[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

[NRC-2017-0025]

RIN 3150-AJ94

Approval of American Society of Mechanical Engineers' Code Cases

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is amending its regulations to incorporate by reference revisions of three regulatory guides to approve new, revised, and reaffirmed code cases published by the American Society of Mechanical Engineers. The NRC is also incorporating by reference one NRC NUREG associated with a condition on one of the regulatory guides. This action allows nuclear power plant licensees and applicants for construction permits, operating licenses, combined licenses, standard design certifications, standard design approvals, and manufacturing licenses to use the code cases listed in these regulatory guides as voluntary alternatives to engineering standards for the construction, inservice inspection, and inservice testing of nuclear power plant components. These engineering standards are set forth in the American Society of Mechanical Engineers' Boiler and Pressure Vessel Codes and American Society of Mechanical Engineers' Operation and Maintenance Codes, which are currently incorporated by reference into the NRC's regulations. Further, this final rule announces the availability of a related regulatory

guide, not incorporated by reference into the NRC's regulations, that lists code cases that the NRC has not approved for use.

DATES: This final rule is effective on **April 4, 2022.** The incorporation by reference of certain publications listed in the regulation is approved by the Director of the Federal Register as of **April 4, 2022.**

ADDRESSES: Please refer to Docket ID NRC-2017-0025 when contacting the NRC about the availability of information for this action. You may obtain publicly-available information related to this action by any of the following methods:

- **Federal Rulemaking Website:** Go to https://www.regulations.gov and search for Docket ID NRC-2017-0025. Address questions about NRC dockets to Dawn Forder; telephone: 301-415-3407; email: Dawn.Forder@nrc.gov. For technical questions, contact the individuals listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly-available documents online in the ADAMS Public Documents collection at https://www.nrc.gov/reading-rm/adams.html. To begin the search, select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by email to pdr.resource@nrc.gov. For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in the "Availability of Documents" section.

- **NRC's PDR:** You may examine and purchase copies of public documents, by appointment, at the NRC's PDR, Room P1 B35, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852. To make an appointment to visit the PDR,

please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8:00 a.m. and 4:00 p.m. (ET), Monday through Friday, except Federal holidays.

- **Technical Library:** The Technical Library, which is located at Two White Flint North, 11545 Rockville Pike, Rockville, Maryland 20852, is open by appointment only. Interested parties may make appointments to examine documents by contacting the NRC Technical Library by email at Library.Resource@nrc.gov between 8:00 a.m. and 4:00 p.m. (ET), Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Martha Barillas, Office of Nuclear Material Safety and Safeguards; telephone: 301-415-2760, email: Martha.Barillas@nrc.gov; or Bruce Lin, Office of Nuclear Regulatory Research, telephone: 301-415-2446; email: Bruce.Lin@nrc.gov. Both are staff of the U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

EXECUTIVE SUMMARY:

A. Need for the Regulatory Action

The purpose of this regulatory action is to incorporate by reference into the NRC's regulations the latest revisions of three regulatory guides (RGs). This regulatory action is also incorporating by reference, NUREG-2228, "Weld Residual Stress Finite Element Analysis Validation: Part II—Proposed Validation Procedure," that is associated with a condition in one of the regulatory guides. The three RGs identify new, revised, and reaffirmed code cases published by the American Society of Mechanical Engineers (ASME), which the NRC has determined are acceptable for use as voluntary alternatives to compliance with certain provisions of the ASME *Boiler and Pressure*

Vessel Code (BPV Code) and the ASME *Code for Operation and Maintenance of Nuclear Power Plants, Division 1, OM Code: Section IST* (OM Code), currently incorporated by reference into the NRC's regulations.

B. Major Provisions

The three RGs that the NRC is incorporating by reference are RG 1.84, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III," Revision 39; RG 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 20; and RG 1.192, "Operation and Maintenance [OM] Code Case Acceptability, ASME OM Code," Revision 4. The NRC is also incorporating by reference NUREG-2228, which provides the procedure for validating the weld residual stress analysis methodology associated with ASME Code Case N-847. This final rule allows nuclear power plant licensees and applicants for construction permits, operating licenses, combined licenses, standard design certifications, standard design approvals, and manufacturing licenses to use the code cases newly listed in these revised RGs as voluntary alternatives to engineering standards for the construction, inservice inspections, and inservice testing of nuclear power plant components. In this document, the NRC also notifies the public of the availability of RG 1.193, "ASME Code Cases Not Approved for Use," Revision 7. This document lists code cases that the NRC has not approved for generic use and is not incorporated by reference into the NRC's regulations.

The NRC prepared a regulatory analysis to determine the expected quantitative costs and benefits of this final rule, as well as qualitative factors to be considered in the NRC's rulemaking decision. The analysis concluded that this rule results in net savings to the industry and the NRC. As shown in Table 1, the estimated total net benefits relative to the regulatory baseline range from approximately $5.86 million (7-percent net present value) to $6.67 million (3-percent net present value).

Table 1 — Cost Benefit Summary

Attribute	Total averted costs (costs)		
	Undiscounted	**7% Net Present Value**	**3% Net Present Value**
Industry Implementation	$0	$0	$0
Industry Operation	$4,920,000	$3,920,000	$4,450,000
Total Industry Costs	*$4,920,000*	*$3,920,000*	*$4,450,000*
NRC Implementation	$0	$0	$0
NRC Operation	$2,460,000	$1,940,000	$2,220,000
Total NRC Costs	*$2,460,000*	*$1,940,000*	*$2,220,000*
Net	**$7,380,000**	**$5,860,000**	**$6,670,000**

The regulatory analysis also considered the following qualitative considerations: 1) flexibility and decreased uncertainty for licensees when making modifications or preparing to perform inservice inspection or inservice testing; 2) consistency with the provisions of the National Technology Transfer and Advancement Act of 1995, which encourages Federal regulatory agencies to consider adopting voluntary consensus standards as an alternative to *de novo* agency development of standards affecting an industry; 3) consistency with the NRC's policy of evaluating the latest versions of consensus standards in terms of their suitability for endorsement by regulations and regulatory guides; and 4) consistency with the NRC's goal to harmonize with international standards to improve regulatory efficiency for both the NRC and international standards groups.

The regulatory analysis concludes that this final rule should be adopted because it is justified when integrating the cost-beneficial quantitative results and the positive and supporting nonquantitative considerations in the decision. For more information, please

see the final regulatory analysis as indicated in Section XVI, “Availability of Documents,” of this document.

TABLE OF CONTENTS:

I. Background

The ASME develops and publishes the ASME BPV Code, which contains requirements for the design, construction, and inservice inspection examination of nuclear power plant components, and the ASME OM Code,[1] which contains requirements for inservice testing of nuclear power plant components. In response to BPV and OM Code user requests, the ASME develops code cases that provide voluntary alternatives to BPV and OM Code requirements under special circumstances.

The NRC approves the ASME BPV and OM Codes in § 50.55a, “Codes and standards,” of title 10 of the *Code of Federal Regulations* (10 CFR) through the process

[1] The editions and addenda of the ASME Code for Operation and Maintenance of Nuclear Power Plants have had different titles from 2005 to 2017 and are referred to as the “OM Code” collectively in this rule.

of incorporation by reference. As such, each provision of the ASME Codes incorporated by reference into and mandated by § 50.55a constitutes a legally-binding NRC requirement imposed by rule. As noted previously, the ASME code cases, for the most part, represent alternative approaches for complying with provisions of the ASME BPV and OM Codes. Accordingly, the NRC periodically amends § 50.55a to incorporate by reference the NRC's RGs listing approved ASME code cases that may be used as voluntary alternatives to the BPV and OM Codes.[2]

This final rule is the latest in a series of rules that incorporate by reference new versions of several RGs identifying new, revised, and reaffirmed,[3] and unconditionally or conditionally acceptable ASME code cases that the NRC approves for use. In developing these RGs, the NRC reviews the ASME BPV and OM code cases, determines the acceptability of each code case, and publishes its findings in the RGs. The RGs are revised periodically as new code cases are published by the ASME. The NRC incorporates by reference the RGs listing acceptable and conditionally acceptable ASME code cases into § 50.55a. The NRC published a final rule dated March 16, 2020, that incorporated by reference into § 50.55a the most recent versions of the RGs, which are RG 1.84, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III," Revision 38; RG 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 19; and RG 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," Revision 3.

[2] See *Federal Register* final rule, "Incorporation by Reference of ASME BPV and OM Code Cases" (68 FR 40469; July 8, 2003).

[3] Code Cases are categorized by the ASME as one of three types: new, revised, or reaffirmed. A new Code Case provides for a new alternative to specific the ASME Code provisions or addresses a new need. The ASME defines a revised Code Case to be a revision (modification) to an existing Code Case to address, for example, technological advancements in examination techniques or to address NRC conditions imposed in one of the RGs that have been incorporated by reference into § 50.55a. The ASME defines "reaffirmed" as an OM Code Case that does not have any change to technical content, but includes editorial changes.

II. Discussion

This final rule incorporates by reference NUREG-2228 and the latest revisions of the NRC's RGs that list the ASME BPV and OM code cases that the NRC finds to be acceptable, or acceptable with NRC-specified conditions ("conditionally acceptable"). Regulatory Guide 1.84, Revision 39, supersedes the incorporation by reference of Revision 38; RG 1.147, Revision 20, supersedes the incorporation by reference of Revision 19; and RG 1.192, Revision 4, supersedes the incorporation by reference of Revision 3.

The ASME code cases that are the subject of this final rule are the new and revised Section III and Section XI code cases as listed in Supplements 0 through 7 to the 2015 Edition of the ASME BPV Code, Supplements 0 through 7 to the 2017 Edition of the ASME BPV Code, Supplements 0 and 1 to the 2019 Edition of the ASME BPV Code, and the OM code cases listed in the 2020 Edition of the ASME OM Code and on the ASME Codes & Standards (C&S) Connect website.[4]

The latest editions and addenda of the ASME BPV and OM Codes that the NRC has approved for use are referenced in § 50.55a. The ASME also publishes code cases that provide alternatives to existing Code requirements that the ASME developed and approved. This final rule incorporates by reference the most recent revisions of RGs 1.84, 1.147, and 1.192, which allow nuclear power plant licensees, and applicants for combined licenses, standard design certifications, standard design approvals, and manufacturing licenses under the regulations that govern license certifications, to use the code cases listed in these RGs as suitable alternatives to the ASME BPV and OM

[4] The ASME included code cases with the published editions and addenda of the OM Code through the 2017 Edition. Starting with the 2020 Edition, code cases were not published with the OM Code; an applicability index for ASME OM code cases was published. Code cases are available on the ASME website under the "O&M CASES" tab in the left-hand column at http://go.asme.org/OMcommittee.

