirements.*

(A) ASME NQA-1, “Quality Assurance Program Requirements for Nuclear Facilities:”

- (1) NQA-1 - 1983 Edition;
- (2) NQA-1a - 1983 Addenda;
- (3) NQA-1b - 1984 Addenda;
- (4) NQA-1c - 1985 Addenda;
- (5) NQA-1 - 1986 Edition;
- (6) NQA-1a - 1986 Addenda;
- (7) NQA-1b - 1987 Addenda;
- (8) NQA-1c - 1988 Addenda;
- (9) NQA-1 - 1989 Edition;
- (10) NQA-1a - 1989 Addenda;
- (11) NQA-1b - 1991 Addenda; and
- (12) NQA-1c - 1992 Addenda.

(B) ASME NQA-1, “Quality Assurance Requirements for Nuclear Facility Applications:”

- (1) NQA-1 - 1994 Edition;
- (2) NQA-1 - 2008 Edition;
- (3) NQA-1a - 2009;
- (4) NQA-1b - 2011 Addenda;
- (5) NQA-1 - 2012; and
- (6) NQA-1 - 2015.

(2) ***Institute of Electrical and Electronics Engineers (IEEE) Service Center***, 445 Hoes Lane, Piscataway, NJ 08855; telephone: 1-800-678-4333; <http://ieeexplore.ieee.org>.

(i) ***IEEE standard 279-1968***. (IEEE Std 279-1968), “Proposed IEEE Criteria for Nuclear Power Plant Protection Systems” (Approval Date: August 30, 1968), referenced in

[paragraph \(h\)\(2\)](#) of this section. (Copies of this document may be purchased from IHS Global, 15 Inverness Way East, Englewood, CO 80112; <https://global.ihs.com>.)

(ii) **IEEE standard 279-1971.** (IEEE Std 279-1971), “Criteria for Protection Systems for Nuclear Power Generating Stations” (Approval Date: June 3, 1971), referenced in [paragraph \(h\)\(2\)](#) of this section.

(iii) **IEEE standard 603-1991.** (IEEE Std 603-1991), “Standard Criteria for Safety Systems for Nuclear Power Generating Stations” (Approval Date: June 27, 1991), referenced in [paragraphs \(h\)\(2\)](#) and [\(h\)\(3\)](#) of this section. All other standards that are referenced in IEEE Std 603-1991 are not approved for incorporation by reference.

(iv) **IEEE standard 603-1991, correction sheet.** (IEEE Std 603-1991 correction sheet), “Standard Criteria for Safety Systems for Nuclear Power Generating Stations, Correction Sheet, Issued January 30, 1995,” referenced in [paragraphs \(h\)\(2\)](#) and [\(h\)\(3\)](#) of this section. (This correction sheet is available from IEEE at <http://standards.ieee.org/findstds/errata/>).

(3) **U.S. Nuclear Regulatory Commission (NRC) Public Document Room,** 11555 Rockville Pike, Rockville, Maryland 20852; telephone: 1-800-397-4209; email: [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov); <https://www.nrc.gov/reading-rm/doc-collections/reg-guides/>. The use of code cases listed in the NRC regulatory guides in [paragraphs \(a\)\(3\)\(i\)](#) through [\(iii\)](#) of this section is acceptable with the specified conditions in those guides when implementing the editions and addenda of the ASME BPV Code and ASME OM Code incorporated by reference in [paragraph \(a\)\(1\)](#) of this section. The NRC report in [paragraph \(a\)\(3\)\(iv\)](#) of this section is acceptable as specified in the conditions when implementing code cases listed in the NRC regulatory guides in [paragraphs \(a\)\(3\)\(i\)](#) through [\(iii\)](#) of this section.

(i) **NRC Regulatory Guide 1.84, Revision 39.** NRC Regulatory Guide 1.84, Revision 39, “Design, Fabrication, and Materials Code Case Acceptability, ASME Section III,” issued December 2021, with the requirements in [paragraph \(b\)\(4\)](#) of this section.

(ii) **NRC Regulatory Guide 1.147, Revision 20.** NRC Regulatory Guide 1.147, Revision 20, “Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1,” issued December 2021, which lists ASME Code Cases that the NRC has approved in accordance with the requirements in [paragraph \(b\)\(5\)](#) of this section.

(iii) **NRC Regulatory Guide 1.192, Revision 4.** NRC Regulatory Guide 1.192, Revision 3, “Operation and Maintenance Code Case Acceptability, ASME OM Code,” issued December 2021, which lists ASME Code Cases that the NRC has approved in accordance with the requirements in [paragraph \(b\)\(6\)](#) of this section.

(iv) **NUREG-2228.** NUREG-2228, “Weld Residual Stress Finite Element Analysis Validation: Part II - Proposed Validation Procedure,” Published July 2020 (including Errata September 22, 2021), which is referenced in RG 1.147, Revision 20.

(4) Electric Power Research Institute, Materials Reliability Program, 3420 Hillview Avenue, Palo Alto, CA 94304-1338; telephone: 1-650-855-2000; <http://www.epri.com>.

(i) “Materials Reliability Program: Topical Report for Primary Water Stress Corrosion Cracking Mitigation by Surface Stress Improvement (MRP-335, Revision 3-A)”, EPRI approval date: November 2016.

(ii) [Reserved]

(b) ***Use and conditions on the use of standards.*** Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code and the ASME OM Code as specified in this [paragraph \(b\)](#). Each combined license for a utilization facility is subject to the following conditions.

(1) ***Conditions on ASME BPV Code Section III.*** Each manufacturing license, standard design approval, and design certification under [10 CFR part 52](#) is subject to the following conditions. As used in this section, references to Section III refer to Section III of the ASME BPV Code and include the 1963 Edition through 1973 Winter Addenda and the 1974 Edition (Division 1) through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section, subject to the following conditions:

(i) ***Section III condition: Section III materials.*** When applying the 1992 Edition of Section III, applicants or licensees must apply the 1992 Edition with the 1992 Addenda of Section II of the ASME Boiler and Pressure Vessel Code.

(ii) ***Section III condition: Weld leg dimensions.*** When applying the 1989 Addenda through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)](#) of this section, applicants and licensees may not apply the Section III provisions identified in table 1 to this [paragraph \(b\)\(1\)\(ii\)](#) for welds with leg size less than  $1.09 t_n$ :

Table 1 to Paragraph (b)(1)(ii) - Prohibited Code Provisions

Editions and addenda	Code provision
1989 Addenda through the latest edition and addenda incorporated by reference in <a href="#">paragraph (a)(1)(i)</a> of this section	Subparagraph NB-3683.4(c)(1); Subparagraph NB-3683.4(c)(2).
1989 Addenda through 2003 Addenda	Footnote 11 to Figure NC-3673.2(b)-1; Note 11 to Figure ND-3673.2(b)-1.
2004 Edition through 2010 Edition	Footnote 13 to Figure NC-3673.2(b)-1; Note 13 to Figure ND-3673.2(b)-1.
2011 Addenda through the latest edition and addenda incorporated by reference in <a href="#">paragraph (a)(1)(i)</a> of this section	Footnote 11 to Table NC-3673.2(b)-1; Note 11 to Table ND-3673.2(b)-1.

(iii) **Section III condition: Seismic design of piping.** Applicants or licensees may use Subarticles NB-3200, NB-3600, NC-3600, and ND-3600 for seismic design of piping, up to and including the 1993 Addenda, subject to the condition specified in [paragraph \(b\)\(1\)\(ii\)](#) of this section. Applicants or licensees may not use these subarticles for seismic design of piping in the 1994 Addenda through the 2005 Addenda incorporated by reference in [paragraph \(a\)\(1\)](#) of this section, except that Subarticle NB-3200 in the 2004 Edition through the 2017 Edition may be used by applicants and licensees, subject to the condition in [paragraph \(b\)\(1\)\(iii\)\(A\)](#) of this section. Applicants or licensees may use Subarticles NB-3600, NC-3600, and ND-3600 for the seismic design of piping in the 2006 Addenda through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section, subject to the conditions of this [paragraph \(b\)\(1\)\(iii\)](#) corresponding to those subarticles.

(A) **Seismic design of piping: First provision.** When applying Note (1) of Figure NB-3222-1 for Level B service limits, the calculation of Pb stresses must include reversing dynamic loads (including inertia earthquake effects) if evaluation of these loads is required by NB-3223(b).

(B) **Seismic design of piping: Second provision.** For Class 1 piping, the material and Do/t requirements of NB-3656(b) must be met for all Service Limits when the Service Limits include reversing dynamic loads, and the alternative rules for reversing dynamic loads are used.

(iv) **Section III condition: Quality assurance.** When applying editions and addenda later than the 1989 Edition of Section III, an applicant or licensee may use the requirements of NQA-1, “Quality Assurance Requirements for Nuclear Facility Applications,” that is both incorporated by reference in [paragraph \(a\)\(1\)\(v\)](#) of this section and specified in either NCA-4000 or NCA-7000 of that Edition and Addenda of Section III, [with the exceptions in paragraph \(b\)\(1\)\(iv\)\(A\) of this section](#), provided that the administrative, quality, and technical provisions contained in that Edition and Addenda of Section III are used in conjunction with the applicant's or licensee's appendix B to this part quality assurance program; and that the applicant's or licensee's Section III activities comply with those commitments contained in the applicant's or licensee's quality assurance program description. Where NQA-1 and Section III do not address the commitments contained in the applicant's or licensee's appendix B quality assurance program description, those licensee commitments must be applied to Section III activities.

[\(A\) Subpart 2.19 in NQA-1-2017, NQA-1-2019 and NQA-1-2022 is not approved for use.](#)

[\(A\)\(B\) \[Reserved\]](#)

(v) **Section III condition: Independence of inspection.** Applicants or licensees may not apply the exception in NCA-4134.10(a) of Section III, 1995 Edition through 2009b Addenda of the 2007 Edition, from paragraph 3.1 of Supplement 10S-1 of NQA-1-1994 Edition.

(vi) **Section III condition: Subsection NH.** The provisions in Subsection NH, “Class 1 Components in Elevated Temperature Service,” 1995 Addenda through all editions and addenda up to and including the 2013 Edition incorporated by reference in [paragraph \(a\)\(1\)](#) of this section, may only be used for the design and construction of Type 316 stainless steel pressurizer heater ~~sheath~~~~sleeves~~ where service conditions do not cause the components to reach temperatures exceeding 900 °F. This condition is not applicable to the 2015 Edition and later editions.

(vii) **Section III condition: Capacity certification and demonstration of function of incompressible-fluid pressure-relief valves.** When applying the 2006 Addenda through all editions and addenda up to and including the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section, applicants and licensees may use paragraph NB-7742, except that paragraph NB-7742(a)(2) may not be used. For a valve design of a single size to be certified over a range of set pressures, the demonstration of function tests under paragraph NB-7742 must be conducted as prescribed in NB-7732.2 on two valves covering the minimum set pressure for the design and the maximum set pressure that can be accommodated at the demonstration facility selected for the test.

(viii) **Section III condition: Use of ASME certification marks.** When applying editions and addenda earlier than the 2011 Addenda to the 2010 Edition, licensees may use either the ASME BPV Code Symbol Stamps or the ASME Certification Marks with the appropriate certification designators and class designators as specified in the 2013 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)](#) of this section.

(ix) **Section III Condition: NPT Code Symbol Stamps.** Licensees may use the NPT Code Symbol Stamp with the letters arranged horizontally as specified in ASME BPV Code Case N-852 for the service life of a component that had the NPT Code Symbol Stamp applied during the time period from January 1, 2005, through December 31, 2015.

(x) **Section III Condition: Visual examination of bolts, studs and nuts.** Applicants or licensees applying the provisions of NB-2582, NC-2582, ND-2582, NE-2582, NF-2582, NG-2582 in the 2017 Edition of Section III through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section, must apply [paragraphs \(b\)\(1\)\(x\)\(A\)](#) and [\(B\)](#) of this section.

(A) **Visual examination of bolts, studs, and nuts: First provision.** When applying the provisions of NB-2582, NC-2582, ND-2582, NE-2582, NF-2582, NG-2582 in the 2017 Edition of Section III through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section, the visual examinations are required to be performed in accordance with procedures qualified to NB-5100, NC-5100, ND-5100, NE-5100, NF-5100, NG-5100 and performed by personnel qualified in accordance with NB-5500, NC-5500, ND-5500, NE-5500, NF-5500, and NG-5500.

(B) **Visual examination of bolts, studs, and nuts: Second provision.** When applying the provisions of NB-2582, NC-2582, ND-2582, NE-2582, NF-2582, and NG-2582 in the

2017 Edition of Section III through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section, bolts, studs, and nuts must be visually examined for discontinuities including cracks, bursts, seams, folds, thread lap, voids, and tool marks.

(xi) **Section III condition: Mandatory Appendix XXVI.** When applying the 2015 and 2017 Editions of Section III, Mandatory Appendix XXVI, “Rules for Construction of Class 3 Buried Polyethylene Pressure Piping,” applicants or licensees must meet the ~~following conditions~~first provision of paragraph (b)(1)(xi)(A) of this section. When applying the 2015 through 2021 Editions of Section III, Mandatory Appendix XXVI, “Rules for Construction of Class 3 Buried Polyethylene Pressure Piping,” applicants or licensees must meet the second provision in paragraph (b)(1)(xi)(B) of this section. When applying the 2017 Edition of Section III, Mandatory Appendix XXVI, “Rules for Construction of Class 3 Buried Polyethylene Pressure Piping,” applicants or licensees must meet the third provision in paragraph (b)(1)(xi)(C) of this section.:

(A) **Mandatory Appendix XXVI: First provision.** When performing fusing procedure qualification testing in accordance with XXVI-2300 and XXVI-4330 the following essential variables must be used for the performance qualification tests of butt fusion joints:

- (1) Joint Type: A change in the type of joint from that qualified, except that a square butt joint qualifies as a mitered joint.
- (2) Pipe Surface Alignment: A change in the pipe outside diameter (O.D.) surface misalignment of more than 10 percent of the wall thickness of the thinner member to be fused.
- (3) PE Material: Each lot of polyethylene source material to be used in production (XXVI-2310(c)).
- (4) Wall Thickness: Each thickness to be fused in production (XXVI-2310(c)).
- (5) Diameter: Each diameter to be fused in production (XXVI-2310(c)).
- (6) Cross-sectional Area: Each combination of thickness and diameter (XXVI-2310(c)).
- (7) Position: Maximum machine carriage slope when greater than 20 degrees from horizontal (XXVI-4321(c)).
- (8) Heater Surface Temperature: A change in the heater surface temperature to a value beyond the range tested (XXVI-2321).
- (9) Ambient Temperature: A change in ambient temperature to less than 50 °F (10 °C) or greater than 125 °F (52 °C) (XXVI-4412(b)).



(10) Interfacial Pressure: A change in interfacial pressure to a value beyond the range tested (XXVI-2321).

(11) Decrease in Melt Bead Width: A decrease in melt bead size from that qualified.

(12) Increase in Heater Removal Time: An increase in heater plate removal time from that qualified.

(13) Decrease in Cool-down Time: A decrease in the cooling time at pressure from that qualified.

(14) Fusing Machine Carriage Model: A change in the fusing machine carriage model from that tested (XXVI-2310(d)).

(B) **Mandatory Appendix XXVI: Second provision.** When performing procedure qualification for high speed tensile impact testing of butt fusion joints in accordance with XXVI-2300 or XXVI-4330 of 2015 through 2021 Editions of BPV Code Section III, breaks in the specimen that are away from the fusion zone must be retested. When performing fusing operator qualification bend tests of butt fusion joints in accordance with XXVI-4342, guided side bend testing must be used for all thicknesses greater than 1.25 inches.

