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SECTION XI

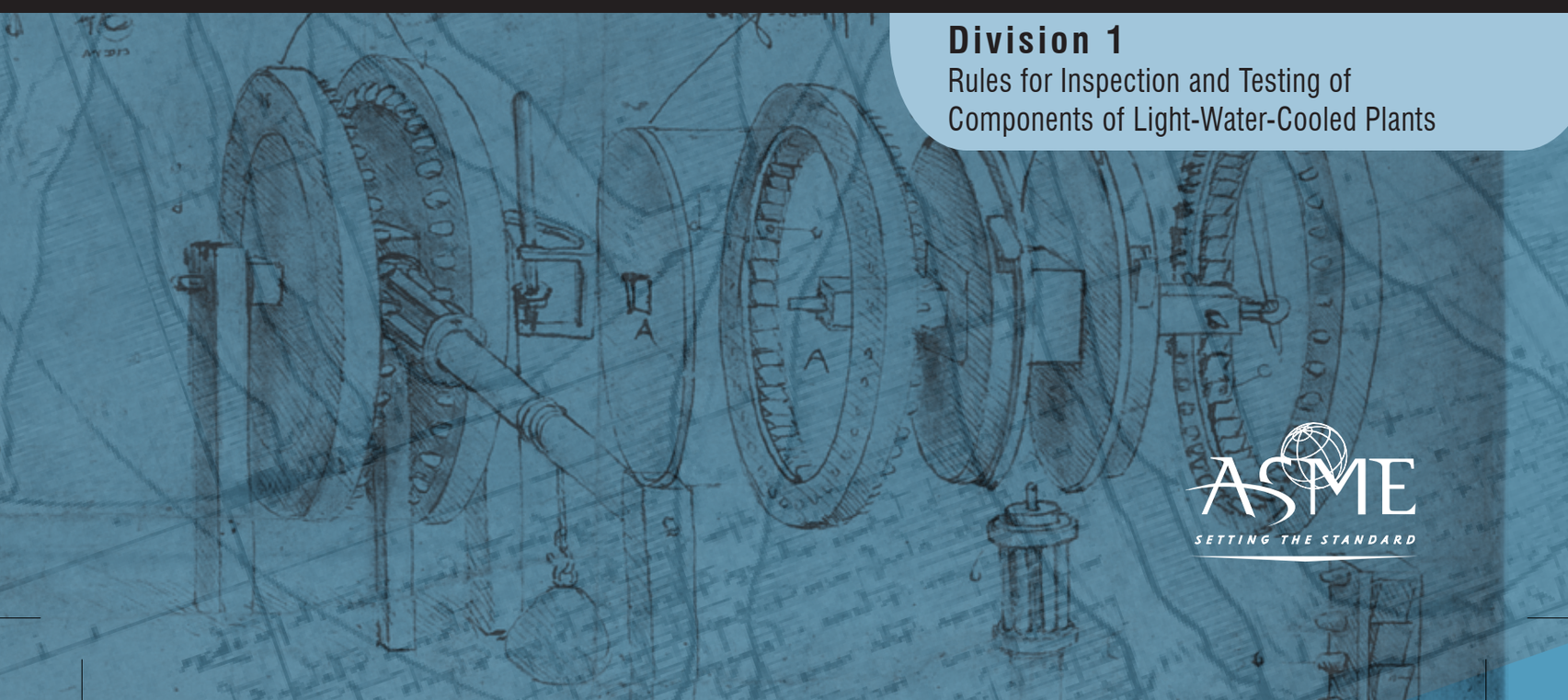
Rules for Inservice Inspection of Nuclear Reactor Facility Components

2023 ASME Boiler and Pressure Vessel Code

An International Code

Division 1

Rules for Inspection and Testing of Components of Light-Water-Cooled Plants



ASME

SETTING THE STANDARD

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XI

RULES FOR INSERVICE INSPECTION OF NUCLEAR REACTOR FACILITY COMPONENTS

Division 1

Rules for Inspection and Testing of Components of Light-Water-Cooled Plants

ASME Boiler and Pressure Vessel Committee
on Nuclear Inservice Inspection

The American Society of Mechanical Engineers

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FOREWORD[*]