Codes for the construction, inservice inspections, and inservice testing of nuclear power plant components. Because the NRC is requiring the use of NUREG-2228 within a condition on Code Case N-847, the NRC is also incorporating by reference NUREG-2228. The ASME publishes the OM Code Cases and lists the code cases in the ASME OM Code edition and on the ASME C&S Connect web site. In contrast, the ASME publishes BPV code cases in a separate document and at a different time than the ASME BPV code editions. This final rule identifies the code cases by the edition of the ASME BPV Code or ASME OM Code under which they were published by the ASME.

The following general guidance applies to the use of the ASME code cases approved in the latest versions of the RGs that are incorporated by reference into § 50.55a as part of this final rule. Specifically, the use of the code cases listed in the latest versions of RGs 1.84, 1.147, and 1.192 are acceptable with the specified conditions when implementing the editions and addenda of the ASME BPV and OM Codes incorporated by reference in § 50.55a.

The approval of a code case in the NRC's RGs constitutes acceptance of its technical position for applications that are not precluded by regulatory or other requirements or by the recommendations in these RGs. The applicant or licensee is responsible for ensuring that use of the code case does not conflict with regulatory requirements or licensee commitments. The code cases listed in the RGs are acceptable for use within the limits specified in the code cases. If the RG states an NRC condition on the use of a code case, then the NRC condition supplements and does not supersede any condition(s) specified in the code case, unless otherwise stated in the NRC condition.

The ASME code cases may be revised for many reasons (e.g., to incorporate operational examination and testing experience and to update material requirements

based on research results). On occasion, an inaccuracy in an equation is discovered or an examination, as practiced, is found not to be adequate to detect a newly discovered degradation mechanism.

Therefore, when an applicant or a licensee initially implements a code case, § 50.55a requires that the applicant or the licensee implement the most recent version of that code case, as listed in the RGs incorporated by reference. Code cases superseded by revision are no longer acceptable for new applications unless otherwise indicated.

Section III of the ASME BPV Code applies to new construction (i.e., the edition and addenda to be used in the construction of a plant are selected based on the date of the construction permit and are not changed thereafter, except voluntarily by the applicant or the licensee). Hence, if a Section III code case is implemented by an applicant or a licensee and a later version of the code case is incorporated by reference into § 50.55a and listed in the RG, the applicant or licensee may use either version of the code case (subject, however, to whatever change requirements apply to its licensing basis (e.g., § 50.59)).

A licensee's inservice inspection and inservice testing programs must be updated every 10 years to the latest edition and addenda of the ASME BPV Code, Section XI, and the OM Code, respectively, that were incorporated by reference into § 50.55a and in effect 18 months prior to the start of the next inspection and testing interval. Licensees that were using a code case prior to the effective date of its revision may continue to use the previous version for the remainder of the 120-month inservice inspection or inservice testing interval. This relieves licensees of the burden of having to update their inservice inspection or inservice testing program each time a code case is revised by the ASME and approved for use by the NRC. Code cases apply to specific editions and addenda, and code cases may be revised if they are no longer accurate or adequate, so licensees choosing to continue using a code case during the subsequent inservice inspection or

inservice testing interval must implement the latest version incorporated by reference into § 50.55a and listed in the RGs.

The ASME may annul code cases that are no longer required, are determined to be inaccurate or inadequate, or have been incorporated into the BPV or OM Codes. A code case may be revised, for example, to incorporate user experience. The older or superseded version of the code case cannot be applied by the licensee or applicant unless it was applied prior to being annulled or superseded.

If an applicant or a licensee applied a code case before it was listed as superseded, the applicant or the licensee may continue to use the code case until the applicant or the licensee updates its construction Code of Record (in the case of an applicant, updates its application) or until the licensee's 120-month inservice inspection or inservice testing update interval expires, after which the continued use of the code case is prohibited unless NRC authorization is given under § 50.55a(z). If a code case is incorporated by reference into § 50.55a and later a revised version is issued by the ASME because experience has shown that the design analysis, construction method, examination method, or testing method is inadequate, the NRC will amend § 50.55a and the relevant RG to remove the approval of the superseded code case. Applicants and licensees should not begin to implement such superseded code cases in advance of the rulemaking.

A. ASME Code Cases Approved for Unconditional Use

The code cases discussed in Table I are new, revised, or reaffirmed code cases in which the NRC approves for use without conditions. The table identifies the regulatory guide listing the applicable code case that the NRC approves for use.

Table I – Acceptable Code Cases

Boiler and Pressure Vessel Code Section III (addressed in RG 1.84, Table 1)		
Code Case No.	**Published with Supplement**	**Title**
N-249-17	0 (2019 Edition)	Additional Materials for Subsection NF, Classes 1, 2, 3, and MC Supports Fabricated without Welding, Section III, Division 1
N-539-1	0 (2017 Edition)	UNS N08367 in Class 2 and 3 Valves, Section III, Division 1
N-692-1	6 (2015 Edition)	Use of Standard Welding Procedures, Section III, Division 1
N-721-1	5 (2017 Edition)	Alternative Rules for Linear Piping Supports, Section III, Division 1
N-801-3	1 (2017 Edition)	Rules for Repair of N-Stamped Class 1, 2, and 3 Components, Section III, Division 1
N-822-4	7 (2015 Edition)	Application of the ASME Certification Mark, Section III, Divisions 1, 2, 3, and 5
N-855	2 (2015 Edition)	SB-148 C95800 Valves for Class 3 Construction, Section III, Division 1
N-856	2 (2015 Edition)	SA-494 Grade CW-12MW (UNS N30002) Nickel Alloy Castings for Construction of NPS 2½ and Smaller Flanged Valves for Class 3 Construction, Section III, Division 1
N-859	5 (2015 Edition)	Construction of ASME B16.9 Wrought Buttwelding Fittings and ASME B16.11 Forged Fittings Made From SB-366 UNS N04400 Material for Section III, Class 3 Construction, Section III, Division 1
N-863-1	1 (2017 Edition)	Post Weld Heat Treatment (PWHT) of Valve Seal Welds for P4 and P5A Materials, Section III, Division 1
N-866	0 (2017 Edition)	Alternative Materials for Construction of Section III, Class 2 Vessels, Section III, Division 1
N-870-1	4 (2017 Edition)	Rules for the Elimination of External Surface Defects on Class 1, 2, and 3 Piping, Pumps, or Valves After Component Stamping and Prior to Completion of the N-3 Data Report, Section III, Division 1
N-879	1 (2017 Edition)	Use of Micro-Alloyed Carbon Steel Bar in Patented Mechanical Joints and Fittings, Classes 1, 2, and 3, Section III, Division 1

N-884	0 (2019 Edition)	Procedure to Determine Strain Rate for Use with the Environmental Fatigue Design Curve Method and the Environmental Fatigue Correction Factor, F_{en}, Method as Part of an Environmental Fatigue Evaluation for Components Analyzed per the NB-3200 Rules, Section III, Division 1
N-887	6 (with errata issued in 3/19E)	Alternatives to the Requirements of NB-4424.2(a), Figure NB-4250-2, and Figure NB-4250-3, Section III, Division 1
N-891	0 (2019 Edition)	Alternative Requirements to Appendix XXVI, XXVI-2400, XXVI-4130, and XXVI-4131 for Inspection and Repair of Indentations for Polyethylene Pipe and Piping Components, Section III, Division 1
Boiler and Pressure Vessel Code Section XI (addressed in RG 1.147, Table 1)		
Code Case No.	**Published with Supplement**	**Title**
N-561-3	0 (2019 Edition)	Alternative Requirements for Wall Thickness Restoration of Class 2 and High Energy Class 3 Carbon Steel Piping, Section XI, Division 1
N-638-10	1 (2019 Edition)	Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique, Section XI, Division 1
N-653-2	2 (2015 Edition)	Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds, Section XI, Division 1
N-702-1	1 (2019 Edition)	Alternative Requirements for Boiling Water Reactor (BWR) Nozzle Inner Radius and Nozzle-to-Shell Welds, Section XI, Division 1
N-716-2	0 (2017 Edition)	Alternative Piping Classification and Examination Requirements, Section XI, Division 1
N-768	0 (2019 Edition)	Alternative Volumetric Coverage Requirements for Ultrasonic Examination of Class 1 and 2 Pressure Vessel Weld Joints Greater Than 2 in. (50 mm) in Thickness, Section XI, Division 1
N-786-3	1 (2017 Edition)	Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate Energy Carbon Steel Piping, Section XI, Division 1
N-789-3	1 (2017 Edition)	Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate Energy Carbon Steel Piping for Raw Water Service, Section XI, Division 1
N-809	2 (2015 Edition)	Reference Fatigue Crack Growth Rate Curves for Austenitic Stainless Steels in Pressurized Reactor Water Environments, Section XI, Division 1
N-845-1	6 (2015 Edition)	Qualification Requirements for Bolts and Studs, Section XI, Division 1
N-848-1	0 (2017 Edition)	Alternative Characterization Rules for Quasi-Laminar Flaws, Section XI, Division 1

N-851	0 (2015 Edition)	Alternate Method for Establishing the Reference Temperature for Pressure Retaining Materials, Section XI, Division 1
N-858	2 (2017 Edition)	Alternative Volumetric Coverage Requirements for Ultrasonic Examination of Class 1 Nozzle-to-Vessel Welds, Section XI, Division 1
N-865	2 (2017 Edition)	Alternative Requirements for Pad Reinforcement of Class 2 and 3 Atmospheric Storage Tanks, Section XI, Division 1
N-867	0 (2017 Edition)	Clarification of NDE Practical Examination Requirements, Section XI, Division 1
N-873	1 (2017 Edition)	Examination Requirements for the Core Makeup Tanks, Section XI, Division 1
N-874	7 (2017 Edition)	Temporary Acceptance of Leakage Through Brazed Joints of Class 3 Copper, Copper-Nickel, and Nickel-Copper Moderate Energy Piping, Section XI, Division 1
N-877	2 (2017 Edition)	Alternative Characterization Rules for Multiple Subsurface Radially Oriented Planar Flaws, Section XI, Division 1
N-882	6 (2017 Edition)	Alternative Requirements for Attaching Nonstructural Electrical Connections to Class 2 and 3 Components, Section XI, Division 1
N-885	0 (2019 Edition)	Alternative Requirements for Table IWB-2500-1, Examination Category B-N-1, Interior of Reactor Vessel, Category B-N-2, Welded Core Support Structures and Interior Attachments to Reactor Vessels, Category B-N-3, Removable Core Support Structures, Section XI, Division 1
N-892	0 (2019 Edition)	Alternative Requirement for Form OAR-1, Owner's Activity Report, Completion Time, Section XI, Division 1
Operation and Maintenance Code (addressed in RG 1.192, Table 1)		
Code Case	**Published with**	**Title**
OMN-13, Revision 3	2020 Edition	Performance-Based Requirements for Extending Snubber Inservice Visual Examination Interval at LWR Power Plants
OMN-15, Revision 3	2020 Edition	Performance-Based Requirements for Extending the Snubber Operational Readiness Testing Interval at LWR Power Plants
OMN-17, Revision 1	2020 Edition	Alternative Requirements for Testing ASME Class 1 Pressure Relief/Safety Valves
OMN-18[5]	2020 Edition	Alternate Testing Requirements for Pumps Tested Quarterly Within ±20% of Design Flow

[5]As a result of a public comment, the NRC agreed that the condition to require the slightly more restrictive upper-end values of the acceptable ranges for flow and differential pressure are not necessary to provide reasonable assurance that the implementation of Code Case OMN-18 will demonstrate the acceptable performance of pumps within the scope of the ASME OM Code. Therefore, the NRC deleted the condition proposed and moved OMN-18 to Table I.