(C) **Mandatory Appendix XXVI: Third provision.** When performing fusing procedure qualification tests in accordance with 2017 Edition of BPV Code Section III XXVI-2300 and XXVI-4330, the following essential variables must be used for the testing of electrofusion joints:

(1) Joint Design: A change in the design of an electrofusion joint.

(2) Fit-up Gap: An increase in the maximum radial fit-up gap qualified.

(3) Pipe PE Material: A change in the PE designation or cell classification of the pipe from that tested (XXVI-2322(a)).

(4) Fitting PE Material: A change in the manufacturing facility or production lot from that tested (XXVI-2322(b)).

(5) Pipe Wall Thickness: Each thickness to be fused in production (XXVI-2310(c)).

(6) Fitting Manufacturer: A change in fitting manufacturer.

(7) Pipe Diameter: Each diameter to be fused in production (XXVI-2310(c)).

(8) Cool-down Time: A decrease in the cool time at pressure from that qualified.

(9) Fusion Voltage: A change in fusion voltage.



(10) Nominal Fusion Time: A change in the nominal fusion time.

(11) Material Temperature Range: A change in material fusing temperature beyond the range qualified.

(12) Power Supply: A change in the make or model of electrofusion control box (XXVI-2310(f)).

(13) Power Cord: A change in power cord material, length, or diameter that reduces current at the coil to below the minimum qualified.

(14) Processor: A change in the manufacturer or model number of the processor. (XXVI-2310(f)).

(15) Saddle Clamp: A change in the type of saddle clamp.

(16) Scraping Device: A change from a clean peeling scraping tool to any other type of tool.

(xii) **Section III condition: Certifying Engineer.** When applying the 2017 and later editions of ASME BPV Code Section III, the NRC does not permit applicants and licensees to use a Certifying Engineer who is not a Registered Professional Engineer qualified in accordance with paragraph XXIII-1222 for Code-related activities that are applicable to U.S. nuclear facilities regulated by the NRC. The use of paragraph XXIII-1223 is prohibited.

(xiii) **Section III Condition: Preservice Inspection of Steam Generator Tubes.** Applicants or licensees applying the provisions of NB-5283 and NB-5360 in the 2019 Edition of Section III through the latest edition and addenda incorporated by reference in paragraph (a)(1)(i) of this section, must apply paragraphs (b)(1)(xiii)(A) and (B) of this section.

(A) **Preservice Inspection of Steam Generator Tubes: First provision.** When applying the provisions of NB-5283 in the 2019 Edition of Section III through the latest edition and addenda incorporated by reference in paragraph (a)(1)(i) of this section, a full-length preservice examination of 100 percent of the steam generator tubing in each newly installed steam generator must be performed prior to plant startup.

(B) **Preservice Inspection of Steam Generator Tubes: Second provision.** When applying the provisions of NB-5360 in the 2019 Edition of Section III through the latest edition and addenda incorporated by reference in paragraph (a)(1)(i) of this section, flaws revealed during preservice examination of steam generator tubing performed in accordance with paragraph (b)(1)(xiii)(A) of this section must be evaluated using the criteria in the design specifications.

(xiv) Section III condition: Repairs to Stamped Components. Applicants or licensees applying the provisions of NCA-8151, NCA-8500 and Nonmandatory Appendix NN in the

2021 Edition of Section III, are required to meet all of the requirements in Nonmandatory Appendix NN.

(2) **Conditions on ASME BPV Code, Section XI.** As used in this section, references to Section XI refer to Section XI, Division 1, in the editions and addenda of the ASME BPV Code, ~~and include the 1970 Edition through the 1976 Winter Addenda and the 1977 Edition through the latest edition~~ incorporated by reference in paragraph (a)(1)(ii) of this section, subject to the following conditions:

(i) [Reserved]

(ii) **Section XI condition: Pressure-retaining welds in ASME Code Class 1 piping (applies to Table IWB-2500 and IWB-2500-1 and Category B-J).** If the facility's application for a construction permit was docketed prior to July 1, 1978, the extent of examination for Code Class 1 pipe welds may be determined by the requirements of Table IWB-2500 and Table IWB-2600 Category B-J of Section XI of the ASME BPV Code in the 1974 Edition and Addenda through the Summer 1975 Addenda or other requirements the NRC may adopt.

(iii)-(vii) [Reserved]

(viii) **Section XI condition: Concrete containment examinations.** Applicants or licensees applying Subsection IWL, 2001 Edition through the 2004 Edition, up to and including the 2006 Addenda, must apply paragraphs (b)(2)(viii)(E) through (G) of this section. Applicants or licensees applying Subsection IWL, 2007 Edition up to and including the 2008 Addenda must apply paragraph (b)(2)(viii)(E) of this section. Applicants or licensees applying Subsection IWL, 2007 Edition with the 2009 Addenda through the 2019 Edition latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, must apply paragraphs (b)(2)(viii)(H) and (I) of this section.

(A)-(D) [Reserved]

(E) **Concrete containment examinations: Fifth provision.** For Class CC applications, the applicant or licensee must evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of or the result in degradation to such inaccessible areas. For each inaccessible area identified, the applicant or licensee must provide the following in the ISI Summary Report required by IWA-6000:

- (1) A description of the type and estimated extent of degradation, and the conditions that led to the degradation;
- (2) An evaluation of each area, and the result of the evaluation; and
- (3) A description of necessary corrective actions.

(F) **Concrete containment examinations: Sixth provision.** Personnel that examine containment concrete surfaces and tendon hardware, wires, or strands must meet the qualification provisions in IWA-2300. The “owner-defined” personnel qualification provisions in IWL-2310(d) are not approved for use.

(G) **Concrete containment examinations: Seventh provision.** Corrosion protection material must be restored following concrete containment post-tensioning system repair and replacement activities in accordance with the quality assurance program requirements specified in IWA-1400.

(H) **Concrete containment examinations: Eighth provision.** For each inaccessible area of concrete identified for evaluation under IWL-2512(a), or identified as susceptible to deterioration under IWL-2512(b), the licensee must provide the applicable information specified in [paragraphs \(b\)\(2\)\(viii\)\(E\)\(I\), \(2\), and \(3\)](#) of this section in the ISI Summary Report required by IWA-6000.

(I) **Concrete containment examinations: Ninth provision.** During the period of extended operation of a renewed license under [part 54 of this chapter](#), the licensee must perform the technical evaluation under IWL-2512(b) of inaccessible below-grade concrete surfaces exposed to foundation soil, backfill, or groundwater at periodic intervals not to exceed 5 years. In addition, the licensee must examine representative samples of the exposed portions of the below-grade concrete, when such below-grade concrete is excavated for any reason.

(ix) **Section XI condition: Metal containment examinations.** Applicants or licensees applying Subsection IWE, 2001 Edition up to and including the 2003 Addenda, must satisfy the requirements of [paragraphs \(b\)\(2\)\(ix\)\(A\) and \(B\), \(F\) through \(I\), and \(K\)](#) of this section. Applicants or licensees applying Subsection IWE, 2004 Edition, up to and including the 2005 Addenda, must satisfy the requirements of [paragraphs \(b\)\(2\)\(ix\)\(A\) and \(B\), \(F\) through \(H\), and \(K\)](#) of this section. Applicants or licensees applying Subsection IWE, 2004 Edition with the 2006 Addenda, must satisfy the requirements of [paragraphs \(b\)\(2\)\(ix\)\(A\)\(2\) and \(b\)\(2\)\(ix\)\(B\) and \(K\)](#) of this section. Applicants or licensees applying Subsection IWE, 2007 Edition through the 2015 Edition, must satisfy the requirements of [paragraphs \(b\)\(2\)\(ix\)\(A\)\(2\) and \(b\)\(2\)\(ix\)\(B\), \(J\), and \(K\)](#) of this section. Applicants or licensees applying Subsection IWE, 2017 Edition, through the 2019 Edition, must satisfy the requirements of paragraphs (b)(2)(ix)(A)(2) and (b)(2)(ix)(B) and (J) of this section. Applicants or licensees applying Subsection IWE, 2021 Edition, through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section must satisfy the requirements of paragraphs (b)(2)(ix)(A)(2) and paragraphs (b)(2)(ix)(B) and (J) of this section.

(A) **Metal containment examinations: First provision.** For Class MC applications, the following apply to inaccessible areas.

(1) The applicant or licensee must evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of or could result in degradation to such inaccessible areas.

(2) For each inaccessible area identified for evaluation, the applicant or licensee must provide the following in the ISI Summary Report as required by IWA-6000:

(i) A description of the type and estimated extent of degradation, and the conditions that led to the degradation;

(ii) An evaluation of each area, and the result of the evaluation; and

(iii) A description of necessary corrective actions.

(B) ***Metal containment examinations: Second provision.*** When performing remotely the visual examinations required by Subsection IWE, the maximum direct examination distance specified in Table IWA-2210-1 (2001 Edition through 2004 Edition) or Table IWA-2211-1 (2005 Addenda through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)](#) of this section) may be extended and the minimum illumination requirements specified may be decreased provided that the conditions or indications for which the visual examination is performed can be detected at the chosen distance and illumination.

(C)-(E) [Reserved]

(F) ***Metal containment examinations: Sixth provision.*** VT-1 and VT-3 examinations must be conducted in accordance with IWA-2200. Personnel conducting examinations in accordance with the VT-1 or VT-3 examination method must be qualified in accordance with IWA-2300. The “owner-defined” personnel qualification provisions in IWE-2330(a) for personnel that conduct VT-1 and VT-3 examinations are not approved for use.

(G) ***Metal containment examinations: Seventh provision.*** The VT-3 examination method must be used to conduct the examinations in Items E1.12 and E1.20 of Table IWE-2500-1, and the VT-1 examination method must be used to conduct the examination in Item E4.11 of Table IWE-2500-1. An examination of the pressure-retaining bolted connections in Item E1.11 of Table IWE-2500-1 using the VT-3 examination method must be conducted once each interval. The “owner-defined” visual examination provisions in IWE-2310(a) are not approved for use for VT-1 and VT-3 examinations.

(H) ***Metal containment examinations: Eighth provision.*** Containment bolted connections that are disassembled during the scheduled performance of the examinations in Item E1.11 of Table IWE-2500-1 must be examined using the VT-3 examination method. Flaws or degradation identified during the performance of a VT-3 examination must be examined in accordance with the VT-1 examination method. The criteria in the material specification or IWB-3517.1 must be used to evaluate containment bolting flaws or degradation. As an alternative to performing VT-3 examinations of containment bolted

connections that are disassembled during the scheduled performance of Item E1.11, VT-3 examinations of containment bolted connections may be conducted whenever containment bolted connections are disassembled for any reason.

(I) ***Metal containment examinations: Ninth provision.*** The ultrasonic examination acceptance standard specified in IWE-3511.3 for Class MC pressure-retaining components must also be applied to metallic liners of Class CC pressure-retaining components.

(J) ***Metal containment examinations: Tenth provision.*** In general, a repair/replacement activity such as replacing a large containment penetration, cutting a large construction opening in the containment pressure boundary to replace steam generators, reactor vessel heads, pressurizers, or other major equipment; or other similar modification is considered a major containment modification. When applying IWE-5000 to Class MC pressure-retaining components, any major containment modification or repair/replacement must be followed by a Type A test to provide assurance of both containment structural integrity and leak-tight integrity prior to returning to service, in accordance with appendix J to this part, Option A or Option B, on which the applicant's or licensee's Containment Leak-Rate Testing Program is based. When applying IWE-5000, if a Type A, B, or C Test is performed, the test pressure and acceptance standard for the test must be in accordance with appendix J to this part.

(K) ***Metal Containment Examinations: Eleventh provision.*** A general visual examination of containment leak chase channel moisture barriers must be performed once each interval, in accordance with the completion percentages in Table IWE 2411-1 of the 2017 Edition. Examination shall include the moisture barrier materials (caulking, gaskets, coatings, etc.) that prevent water from accessing the embedded containment liner within the leak chase channel system. Caps of stub tubes extending to or above the concrete floor interface may be inspected, provided the configuration of the cap functions as a moisture barrier as described previously. Leak chase channel system closures need not be disassembled for performance of examinations if the moisture barrier material is clearly visible without disassembly, or coatings are intact. The closures are acceptable if no damage or degradation exists that would allow intrusion of moisture against inaccessible surfaces of the metal containment shell or liner within the leak chase channel system. Examinations that identify flaws or relevant conditions shall be extended in accordance with paragraph IWE 2430 of the 2017 Edition.

(x) ***Section XI condition: Quality assurance.*** When applying the editions and addenda later than the 1989 Edition of ASME BPV Code, Section XI, licensees may use any edition or addenda of NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications," that is both incorporated by reference in [paragraph \(a\)\(1\)\(v\)](#) of this section and specified in Table IWA 1600-1 of that edition and addenda of Section XI, provided that the licensee uses its appendix B to this part quality assurance program in conjunction with Section XI requirements and the commitments contained in the licensee's quality assurance program description. Where NQA-1 and Section XI do not address the

commitments contained in the licensee's appendix B quality assurance program description, those licensee commitments must be applied to Section XI activities.

(xi) [Reserved]

(xii) **Section XI condition: Underwater welding.** The provisions in IWA-4660, "Underwater Welding," of Section XI, 2001 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, are approved for use on irradiated material with the following conditions:

(A) **Underwater welding: First provision.** Licensees must obtain NRC approval in accordance with [paragraph \(z\)](#) of this section regarding the welding technique to be used prior to performing welding on ferritic material exposed to fast neutron fluence greater than  $1 \times 10^{17}$  n/cm<sup>2</sup> ( $E > 1$  MeV).

(B) **Underwater welding: Second provision.** Licensees must obtain NRC approval in accordance with [paragraph \(z\)](#) of this section regarding the welding technique to be used prior to performing welding on austenitic material other than P-No. 8 material exposed to thermal neutron fluence greater than  $1 \times 10^{17}$  n/cm<sup>2</sup> ( $E < 0.5$  eV). Licensees must obtain NRC approval in accordance with paragraph (z) regarding the welding technique to be used prior to performing welding on P-No. 8 austenitic material exposed to thermal neutron fluence greater than  $1 \times 10^{17}$  n/cm<sup>2</sup> ( $E < 0.5$  eV) and measured or calculated helium concentration of the material greater than 0.1 atomic parts per million.

(xiii) [Reserved]

(xiv) **Section XI condition: Appendix VIII personnel qualification.** All personnel qualified for performing ultrasonic examinations in accordance with Appendix VIII must receive 8 hours of annual hands-on training on specimens that contain cracks. Licensees applying the 2001 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section may use the annual practice requirements in VII-4240 of Appendix VII of Section XI in place of the 8 hours of annual hands-on training provided that the supplemental practice is performed on material or welds that contain cracks, or by analyzing prerecorded data from material or welds that contain cracks. In either case, training must be completed no earlier than 6 months prior to performing ultrasonic examinations at a licensee's facility.