In 1911, The American Society of Mechanical Engineers established the Boiler and Pressure Vessel Committee to formulate standard rules for the construction of steam boilers and other pressure vessels. In 2009, the Boiler and Pressure Vessel Committee was superseded by the following committees:

(a) Committee on Power Boilers (I)
(b) Committee on Materials (II)
(c) Committee on Construction of Nuclear Facility Components (III)
(d) Committee on Heating Boilers (IV)
(e) Committee on Nondestructive Examination (V)
(f) Committee on Pressure Vessels (VIII)
(g) Committee on Welding, Brazing, and Fusing (IX)
(h) Committee on Fiber-Reinforced Plastic Pressure Vessels (X)
(i) Committee on Nuclear Inservice Inspection (XI)
(j) Committee on Transport Tanks (XII)
(k) Committee on Overpressure Protection (XIII)
(l) Technical Oversight Management Committee (TOMC)

Where reference is made to "the Committee" in this Foreword, each of these committees is included individually and collectively.

The Committee's function is to establish rules of safety relating to pressure integrity, which govern the construction[**] of boilers, pressure vessels, transport tanks, and nuclear components, and the inservice inspection of nuclear components and transport tanks. For nuclear items other than pressure-retaining components, the Committee also establishes rules of safety related to structural integrity. The Committee also interprets these rules when questions arise regarding their intent. The technical consistency of the Sections of the Code and coordination of standards development activities of the Committees is supported and guided by the Technical Oversight Management Committee. This Code does not address other safety issues relating to the construction of boilers, pressure vessels, transport tanks, or nuclear components, or the inservice inspection of nuclear components or transport tanks. Users of the Code should refer to the pertinent codes, standards, laws, regulations, or other relevant documents for safety issues other than those relating to pressure integrity and, for nuclear items other than pressure-retaining components, structural integrity. Except for Sections XI and XII, and with a few other exceptions, the rules do not, of practical necessity, reflect the likelihood and consequences of deterioration in service related to specific service fluids or external operating environments. In formulating the rules, the Committee considers the needs of users, manufacturers, and inspectors of components addressed by the Code. The objective of the rules is to afford reasonably certain protection of life and property, and to provide a margin for deterioration in service to give a reasonably long, safe period of usefulness. Advancements in design and materials and evidence of experience have been recognized.

This Code contains mandatory requirements, specific prohibitions, and nonmandatory guidance for construction activities and inservice inspection and testing activities. The Code does not address all aspects of these activities and those aspects that are not specifically addressed should not be considered prohibited. The Code is not a handbook and cannot replace education, experience, and the use of engineering judgment. The phrase *engineering judgment* refers to technical judgments made by knowledgeable engineers experienced in the application of the Code. Engineering judgments must be consistent with Code philosophy, and such judgments must never be used to overrule mandatory requirements or specific prohibitions of the Code.

The Committee recognizes that tools and techniques used for design and analysis change as technology progresses and expects engineers to use good judgment in the application of these tools. The designer is responsible for complying with Code rules and demonstrating compliance with Code equations when such equations are mandatory. The Code

[*] The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. Therefore, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Code.

[**] *Construction*, as used in this Foreword, is an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and overpressure protection.

neither requires nor prohibits the use of computers for the design or analysis of components constructed to the requirements of the Code. However, designers and engineers using computer programs for design or analysis are cautioned that they are responsible for all technical assumptions inherent in the programs they use and the application of these programs to their design.

The rules established by the Committee are not to be interpreted as approving, recommending, or endorsing any proprietary or specific design, or as limiting in any way the manufacturer's freedom to choose any method of design or any form of construction that conforms to the Code rules.