OMN-22	2020 Edition	Smooth Running Pumps
OMN-23	2020 Edition	Alternative Requirements for Testing Pressure Isolation Valves
OMN-24	2020 Edition	Alternative Requirements for Testing ASME Class 2 and 3 Pressure Relief Valves (For Relief Valves in a Group of One)
OMN-25	2020 Edition	Alternative Requirements for Testing Appendix I Pressure Relief Valves
OMN-26	2020 Edition	Alternate Risk-Informed and Margin Based Rules for Inservice Testing of Motor Operated Valves
OMN-27	2020 Edition	Alternative Requirements for Testing Category A Valves (Non-PIV/CIV)

B. ASME Code Cases Approved for Use with Conditions

The NRC determined that certain code cases, as issued by the ASME, are generally acceptable for use, but that the alternative requirements specified in those code cases must be supplemented in order to provide an acceptable level of quality and safety. Accordingly, the NRC imposes conditions on the use of these code cases to modify, limit, or clarify their requirements. The conditions specify, for each applicable code case, the additional activities that must be performed, the limits on the activities specified in the code case, and/or the supplemental information needed to provide clarity. These ASME code cases, listed in Table II below, are included in Table 2 of RG 1.84, RG 1.147, and RG 1.192. This section provides the NRC's evaluation of the code cases and the reasons for the NRC's conditions. Notations indicate the conditions duplicated from previous versions of the RG.

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Table II - Conditionally Acceptable Code Cases

Boiler and Pressure Vessel Code Section III (addressed in RG 1.84, Table 2)		
Code Case No.	**Published with Supplement**	**Title**
N-71-20	6 (2015 Edition)	Additional Materials for Subsection NF, Class 1, 2, 3, and MC Supports Fabricated by Welding, Section III, Division 1
N-155-3	5 (2015 Edition)	Fiberglass Reinforced Thermosetting Resin Pipe, Section III, Division 1
N-755-4	1 (2017 Edition)	Use of Polyethylene (PE) Class 3 Plastic Pipe, Section III, Division 1
N-779	8 (2007 Edition)[6]	Alternative Rules for Simplified Elastic-Plastic Analysis Class 1, Section III, Division 1
N-852	0 (2015 Edition)	Application of the ASME NPT Stamp, Section III, Divisions 1, 2, 3, and 5
N-883	5 (2017 Edition)	Construction of Items Prior to the Establishment of a Section III, Division 1 Owner, Section III, Division 1
N-886	6 (2017 Edition)	Use of Polyethylene Pipe for Class 3, Section III, Division 1
Boiler and Pressure Vessel Code Section XI (addressed in RG 1.147, Table 2)		
Code Case No.	**Published with Supplement**	**Title**
N-513-5	6 (2017 Edition)	Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping and Gate Valves, Section XI, Division 1
N-516-5	6 (2015 Edition)	Underwater Welding, Section XI, Division 1
N-597-3	5 (2013 Edition)	Evaluation of Pipe Wall Thinning, Section XI
N-705-1	2 (2017 Edition)	Evaluation Criteria for Temporary Acceptance of Degradation in Moderate Energy Class 2 or 3 Vessels and Tanks, Section XI, Division 1
N-766-3	2 (2017 Edition)	Nickel Alloy Reactor Coolant Inlay and Onlay for Mitigation of PWR Full Penetration Circumferential Nickel Alloy Dissimilar Metal Welds in Class 1 Items, Section XI, Division 1
N-778	0 (2010 Edition)	Alternative Requirements for Preparation and Submittal of Inservice Inspection Plans, Schedules, and Preservice and Inservice Inspection Summary Reports, Section XI, Division 1
N-831-1	7 (2017 Edition)	Ultrasonic Examination in Lieu of Radiography for Welds in Ferritic or Austenitic Pipe, Section XI, Division 1

[6]Correcting editorial error from proposed rule to final rule to state correct supplement 8.

N-847	0 (2017 Edition)	Partial Excavation and Deposition of Weld Metal for Mitigation of Class 1 Items, Section XI, Division 1
N-864	2 (2017 Edition)	Reactor Vessel Threads in Flange Examinations, Section XI, Division 1
N-869	6 (2017 Edition)	Evaluation Criteria for Temporary Acceptance of Flaws in Class 2 or 3 Piping, Section XI, Division 1
N-876	2 (2017 Edition)	Austenitic Stainless Steel Cladding and Nickel Base Cladding Using Ambient Temperature Automatic or Machine Dry Underwater Laser Beam Welding (ULBW) Temper Bead Technique, Section XI, Division 1
N-878	1 (2017 Edition)	Alternative to QA Program Requirements of IWA-4142, Section XI, Division 1
N-880	2 (2017 Edition)	Alternative to Procurement Requirements of IWA-4143 for Small Nonstandard Welded Fittings, Section XI, Division 1
N-889	7 (2017 Edition)	Reference Stress Corrosion Crack Growth Rate Curves for Irradiated Austenitic Stainless Steel in Light-Water Reactor Environments, Section XI, Division 1
N-890	0 (2019 Edition)	Materials Exempted From G-2110(b) Requirement, Section XI, Division 1
Operation and Maintenance Code (addressed in RG 1.192, Table 2)		
Code Case No.	**Published with**	**Title**
OMN-1, Revision 2	2020 Edition	Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants
OMN-3	2020 Edition	Requirements for Safety Significance Categorization of Components Using Risk Insights for Inservice Testing of LWR Power Plants
OMN-4	2020 Edition	Requirements for Risk Insights for Inservice Testing of Check Valves at LWR Power Plants
OMN-9	2020 Edition	Use of a Pump Curve for Testing
OMN-12	2020 Edition	Alternative Requirements for Inservice Testing Using Risk Insights for Pneumatically and Hydraulically Operated Valve Assemblies in Light-Water Reactor Power Plants (OM-Code 1998, Subsection ISTC)
OMN-19	2020 Edition	Alternative Upper Limit for the Comprehensive Pump Test
OMN-20	2020 Edition	Inservice Test Frequency

1. ASME BPV Code, Section III Code Cases (RG 1.84)

Code Case N-71-20 [Supplement 6, 2015 Edition]

Type: Revised

Title: Additional Materials for Subsection NF, Class 1, 2, 3, and MC Supports Fabricated by Welding, Section III, Division 1

The conditions on Code Case N-71-20 are the same as the conditions on N-71-19 that were approved by the NRC in Revision 38 of RG 1.84. When the ASME revised N-71, the code case was not modified in a way that would make it possible for the NRC to remove the conditions. Therefore, the conditions are retained in Revision 39 of RG 1.84.

Code Case N-155-3 [Supplement 5, 2015 Edition]

Type: Revised

Title: Fiberglass Reinforced Thermosetting Resin Pipe, Section III, Division 1

The conditions on Code Case N-155-3 are the same as the conditions on N-155-2 that were approved by the NRC in Revision 38 of RG 1.84. When the ASME revised N-155-2, the code case was not modified in a way that would make it possible for the NRC to remove the conditions. Therefore, the conditions are retained in Revision 39 of RG 1.84.

Code Case N-755-4 [Supplement 1, 2017 Edition]

Type: Revised

Title: Use of Polyethylene (PE) Class 3 Plastic Pipe, Section III, Division 1

This code case is applicable only to butt fusion joints and the content was incorporated into Mandatory Appendix XXVI in the 2015 Edition of Section III of the ASME Code. The relevant provisions of Code Case N-755-4 are the same as those in

Mandatory Appendix XXVI. Therefore, the NRC is applying the same conditions to Code Case N-755-4. The NRC has determined that these conditions are necessary to ensure structural integrity of the polyethylene piping and fusion joints when the polyethylene piping is used in Class 3 safety-related applications.

Code Case N-779 [Supplement 8, 2007 Edition]

Type: New

Title: Alternative Rules for Simplified Elastic-Plastic Analysis Class 1, Section III, Division 1

The NRC finds the code case satisfactory and technically acceptable for use only with code editions Summer 1979 and later. This code case, as written, is not acceptable for use with editions of Section III earlier than the Summer 1979 Edition, which included the term Delta T1 in NB-3600 Equation 10, because the code case is based on equations used in the Summer 1979 Edition and later editions of the Code.

Code Case N-852 [Supplement 0, 2015 Edition]

Type: New

Title: Application of the ASME NPT Stamp, Section III, Divisions 1, 2, 3, and 5

The NRC approved this code case with a condition in a § 50.55a rulemaking issued in 2017 (82 FR 32934; July 18, 2017), and the supplement was not modified in a way that would make it possible for the NRC to remove the condition. Therefore, the condition is retained in Revision 39 of RG 1.84.

Code Case N-883 [Supplement 5, 2017 Edition]

Type: New

Title: Construction of Items Prior to the Establishment of a Section III, Division 1 Owner, Section III, Division 1

This code case allows certificate holders to construct all items prior to the establishment of an Owner. Code Case N-883 was developed to address international stakeholders and identify the ASME as a global standard development organization. The NRC's main concern is that without the designation of an Owner, the NRC would not be able to provide regulatory oversight of the ASME certificate holder manufacturing the items, which is not consistent with appendix B to 10 CFR part 50 and the requirements in § 50.55(a) for a basic component. During discussions with the ASME staff on this code case, it was determined that the NRC would condition this code case based on regulatory oversight, as would other regulatory bodies depending on each countries' specific regulations. This is evident as this code case specifies that the "the items have been constructed by [ASME] Certificate Holders who are specifically authorized by the Regulatory Authority having jurisdiction over the Owner's facility to construct items using this Case." The condition, "This Code Case may be used for the construction of items by a holder of a construction permit, operating license, or combined license under 10 CFR part 50 or part 52," provides this specific regulatory authorization thereby ensuring the appropriate regulatory oversight. As a result of public comment, the NRC clarified the condition on the code case as follows: "This Code Case may only be used for the construction of items by a holder of a construction permit, operating license, or combined license under 10 CFR Part 50 or 10 CFR Part 52. This Code Case may not be used by a holder of a manufacturing license or standard design approval or by a design certification applicant."