(xv) ~~[Reserved] **Section XI condition: Appendix VIII specimen set and qualification requirements.** Licensees using Appendix VIII in the 2001 Edition of the ASME Boiler and Pressure Vessel Code may elect to comply with all of the provisions in paragraphs (b)(2)(xv)(A) through (M) of this section, except for paragraph (b)(2)(xv)(F) of this section, which may be used at the licensee's option. Licensees using editions and addenda after 2001 Edition through the 2006 Addenda must use the 2001 Edition of Appendix VIII and may elect to comply with all of the provisions in paragraphs (b)(2)(xv)(A) through (M) of this section, except for paragraph (b)(2)(xv)(F) of this section, which may be used at the licensee's option.~~



~~(A) **Specimen set and qualification: First provision.** When applying Supplements 2, 3, and 10 to Appendix VIII, the following examination coverage criteria requirements must be used:~~

~~(1) Piping must be examined in two axial directions, and when examination in the circumferential direction is required, the circumferential examination must be performed in two directions, provided access is available. Dissimilar metal welds must be examined axially and circumferentially.~~

~~(2) Where examination from both sides is not possible, full coverage credit may be claimed from a single side for ferritic welds. Where examination from both sides is not possible on austenitic welds or dissimilar metal welds, full coverage credit from a single side may be claimed only after completing a successful single-sided Appendix VIII demonstration using flaws on the opposite side of the weld. Dissimilar metal weld qualifications must be demonstrated from the austenitic side of the weld, and the qualification may be expanded for austenitic welds with no austenitic sides using a separate add-on performance demonstration. Dissimilar metal welds may be examined from either side of the weld.~~

~~(B) **Specimen set and qualification: Second provision.** The following conditions must be used in addition to the requirements of Supplement 4 to Appendix VIII:~~

~~(1) Paragraph 3.1, Detection acceptance criteria—Personnel are qualified for detection if the results of the performance demonstration satisfy the detection requirements of ASME Section XI, Appendix VIII, Table VIII S4-1, and no flaw greater than 0.25 inch through-wall dimension is missed.~~

~~(2) Paragraph 1.1(c), Detection test matrix—Flaws smaller than the 50 percent of allowable flaw size, as defined in IWB-3500, need not be included as detection flaws. For procedures applied from the inside surface, use the minimum thickness specified in the scope of the procedure to calculate a/t. For procedures applied from the outside surface, the actual thickness of the test specimen is to be used to calculate a/t.~~

~~(C) **Specimen set and qualification: Third provision.** When applying Supplement 4 to Appendix VIII, the following conditions must be used:~~

~~(1) A depth-sizing requirement of 0.15 inch RMS must be used in lieu of the requirements in Subparagraphs 3.2(a) and 3.2(c), and a length-sizing requirement of 0.75 inch RMS must be used in lieu of the requirement in Subparagraph 3.2(b).~~

~~(2) In lieu of the location acceptance criteria requirements of Subparagraph 2.1(b), a flaw will be considered detected when reported within 1.0 inch or 10 percent of the metal path to the flaw, whichever is greater, of its true location in the X and Y directions.~~

~~(3) In lieu of the flaw type requirements of Subparagraph 1.1(c)(1), a minimum of 70 percent of the flaws in the detection and sizing tests must be cracks. Notches, if used, must be limited by the following:~~

~~(i) Notches must be limited to the case where examinations are performed from the clad surface.~~

~~(ii) Notches must be semielliptical with a tip width of less than or equal to 0.010 inches.~~

~~(iii) Notches must be perpendicular to the surface within  $\pm 2$  degrees.~~

~~(4) In lieu of the detection test matrix requirements in paragraphs 1.1(e)(2) and 1.1(e)(3), personnel demonstration test sets must contain a representative distribution of flaw orientations, sizes, and locations.~~

~~(D) **Specimen set and qualification: Fourth provision.** The following conditions must be used in addition to the requirements of Supplement 6 to Appendix VIII:~~

~~(1) Paragraph 3.1, Detection Acceptance Criteria—Personnel are qualified for detection if:~~

~~(i) No surface connected flaw greater than 0.25 inch through wall has been missed.~~

~~(ii) No embedded flaw greater than 0.50 inch through wall has been missed.~~

~~(2) Paragraph 3.1, Detection Acceptance Criteria—For procedure qualification, all flaws within the scope of the procedure are detected.~~

~~(3) Paragraph 1.1(b) for detection and sizing test flaws and locations—Flaws smaller than the 50 percent of allowable flaw size, as defined in IWB-3500, need not be included as detection flaws. Flaws that are less than the allowable flaw size, as defined in IWB-3500, may be used as detection and sizing flaws.~~

~~(4) Notches are not permitted.~~

~~(E) **Specimen set and qualification: Fifth provision.** When applying Supplement 6 to Appendix VIII, the following conditions must be used:~~

~~(1) A depth sizing requirement of 0.25 inch RMS must be used in lieu of the requirements of subparagraphs 3.2(a), 3.2(c)(2), and 3.2(c)(3).~~

~~(2) In lieu of the location acceptance criteria requirements in Subparagraph 2.1(b), a flaw will be considered detected when reported within 1.0 inch or 10 percent of the metal path to the flaw, whichever is greater, of its true location in the X and Y directions.~~

~~(3) In lieu of the length sizing criteria requirements of Subparagraph 3.2(b), a length sizing acceptance criteria of 0.75 inch RMS must be used.~~

~~(4) In lieu of the detection specimen requirements in Subparagraph 1.1(e)(1), a minimum of 55 percent of the flaws must be cracks. The remaining flaws may be cracks or fabrication type flaws, such as slag and lack of fusion. The use of notches is not allowed.~~



~~(5) In lieu of paragraphs 1.1(e)(2) and 1.1(e)(3) detection test matrix, personnel demonstration test sets must contain a representative distribution of flaw orientations, sizes, and locations.~~

~~(F) **Specimen set and qualification: Sixth provision.** The following conditions may be used for personnel qualification for combined Supplement 4 to Appendix VIII and Supplement 6 to Appendix VIII qualification. Licensees choosing to apply this combined qualification must apply all of the provisions of Supplements 4 and 6 including the following conditions:~~

~~(1) For detection and sizing, the total number of flaws must be at least 10. A minimum of 5 flaws must be from Supplement 4, and a minimum of 50 percent of the flaws must be from Supplement 6. At least 50 percent of the flaws in any sizing must be cracks. Notches are not acceptable for Supplement 6.~~

~~(2) Examination personnel are qualified for detection and length sizing when the results of any combined performance demonstration satisfy the acceptance criteria of Supplement 4 to Appendix VIII.~~

~~(3) Examination personnel are qualified for depth sizing when Supplement 4 to Appendix VIII and Supplement 6 to Appendix VIII flaws are sized within the respective acceptance criteria of those supplements.~~

~~(G) **Specimen set and qualification: Seventh provision.** When applying Supplement 4 to Appendix VIII, Supplement 6 to Appendix VIII, or combined Supplement 4 and Supplement 6 qualification, the following additional conditions must be used, and examination coverage must include:~~

~~(1) The clad-to-base-metal interface, including a minimum of 15 percent T (measured from the clad-to-base-metal interface), must be examined from four orthogonal directions using procedures and personnel qualified in accordance with Supplement 4 to Appendix VIII.~~

~~(2) If the clad-to-base-metal interface procedure demonstrates detectability of flaws with a tilt angle relative to the weld centerline of at least 45 degrees, the remainder of the examination volume is considered fully examined if coverage is obtained in one parallel and one perpendicular direction. This must be accomplished using a procedure and personnel qualified for single-side examination in accordance with Supplement 6. Subsequent examinations of this volume may be performed using examination techniques qualified for a tilt angle of at least 10 degrees.~~

~~(3) The examination volume not addressed by paragraph (b)(2)(xv)(G)(1) of this section is considered fully examined if coverage is obtained in one parallel and one perpendicular direction, using a procedure and personnel qualified for single-sided examination when the conditions in paragraph (b)(2)(xv)(G)(2) are met.~~

~~(H) **Specimen set and qualification: Eighth provision.** When applying Supplement 5 to Appendix VIII, at least 50 percent of the flaws in the demonstration test set must be cracks and the maximum misorientation must be demonstrated with cracks. Flaws in nozzles with bore diameters equal to or less than 4 inches may be notches.~~

~~(I) **Specimen set and qualification: Ninth provision.** When applying Supplement 5, Paragraph (a), to Appendix VIII, the number of false calls allowed must be  $D/10$ , with a maximum of 3, where  $D$  is the diameter of the nozzle.~~

~~(J) [Reserved]~~

~~(K) **Specimen set and qualification: Eleventh provision.** When performing nozzle-to-vessel weld examinations, the following conditions must be used when the requirements contained in Supplement 7 to Appendix VIII are applied for nozzle-to-vessel welds in conjunction with Supplement 4 to Appendix VIII, Supplement 6 to Appendix VIII, or combined Supplement 4 and Supplement 6 qualification.~~

~~(I) For examination of nozzle-to-vessel welds conducted from the bore, the following conditions are required to qualify the procedures, equipment, and personnel:~~

~~(i) For detection, a minimum of four flaws in one or more full-scale nozzle mock-ups must be added to the test set. The specimens must comply with Supplement 6, paragraph 1.1, to Appendix VIII, except for flaw locations specified in Table VIII S6-1. Flaws may be notches, fabrication flaws, or cracks. Seventy-five (75) percent of the flaws must be cracks or fabrication flaws. Flaw locations and orientations must be selected from the choices shown in paragraph (b)(2)(xv)(K)(I) of this section, Table VIII S7-1—Modified, with the exception that flaws in the outer eighty-five (85) percent of the weld need not be perpendicular to the weld. There may be no more than two flaws from each category, and at least one subsurface flaw must be included.~~

~~(ii) For length sizing, a minimum of four flaws as in paragraph (b)(2)(xv)(K)(I)(i) of this section must be included in the test set. The length-sizing results must be added to the results of combined Supplement 4 to Appendix VIII and Supplement 6 to Appendix VIII. The combined results must meet the acceptance standards contained in paragraph (b)(2)(xv)(E)(3) of this section.~~

~~(iii) For depth sizing, a minimum of four flaws as in paragraph (b)(2)(xv)(K)(I)(i) of this section must be included in the test set. Their depths must be distributed over the ranges of Supplement 4, Paragraph 1.1, to Appendix VIII, for the inner 15 percent of the wall thickness and Supplement 6, Paragraph 1.1, to Appendix VIII, for the remainder of the wall thickness. The depth-sizing results must be combined with the sizing results from Supplement 4 to Appendix VIII for the inner 15 percent and to Supplement 6 to Appendix VIII for the remainder of the wall thickness. The combined results must meet the depth sizing acceptance criteria contained in paragraphs (b)(2)(xv)(C)(I), (b)(2)(xv)(E)(I), and (b)(2)(xv)(F)(3) of this section.~~

~~(2) For examination of reactor pressure vessel nozzle-to-vessel welds conducted from the inside of the vessel, the following conditions are required:~~

~~(i) The clad-to-base-metal interface and the adjacent examination volume to a minimum depth of 15 percent T (measured from the clad-to-base-metal interface) must be examined from four orthogonal directions using a procedure and personnel qualified in accordance with Supplement 4 to Appendix VIII as conditioned by paragraphs (b)(2)(xv)(B) and (C) of this section.~~

~~(ii) When the examination volume defined in paragraph (b)(2)(xv)(K)(2)(i) of this section cannot be effectively examined in all four directions, the examination must be augmented by examination from the nozzle bore using a procedure and personnel qualified in accordance with paragraph (b)(2)(xv)(K)(I) of this section.~~

~~(iii) The remainder of the examination volume not covered by paragraph (b)(2)(xv)(K)(2)(ii) of this section or a combination of paragraphs (b)(2)(xv)(K)(2)(i) and (ii) of this section, must be examined from the nozzle bore using a procedure and personnel qualified in accordance with paragraph (b)(2)(xv)(K)(I) of this section, or from the vessel shell using a procedure and personnel qualified for single-sided examination in accordance with Supplement 6 to Appendix VIII, as conditioned by paragraphs (b)(2)(xv)(D) through (G) of this section.~~

~~(3) For examination of reactor pressure vessel nozzle-to-shell welds conducted from the outside of the vessel, the following conditions are required:~~

~~(i) The clad-to-base-metal interface and the adjacent metal to a depth of 15 percent T (measured from the clad-to-base-metal interface) must be examined from one radial and two opposing circumferential directions using a procedure and personnel qualified in accordance with Supplement 4 to Appendix VIII, as conditioned by paragraphs (b)(2)(xv)(B) and (C) of this section, for examinations performed in the radial direction; and Supplement 5 to Appendix VIII, as conditioned by paragraph (b)(2)(xv)(J) of this section, for examinations performed in the circumferential direction.~~

~~(ii) The examination volume not addressed by paragraph (b)(2)(xv)(K)(3)(i) of this section must be examined in a minimum of one radial direction using a procedure and personnel qualified for single-sided examination in accordance with Supplement 6 to Appendix VIII, as conditioned by paragraphs (b)(2)(xv)(D) through (G) of this section.~~

~~(4) Table VIII-S7-1, "Flaw Locations and Orientations," Supplement 7 to Appendix VIII, is conditioned as follows:~~

~~Table 2 to Paragraph (b)(2)(xv)(K)(4) – Table VIII: S7-1 – Modified~~

~~[Flaw locations and orientations]~~

	Parallel to weld	Perpendicular to weld
Inner 15 percent	X	X
Outside Diameter Surface	X	
Subsurface	X	

~~(L) **Specimen set and qualification: Twelfth provision.** As a condition to the requirements of Supplement 8, Subparagraph 1.1(c), to Appendix VIII, notches may be located within one diameter of each end of the bolt or stud.~~

~~(M) **Specimen set and qualification: Thirteenth provision.** When implementing Supplement 12 to Appendix VIII, only the provisions related to the coordinated implementation of Supplement 3 to Supplement 2 performance demonstrations are to be applied.~~

(xvi) **Section XI condition: Appendix VIII single side ferritic vessel and piping and stainless steel piping examinations.** When applying editions and addenda prior to the 2007 Edition of Section XI, the following conditions apply.

(A) **Ferritic and stainless steel piping examinations: First provision.** Examinations performed from one side of a ferritic vessel weld must be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. To demonstrate equivalency to two sided examinations, the demonstration must be performed to the requirements of Appendix VIII, as conditioned by this paragraph and [paragraphs \(b\)\(2\)\(xv\)\(B\) through \(G\)](#) of this section, on specimens containing flaws with non-optimum sound energy reflecting characteristics or flaws similar to those in the vessel being examined.

(B) **Ferritic and stainless steel piping examinations: Second provision.** Examinations performed from one side of a ferritic or stainless steel pipe weld must be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. To demonstrate equivalency to two sided examinations, the demonstration must be performed to the requirements of Appendix VIII, as conditioned by this paragraph and [paragraph \(b\)\(2\)\(xv\)\(A\)](#) of this section.

(xvii) [Reserved]

(xviii) **Section XI condition: NDE personnel certification -**

(A) **NDE personnel certification: First provision.** Level I and II nondestructive examination personnel must be recertified on a 3-year interval in lieu of the 5-year interval specified in IWA-2314(a) and IWA-2314(b) of the 2001 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section.

(B) ***NDE personnel certification: Second provision.*** When applying editions and addenda prior to the 2007 Edition of Section XI, paragraph IWA-2316 may only be used to qualify personnel that observe leakage during system leakage and hydrostatic tests conducted in accordance with IWA 5211(a) and (b).

(C) ***NDE personnel certification: Third provision.*** When applying editions and addenda prior to the 2005 Addenda of Section XI, licensee's qualifying visual examination personnel for VT-3 visual examination under paragraph IWA-2317 of Section XI must demonstrate the proficiency of the training by administering an initial qualification examination and administering subsequent examinations on a 3-year interval.

(D) ***NDE personnel certification: Fourth provision.*** The use of Appendix VII, Table VII-4110-1 and Appendix VIII, Subarticle VIII-2200 of the 2011 Addenda through the latest edition incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section is prohibited. When using ASME BPV Code, Section XI editions and addenda later than the 2010 Edition, licensees and applicants must use the prerequisites for ultrasonic examination personnel certifications in Appendix VII, Table VII-4110-1 and Appendix VIII, Subarticle VIII-2200 in the 2010 Edition.