The Committee meets regularly to consider revisions of the rules, new rules as dictated by technological development, Code Cases, and requests for interpretations. Only the Committee has the authority to provide official interpretations of this Code. Requests for revisions, new rules, Code Cases, or interpretations shall be addressed to the Secretary in writing and shall give full particulars in order to receive consideration and action (see Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees). Proposed revisions to the Code resulting from inquiries will be presented to the Committee for appropriate action. The action of the Committee becomes effective only after confirmation by ballot of the Committee and approval by ASME. Proposed revisions to the Code approved by the Committee are submitted to the American National Standards Institute (ANSI) and published at http://go.asme.org/BPVCPublicReview to invite comments from all interested persons. After public review and final approval by ASME, revisions are published at regular intervals in Editions of the Code.

The Committee does not rule on whether a component shall or shall not be constructed to the provisions of the Code. The scope of each Section has been established to identify the components and parameters considered by the Committee in formulating the Code rules.

Questions or issues regarding compliance of a specific component with the Code rules are to be directed to the ASME Certificate Holder (Manufacturer). Inquiries concerning the interpretation of the Code are to be directed to the Committee. ASME is to be notified should questions arise concerning improper use of the ASME Single Certification Mark.

When required by context in this Section, the singular shall be interpreted as the plural, and vice versa, and the feminine, masculine, or neuter gender shall be treated as such other gender as appropriate.

The words "shall," "should," and "may" are used in this Standard as follows:

- *Shall* is used to denote a requirement.
- *Should* is used to denote a recommendation.
- *May* is used to denote permission, neither a requirement nor a recommendation.

STATEMENT OF POLICY ON THE USE OF THE ASME SINGLE CERTIFICATION MARK AND CODE AUTHORIZATION IN ADVERTISING

ASME has established procedures to authorize qualified organizations to perform various activities in accordance with the requirements of the ASME Boiler and Pressure Vessel Code. It is the aim of the Society to provide recognition of organizations so authorized. An organization holding authorization to perform various activities in accordance with the requirements of the Code may state this capability in its advertising literature.

Organizations that are authorized to use the ASME Single Certification Mark for marking items or constructions that have been constructed and inspected in compliance with the ASME Boiler and Pressure Vessel Code are issued Certificates of Authorization. It is the aim of the Society to maintain the standing of the ASME Single Certification Mark for the benefit of the users, the enforcement jurisdictions, and the holders of the ASME Single Certification Mark who comply with all requirements.

Based on these objectives, the following policy has been established on the usage in advertising of facsimiles of the ASME Single Certification Mark, Certificates of Authorization, and reference to Code construction. The American Society of Mechanical Engineers does not "approve," "certify," "rate," or "endorse" any item, construction, or activity and there shall be no statements or implications that might so indicate. An organization holding the ASME Single Certification Mark and/or a Certificate of Authorization may state in advertising literature that items, constructions, or activities "are built (produced or performed) or activities conducted in accordance with the requirements of the ASME Boiler and Pressure Vessel Code," or "meet the requirements of the ASME Boiler and Pressure Vessel Code." An ASME corporate logo shall not be used by any organization other than ASME.

The ASME Single Certification Mark shall be used only for stamping and nameplates as specifically provided in the Code. However, facsimiles may be used for the purpose of fostering the use of such construction. Such usage may be by an association or a society, or by a holder of the ASME Single Certification Mark who may also use the facsimile in advertising to show that clearly specified items will carry the ASME Single Certification Mark.

STATEMENT OF POLICY ON THE USE OF ASME MARKING TO IDENTIFY MANUFACTURED ITEMS

The ASME Boiler and Pressure Vessel Code provides rules for the construction of boilers, pressure vessels, and nuclear components. This includes requirements for materials, design, fabrication, examination, inspection, and stamping. Items constructed in accordance with all of the applicable rules of the Code are identified with the ASME Single Certification Mark described in the governing Section of the Code.