Code Case N-886 [Supplement 6, 2017 Edition]

Type: New

Title: Use of Polyethylene Pipe for Class 3, Section III, Division 1

This code case is applicable for the use of polyethylene pipe in Section III, Class 3, Division 1 above ground applications. This code case refers to Mandatory Appendix XXVI of Section III of the ASME Code. The 2015 Edition of Appendix XXVI contains requirements for butt fusion joints for buried piping. The 2017 Edition of Appendix XXVI contains requirements for butt fusion and electrofusion joints for buried piping. Therefore, all the conditions as noted in Section III of the 2015-2017 Code Edition rule related to buried piping Mandatory Appendix XXVI apply to this code case. The same conditions as buried piping also apply to above ground application. One additional condition is needed for above ground applications related to fire protection. A condition on fire protection is needed because polyethylene material is combustible and above ground uses are more susceptible to fire hazards.

The NRC agreed with the public comments to remove conditions 1, 2, and 3 because the three conditions are the same as those for Section III, Mandatory Appendix XXVI, which was conditionally accepted by the NRC in § 50.55a. It is redundant to specify these conditions to Code Case N-886.

As a result of public comment, the NRC clarified condition 4 to state that for aboveground applications, licensees must ensure that plant fire protection program addresses any high-density polyethylene (HDPE) consistent with the requirements of 10 CFR 50.48. The licensee must identify the specific program to satisfy this objective such as the plant fire protection program. Therefore, the condition is retained in Revision 39 of RG 1.84.

The NRC agreed with the public comment to remove condition 5 because the requirement that carbon black distribution in HDPE pipe to be homogenous to prevent

windows and delamination is a pipe manufacturing process issue. The staff determined that the requirements in Mandatory Appendix XXVI-2231(b) adequately address this issue. Code Case N-886 is only for design, and all materials must meet the requirements of Appendix XXVI.

2. ASME BPV Code, Section XI Code Cases (RG 1.147)

Code Case N-513-5 [Supplement 6, 2017 Edition]

Type: Revised

Title: Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping and Gate Valves, Section XI, Division 1

Code Case N-513-5 contains provisions to permit temporary acceptance of flaws, in moderate energy Class 2 or 3 piping, including elbows, pipe bends, reducers, expanders, branch tees, and gate valves without performing a repair/replacement activity for a limited period. The code case contains provisions regarding the scope, flaw characterization, periodic leakage monitoring, flaw evaluation, and augmented examinations. The NRC finds that the provisions of N-513-5 are acceptable except that the augmented examination provisions in Section 5 of the code case require clarification.

When a licensee applies N-513-5 to disposition a through-wall leak or wall thinning in a piping system, Section 5 of the code case requires augmented examinations for flaws and significant flaws. The augmented examination requirements in N-513-5 are the same as in Code Case N-513-3.

In 2018, the NRC found an instance where a licensee misinterpreted the provisions in Section 5 of N-513-3 and did not perform the required augmented examinations to disposition a through-wall leak in a service water system pipe. Other licensees have similarly misinterpreted the augmented examination provisions in Section

5 of N-513-3. The NRC found that the issue stems from the definition of the terms “flaw” and “significant flaw” in Sections 5(b) and 5(c) of N-513-3, respectively. The NRC, therefore, imposes two conditions to define “flaw” and “significant flaw” as those terms are used in Section 5 of N-513-5. Licensees would be required to apply these definitions to Section 5 when using the code case.

The first condition defines a “flaw” as a non-through-wall planar or nonplanar flaw with a wall thickness less than 87.5 percent of the nominal wall thickness of the pipe or the design minimum wall thickness. The NRC notes that the pipe wall thickness at the time of the plant construction may deviate from the nominal pipe wall thickness slightly as part of manufacturing process. The generally accepted deviation is 12.5 percent of the nominal pipe wall thickness or the design minimum wall thickness.

The second condition defines “significant flaw” as any pipe location that does not satisfy the provisions of Section 3 of N-513-5 or if any detected flaw that has a depth greater than 75 percent of the pipe wall thickness. The NRC staff notes that the criterion of the 75 percent wall thickness criterion originates from the provisions of IWC/IWD-3643 of the ASME Code, Section XI, which prohibits a flaw that exceeds 75 percent of the pipe wall thickness to remain in service. Under Section 5 of N-513-5, a planar flaw that exceeds 75 percent of the pipe wall thickness may remain in service; however, the licensee must perform an augmented examination. The NRC agreed with the public comment that Condition 2 needed clarification. As a result, the NRC revised Condition No. 2 as follows: “For the purposes of section 5 of Code Case N-513-5, the term “significant flaw” means any flaw found during augmented examinations performed per Section 5 of N-513-5 that has a depth greater than 75 percent of the pipe wall thickness or that does not satisfy the applicable requirements of the flaw evaluation per Section 3 of N-513-5. If a significant flaw as defined above is present, then the licensee must perform the additional augmented examination specified in Section 5.”

Code Case N-516-5 [Supplement 6, 2015 Edition]

Type: Revised

Title: Underwater Welding, Section XI, Division 1

In the rulemaking for the 2009 Addenda through 2013 Editions of the ASME Code (82 FR 32934; September 18, 2017), the NRC-specified conditions that should be applied to Section XI, Article IWA-4660 when performing underwater welding on irradiated materials. These conditions provide guidance on what level of neutron irradiation and/or helium content would require review and approval by the NRC because of the impact of neutron fluence on weldability. These conditions provide separate criteria for three generic classes of material: ferritic material, austenitic material other than P-No. 8 (e.g., nickel-based alloys) and austenitic P-No. 8 material (e.g., stainless steel alloys). These conditions are currently located in § 50.55a(b)(2)(xii)(A) and (B). The conditions located in § 50.55a(b)(2)(xii)(A) and (B) are identical to the conditions that were imposed on Code Case N-516-4 that were approved by the NRC in Revision 19 of RG 1.147. When the ASME revised N-516, the code case was not modified in a way that would make it possible for the NRC to remove the conditions. Therefore, the conditions are retained in Revision 20 of RG 1.147 by stating the provisions of § 50.55a(b)(2)(xii)(A) and (B) must be met when applying this code case.

Code Case N-597-3 [Supplement 5, 2013 Edition]

Type: Revised

Title: Evaluation of Pipe Wall Thinning, Section XI

Based on public comments, the NRC found that existing Condition 2(b) references Figure-3622.1(a)(1), which does not exist in Code Case N-597-3. The NRC revised Condition 2(b) in the final rule to reference Figure 3622-1 of the code case.

Code Case N-705-1 [Supplement 2, 2017 Edition]

Type: Revised

Title: Evaluation Criteria for Temporary Acceptance of Degradation in Moderate Energy Class 2 or 3 Vessels and Tanks, Section XI, Division 1

The condition on Code Case N-705-1 is identical to the condition on N-705 that was approved by the NRC in Revision 19 of RG 1.147. When the ASME revised N-705, the code case was not modified in a way that would make it possible for the NRC to remove the condition. Therefore, the condition is retained in Revision 20 of RG 1.147.

Code Case N-766-3 [Supplement 2, 2017 Edition]

Type: Revised

Title: Nickel Alloy Reactor Coolant Inlay and Onlay for Mitigation of Pressurized Water Reactor (PWR) Full Penetration Circumferential Nickel Alloy Dissimilar Metal Welds in Class 1 Items, Section XI, Division 1

The conditions on Code Case N-766-3 are identical to the conditions on N-766-1 that were approved by the NRC in Revision 19 of RG 1.147. When the ASME revised N-766, the code case was not modified in a way that would make it possible for the NRC to remove the conditions. Therefore, the conditions are retained in Revision 20 of RG 1.147.

Code Case N-778 [Supplement 0, 2010 Edition]

Type: New

Title: Alternative Requirements for Preparation and Submittal of Inservice Inspection Plans, Schedules, and Preservice and Inservice Inspection Summary Reports, Section XI, Division 1

Code Case N-778 was originally listed in Table 2 of Revision 18 of RG 1.147 with two conditions. As a result of public comments, the NRC revised the second condition on Code Case N-778 to be consistent with Code Case N-892 by increasing the time period for submittal of the inservice inspection summary report to 120 days following the completion of each refueling outage.

Code Case N-831-1 [Supplement 7, 2017 Edition]

Type: Revised

Title: Ultrasonic Examination in Lieu of Radiography for Welds in Ferritic or Austenitic Pipe, Section XI, Division 1

The condition on Code Case N-831-1 is identical to the condition on N-831 that was approved by the NRC in Revision 19 of RG 1.147. When ASME revised N-831, the code case was not modified in a way that would make it possible for the NRC to remove the condition. Therefore, the condition is retained in Revision 20 of RG 1.147.

Code Case N-847 [Supplement 0, 2017 Edition]

Type: New

Title: Partial Excavation and Deposition of Weld Metal for Mitigation of Class 1 Items, Section XI, Division 1

The ASME Code Case N-847 provides guidelines for a repair/mitigation process for welds. The process, excavation and weld repair (EWR), removes susceptible material from the outside diameter of the pipe, and replaces it with more resistant weld material. This technique allows for the potential of two mitigation methods, the use of

more crack-resistant material and the potential for compressive stresses on the inside surface of the repaired/mitigated weld to arrest or prevent cracking. Finally, the excavation can be done 360-degrees around the weld or only for a partial arc of the weld.

The code case would allow for application of this process to both BWR and PWR designs. However, the EWR process, as defined in this code case, has certain challenges addressing the cracking mechanisms in these operating environments and materials. In addition, the regulatory requirements or guidelines related to the code case vary depending on the design of the reactor. For PWR designs, the inservice inspection rules are provided by § 50.55a(g)(6)(ii)(F), which mandates the implementation of a version of ASME Code Case N-770-5. For BWR designs, the inservice inspection guidelines are provided by Generic Letter 88-01, "NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel Piping," or BWRVIP-75-A, "BWR Vessel and Internals Project Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules." Therefore, the NRC is imposing six conditions to ensure the inservice inspection frequency guidelines of the code case are consistent with the previous requirements and guidance, which are based on the effectiveness of the overall design of the repair/mitigation to address the various cracking mechanisms of these operating reactor designs.

The first condition is a continuation of the condition of § 50.55a(g)(6)(ii)(F)(*16*), which requires that a partial arc EWR, as described in Inspection Item O of ASME Code Case N-770-5, cannot be used without NRC review and approval for PWR designs. The NRC notes that the issues addressed in the final rule incorporating by reference the 2015 and 2017 Editions of the ASME BPV Code and the 2015 and 2017 Editions of the ASME OM Code remain applicable, and further apply to BWR design application of a partial arc EWR. These concerns are for the effectiveness of the repair through a weld

residual stress calculation and flaw growth analysis to confirm design of the mitigation for the required inspection interval, non-destructive examination uncertainty analysis of the as-found flaw remaining in the reactor coolant pressure boundary, and the potential for further crack initiation or growth. The NRC requires, through the first condition, that approval of the use of this code case is only for the application of the 360-degree EWR.