(1) As an alternative to Note (c) in Table VII-4110-1 of ASME BPV Code, Section XI, 2010 Edition, the 250 hours of Level I experience time may be reduced to 175 hours, if the experience time includes a minimum of 125 hours of field experience and 50 hours of laboratory practice beyond the requirements of for training in accordance with Appendix VII Subarticle 4220, provided those practice hours are dedicated to the Level I or Level II skill areas as described in ANSI/ASNT CP-189.

(2) As an alternative to Note (d) in Table VII-4110-1 of ASME BPV Code, Section XI, 2010 Edition, the 800 hours of Level II experience time may be reduced to 720 hours, if the experience time includes a minimum of 400 hours of field experience and a minimum of 320 hours of laboratory practice. The practice must be dedicated to scanning specimens containing flaws in materials representative of those in actual power plant components. Additionally, for Level II Certification, the candidate must pass a Mandatory Appendix VIII, Supplement 2 performance demonstration for detection and length sizing.

(xix) ***Section XI condition: Substitution of alternative methods.*** The provisions for substituting alternative examination methods, a combination of methods, or newly developed techniques in the 1997 Addenda of IWA-2240 must be applied when using the 2001 Edition through the 2004 Edition of Section XI of the ASME BPV Code. The provisions in IWA-4520(c), 2001 Edition through the 2004 Edition, allowing the substitution of alternative methods, a combination of methods, or newly developed techniques for the methods specified in the Construction Code, are not approved for use. The provisions in IWA-4520(b)(2) and IWA-4521 of the 2008 Addenda through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, allowing the substitution of ultrasonic examination for radiographic examination specified in the Construction Code, are not approved for use.

(xx) **Section XI condition: System leakage tests -**

(A) **System leakage tests: First provision.** When performing system leakage tests in accordance with IWA-5213(a), 2001 Edition through 2002 Addenda, the licensee must maintain a 10-minute hold time after test pressure has been reached for Class 2 and Class 3 components that are not in use during normal operating conditions. No hold time is required for the remaining Class 2 and Class 3 components provided that the system has been in operation for at least 4 hours for insulated components or 10 minutes for uninsulated components.

(B) **System leakage tests: Second provision.** The nondestructive examination method and acceptance criteria of the 1992 Edition or later of Section III shall be met when performing system leakage tests (in lieu of a hydrostatic test) in accordance with IWA-4520 after repair and replacement activities performed by welding or brazing on a pressure retaining boundary using the 2003 Addenda through the latest edition and addenda of Section XI incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section. The nondestructive examination and pressure testing may be performed using procedures and personnel meeting the requirements of the licensee's/applicant's current ISI code of record.

(C) **System leakage tests: Third provision.** The use of the provisions for an alternative BWR pressure test at reduced pressure to satisfy IWA-4540 requirements as described in IWB-5210(c) of Section XI, 2017 Edition and IWA-5213(b)(2) and IWB-5221(d) of Section XI, 2017 Edition through the latest edition incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section may be used subject to the following conditions:

(1) The use of nuclear heat to conduct the BWR Class 1 system leakage test is prohibited (*i.e.*, the reactor must be in a non-critical state), except during refueling outages in which the ASME Section XI Category B-P pressure test has already been performed, or at the end of mid-cycle maintenance outages fourteen (14) days or less in duration.

(2) In lieu of the test condition holding time of IWA-5213(b)(2), after pressurization to test conditions, and before the visual examinations commence, the holding time shall be 1 hour for non-insulated components.

(xxi) **Section XI condition: Table IWB-2500-1 examination requirements.**

(A) [Reserved]

(B) **Table IWB-2500-1 examination.** Use of the provisions of IWB-2500(f) and (g) and Table IWB-2500-1 Notes 6 and 7 of Section XI, 2017 Edition through the latest edition incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, for examination of Examination Category B-D Item Numbers B3.90 and B3.100 shall be subject to the following conditions:



(1) A plant-specific evaluation demonstrating the criteria of IWB-2500(f) are met must be maintained in accordance with IWA-1400(l).

(2) The use of the provisions of IWB-2500(f) and Table IWB-2500-1 Note 6 for examination of Examination Category B-D Item Numbers B3.90 is prohibited for plants with renewed licenses in accordance with [10 CFR part 54](#).

(3) The provisions of IWB-2500(g) and Table IWB-2500-1 Notes 6 and 7 for examination of Examination Category B-D Item Numbers B3.90 and B3.100 shall not be used to eliminate the preservice or inservice volumetric examination of plants with a Combined Operating License pursuant to [10 CFR part 52](#), or a plant that receives its operating license after October 22, 2015.

(xxii) **Section XI condition: Surface examination.** The use of the provision in IWA-2220, “Surface Examination,” of Section XI, 2001 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, that allows use of an ultrasonic examination method is prohibited.

(xxiii) **Section XI condition: Evaluation of thermally cut surfaces.** The use of the provisions for eliminating mechanical processing of thermally cut surfaces in IWA-4461.4.2 of Section XI, 2001 Edition through the 2009 Addenda, is prohibited.

(xxiv) **Section XI condition: Incorporation of the performance demonstration initiative and addition of ultrasonic examination criteria.** The use of Appendix VIII and the supplements to Appendix VIII and Article I-3000 of Section XI of the ASME BPV Code, 2002 Addenda through the 2006 Addenda, is prohibited.

(xxv) **Section XV Condition: Mitigation of defects by modification.** Use of the provisions of IWA-4340 must be subject to the following conditions:

(A) **Mitigation of defects by modification: First person.** The use of the provisions for mitigation of defects by modification in IWA-4340 of Section XI 2001 Edition through the 2010 Addenda, is prohibited.

(B) **Mitigation of defects by modification: Second provision.** The provisions for mitigation of defects by modification in IWA-4340 of Section XI, 2011 Edition through the latest edition incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, may be used subject to the following conditions:

(1) The use of the provisions in IWA 4340 to mitigate crack-like defects or those associated with flow accelerated corrosion are prohibited.

(2) The design of a modification that mitigates a defect must incorporate a loss of material rate either 2 times the actual measured corrosion rate, which must be established based on wall thickness measurements conducted at least twice, in that pipe location or another location with similar corrosion conditions, similar flow

characteristics, and the same piping configuration (*e.g.*, straight run of pipe, elbow, tee) as the encapsulated area, or 4 times the estimated maximum corrosion rate for the piping system.

(3) The licensee must perform a wall thickness examination in the vicinity of the modification and relevant pipe base metal at half its expected life or, if the modification has an expected life greater than 19 years, once per interval starting with the interval subsequent to the mitigation, and the results must be used to confirm corrosion rates, determine the next inspection date, and confirm the design inputs.

(i) For buried pipe locations where the loss of material has occurred due to internal corrosion, the wall thickness examinations may be conducted at a different location in the same system as long as: Wall thickness measurements were conducted at the different location at the same time as installation of the modification; the flow rate is the same or higher at the different location; the piping configuration is the same (*e.g.*, straight run of pipe, elbow, tee); and if pitting occurred at the modification location, but not the different location, wall loss values must be multiplied by four (instead of two) times the actual measured corrosion rate. Where wall loss values are greater than that assumed during the design of the modification, the structural integrity of the modification must be reanalyzed. Additionally, if the extent of degradation is different (*i.e.*, percent wall loss plus or minus 25 percent) or the corrosion mechanism (*e.g.*, general, pitting) is not the same at the different location as at the modification location, the modification must be examined at half its expected life or 10 years, whichever is sooner.

(ii) For buried pipe locations where loss of material has occurred due to external corrosion, the modification must be examined at half its expected life or 10 years, whichever is sooner. Alternatively, when the modification has been recoated prior to return to service, the modification may be examined at half its expected life or during the subsequent 10-year inspection interval after installation, whichever is sooner.

(xxvi) ***Section XI condition: Pressure Testing of Class 1, 2, and 3 Mechanical Joints.*** Mechanical joints in Class 1, 2, and 3 piping and components greater than NPS-1 that are disassembled and reassembled during the performance of a Section XI repair/replacement activity requiring documentation on a Form NIS-2 must be verified to be leak tight. The verification must be performed to the standards of the licensee's appendix B to this part quality assurance program.

(xxvii) ***Section XI condition: Removal of insulation.*** When performing visual examination in accordance with IWA-5242 of Section XI of the ASME BPV Code, 2003 Addenda through the 2006 Addenda, or IWA-5241 of the 2007 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, insulation must be removed from 17-4 PH or 410 stainless steel studs or bolts aged at a temperature below 1100 °F or having a Rockwell Method C hardness value above 30, and from A-286 stainless steel studs or bolts preloaded to 100,000 pounds per square inch or higher.



(xxviii) **Section XI condition: Analysis of flaws.** Licensees using ASME BPV Code, Section XI, Appendix A, must use the following conditions when implementing Equation (2) in A-4300(b)(1):

For  $R < 0$ ,  $\Delta K_I$  depends on the crack depth ( $a$ ), and the flow stress ( $\sigma_f$ ). The flow stress is defined by  $\sigma_f = 1/2(\sigma_{ys} + \sigma_{ult})$ , where  $\sigma_{ys}$  is the yield strength and  $\sigma_{ult}$  is the ultimate tensile strength in units ksi (MPa) and ( $a$ ) is in units in. (mm). For  $-2 \leq R \leq 0$  and  $K_{max} - K_{min} \leq 0.8 \times 1.12 \sigma_f \sqrt{(\pi a)}$ ,  $S = 1$  and  $\Delta K_I = K_{max}$ . For  $R < -2$  and  $K_{max} - K_{min} \leq 0.8 \times 1.12 \sigma_f \sqrt{(\pi a)}$ ,  $S = 1$  and  $\Delta K_I = (1 - R) K_{max}/3$ . For  $R < 0$  and  $K_{max} - K_{min} > 0.8 \times 1.12 \sigma_f \sqrt{(\pi a)}$ ,  $S = 1$  and  $\Delta K_I = K_{max} - K_{min}$ .

(xxix) **Section XI condition: Nonmandatory Appendix R.**

(A) Nonmandatory Appendix R, “Risk-Informed Inspection Requirements for Piping Supplement 1 - Risk-Informed Selection Process - Method A,” of Section XI, 2005 Addenda through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, may not be implemented without prior NRC authorization of the proposed alternative in accordance with [paragraph \(z\)](#) of this section.

(B) Nonmandatory Appendix R, “Risk-Informed Inspection Requirements for Piping, Supplement 2 - Risk-Informed Selection Process - Method B” of Section XI, 2005 Addenda through the 2015 Edition, may not be implemented without prior NRC authorization of the proposed alternative in accordance with [paragraph \(z\)](#) of this section.

(C) Nonmandatory Appendix R, “Risk-Informed Inspection Requirements for Piping, Supplement 2 - Risk-Informed Selection Process - Method B” of Section XI, 2017 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, may be implemented without prior NRC authorization of the proposed alternative in accordance with [paragraph \(z\)](#) of this section.

(xxx) [Reserved]

(xxxi) **Section XI condition: Mechanical clamping devices.** When installing a mechanical clamping device on an ASME BPV Code class piping system, Appendix W of Section XI shall be treated as a mandatory appendix and all of the provisions of Appendix W shall be met for the mechanical clamping device being installed. Additionally, use of IWA-4131.1(c) of the 2010 Edition of Section XI and IWA-4131.1(d) of the 2011 Addenda of the 2010 Edition and later versions of Section XI is prohibited on small item Class 1 piping and portions of a piping system that form the containment boundary.

(xxxii) **Section XI condition: Summary report submittal.** When using ASME BPV Code, Section XI, 2010 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section, Summary Reports and Owner's Activity Reports described in IWA-6230 must be submitted to the NRC. Preservice inspection reports for examinations prior to commercial service must be submitted prior to the date of placement of the unit into commercial service. For preservice and inservice examinations performed

following placement of the unit into commercial service, reports must be submitted within 120 calendar days of the completion of each refueling outage.

(xxxiii) **Section XI condition: Risk-Informed allowable pressure.** The use of Paragraph G-2216 in Appendix G in the 2011 Addenda and later editions and addenda of the ASME BPV Code, Section XI is prohibited.

(xxxiv) **Section XI condition: Nonmandatory Appendix U.** ~~When using Nonmandatory Appendix U of the ASME BPV Code, Section XI, 2013 Edition through the latest edition incorporated by reference in paragraph (a)(1)(ii) of this section, the following conditions apply:~~

~~(A) When using Nonmandatory Appendix U of the ASME BPV Code, Section XI, 2013 Edition through the 2019 Edition, the following conditions apply: The repair or replacement activities temporarily deferred under the provisions of Nonmandatory Appendix U must be performed during the next scheduled refueling outage.~~

~~(1) The repair or replacement activities temporarily deferred under the provisions of Nonmandatory Appendix U must be performed during the next schedule refueling outage.~~

~~(2) In lieu of the appendix referenced in paragraph U-S1-4.2.1(c) of Appendix U of the 2013 and the 2015 Editions, the mandatory appendix of the latest NRC approved version of the ASME BPV Code Case N-513 in NRC Regulatory Guide 1.147 must be used.~~

~~(B) Use of Nonmandatory Appendix U, Supplement U-S1 of the ASME BPV Code, Section XI, 2021 Edition is prohibited. In lieu of the appendix referenced in paragraph U-S1-4.2.1(c) of Appendix U of the 2013 and the 2015 Editions the mandatory appendix in ASME BPV Code Case N-513-3 must be used.~~

(xxxv) **Section XI condition: Use of  $RT_{T0}$  in the  $K_{Ia}$  and  $K_{Ic}$  equations.**

(A) When using the 2013 Edition of the ASME BPV Code, Section XI, Appendix A, paragraph A-4200, if  $T_0$  is available, then  $RT_{T0}$  may be used in place of  $RT_{NDT}$  for applications using the  $K_{Ic}$  equation and the associated  $K_{Ic}$  curve, but not for applications using the  $K_{Ia}$  equation and the associated  $K_{Ia}$  curve.

(B) When using the 2015 Edition of the ASME BPV Code, Section XI, Appendix A, paragraph A-4200 subparagraph (c)  $RT_{K_{Ia}}$  shall be defined as  $RT_{K_{Ia}} = T_0 + 90.267 \exp(-0.003406T_0)$  for U.S. Customary Units.

(xxxvi) **Section XI condition: Fracture toughness of irradiated materials.** When using the 2013 Edition through the latest edition incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section of the ASME BPV Code, Section XI, Appendix A paragraph A-4400, the licensee shall obtain NRC approval under [paragraph \(z\)](#) of this section before using

irradiated T<sub>0</sub> and the associated RT<sub>T0</sub> in establishing fracture toughness of irradiated materials.

(xxxviii) **Section XI condition: ASME Code Section XI Appendix III Supplement 2.** Licensees applying the provisions of ASME Code Section XI Appendix III Supplement 2, “Welds in Cast Austenitic Materials,” are subject to the following conditions:

(A) **ASME Code Section XI Appendix III Supplement 2: First provision.** : First provision. In lieu of Paragraph (c)(1)(-c)(-2), licensees shall use a search unit with a center frequency of 500 kHz with a tolerance of  $\pm 20$  percent.

(B) **ASME Code Section XI Appendix III Supplement 2: Second provision.** : Second provision. In lieu of Paragraph (c)(1)(-d), the search unit shall produce angles including, but not limited to, 30 to 55 degrees with a maximum increment of 5 degrees.

(xxxix) **Section XI condition: Defect Removal.** The use of the provisions for removal of defects by welding or brazing in IWA-4421(c)(1) and IWA-4421(c)(2) of Section XI, 2017 Edition through the latest edition incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section may be used subject to the following conditions:

(A) **Defect removal requirements: First provision.** The provisions of subparagraph IWA 4421(c)(1) shall not be used to contain or isolate a defective area without removal of the defect.