Markings such as "ASME," "ASME Standard," or any other marking including "ASME" or the ASME Single Certification Mark shall not be used on any item that is not constructed in accordance with all of the applicable requirements of the Code.

Items shall not be described on ASME Data Report Forms nor on similar forms referring to ASME that tend to imply that all Code requirements have been met when, in fact, they have not been. Data Report Forms covering items not fully complying with ASME requirements should not refer to ASME or they should clearly identify all exceptions to the ASME requirements.

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January 1, 2023

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CORRESPONDENCE WITH THE COMMITTEE (23)

General

ASME codes and standards are developed and maintained by committees with the intent to represent the consensus of concerned interests. Users of ASME codes and standards may correspond with the committees to propose revisions or cases, report errata, or request interpretations. Correspondence for this Section of the ASME Boiler and Pressure Vessel Code (BPVC) should be sent to the staff secretary noted on the Section's committee web page, accessible at https://go.asme.org/CSCommittees.

NOTE: See ASME BPVC Section II, Part D for guidelines on requesting approval of new materials. See Section II, Part C for guidelines on requesting approval of new welding and brazing materials ("consumables").

Revisions and Errata

The committee processes revisions to this Code on a continuous basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Code. Approved revisions will be published in the next edition of the Code.

In addition, the committee may post errata and Special Notices at http://go.asme.org/BPVCerrata. Errata and Special Notices become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata and Special Notices.

This Code is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Code

(4) to permit use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Code.

(c) The committee will consider proposed cases concerning the following topics only:

(1) equipment to be marked with the ASME Single Certification Mark, or

(2) equipment to be constructed as a repair/replacement activity under the requirements of Section XI

(d) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Code Section and the paragraph, figure, or table number(s) to which the proposed case applies

(4) the edition(s) of the Code to which the proposed case applies

(e) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Cases that have been approved will appear in the next edition or supplement of the Code Cases books, "Boilers and Pressure Vessels" or "Nuclear Components." Each Code Cases book is updated with seven Supplements. Supplements will be sent or made available automatically to the purchasers of the Code Cases books until the next edition of the Code. Annulments of Code Cases become effective six months after the first announcement of the annulment in a Code Case Supplement or Edition of the appropriate Code Case book. The status of any case is available at http://go.asme.org/BPVCCDatabase. An index of the complete list of Boiler and Pressure Vessel Code Cases and Nuclear Code Cases is available at http://go.asme.org/BPVCC.

Interpretations

(a) Interpretations clarify existing Code requirements and are written as a question and reply. Interpretations do not introduce new requirements. If a revision to resolve conflicting or incorrect wording is required to support the interpretation, the committee will issue an intent interpretation in parallel with a revision to the Code.

(b) Upon request, the committee will render an interpretation of any requirement of the Code. An interpretation can be rendered only in response to a request submitted through the online Interpretation Submittal Form at http://go.asme.org/InterpretationRequest. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

(c) ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Code requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers may track the status of their requests at http://go.asme.org/Interpretations.

(d) ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME committee or subcommittee. ASME does not “approve,” “certify,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

(e) Interpretations are published in the ASME Interpretations Database at http://go.asme.org/Interpretations as they are issued.

Committee Meetings

The ASME BPVC committees regularly hold meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the applicable committee. Information on future committee meetings can be found at http://go.asme.org/BCW.

PREFACE TO SECTION XI (23)

INTRODUCTION

Section XI, Division 1, Rules for Inspection and Testing of Components of Light-Water-Cooled Plants, of the ASME Boiler and Pressure Vessel Code provides requirements for examination, testing, and inspection of components and systems, and repair/replacement activities in a nuclear power plant. Application of Division 1 begins when the requirements of the Construction Code have been satisfied.