The second condition is related to Figure 1A and Figure 1B of the code case. The NRC has experience with relief request submittals, where the details associated with the configuration of the prep area, where the defect is being removed, have shown sharp bottom edges and steep walls. This geometry can result in welding issues, which could result in unfused material, leading to stress risers, which may promote cracking. The NRC requires, through the second condition, that the intersection points at the interface between EWR metal and existing base metal must be rounded to minimize stress concentration.

The third condition is related to Section 2(d) of the code case, which discusses the flaw evaluations required for the design considerations of the EWR. In recent testing conducted for the NRC measurable stress corrosion cracking (SCC) growth was detected past the interface between the SCC-susceptible and less susceptible material. It was demonstrated that the crack can branch and propagate in a direction normal to the original direction along a SCC-susceptible path. In the Alloy 52M deposited onto Alloy 182 specimens tested, this occurred in the diluted region of the Alloy 52M material as well as the weld metal. The NRC requires, through the third condition, that flaw analysis include the potential for crack growth through the dilution zone including crack branching. As NRC-approved crack growth rates are not available for all material types (e.g., Alloy 690 weld material), the alternative requirements for development of crack growth rates should be consistent with ASME Section XI Appendix C, “Flaw Growth Rate Due to Stress Corrosion Cracking,” C-3220(a). As a result of public comment, the NRC

agrees this condition should be updated to reference Section 2(d)(1), rather than 2(d)(2) as discussed in the proposed rule, for nickel-based alloys. The NRC clarified the condition to state the evaluation in Section 2(d)(1) of the code case must include evaluation of crack growth into the Alloy 690 weld material, including the dilution zones and allowing change in flaw growth direction.

The fourth condition is related to Section 2 of the code case. The NRC is requiring the use of NUREG-2228, because it provides a proven method for validating the weld residual stress analysis methodology. Because the NRC requires the use of NUREG-2228 within this condition on the requirements in the code case, the NRC is incorporating by reference NUREG-2228 into § 50.55a(a)(3)(iv).

The fifth condition is related to the longer-term volumetric inspection frequencies of Table 1, including notes (1), (3), and (4). These notes provide the BWR design inspection frequency of various EWR types based on Generic Letter 88-01 (1988) as supplemented by Generic Letter 88-01, Supplement 1 (1992), "NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel Piping," or BWRVIP-75-A, "BWR Vessel and Internals Project Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules." The NRC has concluded that the inspection requirements for EWRs for BWRs need to be augmented.

The first volumetric examination following application of BWR EWR-2A, EWR-1B, and EWR-2B welds is performed to verify effectiveness of the repair/mitigation before the new weld can be placed in a longer-term volumetric inspection frequency. The code case allows licensees the option of performing this examination during the first or second refueling outage after installation. However, based on the lower operating temperatures of a BWR (approximately 546 °F to 558 °F), and hence the potential slow crack growth rate of the remaining flaw left in service, the NRC has concluded that the examination should occur during the second refueling outage after the EWR application to provide

adequate time for any potential measurable flaw growth to occur or in the case of an EWR-2A, for crack initiation and growth to occur.

The long-term volumetric inspections for BWRs require modification because: (a) for EWR-1A EWRs, the augmented inspection requirements are consistent with the conditions of the inspection frequencies of Code Case N-770-5. These inspection frequency requirements were previously developed by the NRC based on the capabilities of the EWR process to address stress corrosion cracking while providing significant credit for the use of hydrogen water chemistry/noble metal chemical addition controls; and (b) for EWR-1B EWRs, the design that would allow a crack to be left in service, should not be allowed to go uninspected for the remainder of plant life. Therefore, the NRC requires the long-term volumetric inspection of these welds at each 10-year inservice inspection interval. The NRC notes that this condition is consistent with the NRC condition established in § 50.55a for Inspection Item N-1 EWRs (EWR that meets stress criteria; however, a crack is present).

The sixth condition is related to Table 1, Note (1), and the option to use an unspecified alternative to determine examination frequencies and scope expansion criteria. Note (1) specifies the use of NRC Generic Letter 88-01 and includes BWRVIP-75-A as an example of an alternative. The NRC has concluded that NRC Generic Letter 88-01 (1988), as supplemented by Generic Letter 88-01, Supplement 1 (1992), or BWRVIP-75-A, are acceptable, subject to the fifth condition, to determine examination frequencies and scope expansion criteria. However, Note (1) would allow the use of other, unknown alternatives and does not provide criteria to ensure alternatives are adequate for this purpose. Therefore, to ensure that licensees use an adequate standard to determine examination frequencies and scope expansion criteria, the sixth condition requires that licensees must not use an alternative other than those specified in Note (1).

Code Case N-864 [Supplement 2, 2017 Edition]

Type: New

Title: Reactor Vessel Threads in Flange Examinations, Section XI, Division 1

Code Case N-864 eliminates the required ASME Code, Section XI examination for the reactor vessel threads-in-flange for all inservice inspection intervals. The NRC has previously granted alternatives under § 50.55a(z) that eliminate the reactor pressure vessel threads-in-flange examinations (ASME Section XI, Examination Category B-G-1, Item No. B6.40) for up to two inservice inspection intervals through the NRC's alternative request process. For alternatives that requested elimination of the examination for a second consecutive 10-year inservice inspection interval, the NRC has been requesting additional information on activities performed to ensure that the condition of the reactor pressure vessel threads-in-flange receives some level of monitoring. These activities typically have included care and maintenance of the reactor vessel threads-in-flange (and studs) whenever the closure head is removed. The NRC has limited approval of such requests to two subsequent inservice inspection intervals because the NRC has determined that complete elimination of the examinations does not provide adequate protection against long-term degradation of the threads-in-flange. The NRC is imposing conditions on the use of Code Case N-864 that are consistent with the limits the NRC has placed on similar alternatives requests.

The first condition in Code Case N-864 requires that the reactor pressure vessel threads-in-flange examinations (ASME Section XI, Examination Category B-G-1, Item No. B6.40) must be performed in at least every third 10-year ISI interval. This condition also limits the application of Code Case N-864 at facilities that have been authorized under §50.55a(z) to use alternatives that eliminate reactor pressure vessel threads-in-

flange examinations to ensure that the required examination is performed at least every third 10-year inservice inspection interval.

The second condition in Code Case N-864 ensures that sufficient monitoring and maintenance activities are performed and documented when the code case is applied. As a result of public comments, the NRC clarified that performing and documenting the facility's maintenance procedures for removal, care, and visual inspection of the reactor head closure studs and threads in flange during each refueling outage are sufficient to satisfy the second condition.

Code Case N-869 [Supplement 6, 2017 Edition]

Type: New

Title: Evaluation Criteria for Temporary Acceptance of Flaws in Class 2 or 3 Piping, Section XI, Division 1

Code Case N-869 contains provisions for temporary acceptance of flaws, including through-wall flaws in Class 2 or 3 piping including elbows, pipe bends, reducers, and branch tees, whose maximum operating pressure is greater than 275 psig and does not exceed 600 psig, without performing a repair/replacement activity. The code case contains provisions regarding the scope, flaw characterization, periodic leakage monitoring, flaw evaluation, and augmented examinations. The NRC finds that the code case provides reasonable assurance that structural integrity of degraded piping will be maintained until the next scheduled refueling outage. However, the NRC finds that the augmented examination provisions in Section 5 of the code case are unclear and need additional clarification.

When a licensee applies N-869 to disposition a through-wall leak or wall thinning in a piping system, Section 5 of the code case requires augmented examinations for

flaws and significant flaws. The augmented examination requirements in N-869 are the same as in Code Case N-513-3.

In 2018, the NRC found an instance where a licensee misinterpreted the provisions in Section 5 of N-513-3 and did not perform the required augmented examinations to disposition a through-wall leak in a service water system pipe. Other licensees have similarly misinterpreted the augmented examination provisions in Section 5 of N-513-3. The NRC found that the issue stems from the definition of the terms “flaw” and “significant flaw” in Sections 5(b) and 5(c) of N-513-3, respectively. The NRC, therefore, imposes two conditions to define “flaw” and “significant flaw” as those terms are used in Section 5 of N-869. Licensees would be required to apply these definitions to Section 5 when using the code case.

The first condition defines a “flaw” as a non-through-wall planar or nonplanar flaw with a wall thickness less than 87.5 percent of the nominal wall thickness of the pipe or the design minimum wall thickness. The NRC notes that the pipe wall thickness at the time of the plant construction may deviate from the nominal pipe wall thickness slightly as part of manufacturing process. The generally accepted deviation is 12.5 percent of the nominal pipe wall thickness or the design minimum wall thickness.

The second condition defines “significant flaw” as any pipe location that does not satisfy the provisions of Section 3 of N-869 or if any detected flaw that has a depth greater than 75 percent of the pipe wall thickness. The NRC staff notes that the 75 percent wall thickness criterion originates from the provisions of IWC/IWD-3643 of the ASME Code, Section XI, which prohibit a flaw that exceeds 75 percent of the pipe wall thickness to remain in service. Under Section 5 of N-869, a planar flaw that exceeds 75 percent of the pipe wall thickness may remain in service; however, the licensee needs to perform an augmented examination.

Code Case N-876 [Supplement 2, 2017 Edition]

Type: New

Title: Austenitic Stainless Steel Cladding and Nickel Base Cladding Using Ambient Temperature Automatic or Machine Dry Underwater Laser Beam Welding (ULBW) Temper Bead Technique, Section XI, Division 1

Some irradiated stainless steel reactor vessel internal components are susceptible to experiencing irradiation assisted stress corrosion cracking. Code Case N-876 provides guidelines for repair welding the irradiated stainless steel components inside the reactor vessel. Code Case N-876 provides an alternative to the cladding temper bead repair rules of Section XI, IWA-4400, which requires preheat and postweld heat treatment. This alternative establishes new rules governing ambient temperature temper bead cladding repairs using the ULBW process.

The NRC is imposing two conditions on this code case. The first condition that must be applied when performing ULBW on irradiated materials provides guidance on what level of neutron irradiation and/or helium content would require review and approval by the NRC because of the impact of neutron fluence on weldability. The second condition limits the depth of the cladding repair due to concerns with the fracture toughness of the base metal.