(B) **Defect removal requirements: Second provision.** The provisions of subparagraph IWA-4421(c)(2) shall not be used for crack-like defects.

(xl) [Reserved]

(xli) **Section XI condition: Preservice Volumetric and Surface Examinations Acceptance.** The use of the provisions for accepting flaws by analytical evaluation during preservice inspection in IWB-3112(a)(3) and IWC-3112(a)(3) of Section XI, 2013 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section is prohibited.

(xlii) **Section XI condition: Steam Generator Nozzle-to-Component welds and Reactor Vessel Nozzle-to-Component welds.** Licensees applying the provisions of Table IWB-2500-1, Examination Category B-F, Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles, Item B5.11 (NPS 4 or Larger Nozzle-to-Component Butt Welds) of the 2013 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section and Item B5.71 (NPS 4 or Larger Nozzle-to-Component Butt Welds) of the 2011a Addenda through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section must also meet the following conditions:

(A) Ultrasonic examination procedures, equipment, and personnel shall be qualified by performance demonstration in accordance with Mandatory Appendix VIII.

(B) When applying the examination requirements of Figure IWB-2500-8, the volumetric examination volume shall be extended to include 100 percent of the weld volume, except as provided in paragraph (b)(2)(xlii)(B)(1) of this section:

(1) If the examination volume that can be obtained by performance demonstration qualified procedures is less than 100 percent of the weld volume, the licensee may ultrasonically examine the qualified volume and perform a flaw evaluation of the largest hypothetical crack that could exist in the volume not qualified for ultrasonic examination, subject to prior NRC authorization in accordance with [paragraph \(z\)](#) of this section.

(2) [Reserved]

(xliii) ***Section XI condition: Section XI Condition: Regulatory Submittal Requirements.*** Licensees shall submit for NRC review and approval the following analyses:

(A) The analytical evaluation determining the effects of an out-of-limit condition on the structural integrity of the Reactor Coolant System, as described in IWB-3720(a);

(B) Determination of  $T_0$  and  $RT_{T0}$ , as described in Nonmandatory Appendix A, A-4200(c); and

(C) Determination of  $T_0$  and  $RT_{T0}$ , as described in Nonmandatory Appendix G, G-2110(c).

(xliv) ***Section XI condition: Nonmandatory Appendix Y. When using Nonmandatory Appendix Y of the ASME BPV Code, Section XI, 2021 Edition, the following conditions apply:***

(A) Use of Nonmandatory Appendix Y, Article Y-2200 is prohibited.

(B) Use of Nonmandatory Appendix Y, Subarticle Y-2440 is prohibited.

(C) Use of Nonmandatory Appendix Y, Article Y-3200 is prohibited.

(xlv) ***Section XI condition: Pressure Testing of Containment Penetration Piping After Repair/Replacement Activities.*** Applicants or licensees applying the provision of IWA-4540(a) and (e) of the 2021 Edition of the ASME Code, Section XI, are required to perform a VT-2 examination of the area affected by the repair/replacement activity during the Type C test in Appendix J of this part.

(xlvi) ***Section XI condition: Contracted Repair/Replacement Organization Fabricating Items Offsite of the Owner's Facility.*** When applicants or licensees apply the provision of IWA-4143 in the 2021 Edition of Section XI of the ASME Code, a contracted Repair/Replacement Organization fabricating ASME Code, Section III parts, appurtenances, piping subassemblies, and supports offsite of the Owner's facility (e.g.,

vendor facility) without an ASME Certificate of Authorization and without applying an ASME Stamp/Certification Mark is prohibited.

(xlvii) **Section XI condition: Weld Overlay Design Crack Growth Analysis.** Under Subparagraph Q-3000(a) stress corrosion crack growth analysis is required within the weld overlay material.

(xlviii) **Section XI condition: Analytical Evaluations of Degradation.** Applicants or licensees using the 2021 Edition of Section XI must submit analytical evaluations performed as required by IWB-3132.3 and IWC-3132.3 to the Nuclear Regulatory Commission.

(xlix) **Section XI condition: Analytical Evaluations of Flaws in Cladding.** The use of IWB-3600(b)(1) in the 2021 Edition of ASME BPV Code, Section XI (Division 1) is prohibited for the inlay and onlay that are subject to the augmented inspection requirements in paragraph (g)(6)(ii)(F) of this section.

(3) **Conditions on ASME OM Code.** As used in this section, references to the ASME OM Code are to the ASME OM Code, Subsections ISTA, ISTB, ISTC, ISTD, ISTE, and ISTF; Mandatory Appendices I, II, III, IV, and V; and Nonmandatory Appendices A through H and J through M, in the editions and addenda of the ASME OM Code incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section. Mandatory appendices must be used if required by the OM Code; nonmandatory appendices are approved for use by the NRC but need not be used. When implementing the ASME OM Code, conditions are applicable only as specified in the following paragraphs:

(i) **OM condition: Quality assurance.** When applying editions and addenda of the ASME OM Code, the requirements of ASME Standard NQA-1, “Quality Assurance Requirements for Nuclear Facility Applications,” 1994 Edition, 2008 Edition, and 2009-1a Addenda, are acceptable as permitted by either ISTA 1.4 of the 1995 Edition through 1997 Addenda or ISTA-1500 of the 1998 Edition through the latest edition and addenda of the ASME OM Code incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section, provided the licensee uses its appendix B to this part quality assurance program in conjunction with the ASME OM Code requirements and the commitments contained in the licensee's quality assurance program description. Where NQA-1 and the ASME OM Code do not address the commitments contained in the licensee's appendix B quality assurance program description, the commitments must be applied to ASME OM Code activities.

(ii) **OM condition: Motor-Operated Valve (MOV) testing.** Licensees must comply with the provisions for testing MOVs in ASME OM Code, ISTC 4.2, 1995 Edition with the 1996 and 1997 Addenda, or ISTC-3500, 1998 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section, and must establish a program to ensure that MOVs continue to be capable of performing their design basis safety functions. Licensees implementing ASME OM Code, Mandatory Appendix III, “Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in ~~Light~~-Water-~~Cooled~~ Reactor Nuclear Power Plants,” of the 2009 Edition, through the latest

edition and addenda of the ASME OM Code incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section shall comply with the following conditions (with the exception of conditions in paragraphs (A), (B), and (C) when implementing the 2022 Edition of the ASME OM Code):

(A) **MOV diagnostic test interval.** Licensees shall evaluate the adequacy of the diagnostic test intervals established for MOVs within the scope of ASME OM Code, Appendix III, not later than 5 years or three refueling outages (whichever is longer) from initial implementation of ASME OM Code, Appendix III.

(B) **MOV testing impact on risk.** Licensees shall ensure that the potential increase in core damage frequency and large early release frequency associated with the extension is acceptably small when extending exercise test intervals for high risk MOVs beyond a quarterly frequency.

(C) **MOV risk categorization.** When applying Appendix III to the ASME OM Code, licensees shall categorize MOVs according to their safety significance using the methodology described in ASME OM Code Case OMN-3, "Requirements for Safety Significance Categorization of Components Using Risk Insights for Inservice Testing of LWR Power Plants," subject to the conditions applicable to OMN-3 which are set forth in Regulatory Guide 1.192, or using an MOV risk ranking methodology accepted by the NRC on a plant-specific or industry-wide basis in accordance with the conditions in the applicable safety evaluation.

(D) **MOV stroke time.** When applying Paragraph III-3600, "MOV Exercising Requirements," of Appendix III to the ASME OM Code, licensees shall verify that the stroke time of MOVs specified in plant technical specifications satisfies the assumptions in the plant's safety analyses.

(iii) **OM condition: New reactors.** In addition to complying with the provisions in the ASME OM Code with the conditions specified in [paragraph \(b\)\(3\)](#) of this section, holders of operating licenses for nuclear power reactors that received construction permits under this part on or after August 17, 2018, and holders of combined licenses issued under [10 CFR part 52](#), whose initial fuel loading occurs on or after August 17, 2018, must also comply with the following conditions, as applicable:

(A) **Power-operated valves.** Licensees must periodically verify the capability of power-operated valves to perform their design-basis safety functions.

(B) ~~[Reserved] **Check valves.** Licensees must perform bi-directional testing of check valves within the IST program where practicable.~~

(C) ~~[Reserved] **Flow-induced vibration.** Licensees must monitor flow-induced vibration from hydrodynamic loads and acoustic resonance during preservice testing or inservice testing to identify potential adverse flow effects on components within the scope of the IST program.~~



(D) **High risk non-safety systems.** Licensees must assess the operational readiness of pumps, valves, and dynamic restraints within the scope of the Regulatory Treatment of Non-Safety Systems for applicable reactor designs.

(iv) **OM condition: Check valves (Appendix II).** Appendix II of the ASME OM Code, 2003 Addenda through the 2012 Edition, is acceptable for use with the following requirements. Trending and evaluation must support the determination that the valve or group of valves is capable of performing its intended function(s) over the entire interval. At least one of the Appendix II condition monitoring activities for a valve group must be performed on each valve of the group at approximate equal intervals not to exceed the maximum interval shown in the following table:

Table 3 to Paragraph (b)(3)(iv) - Maximum Intervals for Use When Applying Interval Extensions

Group size	Maximum interval between activities of member valves in the groups (years)	Maximum interval between activities of each valve in the group (years)
≥4	4.5	16
3	4.5	12
2	6	12
1	Not applicable	10

(v) **OM condition: Snubbers ISTD.** Article IWF-5000, “Inservice Inspection Requirements for Snubbers,” of the ASME BPV Code, Section XI, must be used when performing inservice inspection examinations and tests of snubbers at nuclear power plants, except as conditioned in [paragraphs \(b\)\(3\)\(v\)\(A\)](#) and [\(B\)](#) of this section.

(A) **Snubbers: First provision.** Licensees may use Subsection ISTD, “Preservice and Inservice Examination and Testing of Dynamic Restraints (Snubbers) in Light-Water Reactor Power Plants,” ASME OM Code, 1995 Edition through the latest edition and addenda incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section, in place of the requirements for snubbers in the editions and addenda up to the 2005 Addenda of the ASME BPV Code, Section XI, IWF-5200(a) and (b) and IWF-5300(a) and (b), by making appropriate changes to their technical specifications or licensee-controlled documents. Preservice and inservice examinations must be performed using the VT-3 visual examination method described in IWA-2213.

(B) **Snubbers: Second provision.** Licensees must comply with the provisions for examining and testing snubbers in Subsection ISTD of the ASME OM Code and make appropriate changes to their technical specifications or licensee-controlled documents when using the 2006 Addenda and later editions and addenda of Section XI of the ASME BPV Code.

(vi) **OM condition: Exercise interval for manual valves.** Manual valves must be exercised on a 2-year interval rather than the 5-year interval specified in paragraph ISTC-3540 of the 1999 through the 2005 Addenda of the ASME OM Code, provided that adverse conditions do not require more frequent testing.

(vii) ~~[Reserved]~~ **OM condition: Snubber visual examination interval extension.** When implementing Subsection ISTD, paragraph ISTD-4253, and Note 7 of Table ISTD-4252-1, in the 2022 Edition of the ASME OM Code, incorporated by reference in paragraph (a)(1)(iv) of this section, to extend snubber visual examination beyond 2 refueling cycles (48 months), the licensee is prohibited from applying OM Code Case OMN-15, Revision 2, to extend the operational readiness testing interval of snubbers.

(viii) **OM condition: Subsection ISTE.** Licensees may not implement the risk-informed approach for inservice testing (IST) of pumps and valves specified in Subsection ISTE, “Risk-Informed Inservice Testing of Components in Light-Water Reactor Nuclear Power Plants,” in the ASME OM Code, 2009 Edition through the 2017 Edition, without first obtaining NRC authorization to use Subsection ISTE as an alternative to the applicable IST requirements in the ASME OM Code, pursuant to [paragraph \(z\)](#) of this section.

(ix) **OM condition: Subsection ISTF.** Licensees applying Subsection ISTF, 2012 Edition must satisfy the requirements of Mandatory Appendix V, “Pump Periodic Verification Test Program,” of the ASME OM Code in that edition.

(x) ~~[Reserved]~~ **OM condition: Class 1 Pressure Relief Valve Sample Expansion.** When implementing paragraph I-1320(c)(1) in Appendix I, “Inservice Testing of Pressure Relief Devices in Water-Cooled Reactor Nuclear Power Plants,” of the editions and addenda of the ASME OM Code, incorporated by reference in paragraph (a)(1)(iv) of this section, the requirement for sample expansion of Class 1 Pressure Relief Valves shall be implemented such that for each valve tested for which the as-found set-pressure (first test actuation) exceeds the plus/minus tolerance limit of the Owner-established design set-pressure acceptance criteria of paragraph I-1310(e), or  $\pm 3$  percent of valve nameplate set-pressure if the Owner has not established design set-pressure acceptance criteria, two additional valves shall be tested from the same valve group.

(xi) **OM condition: Valve Position Indication.** When implementing paragraph ISTC-3700, “Position Verification Testing,” in the ASME OM Code, 2012 Edition through the latest edition of the ASME OM Code incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section, licensees must verify that valve operation is accurately indicated by supplementing valve position indicating lights with other indications, such as flow meters or other suitable instrumentation to provide assurance of proper obturator position for valves with remote position indication within the scope of Subsection ISTC including its mandatory appendices and their verification methods and frequencies. For valves not susceptible to stem-disk separation, licensees may implement ASME OM Code Case OMN-28, “Alternative Valve Position Verification Approach to Satisfy ISTC-3700 for Valves Not Susceptible to Stem-Disk Separation,” which is incorporated by reference in [paragraph \(a\)\(1\)\(iii\)\(H\)](#) of this section. Where plant conditions make it impractical to perform the



initial ISTC-3700 test as supplemented by [paragraph \(b\)\(3\)\(xi\)](#) of this section by the date 2 years following the previously performed ISTC-3700 test, a licensee may justify an extension of this initial supplemental valve position verification provided the ISTC-3700 test as supplemented by [paragraph \(b\)\(3\)\(xi\)](#) of this section is performed at the next available opportunity and no later than the next plant shutdown. This one-time extension of the ISTC-3700 test schedule as supplemented by [paragraph \(b\)\(3\)\(xi\)](#) of this section is acceptable provided the licensee has available for NRC review documented justification based on information obtained over the previous 5 years of the structural integrity of the stem-disk connection for the applicable valves. The licensee's justification could be based on, for example, verification of the valve stem-disk connection through an appropriate weak link analysis, appropriate disk motion confirmed during diagnostic testing, or allowance and cessation of flow through the valves. The licensee's justification must provide reasonable assurance that the remote indicating lights accurately reveal the position of the valve obturator until the next ISTC-3700 test as supplemented by [paragraph \(b\)\(3\)\(xi\)](#) of this section is performed.

(4) ***Conditions on Design, Fabrication, and Materials Code Cases.*** Each manufacturing license, standard design approval, and design certification application under [part 52 of this chapter](#) is subject to the following conditions. Licensees may apply the ASME BPV Code Cases listed in NRC Regulatory Guide 1.84, as incorporated by reference in [paragraph \(a\)\(3\)\(i\)](#) of this section, without prior NRC approval, subject to the following conditions:

(i) ***Design, Fabrication, and Materials Code Case condition: Applying Code Cases.*** When an applicant or licensee initially applies a listed Code Case, the applicant or licensee must apply the most recent version of that Code Case incorporated by reference in [paragraph \(a\)](#) of this section.

(ii) ***Design, Fabrication, and Materials Code Case condition: Applying different revisions of Code Cases.*** If an applicant or licensee has previously applied a Code Case and a later version of the Code Case is incorporated by reference in [paragraph \(a\)](#) of this section, the applicant or licensee may continue to apply the previous version of the Code Case as authorized or may apply the later version of the Code Case, including any NRC-specified conditions placed on its use, until it updates its Code of Record for the component being constructed.