Section XI, Division 2, Requirements for Reliability and Integrity Management (RIM) Programs for Nuclear Reactor Facilities, is a technology-neutral standard of the ASME Boiler and Pressure Vessel Code. It provides requirements for protecting pressure integrity of structures, systems, and components (SSCs) that affect reliability. Application of Division 2 begins when the requirements of the Construction Code have been satisfied. It is applicable regardless of the Construction Code classification used for an SSC if the SSC is designated as important to the safety and reliability of an operating facility.

GENERAL

The rules of this Section constitute requirements to maintain the nuclear reactor facility and to return the facility to service, following facility outages, in a safe and expeditious manner.

Division 1 rules require a mandatory program of examinations, testing, and inspections to evidence adequate safety and to manage deterioration and aging effects. The rules also stipulate duties of the Authorized Nuclear Inservice Inspector to verify that the mandatory program has been completed, permitting the plant to return to service in an expeditious manner.

Division 2 rules require the development of a Reliability and Integrity Management (RIM) Program that considers the combination of design, fabrication, degradation mechanisms, inspection, examination, monitoring, operation, and maintenance of SSCs to ensure they will meet their required reliability target values. The rules also stipulate duties of the Authorized Nuclear Inservice Inspector to verify that the program has been completed, implemented, and updated in accordance with the requirements of Division 2.

(23)

ORGANIZATION OF SECTION XI

1 DIVISIONS

Section XI consists of two Divisions, as follows:

Division 1 = Rules for Inspection and Testing of Components of Light-Water-Cooled Plants
Division 2 = Requirements for Reliability and Integrity Management (RIM) Programs for Nuclear Reactor Facilities

2 ORGANIZATION OF DIVISION 1

2.1 SUBSECTIONS

Division 1 is broken down into Subsections that are designated by capital letters, preceded by the letters IW. Division 1 consists of Subsections covering the following aspects of the rules:

Subsection	Title
IWA	General Requirements
IWB	Class 1 Components
IWC	Class 2 Components
IWD	Class 3 Components
IWE	Class MC and CC Components
IWF	Class 1, 2, 3, and MC Component Supports
IWG	Core Internal Structures (In course of preparation)
IWL	Class CC Concrete Components

Subsections are divided into Articles, subarticles, paragraphs, and, where necessary, subparagraphs.

2.2 ARTICLES

Articles are designated by the applicable letters indicated above for the Subsections, followed by Arabic numbers, such as IWA-1000 or IWB-2000. Where possible, Articles dealing with the same general topics are given the same number in each Subsection, in accordance with the following scheme:

Article Number	Title
1000	Scope and Responsibility
2000	Examination and Inspection
3000	Acceptance Standards
4000	Repair/Replacement Activities
5000	System Pressure Tests
6000	Records and Reports

The numbering of Articles and material contained in the Articles may not, however, be consecutive. Due to the fact that the complete outline may cover phases not applicable to a particular Subsection or Article, the requirements have been prepared with some gaps in the numbering.

2.3 SUBARTICLES

Subarticles are numbered in units of 100, such as IWA-1100 or IWA-1200.

2.4 SUBSUBARTICLES

Subsubarticles are numbered in units of 10, such as IWA-2130, and may have no text. When a number such as IWA-1110 is followed by text, it is considered a paragraph.

2.5 PARAGRAPHS

Paragraphs are numbered in units of 1, such as IWA-2131 or IWA-2132.

2.6 SUBPARAGRAPHS

Subparagraphs, when they are *major* subdivisions of a paragraph, are designated by adding a decimal followed by one or more digits to the paragraph number, such as IWA-1111.1 or IWA-1111.2. When they are *minor* subdivisions of a paragraph, subparagraphs may be designated by lowercase letters in parentheses, such as IWA-1111(a) or IWA-1111(b).