The technical basis for imposing conditions on the welding of irradiated materials are that neutrons can generate helium atoms within the metal lattice through transmutation of various isotopes of boron and/or nickel. At high temperatures, such as occurs during welding, these helium atoms rapidly diffuse though the metal lattice, coalescing and forming helium bubbles at the grain boundaries. In sufficient concentration, these helium bubbles can cause grain boundary cracking that occurs in the fusion zones and heat affected zones during the heat-up/cooldown cycle.

The first condition applies conditions already applicable to Code Case N-516-5 "Underwater Welding Section XI, Division 1," that the provisions of § 50.55a(b)(2)(xii)(A) and (B) must be met. This regulation provides limits on specific levels of neutron irradiation and/or helium content, above which welding is prohibited without prior NRC review and approval. The NRC is imposing the same condition to uses of Code Case N-876.

The second condition is necessary because the code case does not require impact testing of the base metal heat affected zone (HAZ) to verify adequate fracture toughness. The code case allows the depth of the repair cavity into the ferritic base metal to be up to ¼″. This would allow welding directly to the base metal; thus, it will affect the fracture toughness of the base metal in the HAZ. Therefore, the NRC is imposing a condition restricting the use of the code case to repairs where at least 1/8" of cladding remains. The basis for the 1/8" limit is that this amount of austenitic material between the ferritic base metal and the first weld layer has generally been considered to sufficiently limit the heat input to the base metal such that deleterious effects on the fracture toughness will not occur; therefore, impact testing of the base metal is not necessary. The NRC notes that Code Case N-803, which is approved without conditions, allows repair of ferritic base material using nonferritic weld filler material based on welding procedure qualifications performed using tensile tests, side bends, and impact tests, and could be used to perform a cladding repair in which excavation into the base metal is required.

Code Case N-878 [Supplement 1, 2017 Edition]

Type: New

Title: Alternative to QA Program Requirements of IWA-4142, Section XI, Division 1

Code Case N-878 provides alternatives to the quality assurance requirements in IWA-4142 for procurement of Class 1, 2, or 3 non-welded fittings. This code case addresses the testing and certification of material used in the manufacture of non-welded fittings, but does not address how the licensee must ensure that the procured non-welded fittings meet the design and testing requirements of the ASME Code, Section III, NB/NC/ND-3671.7 for Class 1, 2, or 3 applications. Verification that the Section III requirements for the design and testing of these non-welded fittings have been met prior to use is essential in ensuring the structural integrity of these Class 1, 2 and 3 systems is maintained. Therefore, the NRC is imposing conditions for the licensee to verify the design and testing activities associated with qualification of non-welded fittings required by Section III, NB/NC/ND-3671.7 that are performed by the fabricator.

The first condition states for ASME Section III items, the Licensee must review the fabricator's design documentation and methods to ensure the fittings design is in compliance with the Licensee's design specifications, and ASME Section III NB/NC/ND-3671.7 requirements; and either 1) supervise and monitor the performance qualification tests of the fittings to ensure the design is in compliance with the Licensee's design specifications and ASME Section III NB/NC/ND-3671.7, or (2) the Licensee or Repair/Replacement Organization conducts qualification tests of the fittings or conducts design analyses to ensure the design is in compliance with the Licensee's design specifications and ASME Section III NB/NC/ND-3671.7. In response to public comments, the NRC clarified that for ASME Section III items, this condition applies only for those licensees that implemented ASME Code, Section III design requirements for their original construction code and/or the licensees that have upgraded their original design requirements to ASME Code, Section III.

The second condition states that the Licensees must give the Authorized Nuclear Inservice Inspector an opportunity to review the design report prior to installation.

Code Case N-880 [Supplement 2, 2017 Edition]

Type: New

Title: Alternative to Procurement Requirements of IWA-4143 for Small Nonstandard Welded Fittings, Section XI, Division 1

Code Case N-880 provides alternatives to the material procurement requirements of IWA-4142 and IWA-4143 for small nonstandard welded fittings. This code case does not address how the licensee must ensure the procured welded fittings meet the design and testing requirements of the ASME Code, Section III, NB/NC/ND-3671.7 for Class 1, 2, or 3 applications. Verification that the Section III requirements for the design and testing of these welded fittings have been met prior to use is essential in ensuring the structural integrity of these Class 1, 2 and 3 systems is maintained. Therefore, the NRC is imposing conditions requiring the licensee to verify the design and testing activities associated with qualification of welded fittings required by Section III, NB/NC/ND-3671.7 that are performed by the fabricator.

The first condition states for ASME Section III items, the Licensee must review the fabricator's design documentation and methods to ensure the fittings design is in compliance with the Licensee's design specifications, and ASME Section III NB/NC/ND-3671.7 requirements; and either: (1) supervise and monitor the performance qualification tests of the fittings to ensure the design is in compliance with the Licensee's design specifications and ASME Section III NB/NC/ND-3671.7, or (2) the Licensee or Repair/Replacement Organization conducts qualification tests of the fittings or conducts design analyses to ensure the design is in compliance with the Licensee's design specifications and ASME Section III NB/NC/ND-3671.7. In response to public

comments, the NRC clarified that for ASME Section III items, this condition applies only for those licensees that implemented ASME Code, Section III design requirements for their original construction code and/or the licensees that have upgraded their original design requirements to ASME Code, Section III.

The second condition states that the Licensees must give the Authorized Nuclear Inservice Inspector an opportunity to review the design report prior to installation.

Code Case N-889 [Supplement 7, 2017 Edition]

Type: New

Title: Reference Stress Corrosion Crack Growth Rate Curves for Irradiated Austenitic Stainless Steel in Light-Water Reactor Environments, Section XI, Division 1

Code Case N-889 provides a new crack growth rate (CGR) law for irradiation-assisted stress corrosion cracking. The code case is applicable to wrought austenitic stainless steels and associated weld metals, as well as cast austenitic stainless steels. The proposed CGR law requires the user to first calculate irradiated yield stress from the dose to the material. There are two yield stress models: one for Molybdenum bearing stainless steels and one for stainless steels without Molybdenum. Once irradiated yield stress has been determined, the user calculates the CGR as a function of applied crack driving force and temperature.

The staff identified three concerns with the technical basis of this code case. The first concern relates to the limited CGR data at dose levels greater than 20 displacements per atom (dpa). The proposed CGR law indicates that the irradiated yield stress (and, consequently, the CGR) increases with fluence up to a dose of 20 dpa, at which point the irradiated yield's stress ceases to increase appreciably with further dose accumulation. While the data at dose levels greater than 20 dpa does show a plateau behavior in the CGR, the staff's analyses of that data suggests that areas of high CGR

were averaged over the industry calculation of CGR, which increases the uncertainty in the high dose CGRs. Therefore, due to the limited data and the associated high uncertainty at high fluence, the staff's confidence in CGRs at dose levels greater than 20 dpa is low.

The second concern is the effects of uncertainty in the irradiated yield strength value for an individual material-heat. This topic is discussed in Section 4.7 of the technical basis report for Code Case N-889. The NRC also conducted separate analyses. While the results of the NRC's findings are generally consistent with the results in Section 4.7, the interpretation of their significance is not consistent. For materials with yield strengths greater than 600 MPa (i.e., more highly-irradiated materials), the expected CGR for a material with a yield strength in the 95th percentile is less than two times the CGR predicted by the code case, which is not a significant difference. However, for materials with yield strength values less than 250 MPa (i.e., unirradiated or minimally irradiated materials), the expected CGR for a material in the 95th percentile can be more than five times greater than the CGR predicted by the code case. Hence, the NRC's concern is that the CGRs for individual low yield strength materials, or materials with low fluence, could be significantly underpredicted by the code case.

The final concern is related to the data used in the development of the irradiated yield stress model. The methodology for addressing cold work in this model was developed in MRP-135, Revision 1, while the model itself was developed in MRP-211, Revision 0. The database underlying the model included hundreds of yield strength measurements on initially annealed and cold-worked Types 304, 316, and 347/348 stainless steel materials. However, most of the data were for annealed Type 304 and cold-worked Type 316 stainless steels. Revision 1 of MRP-211 contained additional yield strength data, including significantly more data for cold-worked Types 304 and 347

stainless steel. The authors of the code case, as documented in Section 4.5 of the Additional Basis Report dated February 5, 2018, evaluated the code case yield stress model with some of this additional data and found agreement between the model and the additional data. However, the code case authors excluded new data for cold-worked Type 304 and 347 stainless steel materials. Therefore, the technical basis document for Code Case N-889 does not directly address whether cold-worked Type 304 and 347 (non-Molybdenum bearing) materials are adequately predicted by the irradiated yield strength model in the code case. The NRC is imposing three conditions on this code case.

The first condition states that this code case may not be applied for neutron exposures greater than 20 dpa. This condition addresses the NRC concern that there is sparse data with high uncertainty beyond 20 dpa. Given that the predicted CGR saturates at higher fluence, this condition prevents potential underprediction of the CGR in this fluence regime.

The second condition states that at dose levels below 0.75 dpa, the user must use the higher of the Code Case N-889 or the Section XI, Nonmandatory Appendix C, C-8520 CGR predictions. This condition addresses the NRC concern related to possible underprediction of CGR in Code Case N-889 for materials with calculated irradiated yield strength less than 250 MPa.

The final condition states that the irradiated yield stress model for cold-worked Molybdenum bearing materials must be used for cold-worked non-Molybdenum bearing stainless steels (including Type 204 and 247 stainless steels). This condition addresses the NRC concern that data for cold-worked non-Molybdenum bearing steels were not appropriately considered during development of Code Case N-889. The NRC performed its own evaluation of cold-worked Type 304 and 347 stainless steels in the MRP-211

database and found that the yield strength was better predicted by the code case's Molybdenum bearing model than with the code case's non-Molybdenum bearing model.

Code Case N-890 [Supplement 0, 2019 Edition]

Type: New

Title: Materials Exempted From G-2110(b) Requirements, Section XI, Division 1

Code Case N-890 provides an alternative to Section XI, G-2110(b) which removes the requirement of, "obtaining fracture toughness data for at least three heats," for using the static fracture toughness curve (K_{Ic}) curve for specific materials with a minimum specified yield strength at room temperature between 50 kilopound per square inch (ksi) and 90 ksi. Code Case N-890 would allow the toughness of four ferritic steels (SA-508 Grade 2 Class 2, SA-508 Grade 3 Class 2, SA-533 Type A Class 2 and SA-533 Type B Class 2) with specified minimum yield strength greater than 50 ksi to be characterized by Figure G-2110-1 (i.e., the Section XI K_{Ic} curve).

The NRC identified one technical concern when reviewing the technical basis of this code case. The technical basis provided appropriate data to justify use of the K_{Ic} curve for several materials listed in the code case. However, for SA-533 Type B, Class 2 materials, the NRC observed that in the technical basis document, there is no fracture toughness data associated with the weld and heat affected zone to support exclusion of the fracture toughness testing requirements for these materials.