(iii) ***Design, Fabrication, and Materials Code Case condition: Applying annulled Code Cases.*** Application of an annulled Code Case is prohibited unless an applicant or licensee applied the listed Code Case prior to it being listed as annulled in Regulatory Guide 1.84. If an applicant or licensee has applied a listed Code Case that is later listed as annulled in Regulatory Guide 1.84, the applicant or licensee may continue to apply the Code Case until it updates its Code of Record for the component being constructed.

(5) ***Conditions on inservice inspection Code Cases.*** Licensees may apply the ASME BPV Code Cases listed in NRC Regulatory Guide 1.147, as incorporated by reference in [paragraph \(a\)\(3\)\(ii\)](#) of this section, without prior NRC approval, subject to the following:

(i) **ISI Code Case condition: Applying Code Cases.** When a licensee initially applies a listed Code Case, the licensee must apply the most recent version of that Code Case incorporated by reference in [paragraph \(a\)](#) of this section.

(ii) **ISI Code Case condition: Applying different revisions of Code Cases.** If a licensee has previously applied a Code Case and a later version of the Code Case is incorporated by reference in [paragraph \(a\)](#) of this section, the licensee may continue to apply, to the end of the current 120-month interval, the previous version of the Code Case, as authorized, or may apply the later version of the Code Case, including any NRC-specified conditions placed on its use. Licensees who choose to continue use of the Code Case during subsequent 120-month ISI program intervals will be required to implement the latest version incorporated by reference into this section as listed in Tables 1 and 2 of NRC Regulatory Guide 1.147, as incorporated by reference in [paragraph \(a\)\(3\)\(ii\)](#) of this section.

(iii) **ISI Code Case condition: Applying annulled Code Cases.** Application of an annulled Code Case is prohibited unless a licensee previously applied the listed Code Case prior to it being listed as annulled in NRC Regulatory Guide 1.147. If a licensee has applied a listed Code Case that is later listed as annulled in NRC Regulatory Guide 1.147, the licensee may continue to apply the Code Case to the end of the current 120-month interval.

(6) **Conditions on ASME OM Code Cases.** Licensees may apply the ASME OM Code Cases listed in NRC Regulatory Guide 1.192, as incorporated by reference in [paragraph \(a\)\(3\)\(iii\)](#) of this section, without prior NRC approval, subject to the following:

(i) **OM Code Case condition: Applying Code Cases.** When a licensee initially applies a listed Code Case, the licensee must apply the most recent version of that Code Case incorporated by reference in [paragraph \(a\)](#) of this section.

(ii) **OM Code Case condition: Applying different revisions of Code Cases.** If a licensee has previously applied a Code Case and a later version of the Code Case is incorporated by reference in [paragraph \(a\)](#) of this section, the licensee may continue to apply, to the end of the current 120-month interval, the previous version of the Code Case, as authorized, or may apply the later version of the Code Case, including any NRC-specified conditions placed on its use. Licensees who choose to continue use of the Code Case during subsequent 120-month ISI program intervals will be required to implement the latest version incorporated by reference into this section as listed in Tables 1 and 2 of NRC Regulatory Guide 1.192, as incorporated by reference in [paragraph \(a\)\(3\)\(iii\)](#) of this section.

(iii) **OM Code Case condition: Applying annulled Code Cases.** Application of an annulled Code Case is prohibited unless a licensee previously applied the listed Code Case prior to it being listed as annulled in NRC Regulatory Guide 1.192. If a licensee has applied a listed Code Case that is later listed as annulled in NRC Regulatory Guide 1.192, the licensee may continue to apply the Code Case to the end of the current 120-month interval.

(c) **Reactor coolant pressure boundary.** Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code as specified in this paragraph. Each manufacturing license, standard design approval, and design certification application under [part 52 of this chapter](#) and each combined license for a utilization facility is subject to the following conditions:

(1) **Standards requirement for reactor coolant pressure boundary components.**

Components that are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III<sup>1 4</sup> of the ASME BPV Code, except as provided in [paragraphs \(c\)\(2\)](#) through [\(4\)](#) of this section.

(2) **Exceptions to reactor coolant pressure boundary standards requirement.** Components that are connected to the reactor coolant system and are part of the reactor coolant pressure boundary as defined in [§ 50.2](#) need not meet the requirements of [paragraph \(c\)\(1\)](#) of this section, provided that:

(i) **Exceptions: Shutdown and cooling capability.** In the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system; or

(ii) **Exceptions: Isolation capability.** The component is or can be isolated from the reactor coolant system by two valves in series (both closed, both open, or one closed and the other open). Each open valve must be capable of automatic actuation and, assuming the other valve is open, its closure time must be such that, in the event of postulated failure of the component during normal reactor operation, each valve remains operable and the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system only.

(3) **Applicable Code and Code Cases and conditions on their use.** The Code edition, addenda, and optional ASME Code Cases to be applied to components of the reactor coolant pressure boundary must be determined by the provisions of paragraph NCA-1140, Subsection NCA of Section III of the ASME BPV Code, subject to the following conditions:

(i) **Reactor coolant pressure boundary condition: Code edition and addenda.** The edition and addenda applied to a component must be those that are incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section;

(ii) **Reactor coolant pressure boundary condition: Earliest edition and addenda for pressure vessel.** The ASME Code provisions applied to the pressure vessel may be dated no earlier than the summer 1972 Addenda of the 1971 Edition;

(iii) **Reactor coolant pressure boundary condition: Earliest edition and addenda for piping, pumps, and valves.** The ASME Code provisions applied to piping, pumps, and valves may be dated no earlier than the Winter 1972 Addenda of the 1971 Edition; and

(iv) **Reactor coolant pressure boundary condition: Use of Code Cases.** The optional Code Cases applied to a component must be those listed in NRC Regulatory Guide 1.84 that is incorporated by reference in [paragraph \(a\)\(3\)\(i\)](#) of this section.

(4) **Standards requirement for components in older plants.** For a nuclear power plant whose construction permit was issued prior to May 14, 1984, the applicable Code edition and addenda for a component of the reactor coolant pressure boundary continue to be that Code edition and addenda that were required by Commission regulations for such a component at the time of issuance of the construction permit.

(d) **Quality Group B components.** Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code as specified in this paragraph. Each manufacturing license, standard design approval, and design certification application under [part 52 of this chapter](#), and each combined license for a utilization facility is subject to the following conditions.÷

(1) **Standards requirement for Quality Group B components.** For a nuclear power plant whose application for a construction permit under this part, or a combined license or manufacturing license under [part 52 of this chapter](#), docketed after May 14, 1984, or for an application for a standard design approval or a standard design certification docketed after May 14, 1984, components classified Quality Group B<sup>7</sup> must meet the requirements for Class 2 Components in Section III of the ASME BPV Code.

(2) **Quality Group B: Applicable Code and Code Cases and conditions on their use.** The Code edition, addenda, and optional ASME Code Cases to be applied to the systems and components identified in [paragraph \(d\)\(1\)](#) of this section must be determined by the rules of paragraph NCA-1140, Subsection NCA of Section III of the ASME BPV Code, subject to the following conditions:

(i) **Quality Group B condition: Code edition and addenda.** The edition and addenda must be those that are incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section;

(ii) **Quality Group B condition: Earliest edition and addenda for components.** The ASME Code provisions applied to the systems and components may be dated no earlier than the 1980 Edition; and

(iii) **Quality Group B condition: Use of Code Cases.** The optional Code Cases must be those listed in NRC Regulatory Guide 1.84 that is incorporated by reference in [paragraph \(a\)\(3\)\(i\)](#) of this section.

(e) **Quality Group C components.** Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code as specified in this paragraph. Each manufacturing license, standard design approval, and design certification application under [part 52 of this chapter](#) and each combined license for a utilization facility is subject to the following conditions.

(1) **Standards requirement for Quality Group C components.** For a nuclear power plant whose application for a construction permit under this part, or a combined license or manufacturing license under [part 52 of this chapter](#), docketed after May 14, 1984, or for an application for a standard design approval or a standard design certification docketed after May 14, 1984, components classified Quality Group C<sup>7</sup> must meet the requirements for Class 3 components in Section III of the ASME BPV Code.

(2) **Quality Group C applicable Code and Code Cases and conditions on their use.** The Code edition, addenda, and optional ASME Code Cases to be applied to the systems and components identified in [paragraph \(e\)\(1\)](#) of this section must be determined by the rules of paragraph NCA-1140, subsection NCA of Section III of the ASME BPV Code, subject to the following conditions:

(i) **Quality Group C condition: Code edition and addenda.** The edition and addenda must be those incorporated by reference in [paragraph \(a\)\(1\)\(i\)](#) of this section;

(ii) **Quality Group C condition: Earliest edition and addenda for components.** The ASME Code provisions applied to the systems and components may be dated no earlier than the 1980 Edition; and

(iii) **Quality Group C condition: Use of Code Cases.** The optional Code Cases must be those listed in NRC Regulatory Guide 1.84 that is incorporated by reference in [paragraph \(a\)\(3\)\(i\)](#) of this section.

(f) **Preservice and inservice testing requirements.** Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements for preservice and inservice testing (referred to in this [paragraph \(f\)](#) collectively as inservice testing) of the ASME BPV Code and ASME OM Code as specified in this [paragraph \(f\)](#). Each operating license for a boiling or pressurized water-cooled nuclear facility is subject to the following conditions. Each combined license for a boiling or pressurized water-cooled nuclear facility is subject to the following conditions, but the conditions in [paragraphs \(f\)\(4\)](#) through [\(6\)](#) of this section must be met only after the Commission makes the finding under [§ 52.103\(g\) of this chapter](#). Requirements for inservice inspection of Class 1, Class 2, Class 3, Class MC, and Class CC components (including their supports) are located in [paragraph \(g\)](#) of this section.

(1) **Inservice testing requirements for older plants (pre-1971 CPs).** For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued prior to January 1, 1971, pumps and valves must meet the test requirements of [paragraphs \(f\)\(4\)](#) and [\(5\)](#) of this section to the extent practical. Pumps and valves that are part of the reactor coolant pressure boundary must meet the requirements applicable to components that are classified as ASME Code Class 1. Other pumps and valves that perform a function to shut down the reactor or maintain the reactor in a safe shutdown condition, mitigate the consequences of an accident, or provide overpressure protection for safety-related systems (in meeting the requirements of the 1986 Edition, or later, of the BPV or OM Code) must meet the test requirements applicable to components that are classified as ASME Code Class 2 or Class 3.



(2) ***Design and accessibility requirements for performing inservice testing in plants with CPs issued between 1971 and 1974.*** For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued on or after January 1, 1971, but before July 1, 1974, pumps and valves that are classified as ASME BPV Code Class 1 and Class 2 must be designed and provided with access to enable the performance of inservice tests for operational readiness set forth in editions and addenda of Section XI of the ASME BPV Code incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147 or NRC Regulatory Guide 1.192, as incorporated by reference in [paragraphs \(a\)\(3\)\(ii\)](#) and [\(iii\)](#) of this section, respectively) in effect 6 months before the date of issuance of the construction permit. The pumps and valves may meet the inservice test requirements set forth in subsequent editions of this Code and addenda that are incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147 or NRC Regulatory Guide 1.192, as incorporated by reference in [paragraphs \(a\)\(3\)\(ii\)](#) and [\(iii\)](#) of this section, respectively), subject to the applicable conditions listed therein.

(3) ***Design and accessibility requirements for performing inservice testing in plants with CPs issued after 1974.*** For a boiling or pressurized water-cooled nuclear power facility whose construction permit under this part or design approval, design certification, combined license, or manufacturing license under [part 52 of this chapter](#) was issued on or after July 1, 1974:

(i)-(ii) [Reserved]

(iii) ***IST design and accessibility requirements: Class 1 pumps and valves.***

(A) ***Class 1 pumps and valves: First provision.*** In facilities whose construction permit was issued before November 22, 1999, pumps and valves that are classified as ASME BPV Code Class 1 must be designed and provided with access to enable the performance of inservice testing of the pumps and valves for assessing operational readiness set forth in the editions and addenda of Section XI of the ASME BPV Code incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147 or NRC Regulatory Guide 1.192, as incorporated by reference in [paragraphs \(a\)\(3\)\(ii\)](#) and [\(iii\)](#) of this section, respectively) applied to the construction of the particular pump or valve or the summer 1973 Addenda, whichever is later.

(B) ***Class 1 pumps and valves: Second provision.*** In facilities whose construction permit under this part, or design certification, design approval, combined license, or manufacturing license under [part 52 of this chapter](#), issued on or after November 22, 1999, pumps and valves that are classified as ASME BPV Code Class 1 must be designed and provided with access to enable the performance of inservice testing of the pumps and valves for assessing operational readiness set forth in editions and addenda of the ASME OM Code (or the optional ASME OM Code Cases listed in NRC Regulatory Guide 1.192, as incorporated by reference in [paragraph \(a\)\(3\)\(iii\)](#) of this section), incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section at the time the construction permit,

combined license, manufacturing license, design certification, or design approval is issued.

(iv) ***IST design and accessibility requirements: Class 2 and 3 pumps and valves.***

(A) ***Class 2 and 3 pumps and valves: First provision.*** In facilities whose construction permit was issued before November 22, 1999, pumps and valves that are classified as ASME BPV Code Class 2 and Class 3 must be designed and be provided with access to enable the performance of inservice testing of the pumps and valves for assessing operational readiness set forth in the editions and addenda of Section XI of the ASME BPV Code incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section (or the optional ASME BPV Code Cases listed in NRC Regulatory Guide 1.147, as incorporated by reference in [paragraph \(a\)\(3\)\(ii\)](#) of this section) applied to the construction of the particular pump or valve or the Summer 1973 Addenda, whichever is later.

(B) ***Class 2 and 3 pumps and valves: Second provision.*** In facilities whose construction permit under this part, or design certification, design approval, combined license, or manufacturing license under [part 52 of this chapter](#), issued on or after November 22, 1999, pumps and valves that are classified as ASME BPV Code Class 2 and 3 must be designed and provided with access to enable the performance of inservice testing of the pumps and valves for assessing operational readiness set forth in editions and addenda of the ASME OM Code (or the optional ASME OM Code Cases listed in NRC Regulatory Guide 1.192, as incorporated by reference in [paragraph \(a\)\(3\)\(iii\)](#) of this section), incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section at the time the construction permit, combined license, or design certification is issued.

(v) ***IST design and accessibility requirements: Meeting later IST requirements.*** All pumps and valves may meet the test requirements set forth in subsequent editions of codes and addenda or portions thereof that are incorporated by reference in [paragraph \(a\)](#) of this section, subject to the conditions listed in [paragraph \(b\)](#) of this section.

(4) ***Inservice testing standards requirement for operating plants.*** Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the inservice test requirements (except design and access provisions) set forth in the ASME OM Code and addenda that become effective subsequent to editions and addenda specified in [paragraphs \(f\)\(2\)](#) and [\(3\)](#) of this section and that are incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The inservice test requirements for pumps and valves that are within the scope of the ASME OM Code but are not classified as ASME BPV Code Class 1, Class 2, or Class 3 may be satisfied as an augmented IST program. This use of an augmented IST program is acceptable without prior NRC approval provided the basis for deviations from the ASME OM Code, as incorporated by reference in this section, demonstrates an acceptable level of quality and safety, or that implementing the Code provisions would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, where documented and available for NRC review. When using the 2006 Addenda or later of



the ASME BPV Code, Section XI, the inservice examination, testing, and service life monitoring requirements for dynamic restraints (snubbers) must meet the requirements set forth in the applicable ASME OM Code as specified in [paragraph \(b\)\(3\)\(v\)\(B\)](#) of this section. When using the 2005 Addenda or earlier edition or addenda of the ASME BPV Code, Section XI, the inservice examination, testing, and service life monitoring requirements for dynamic restraints (snubbers) must meet the requirements set forth in either the applicable ASME OM Code or ASME BPV Code, Section XI as specified in [paragraph \(b\)\(3\)\(v\)](#) of this section.