3 ORGANIZATION OF DIVISION 2

Division 2 is broken down into Articles that are designated by the capital letters RIM, followed by the Article number. Division 2 Articles consist of the following:

Article	Title
RIM-1	Scope and Responsibility
RIM-2	Reliability and Integrity Management (RIM) Program
RIM-3	Acceptance Standards
RIM-4	Repair/Replacement Activities
RIM-5	System Leak Monitoring and Periodic Tests
RIM-6	Records and Reports
RIM-7	Glossary

Division 2 also maintains Mandatory Appendices that are required for the development and implementation of the RIM Program. Mandatory Appendices consist of the following:

Appendix	Title
I	RIM Decision Flowcharts for Use With the RIM Program
II	Derivation of Component Reliability Targets From Facility Safety Requirements
III	Owner's Record and Report for RIM Program Activities
IV	Monitoring and NDE Qualification
V	Catalog of NDE Requirements and Areas of Interest
VI	Reliability and Integrity Management Expert Panel (RIMEP)
VII	Supplements for Types of Nuclear Reactor Facilities

Articles are divided into paragraphs and subparagraphs. Appendices are divided into Articles, paragraphs, and subparagraphs.

4 REFERENCES

References used within this Section generally fall into one of six categories, as explained below.

(a) References to Other Portions of This Section. When a reference is made to another Article, subarticle, or paragraph number, all numbers subsidiary to that reference shall be included. For example, reference to IWA-2000 includes all materials in Article IWA-2000; reference to IWA-2200 includes all material in subarticle IWA-2200; reference to IWA-2220 includes all paragraphs in IWA-2220, IWA-2221, and IWA-2222.

(b) References to Other Sections. Other Sections referred to in Section XI are as follows:

(1) Section II, Material Specifications. When a requirement for a material or for the examination or testing of a material is to be in accordance with a specification such as SA-105, SA-370, or SB-160, the reference is to material specifications in Section II. These references begin with the letter "S." Materials conforming to ASTM specifications may be used in accordance with the provisions of the last paragraph of the Foreword to the Boiler Code.

(2) Section III, Nuclear Power Plant Components. Section III references begin with the letter "N" and relate to nuclear power plant design or construction requirements.

(3) Section V, Nondestructive Examination. Section V references begin with the letter "T" and relate to the nondestructive examination of material or welds.

(4) Section IX, Welding and Brazing Qualifications. Section IX references begin with the letter "Q" and relate to welding and brazing requirements.

(c) References to Specifications and Standards Other Than Published in Code Sections

(1) Specifications for examination methods and acceptance standards to be used in connection with them are published by the American Society for Testing and Materials. For example, reference to ASTM E71-64 refers to the specification so designated and published by American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428.

(2) Recommended practices for qualifying and certifying nondestructive examination personnel are published by the American Society for Nondestructive Testing (ASNT). These documents are designated SNT-TC-1A and CP-189. A reference to SNT-TC-1A or CP-189 shall be understood to mean the practice and its supplements, so designated and published by the American Society for Nondestructive Testing (ASNT), 1711 Arlingate Lane, P. O. Box 28518, Columbus, OH 43228-0518.

(3) Specifications and standards for materials, processes, examination and test procedures, qualifications of personnel, and other requirements of the Code approved by the American National Standards Institute are designated by the letters ANSI followed by the serialization for the particular specification or standard. Standards published by ASME are available from ASME (https://www.asme.org/).

(4) Specifications and standards for materials, processes, examination and test procedures, and other requirements of the Code relating to concrete are listed in Table IWA-1600-1, designated by the letters ACI, and are approved and published by the American Concrete Institute. Standards published by the American Concrete Institute can be obtained by writing ACI, Box 19150, 22400 West Seven Mile Road, Detroit, MI 48219.

(5) Specifications and standards for determining water chemistry as identified in Table IWA-1600-1 by the letter designation APHA are approved and published by the American Public Health Association. Standards published by the American Public Health Association can be obtained by writing APHA, 1015 15th Street, NW, Washington, D.C. 20005.

(6) Specifications and standards for welding are listed in Table IWA-1600-1 and are approved and published by the American Welding Society. Standards published by the American Welding Society can be obtained by writing AWS, 8669 NW 36 Street, No. 130, Miami, FL 33166.