As such, the imposed NRC condition requires the user to comply with the provisions of Section III, NB-2300 and Section III, G-2110(b) to demonstrate the applicability of the ASME K_{Ic} curve to SA-533 Type B, Class 2 material. These provisions require the user to generate the necessary toughness data to demonstrate that the ASME K_{IC} curve is a conservative representation of the actual material toughness.

3. ASME Operation and Maintenance Code Cases (RG 1.192)

Code Case OMN-1, Revision 2 [2020 Edition]

Type: Reaffirmed

Title: Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants

The conditions on Code Case OMN-1, Revision 2 [2020 Edition] are identical to the conditions on OMN-1, Revision 2 [2017 Edition] that were approved by the NRC in Revision 3 of RG 1.192. The OMN-1, Revision 2 was reaffirmed by the ASME in the 2020 Edition with no change to the code case. Therefore, the conditions are retained in Revision 4 of RG 1.192.

Code Case OMN-3 [2020 Edition]

Type: Reaffirmed

Title: Requirements for Safety Significance Categorization of Components Using Risk Insights for Inservice Testing of LWR Power Plants

The conditions on Code Case OMN-3 [2020 Edition] are identical to the conditions on OMN-3 [2017 Edition] that were approved by the NRC in Revision 3 of RG 1.192. The OMN-3 was reaffirmed by the ASME in the 2020 Edition with no change to the code case. Therefore, the conditions are retained in Revision 4 of RG 1.192.

Code Case OMN-4 [2020 Edition]

Type: Reaffirmed

Title: Requirements for Risk Insights for Inservice Testing of Check Valves at LWR Power Plants

The conditions on Code Case OMN-4 [2020 Edition] are identical to the conditions on OMN-4 [2017 Edition] that were approved by the NRC in Revision 3 of RG 1.192. The OMN-4 was reaffirmed by the ASME in the 2020 Edition with no change to the code case. Therefore, the conditions are retained in Revision 4 of RG 1.192.

Code Case OMN-9 [2020 Edition]

Type: Reaffirmed

Title: Use of a Pump Curve for Testing

The conditions on Code Case OMN-9 [2020 Edition] are identical to the conditions on OMN-9 [2017 Edition] that were approved by the NRC in Revision 3 of RG 1.192. The OMN-9 was reaffirmed by the ASME in the 2020 Edition with no change to the code case. Therefore, the conditions are retained in Revision 4 of RG 1.192.

Code Case OMN-12 [2020 Edition]

Type: Reaffirmed

Title: Alternative Requirements for Inservice Testing Using Risk Insights for Pneumatically and Hydraulically Operated Valve Assemblies in Light-Water Reactor Power Plants (OM-Code 1998, Subsection ISTC)

The conditions on Code Case OMN-12 [2020 Edition] are identical to the conditions on OMN-12 [2017 Edition] that were approved by the NRC in Revision 3 of RG 1.192. The OMN-12 was reaffirmed by the ASME in the 2020 Edition with no change to the code case. Therefore, the conditions are retained in Revision 4 of RG 1.192.

Code Case OMN-19 [2020 Edition]

Type: Reaffirmed

Title: Alternative Upper Limit for the Comprehensive Pump Test

The conditions on Code Case OMN-19 [2020 Edition] are identical to the conditions on OMN-19 [2017 Edition] that were approved by the NRC in Revision 3 of RG 1.192. The OMN-19 was reaffirmed by the ASME in the 2020 Edition with no change to the code case. Therefore, the conditions are retained in Revision 4 of RG 1.192.

Code Case OMN-20 [2020 Edition]

Type: Reaffirmed

Title: Inservice Test Frequency

The conditions on Code Case OMN-20 [2020 Edition] are identical to the conditions on OMN-20 [2017 Edition] that were approved by the NRC in Revision 3 of RG 1.192. The OMN-20 was reaffirmed by the ASME in the 2020 Edition with no change to the code case. Therefore, the conditions are retained in Revision 4 of RG 1.192.

C. ASME Code Cases Not Approved for Use (RG 1.193)

The ASME code cases that are currently issued by the ASME, but not approved for generic use by the NRC, are listed in RG 1.193, “ASME Code Cases not Approved for Use.” In addition to the ASME code cases that the NRC has found to be technically or programmatically unacceptable, RG 1.193 includes code cases on reactor designs for high-temperature gas-cooled reactors and liquid metal reactors, reactor designs not currently licensed by the NRC, and certain requirements in Section III, Division 2, for submerged spent fuel waste casks, that are not endorsed by the NRC. RG 1.193 complements RGs 1.84, 1.147, and 1.192. It should be noted that the NRC is not adopting any of the code cases listed in RG 1.193.

III. Opportunities for Public Participation

The proposed rule and draft RGs were published in the *Federal Register* on February 2, 2021, for a 60-day comment period. The public comment period closed on April 5, 2021.

IV. Public Comment Analysis

The NRC published the proposed rule and draft regulatory guides for public comment in the *Federal Register*. The NRC received 13 comment submissions. A *comment submission* is a communication or document submitted to the NRC by an individual or entity, with one or more individual comments addressing a subject or issue. Private citizens provided five comment submissions, nuclear industry organizations provided five comment submissions, a foreign government entity provided one comment submission, an anonymous commenter provided one comment submission, and a science advocacy group provided one comment submission.

The comment submissions generally addressed the code cases and their proposed conditions, with five comment submissions objecting to incorporation of a code case with no conditions in this rulemaking activity. The NRC received a number of comments that were outside the scope of this rulemaking, such as comments that discuss code cases annulled after the publication of the supplements being considered in this rulemaking. The latter group out of scope comments will be considered in a future rulemaking.

The public comment submittals are available from the Federal e-Rulemaking website at http://www.regulations.gov under Docket ID NRC-2017-0025. The NRC prepared a summary and analysis of public comments received on the 2020 proposed

rule and draft regulatory guides, which is available as indicated in the “Availability of Documents” section of this document. Responses to the public comments, including a summary of how the final rule text or guidance changed as a result of the public comments, can be found in the public comment analysis.

For more information about the associated guidance documents, see the “Availability of Guidance” section of this document.

V. Section-by-Section Analysis

The following paragraphs in § 50.55a are revised:

Paragraph (a) introductory text

This final rule revises the last sentence to update the contact information for the National Archives and Records Administration.

Paragraph (a)(1) introductory text

This final rule corrects a printing error by removing the line break after “telephone:”.

Paragraph (a)(3) introductory text

This final rule adds a reference to new paragraph (a)(3)(iv), which indicates that NUREG-2228 is acceptable as specified in the conditions when implementing code cases listed in certain NRC regulatory guides.

Paragraph (a)(3)(i)

This final rule revises the reference to “NRC Regulatory Guide 1.84, Revision 38,” by removing “Revision 38” and adding in its place “Revision 39” and changes the month and year for the document’s revision date.

Paragraph (a)(3)(ii)

This final rule revises the reference to “NRC Regulatory Guide 1.147, Revision 19” by removing “Revision 19” and adding in its place “Revision 20” and changes the month and year for the document’s revision date.

Paragraph (a)(3)(iii)

This final rule revises the reference to “NRC Regulatory Guide 1.192, Revision 3” by removing “Revision 3” and adding in its place “Revision 4” and changes the month and year for the document’s revision date.

Paragraph (a)(3)(iv)

This final rule adds new paragraph (a)(3)(iv) to reference 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.

Paragraph (b)(1)(ii), Table 1

This final rule revises the reference to table 1 in the text of the paragraph, and designates the table and revises the heading of the table to conform to Office of the Federal Register (OFR) codification requirements.

Paragraph (b)(2)(xv)(K)(4), Table 2

This final rule designates the table and revises the heading of the table to conform to OFR codification requirements.

Paragraph (b)(3)(iv), Table 3

This final rule designates the table and revises the heading of the table to conform to OFR codification requirements, and capitalizes the word “(Years)” in two of the three column headings.

VI. Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act (5 U.S.C. 605(b)), the Commission certifies that this rule, if adopted, will not have a significant economic impact on a substantial number of small entities. This final rule affects only the licensing and operation of nuclear power plants. The companies that own these plants do not fall within the scope of the definition of “small entities” set forth in the Regulatory Flexibility Act or the size standards established by the NRC (§ 2.810).

VII. Regulatory Analysis

The NRC has prepared a regulatory analysis on this regulation. The analysis examines the costs and benefits of the alternatives considered by the NRC. The NRC did not receive public comments on the draft regulatory analysis. The final regulatory analysis is available as indicated in the “Availability of Documents” section of this document.

VIII. Backfitting and Issue Finality

The provisions in this final rule allow licensees and applicants to voluntarily apply NRC-approved code cases, sometimes with NRC-specified conditions. The approved code cases are listed in three RGs that are incorporated by reference into § 50.55a. An applicant's or a licensee's voluntary application of an approved code case does not constitute backfitting, because there is no imposition of a new requirement or new position.

Similarly, voluntary application of an approved code case by a 10 CFR part 52 applicant or licensee does not represent NRC imposition of a requirement or action, and therefore is not inconsistent with any issue finality provision in 10 CFR part 52. For these reasons, the NRC finds that this final rule does not involve any provisions requiring the preparation of a backfit analysis or documentation demonstrating that one or more of the issue finality criteria in 10 CFR part 52 are met.

IX. Plain Writing

The Plain Writing Act of 2010 (Pub. L. 111-274) requires Federal agencies to write documents in a clear, concise, and well-organized manner. The NRC has written this document to be consistent with the Plain Writing Act as well as the Presidential Memorandum, "Plain Language in Government Writing," published June 10, 1998 (63 FR 31885).

X. Environmental Assessment and Final Finding of No Significant Environmental Impact

The Commission has determined under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in subpart A of 10 CFR part 51, that this rule, if adopted, would not be a major Federal action significantly affecting the quality of the human environment; therefore, an environmental impact statement is not required.

The determination of this environmental assessment is that there will be no significant effect on the quality of the human environment from this action. The NRC did not receive public comments regarding any aspect of this environmental assessment.

As voluntary alternatives to the ASME Code, NRC-approved code cases provide an equivalent level of safety. Therefore, the probability or consequences of accidents is not changed. There are also no significant, non-radiological impacts associated with this action because no changes would be made affecting non-radiological plant effluents and because no changes would be made in activities that would adversely affect the environment. The determination of this environmental assessment is that there will be no significant offsite impact to the public from this action.

XI. Paperwork Reduction Act

This final rule amends collections of information subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). The collections of information were approved by the Office of Management and Budget, approval number 3150-0011.

Because the rule will reduce the burden for existing information collections, the public burden for the information collections is expected to be decreased by 230 hours per response. This reduction includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection.