(i) ***Applicable IST Code: Initial 120-month interval.*** Inservice tests to verify operational readiness of pumps and valves, whose function is required for safety, conducted during the initial 120-month interval must comply with the requirements in the latest edition and addenda of the ASME OM Code incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section on the date 18 months before the date of issuance of the operating license under this part, or 18 months before the date scheduled for initial loading of fuel under a combined license under [part 52 of this chapter](#) (or the optional ASME OM Code Cases listed in NRC Regulatory Guide 1.192, as incorporated by reference in [paragraph \(a\)\(3\)\(iii\)](#) of this section, subject to the conditions listed in [paragraph \(b\)](#) of this section).

(ii) ***Applicable IST Code: Successive 120-month intervals.*** Inservice tests to verify operational readiness of pumps and valves, whose function is required for safety, conducted during successive 120-month intervals must comply with the requirements of the latest edition and addenda of the ASME OM Code incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section 18 months before the start of the 120-month interval (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147 or NRC Regulatory Guide 1.192 as incorporated by reference in [paragraphs \(a\)\(3\)\(ii\)](#) and [\(iii\)](#) of this section, respectively), subject to the conditions listed in [paragraph \(b\)](#) of this section.

(iii) [Reserved]

(iv) ***Applicable IST Code: Use of later Code editions and addenda.*** Inservice tests of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in [paragraph \(a\)\(1\)\(iv\)](#) of this section, subject to the conditions listed in [paragraph \(b\)](#) of this section, and subject to NRC approval. Portions of editions or addenda may be used, provided that all related requirements of the respective editions or addenda are met.

##### **(5) Requirements for updating IST programs -**

(i) ***IST program update: Applicable IST Code editions and addenda.*** The inservice test program for a boiling or pressurized water-cooled nuclear power facility must be revised by the licensee, as necessary, to meet the requirements of [paragraph \(f\)\(4\)](#) of this section.

(ii) ***IST program update: Conflicting IST Code requirements with technical specifications.*** If a revised inservice test program for a facility conflicts with the technical specifications for the facility, the licensee must apply to the Commission for amendment of

the technical specifications to conform the technical specifications to the revised program. The licensee must submit this application, as specified in [§ 50.4](#), at least 6 months before the start of the period during which the provisions become applicable, as determined by [paragraph \(f\)\(4\)](#) of this section.

(iii) **IST program update: Notification of impractical IST Code requirements.** If the licensee has determined that conformance with certain Code requirements is impractical for its facility, the licensee must notify the Commission and submit, as specified in [§ 50.4](#), information to support the determination.

(iv) **IST program update: Schedule for completing impracticality determinations.** Where a pump or valve test requirement by the Code or addenda is determined to be impractical by the licensee and is not included in the revised inservice test program (as permitted by [paragraph \(f\)\(4\)](#) of this section), the basis for this determination must be submitted for NRC review and approval not later than 12 months after the expiration of the initial 120-month interval of operation from the start of facility commercial operation and each subsequent 120-month interval of operation during which the test is determined to be impractical.

**(6) Actions by the Commission for evaluating impractical and augmented IST Code requirements -**

(i) **Impractical IST requirements: Granting of relief.** The Commission will evaluate determinations under [paragraph \(f\)\(5\)](#) of this section that code requirements are impractical. The Commission may grant relief and may impose such alternative requirements as it determines are authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

(ii) **Augmented IST requirements.** The Commission may require the licensee to follow an augmented inservice test program for pumps and valves for which the Commission deems that added assurance of operational readiness is necessary.

**(7) Inservice testing reporting requirements.** Inservice Testing Program Test and Examination Plans (IST Plans) for pumps, valves, and dynamic restraints (snubbers) prepared to meet the requirements of the ASME OM Code must be submitted to the NRC as specified in [§ 50.4](#). IST Plans must be submitted within 90 days of their implementation for the applicable 120-month IST Program interval. Electronic submission is preferred.

(g) **Preservice and inservice inspection requirements.** Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code as specified in this paragraph. Each operating license for a boiling or pressurized water-cooled nuclear facility is subject to the following conditions. Each combined license for a boiling or pressurized water-cooled nuclear facility is subject to the following conditions, but the conditions in [paragraphs \(g\)\(4\)](#) through [\(6\)](#) of this section must be met only after the

Commission makes the finding under [§ 52.103\(g\) of this chapter](#). Requirements for inservice testing of Class 1, Class 2, and Class 3 pumps and valves are located in [paragraph \(f\)](#) of this section.

(1) ***Inservice inspection requirements for older plants (pre-1971 CPs).*** For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued before January 1, 1971, components (including supports) must meet the requirements of [paragraphs \(g\)\(4\)](#) and [\(g\)\(5\)](#) of this section to the extent practical. Components that are part of the reactor coolant pressure boundary and their supports must meet the requirements applicable to components that are classified as ASME Code Class 1. Other safety-related pressure vessels, piping, pumps and valves, and their supports must meet the requirements applicable to components that are classified as ASME Code Class 2 or Class 3.

(2) ***Accessibility requirements -***

(i) ***Accessibility requirements for plants with CPs issued between 1971 and 1974.*** For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued on or after January 1, 1971, but before July 1, 1974, components that are classified as ASME BPV Code Class 1 and Class 2 and supports for components that are classified as ASME BPV Code Class 1 and Class 2 must be designed and be provided with the access necessary to perform the required preservice and inservice examinations set forth in editions and addenda of Section III or Section XI of the ASME BPV Code incorporated by reference in [paragraph \(a\)\(1\)](#) of this section (or the optional ASME BPV Code Cases listed in NRC Regulatory Guide 1.147, as incorporated by reference in [paragraph \(a\)\(3\)\(ii\)](#) of this section) in effect 6 months before the date of issuance of the construction permit.

(ii) ***Accessibility requirements for plants with CPs issued after 1974.*** For a boiling or pressurized water-cooled nuclear power facility, whose construction permit under this part, or design certification, design approval, combined license, or manufacturing license under [part 52 of this chapter](#), was issued on or after July 1, 1974, components that are classified as ASME BPV Code Class 1, Class 2, and Class 3 and supports for components that are classified as ASME BPV Code Class 1, Class 2, and Class 3 must be designed and provided with the access necessary to perform the required preservice and inservice examinations set forth in editions and addenda of Section III or Section XI of the ASME BPV Code incorporated by reference in [paragraph \(a\)\(1\)](#) of this section (or the optional ASME BPV Code Cases listed in NRC Regulatory Guide 1.147, as incorporated by reference in [paragraph \(a\)\(3\)\(ii\)](#) of this section) applied to the construction of the particular component.

(iii) ***Accessibility requirements: Meeting later Code requirements.*** All components (including supports) may meet the requirements set forth in subsequent editions of codes and addenda or portions thereof that are incorporated by reference in [paragraph \(a\)](#) of this section, subject to the conditions listed therein.

(3) ***Preservice examination requirements -***

(i) **Preservice examination requirements for plants with CPs issued between 1971 and 1974.** For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued on or after January 1, 1971, but before July 1, 1974, components that are classified as ASME BPV Code Class 1 and Class 2 and supports for components that are classified as ASME BPV Code Class 1 and Class 2 must meet the preservice examination requirements set forth in editions and addenda of Section III or Section XI of the ASME BPV Code incorporated by reference in [paragraph \(a\)\(1\)](#) of this section (or the optional ASME BPV Code Cases listed in NRC Regulatory Guide 1.147, as incorporated by reference in [paragraph \(a\)\(3\)\(ii\)](#) of this section) in effect 6 months before the date of issuance of the construction permit.

(ii) **Preservice examination requirements for plants with CPs issued after 1974.** For a boiling or pressurized water-cooled nuclear power facility, whose construction permit under this part, or design certification, design approval, combined license, or manufacturing license under [part 52 of this chapter](#), was issued on or after July 1, 1974, components that are classified as ASME BPV Code Class 1, Class 2, and Class 3 and supports for components that are classified as ASME BPV Code Class 1, Class 2, and Class 3 must meet the preservice examination requirements set forth in the editions and addenda of Section III or Section XI of the ASME BPV Code incorporated by reference in [paragraph \(a\)\(1\)](#) of this section (or the optional ASME BPV Code Cases listed in NRC Regulatory Guide 1.147, as incorporated by reference in [paragraph \(a\)\(3\)\(ii\)](#) of this section) applied to the construction of the particular component.

(iii)-(iv) [Reserved]

(v) **Preservice examination requirements: Meeting later Code requirements.** All components (including supports) may meet the requirements set forth in subsequent editions of codes and addenda or portions thereof that are incorporated by reference in [paragraph \(a\)](#) of this section, subject to the conditions listed therein.

(4) **Inservice inspection standards requirement for operating plants.** Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) that are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions and addenda of the ASME BPV Code that become effective subsequent to editions specified in [paragraphs \(g\)\(2\)](#) and [\(3\)](#) of this section and that are incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) or [\(iv\)](#) of this section for snubber examination and testing of this section, to the extent practical within the limitations of design, geometry, and materials of construction of the components. Components that are classified as Class MC pressure retaining components and their integral attachments, and components that are classified as Class CC pressure retaining components and their integral attachments, must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of the ASME BPV Code and addenda that are incorporated by reference in [paragraph \(a\)\(1\)\(ii\)](#) of this section subject to the condition listed in [paragraph \(b\)\(2\)\(vi\)](#) of this section and the conditions listed in [paragraphs \(b\)\(2\)\(viii\)](#) and [\(ix\)](#) of this section, to the extent practical within the limitation of design,

geometry, and materials of construction of the components. When using the 2006 Addenda or later of the ASME BPV Code, Section XI, the inservice examination, testing, and service life monitoring requirements for dynamic restraints (snubbers) must meet the requirements set forth in the applicable ASME OM Code as specified in [paragraph \(b\)\(3\)\(v\)\(B\)](#) of this section. When using the 2005 Addenda or earlier edition or addenda of the ASME BPV Code, Section XI, the inservice examination, testing, and service life monitoring requirements for dynamic restraints (snubbers) must meet the requirements set forth in either the applicable ASME OM Code or ASME BPV Code, Section XI as specified in [paragraph \(b\)\(3\)\(v\)](#) of this section.

(i) **Applicable ISI Code: Initial 120-month interval.** Inservice examination of components and system pressure tests conducted during the initial 120-month inspection interval must comply with the requirements in the latest edition and addenda of the ASME Code incorporated by reference in [paragraph \(a\)](#) of this section on the date 18 months before the date of issuance of the operating license under this part, or 18 months before the date scheduled for initial loading of fuel under a combined license under [part 52 of this chapter](#) (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, when using ASME BPV Code, Section XI, or NRC Regulatory Guide 1.192, when using the ASME OM Code, as incorporated by reference in [paragraphs \(a\)\(3\)\(ii\)](#) and [\(iii\)](#) of this section, respectively), subject to the conditions listed in [paragraph \(b\)](#) of this section. Licensees may, at any time in their 120-month ISI interval, elect to use the Appendix VIII in the latest edition and addenda of the ASME BPV Code incorporated by reference in [paragraph \(a\)](#) of this section, subject to any applicable conditions listed in [paragraph \(b\)](#) of this section. Licensees using this option must also use the same edition and addenda of Appendix I, Subarticle I-3200, as Appendix VIII, including any applicable conditions listed in [paragraph \(b\)](#) of this section.

(ii) **Applicable ISI Code: Successive 120-month intervals.** Inservice examination of components and system pressure tests conducted during successive 120-month inspection intervals must comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in [paragraph \(a\)](#) of this section 18 months before the start of the 120-month inspection interval (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, when using ASME BPV Code, Section XI, or NRC Regulatory Guide 1.192, when using the ASME OM Code, as incorporated by reference in [paragraphs \(a\)\(3\)\(ii\)](#) and [\(iii\)](#) of this section), subject to the conditions listed in [paragraph \(b\)](#) of this section. However, a licensee whose inservice inspection interval commences during the 12 through 18-month period after June 3, 2020, may delay the update of their Appendix VIII program by up to 18 months after June 3, 2020. Alternatively, licensees may, at any time in their 120-month ISI interval, elect to use the Appendix VIII in the latest edition and addenda of the ASME BPV Code incorporated by reference in [paragraph \(a\)](#) of this section, subject to any applicable conditions listed in [paragraph \(b\)](#) of this section. Licensees using this option must also use the same edition and addenda of Appendix I, Subarticle I-3200, as Appendix VIII, including any applicable conditions listed in [paragraph \(b\)](#) of this section.

(iii) **Applicable ISI Code: Optional surface examination requirement.** When applying editions and addenda prior to the 2003 Addenda of Section XI of the ASME BPV Code,



licensees may, but are not required to, perform the surface examinations of high-pressure safety injection systems specified in Table IWB-2500-1, Examination Category B-J, Item Numbers B9.20, B9.21, and B9.22.

(iv) ***Applicable ISI Code: Use of subsequent Code editions and addenda.*** Inservice examination of components and system pressure tests may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in [paragraph \(a\)](#) of this section, subject to the conditions listed in [paragraph \(b\)](#) of this section, and subject to Commission approval. Portions of editions or addenda may be used, provided that all related requirements of the respective editions or addenda are met.

(v) ***Applicable ISI Code: Metal and concrete containments.*** For a boiling or pressurized water-cooled nuclear power facility whose construction permit under this part or combined license under [part 52 of this chapter](#) was issued after January 1, 1956, the following are required:

(A) ***Metal and concrete containments: First provision.*** Metal containment pressure retaining components and their integral attachments must meet the inservice inspection, repair, and replacement requirements applicable to components that are classified as ASME Code Class MC;

(B) ***Metal and concrete containments: Second provision.*** Metallic shell and penetration liners that are pressure retaining components and their integral attachments in concrete containments must meet the inservice inspection, repair, and replacement requirements applicable to components that are classified as ASME Code Class MC; and

(C) ***Metal and concrete containments: Third provision.*** Concrete containment pressure retaining components and their integral attachments, and the post-tensioning systems of concrete containments, must meet the inservice inspections, repair, and replacement requirements applicable to components that are classified as ASME Code Class CC.

**(5) Requirements for updating ISI programs -**

(i) ***ISI program update: Applicable ISI Code editions and addenda.*** The inservice inspection program for a boiling or pressurized water-cooled nuclear power facility must be revised by the licensee, as necessary, to meet the requirements of [paragraph \(g\)\(4\)](#) of this section.

(ii) ***ISI program update: Conflicting ISI Code requirements with technical specifications.*** If a revised inservice inspection program for a facility conflicts with the technical specifications for the facility, the licensee must apply to the Commission for amendment of the technical specifications to conform the technical specifications to the revised program. The licensee must submit this application, as specified in [§ 50.4](#), at least six months before the start of the period during which the provisions become applicable, as determined by [paragraph \(g\)\(4\)](#) of this section.

(iii) **ISI program update: Notification of impractical ISI Code requirements.** If the licensee has determined that conformance with a Code requirement is impractical for its facility the licensee must notify the NRC and submit, as specified in [§ 50.4](#), information to support the determinations. Determinations of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the Code requirements during the inservice inspection interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial or subsequent 120-month inspection interval for which relief is sought.

(iv) **ISI program update: Schedule for completing impracticality determinations.** Where the licensee determines that an examination required by Code edition or addenda is impractical, the basis for this determination must be submitted for NRC review and approval not later than 12 months after the expiration of the initial or subsequent 120-month inspection interval for which relief is sought.