(d) References to Government Regulations. U.S. Federal regulations issued by executive departments and agencies, as published in the Federal Register, are codified in the Code of Federal Regulations. The Code of Federal Regulations is published by the Office of the Federal Register, National Archives and Records Service, General Service Administration, and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Title 10 of the Code of Federal Regulations contains the regulations for atomic energy. The abbreviated reference "10 CFR 50" is used to mean "Title 10, Code of Federal Regulations, Part 50."

(e) References to Appendices. Two types of Appendices are used in Section XI and are designated Mandatory and Nonmandatory.

(1) Mandatory Appendices contain requirements which must be followed in Section XI activities; such references are designated by a Roman numeral followed by Arabic numerals. A reference to III-1100, for example, refers to a Mandatory Appendix.

(2) Nonmandatory Appendices provide information or guidance for the use of Section XI; such references are designated by a capital letter followed by Arabic numerals. A reference to A-3300, for example, refers to a Nonmandatory Appendix.

(f) References to Technical Reports. The following reports prepared at the request of the American Society of Mechanical Engineers and published by Electric Power Research Institute are relevant to Code-related articles of Section XI. Requests for copies should be directed to EPRI Research Reports Center, Box 50490, Palo Alto, CA 94303.

(1) NP-1406-SR — Nondestructive Examination Acceptance Standards Technical Basis and Development for Boiler and Pressure Vessel Code, ASME Section XI, Division 1, Special Report, May 1980.

(2) NP-719-SR — Flaw Evaluation Procedures — Background and Application of ASME Section XI Appendix A — Special Report, August 1978.

SUMMARY OF CHANGES

Changes listed below are identified on the pages by a margin note, **(23)**, placed next to the affected area.

Page	*Location*	*Change*
xxv	List of Sections	*(1)* Under Section III, Division 4 added *(2)* Title of Section XI and subtitle of Section XI, Division 2 revised *(3)* Information on interpretations and Code cases moved to "Correspondence With the Committee"
xxix	Personnel	Updated
li	Correspondence With the Committee	Added (replaces "Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees")
liii	Preface to Section XI	Revised
liv	Organization of Section XI	Paragraphs 1 and 3 revised
lxiii	Cross-Referencing in the ASME BPVC	Updated
1	IWA-1320	Subparagraph (a)(2) revised
3	IWA-1500	Endnote 2 revised
3	Table IWA-1600-1	Updated
3	IWA-1700	In subpara. (b), first sentence revised
5	IWA-2200	In subpara. (c), first and penultimate sentences revised
27	IWA-4120	Subparagraphs (a) and (b)(7) revised
28	IWA-4131.2	Subparagraphs (a) and (b) revised
29	IWA-4141	Subparagraph (a) revised
30	IWA-4150	*(1)* Subparagraph (c) revised *(2)* Subparagraph (d) and Endnote 8 added
33	IWA-4320	Revised in its entirety
34	IWA-4331	In subpara. (e), first sentence revised
34	IWA-4340	Subparagraph (b) revised
35	IWA-4411	In subpara. (g), first sentence revised
36	IWA-4440	Subparagraph (a) revised
38	IWA-4511	First sentence revised
39	IWA-4540	Revised in its entirety
40	IWA-4610	Subparagraphs (b)(1)(-d)(-4) and (e)(2) revised
45	IWA-4661	Subparagraph (f) revised
47	IWA-4665	Subparagraph (a)(1) revised
48	IWA-4671	In subpara. (a), last sentence deleted
48	IWA-4672	In subpara. (c), second sentence revised
49	IWA-4673	Subparagraph (b) revised