The information collection is being conducted to document the plans for and the results of inservice inspection and inservice testing programs. The records are generally historical in nature and provide data on which future activities can be based. Information will be used by the NRC to determine if ASME BPV and OM Code provisions for construction, inservice inspection, repairs, and inservice testing are being properly implemented in accordance with § 50.55a of the NRC regulations, or whether specific enforcement actions are necessary. Responses to this collection of information are mandatory under § 50.55a.

You may submit comments on any aspect of the information collections, including suggestions for reducing the burden, by the following methods:

- **Federal rulemaking website:** Go to https://www.regulations.gov and search for Docket ID NRC-2017-0025.

- **Mail comments to:** FOIA, Library, and Information Collections Branch, Office of the Chief Information Officer, Mail Stop: T-6 A10M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001 or to the OMB reviewer at: OMB Office of Information and Regulatory Affairs (3150-0011) Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street, NW, Washington, DC 20503; e-mail: *oira_submission@omb.eop.gov*.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

XII. Congressional Review Act

This final rule is a rule as defined in the Congressional Review Act (5 U.S.C. 801-808). However, the Office of Management and Budget has not found it to be a major rule as defined in the Congressional Review Act.

XIII. Voluntary Consensus Standards

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless using such a standard is inconsistent with applicable law or is otherwise impractical. In this final rule, the NRC is continuing to use the ASME BPV and OM code cases, which are ASME-approved voluntary alternatives to compliance with various provisions of the ASME BPV and OM Codes. The NRC's approval of the ASME code cases is accomplished by amending the NRC's regulations to incorporate by reference the latest revisions of the following, which are the subject of this rulemaking, into § 50.55a: RG 1.84, Revision 39; RG 1.147, Revision 20; RG 1.192, Revision 4; and NUREG-2228. The RGs list the ASME code cases that the NRC has approved for use. The ASME code cases are national consensus standards as defined in the National Technology Transfer and Advancement

Act of 1995 and OMB Circular A-119. The ASME code cases constitute voluntary consensus standards, in which all interested parties (including the NRC and licensees of nuclear power plants) participate.

XIV. Incorporation by Reference-Reasonable Availability to Interested Parties

The NRC is incorporating by reference three NRC RGs that list new and revised ASME code cases that the NRC has approved as voluntary alternatives to certain provisions of NRC-required editions and addenda of the ASME BPV Code and the ASME OM Code. These regulatory guides are RG 1.84, Revision 39; RG 1.147, Revision 20; and RG 1.192, Revision 4. The NRC is also incorporating by reference NUREG-2228, which is referenced in RG 1.147, Revision 20. As described in this document, this report pertains to a condition on Code Case N-847.

The NRC is required by law to obtain approval for incorporation by reference from the OFR. The OFR's requirements for incorporation by reference are set forth in 1 CFR part 51. The discussion in this section complies with the requirement for final rules as set forth in 1 CFR 51.5(b)(2).

The NRC considers "interested parties" to include all potential NRC stakeholders, not only the individuals and entities regulated or otherwise subject to the NRC's regulatory oversight. These NRC stakeholders are not a homogenous group, so the considerations for determining "reasonable availability" vary by class of interested parties. The NRC identified six classes of interested parties with regard to the material to be incorporated by reference in an NRC rule:

- Individuals and small entities regulated or otherwise subject to the NRC's regulatory oversight. This class includes applicants and potential applicants for licenses and other NRC regulatory approvals, and who are subject to the

material to be incorporated by reference. In this context, "small entities" has the same meaning as set out in § 2.810.

- Large entities otherwise subject to the NRC's regulatory oversight. This class includes applicants and potential applicants for licenses and other NRC regulatory approvals, and who are subject to the material to be incorporated by reference. In this context, a "large entity" is one that does not qualify as a "small entity" under § 2.810.
- Non-governmental organizations with institutional interests in the matters regulated by the NRC.
- Other Federal agencies, states, local governmental bodies (within the meaning of § 2.315(c)).
- Federally-recognized and State-recognized Indian tribes.
- Members of the general public (i.e., individual, unaffiliated members of the public who are not regulated or otherwise subject to the NRC's regulatory oversight) who need access to the materials that the NRC proposes to incorporate by reference in order to participate in the rulemaking.

The NUREG-2228 and three RGs that the NRC is incorporating by reference in this final rule are available without cost and can be read online or downloaded online. The NUREG-2228 and three RGs can be viewed, 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; e-mail: *Library.Resource@nrc.gov*.

Because access to NUREG-2228 and the three final regulatory guides is available in various forms at no cost, the NRC determines that NUREG-2228 and the three final regulatory guides, RG 1.84, Revision 39; RG 1.147, Revision 20; and RG

1.192, Revision 4, once approved by the OFR for incorporation by reference, are reasonably available to all interested parties.

Table III: Regulatory Guides Incorporated by Reference in 10 CFR 50.55a

Document Title	**ADAMS Accession No./*Federal Register* Citation**
RG 1.84, Design, Fabrication, and Materials Code Case Acceptability, ASME Section III, Revision 39	ML21181A225
RG 1.147, Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1, Revision 20	ML21181A222
RG 1.192, Operation and Maintenance Code Case Acceptability, ASME OM Code, Revision 4	ML21181A223

Table IV: Related Documents Incorporated by Reference in 10 CFR 50.55a

Document Title	**ADAMS Accession No./*Federal Register* Citation**
NUREG-2228, "Weld Residual Stress Finite Element Analysis Validation: Part II-Proposed Validation Procedure," July 2020	ML20212L592

XV. Availability of Guidance

The NRC is issuing revised guidance, RG 1.193, "ASME Code Cases Not Approved for Use," Revision 7, for the implementation of the requirements in this final rule. The guidance is available as indicated in Section XVI, "Availability of Documents," of this document. You may access information and comment submissions related to the guidance by searching on http://www.regulations.gov under Docket ID NRC-2017-0025.

The regulatory guide lists code cases that the NRC has not approved for generic use and will not be incorporated by reference into the NRC's regulations.

XVI. Availability of Documents

The documents identified in the following table are available to interested persons through one or more of the following methods, as indicated.

DOCUMENT	ADAMS ACCESSION NO. / WEB LINK / *FEDERAL REGISTER* CITATION
RG 1.84, Design, Fabrication, and Materials Code Case Acceptability, ASME Section III, Revision 39, December 2021	ML21181A225
RG 1.147, Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1, Revision 20, December 2021	ML21181A222
RG 1.192, Operation and Maintenance Code Case Acceptability, ASME OM Code, Revision 4, December 2021	ML21181A223
RG 1.193, ASME Code Cases Not Approved for Use, Revision 7	ML21181A224
NUREG-2228, "Weld Residual Stress Finite Element Analysis Validation: Part II-Proposed Validation Procedure," July 2020	ML20212L592
Rulemaking-Proposed Rule-Draft Regulatory Analysis for the American Society of Mechanical Engineers Code Cases, RG 1.84, Rev 39; RG 1.147, Rev 20; RG 1.192 Rev 4	ML20133K152
Rulemaking-Final Rule-Final Regulatory Analysis for the American Society of Mechanical Engineers Code Cases, RG 1.84, Rev 39; RG 1.147, Rev 20; RG 1.192 Rev 4	ML21196A096
NRC Responses to Public Comments	ML21196A100
Proposed Rule-Approval of American Society of Mechanical Engineers Code Cases RG 1.84, Rev 39; RG 1.147, Rev 20; RG 1.192 Rev 4	ML20132A241
Proposed Rule-Approval of American Society of Mechanical Engineers Code Cases RG 1.84, Rev 39; RG 1.147, Rev 20; RG 1.192 Rev 4	86 FR 7820
Final Rule-Approval of American Society of Mechanical Engineers Code Cases RG 1.84, Rev 38; RG 1.147, Rev 19; RG 1.192 Rev 3	85 FR 14736

List of Subjects in 10 CFR Part 50

Antitrust, Classified information, Criminal penalties, Fire protection, Incorporation by reference, Intergovernmental relations, Nuclear power plants and reactors, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 552 and 553, the NRC is adopting the following amendments to 10 CFR part 50:

PART 50 -- DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

1. The authority citation for part 50 continues to read as follows:

Authority: Atomic Energy Act of 1954, secs. 11, 101, 102, 103, 104, 105, 108, 122, 147, 149, 161, 181, 182, 183, 184, 185, 186, 187, 189, 223, 234 (42 U.S.C. 2014, 2131, 2132, 2133, 2134, 2135, 2138, 2152, 2167, 2169, 2201, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2239, 2273, 2282); Energy Reorganization Act of 1974, secs. 201, 202, 206, 211 (42 U.S.C. 5841, 5842, 5846, 5851); Nuclear Waste Policy Act of 1982, sec. 306 (42 U.S.C. 10226); National Environmental Policy Act of 1969 (42 U.S.C. 4332); 44 U.S.C. 3504 note; Sec. 109, Pub. L. 96-295, 94 Stat. 783.

2. In § 50.55a:

a. Revise the last sentence of paragraph (a) introductory text;

b. In paragraph (a)(1) introductory text, remove the line break after “telephone:”;

c. Revise paragraph (a)(3) introductory text;

d. In paragraph (a)(3)(i), remove the text “Revision 38” and add in its place the text “Revision 39” and remove the text “dated October 2019” and add in its place the text “issued December 2021”;

e. In paragraph (a)(3)(ii), remove the text “Revision 19” and add in its place the text “Revision 20” and remove the text “dated October 2019” and add in its place the text “issued December 2021”;

f. In paragraph (a)(3)(iii), remove the text “Revision 3” and add in its place the text “Revision 4” and remove the text “dated October 2019” and add in its place the text “issued December 2021”;

g. Add paragraph (a)(3)(iv);

h. In paragraph (b)(1)(ii), remove the text “Table I of this section” and add in its place the text “table 1 to this paragraph (b)(1)(ii)”;

i. Designate the table immediately following paragraph (b)(1)(ii) and revise the heading of the newly designated table;

j. Designate the table immediately following paragraph (b)(2)(xv)(K)(*4*) and revise the heading of the newly designated table; and

k. Designate the table immediately following paragraph (b)(3)(iv) and revise the heading and column headings of the newly designated table.

The revisions and addition read as follows:

§ 50.55a Codes and standards.

(a) * * * For information on the availability of this material at NARA, email fr.inspection@nara.gov or go to www.archives.gov/federal-register/cfr/ibr-locations.html.

* * * * *

(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;* 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.

* * * * *

(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.

* * * * *

(b) * * *

(1) * * *

(ii) * * *

Table 1 to paragraph (b)(1)(ii) – Prohibited Code Provisions

* * * * *

(2) * * *

(xv) * * *

(K) * * *

(*4*) * * *

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

* * * * *

(3) * * *

(iv) * * *

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)
* *	* * *	* *

* * * * *

Dated: January 25, 2022.

For the Nuclear Regulatory Commission.

/RA/

Andrea D. Veil, Director,
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