**(6) Actions by the Commission for evaluating impractical and augmented ISI Code requirements -**

(i) **Impractical ISI requirements: Granting of relief.** The Commission will evaluate determinations under [paragraph \(g\)\(5\)](#) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines are authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

(ii) **Augmented ISI program.** The Commission may require the licensee to follow an augmented inservice inspection program for systems and components for which the Commission deems that added assurance of structural reliability is necessary.

(A) [Reserved]

(B) **Augmented ISI requirements: Submitting containment ISI programs.** Licensees do not have to submit to the NRC for approval of their containment inservice inspection programs that were developed to satisfy the requirements of Subsection IWE and Subsection IWL with specified conditions. The program elements and the required documentation must be maintained on site for audit.

(C) [Reserved]

(D) **Augmented ISI requirements: Reactor vessel head inspections -**

(1) **Implementation.** Holders of operating licenses or combined licenses for pressurized-water reactors as of or after June 3, 2020 shall implement the requirements of ASME BPV Code Case N-729-6 instead of ASME BPV Code Case N-729-4, subject



to the conditions specified in [paragraphs \(g\)\(6\)\(ii\)\(D\)\(2\)](#) through [\(8\)](#) of this section, by no later than one year after June 3, 2020. All previous NRC-approved alternatives from the requirements of [paragraph \(g\)\(6\)\(ii\)\(D\)](#) of this section remain valid.

(2) **Appendix I use.** If Appendix I is used, Section I-3000 must be implemented to define an alternative examination area or volume.

(3) **Bare metal visual frequency.** Instead of Note 4 of ASME BPV Code Case N-729-6, the following shall be implemented. If effective degradation years (EDY) < 8 and if no flaws are found that are attributed to primary water stress corrosion cracking:

(i) A bare metal visual examination is not required during refueling outages when a volumetric or surface examination is performed; and

(ii) If a wetted surface examination has been performed of all of the partial penetration welds during the previous non-visual examination, the reexamination frequency may be extended to every third refueling outage or 5 calendar years, whichever is less, provided an IWA-2212 VT-2 visual examination of the head is performed under the insulation through multiple access points in outages that the VE is not completed. This IWA-2212 VT-2 visual examination may be performed with the reactor vessel depressurized.

(4) **Surface exam acceptance criteria.** In addition to the requirements of paragraph 3132.1(b) of ASME BPV Code Case N-729-6, a component whose surface examination detects rounded indications greater than allowed in paragraph NB-5352 in size on the partial-penetration or associated fillet weld shall be classified as having an unacceptable indication and corrected in accordance with the provisions of paragraph 3132.2 of ASME BPV Code Case N-729-6.

(5) **Peening.** In lieu of inspection requirements of Table 1, Items B4.50 and B4.60, and all other requirements in ASME BPV Code Case N-729-6 pertaining to peening, in order for a RPV upper head with nozzles and associated J-groove welds mitigated by peening to obtain examination relief from the requirements of Table 1 for unmitigated heads, peening must meet the performance criteria, qualification, and examination requirements stated in MRP-335, Revision 3-A, with the exception that a plant-specific alternative request is not required and NRC condition 5.4 of MRP-335, Revision 3-A does not apply.

(6) **Baseline Examinations.** In lieu of the requirements for Note 7(c) the baseline volumetric and surface examination for plants with a RPV Head with less than 8 EDY shall be performed by 2.25 reinspection years (RIY) after initial startup not to exceed 8 years.

(7) **Sister Plants.** Note 10 of ASME BPV Code Case N-729-6 shall not be implemented without prior NRC approval.

(8) ***Volumetric Leak Path.*** In lieu of paragraph 3200(b) requirement for a surface examination of the partial penetration weld, a volumetric leak path assessment of the nozzle may be performed in accordance with Note 6 of Table 1 of N-729-6.

(9) ***Volumetric Qualifications.*** Volumetric examinations of Table 1 of ASME Code Case N-729-6 may be qualified in accordance with Section XI, Division 1, Mandatory Appendix VIII, Supplement 15, in the 2021 Edition or later Editions, in lieu of subparagraphs (a) through (j) of 2500 of ASME Code Case N-729-6.

**(E) *Augmented ISI requirements: Reactor coolant pressure boundary visual inspections***<sup>10</sup> -

(1) All licensees of pressurized water reactors must augment their inservice inspection program by implementing ASME Code Case N-722-1, subject to the conditions specified in [paragraphs \(g\)\(6\)\(ii\)\(E\)\(2\)](#) through [\(4\)](#) of this section. The inspection requirements of ASME Code Case N-722-1 do not apply to components with pressure retaining welds fabricated with Alloy 600/82/182 materials that have been mitigated by weld overlay or stress improvement.

(2) If a visual examination determines that leakage is occurring from a specific item listed in Table 1 of ASME Code Case N-722-1 that is not exempted by the ASME Code, Section XI, IWB-1220(b)(1), additional actions must be performed to characterize the location, orientation, and length of a crack or cracks in Alloy 600 nozzle wrought material and location, orientation, and length of a crack or cracks in Alloy 82/182 butt welds. Alternatively, licensees may replace the Alloy 600/82/182 materials in all the components under the item number of the leaking component.

(3) If the actions in [paragraph \(g\)\(6\)\(ii\)\(E\)\(2\)](#) of this section determine that a flaw is circumferentially oriented and potentially a result of primary water stress corrosion cracking, licensees must perform non-visual NDE inspections of components that fall under that ASME Code Case N-722-1 item number. The number of components inspected must equal or exceed the number of components found to be leaking under that item number. If circumferential cracking is identified in the sample, non-visual NDE must be performed in the remaining components under that item number.

(4) If ultrasonic examinations of butt welds are used to meet the NDE requirements in [paragraphs \(g\)\(6\)\(ii\)\(E\)\(2\)](#) or [\(3\)](#) of this section, they must be performed using the appropriate supplement of Section XI, Appendix VIII, of the ASME BPV Code.

**(F) *Augmented ISI requirements: Examination requirements for Class 1 piping and nozzle dissimilar-metal butt welds*** -

(1) ***Implementation.*** Holders of operating licenses or combined licenses for pressurized-water reactors as of or after **DATE 30 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER** ~~June 3, 2020~~, shall implement the requirements of ASME BPV Code Case N-770-~~75~~ instead of

ASME BPV Code Case N-770-~~52~~, subject to the conditions specified in [paragraphs \(g\)\(6\)\(ii\)\(F\)\(2\)](#) through [\(16\)](#) of this section, by no later than one year after **DATE 30 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER**~~June 3, 2020~~. All NRC authorized alternatives from previous versions of [paragraph \(g\)\(6\)\(ii\)\(F\)](#) of this section remain applicable.

**(2) Categorization.**

(i) Welds that have been mitigated by the Mechanical Stress Improvement Process (MSIP™) may be categorized as Inspection Items D or E, as appropriate, provided the criteria in Appendix I of the code case have been met.

(ii) In order to be categorized as peened welds, in lieu of inspection category L requirements and examinations, welds must meet the performance criteria, qualification and examination requirements as stated by MRP-335, Revision 3-A, with the exception that no plant-specific alternative is required.

(iii) Other mitigated welds shall be identified as the appropriate inspection item of the NRC authorized alternative or NRC-approved code case for the mitigation type in Regulatory Guide 1.147.

(iv) All other butt welds that rely on Alloy 82/182 for structural integrity shall be categorized as Inspection Items A-1, A-2, B-1 or B-2, as appropriate.

(v) Paragraph -1100(e) of ASME BPV Code Case N-770-5 shall not be used to exempt welds that rely on Alloy 82/182 for structural integrity from any requirement of this section.

**(3) [Reserved]**

**(4) Examination coverage.** When implementing Paragraph -2500(a) of ASME BPV Code Case N-770-5, essentially 100 percent of the required volumetric examination coverage shall be obtained, including greater than 90 percent of the volumetric examination coverage for circumferential flaws. Licensees are prohibited from using Paragraphs -2500(c) and -2500(d) of ASME BPV Code Case N-770-5 to meet examination requirements.

**(5) Inlay/onlay inspection frequency.** All hot-leg operating temperature welds in Inspection Items G, H, J, and K shall be inspected each inspection interval. A 25 percent sample of Inspection Items G, H, J, and K cold-leg operating temperature welds shall be inspected whenever the core barrel is removed (unless it has already been inspected within the past 10 years) or within 20 years, whichever is less.

**(6) Reporting requirements.** The licensee will promptly notify the NRC regarding any volumetric examination of a mitigated weld that detects growth of existing flaws in the required examination volume that exceed the previous IWB-3600 flaw evaluations, new

flaws, or any indication in the weld overlay or excavate and weld repair material characterized as stress corrosion cracking. Additionally, the licensee will submit to the NRC a report summarizing the evaluation, along with inputs, methodologies, assumptions, and causes of the new flaw or flaw growth within 30 days following plant startup.

(7) **Defining “t”.** For Inspection Items G, H, J, and K, when applying the acceptance standards of ASME BPV Code, Section XI, IWB-3514, for planar flaws contained within the inlay or onlay, the thickness “t” in IWB-3514 is the thickness of the inlay or onlay. For planar flaws in the balance of the dissimilar metal weld examination volume, the thickness “t” in IWB-3514 is the combined thickness of the inlay or onlay and the dissimilar metal weld.

(8) **Optimized weld overlay examination.** ~~Following initial inservice volumetric inspection examination of~~ Inspection Items C-2 and F-2 of Table 1 of ASME Code Case N-770-7, for welds overlay examination volumes that show no indication of crack growth or new cracking, in lieu of sample population, 100 percent of these optimized weld overlayed welds shall be added to the ISI program in accordance with -2410 of ASME Code Case N-770-7 and shall be examined once each inspection interval.~~shall be performed between the third refueling outage and no later than 10 years after application of the overlay.~~

(9) **Deferrals.**

(i) The initial inservice volumetric examination of optimized weld overlays, Inspection Item C-2, shall not be deferred.

(ii) Volumetric inspection of peened dissimilar metal butt welds shall not be deferred.

(iii) For Inspection Item M-2, N-1 and N-2 welds, the second required inservice volumetric examination shall not be deferred.

(10) **Examination technique.** Note 14(b) of Table 1 and Note (b) of Figure 5(a) of ASME BPV Code Case N-770-5 may only be implemented if the requirements of Note 14(a) of Table 1 of ASME BPV Code Case N-770-5 cannot be met.

(11) [Reserved]

(12) **Stress improvement inspection coverage.** Under Paragraph I.5.1, for cast stainless steel items, the required examination volume shall be examined by Appendix VIII procedures to the maximum extent practical including 100 percent of the susceptible material volume.

(13) **Encoded ultrasonic examination.** Ultrasonic examinations of non-mitigated or cracked mitigated dissimilar metal butt welds in the reactor coolant pressure boundary must be performed in accordance with the requirements of Table 1 for Inspection Item

A-1, A-2, B-1, B-2, E, F-2, J, K, N-1, N-2 and O. Essentially 100 percent of the required inspection volume shall be examined using an encoded method.

(14) ***Excavate and weld repair cold leg.*** For cold leg temperature M-2, N-1 and N-2 welds, initial volumetric inspection after application of an excavate and weld repair (EWR) shall be performed during the second refueling outage.

(15) ***Cracked excavate and weld repair.*** In lieu of the examination requirements for cracked welds with 360 excavate and weld repairs, Inspection Item N-1 of Table 1, welds shall be examined during the first or second refueling outage following EWR. Examination volumes that show no indication of crack growth or new cracking shall be examined once each inspection interval thereafter.

(16) ***Partial arc excavate and weld repair.*** Inspection Item O cannot be used without NRC review and approval.

(h) ***Protection and safety systems.*** Protection systems of nuclear power reactors of all types must meet the requirements specified in this paragraph. Each combined license for a utilization facility is subject to the following conditions.

(1) [Reserved]

(2) ***Protection systems.*** For nuclear power plants with construction permits issued after January 1, 1971, but before May 13, 1999, protection systems must meet the requirements in IEEE Std 279-1968, "Proposed IEEE Criteria for Nuclear Power Plant Protection Systems," or the requirements in IEEE Std 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations," or the requirements in IEEE Std 603-1991, "Criteria for Safety Systems for Nuclear Power Generating Stations," and the correction sheet dated January 30, 1995. For nuclear power plants with construction permits issued before January 1, 1971, protection systems must be consistent with their licensing basis or may meet the requirements of IEEE Std. 603-1991 and the correction sheet dated January 30, 1995.

(3) ***Safety systems.*** Applications filed on or after May 13, 1999, for construction permits and operating licenses under this part, and for design approvals, design certifications, and combined licenses under [part 52 of this chapter](#), must meet the requirements for safety systems in IEEE Std. 603-1991 and the correction sheet dated January 30, 1995.

(i)-(y) [Reserved]

(z) ***Alternatives to codes and standards requirements.*** Alternatives to the requirements of [paragraphs \(b\)](#) through [\(h\)](#) of this section or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

(1) ***Acceptable level of quality and safety.*** The proposed alternative would provide an acceptable level of quality and safety; or

(2) ***Hardship without a compensating increase in quality and safety.*** 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. Footnotes to [§ 50.55a](#):

<sup>1</sup> USAS and ASME Code addenda issued prior to the winter 1977 Addenda are considered to be “in effect” or “effective” 6 months after their date of issuance and after they are incorporated by reference in [paragraph \(a\)](#) of this section. Addenda to the ASME Code issued after the summer 1977 Addenda are considered to be “in effect” or “effective” after the date of publication of the addenda and after they are incorporated by reference in [paragraph \(a\)](#) of this section.

<sup>2-3</sup> [Reserved]

<sup>4</sup> For ASME Code editions and addenda issued prior to the winter 1977 Addenda, the Code edition and addenda applicable to the component is governed by the order or contract date for the component, not the contract date for the nuclear energy system. For the winter 1977 Addenda and subsequent editions and addenda the method for determining the applicable Code editions and addenda is contained in Paragraph NCA 1140 of Section III of the ASME Code.

<sup>5-6</sup> [Reserved]

<sup>7</sup> Guidance for quality group classifications of components that are to be included in the safety analysis reports pursuant to [§ 50.34\(a\)](#) and [§ 50.34\(b\)](#) may be found in Regulatory Guide 1.26, “Quality Group Classifications and Standards for Water-, Steam-, and Radiological-Waste-Containing Components of Nuclear Power Plants,” and in [Section 3.2.2](#) of NUREG-0800, “Standard Review Plan for Review of Safety Analysis Reports for Nuclear Power Plants.”

<sup>8-9</sup> [Reserved]

<sup>10</sup> For inspections to be conducted once per interval, the inspections must be performed in accordance with the schedule in Section XI, paragraph IWB-2400, except for plants with inservice inspection programs based on a Section XI edition or addenda prior to the 1994 Addenda. For plants with inservice inspection programs based on a Section XI edition or addenda prior to the 1994 Addenda, the inspection must be performed in accordance with the schedule in Section XI, paragraph IWB-2400, of the 1994 Addenda.

[[79 FR 65798](#), Nov. 5, 2014, as amended at [79 FR 66603](#), Nov. 10, 2014; [79 FR 73462](#), Dec. 11, 2014; [82 FR 52825](#), Dec. 15, 2017; [83 FR 2354](#), Jan. 17, 2018; [83 FR 2526](#), Jan. 18, 2018; [84 FR 65644](#), Nov. 29, 2019; [85 FR 14756](#), Mar. 16, 2020; [85 FR 26576](#), May 4, 2020; [85 FR 34088](#), June 3, 2020; [85 FR 65662](#), Oct. 16, 2020; [87 FR 65148](#), Oct. 27, 2022]