Page	*Location*	*Change*
49	IWA-4681	In subpara. (a), last sentence deleted
50	IWA-4683	Subparagraph (b) revised
51	IWA-4711.2.2	Subparagraph (c) revised
52	IWA-4712.2	Subparagraph (b)(6) revised
56	IWA-4721.3.2	Subparagraph (c) revised
59	IWA-5120	Subparagraph (e) revised
59	IWA-5213	In subpara. (b)(1), last sentence added
61	IWA-5244	Subparagraph (d) revised
64	IWA-6211	Subparagraph (d) revised
64	IWA-6220	Subparagraphs (a) and (b) revised
65	IWA-6300	*(1)* IWA-6310, IWA-6330, IWA-6340(k), and IWA-6350(b) revised *(2)* IWA-6340(j)(2) deleted and subsequent subparagraphs redesignated
74	IWB-2200	Subparagraphs (a) and (b)(3) revised and subpara. (c) added
75	IWB-2420	Subparagraph (a) revised
77	IWB-2500	Subparagraph (d) revised
81	Table IWB-2500-1 (B-B)	Note (3) revised
91	Table IWB-2500-1 (B-J)	Note (1) revised
93	Table IWB-2500-1 (B-K)	Under “First Inspection Interval,” entry for Item B10.20 revised; Note (5) revised
105	Figure IWB-2500-7(a)	Revised
106	Figure IWB-2500-7(b)	Revised
107	Figure IWB-2500-7(c)	Revised
108	Figure IWB-2500-7(d)	Title and figure revised
123	IWB-3112	Subparagraph (a)(1) revised
137	IWB-3600	First paragraph and subparagraphs (a) and (b) revised
138	Figure IWB-3600-1	Title and Note (1) revised
141	IWB-3700	Revised
143	IWB-5221	In subpara. (b), last sentence added
143	IWB-5222	Subparagraph (a) revised
147	IWC-2200	Subparagraphs (a) and (b)(3) revised and subpara. (c) added
147	IWC-2420	Subparagraph (a) revised
149	IWC-2500	Subparagraph (d) revised
151	Table IWC-2500-1 (C-A)	Note (5) revised
152	Table IWC-2500-1 (C-B)	Note (3) revised
153	Table IWC-2500-1 (C-C)	Under “Frequency of Examination,” entry for Item C3.20 revised; Note (7) revised
154	Table IWC-2500-1 (C-D)	Note (5) revised

Page	*Location*	*Change*
155	Table IWC-2500-1 (C-F-1)	Note (4) revised
157	Table IWC-2500-1 (C-F-2)	Note (4) revised
179	IWC-3112	Subparagraph (a)(1) revised
192	IWD-2200	Revised
192	IWD-2420	Subparagraph (a) revised
195	Table IWD-2500-1 (D-A)	*(1)* Under "Parts Examined,"Note references added, and under "Frequency of Examination," Note references revised *(2)* Note (2)(e) added and Notes (6) and (7) revised
204	IWE-1220	Subparagraph (d) revised
204	IWE-1232	Subparagraph (c) revised and subpara. (d) added
207	IWE-2420	Subparagraphs (a) and (c) revised
207	IWE-2430	*(1)* Subparagraph (a) revised and subpara. (a)(2) editorially revised *(2)* Subparagraph (a)(2)(-c) added
210	Table IWE-2500-1 (E-A)	*(1)* Under "Examination Requirements/Fig. No.," Note reference deleted *(2)* "Acceptance Standard" cross-references and Note (1)(b) revised
214	IWE-3122.3	In subpara. (b), first sentence revised
215	IWE-3511	Title revised
215	IWE-3512	Title revised
222	IWF-2420	Subparagraph (a) revised
225	Table IWF-2500-1 (F-A)	Note (2) revised
230	IWL-2330	First paragraph and subpara. (d) revised
236	IWL-2523.2	Title revised and subpara. (b) deleted
239	IWL-3221.1	Subparagraph (c) revised
240	IWL-3221.2	Revised
241	IWL-4200	IWL-4210, IWL-4220(a), IWL-4220(e), IWL-4220(f), and IWL-4240(b) revised
243	IWL-5220	Revised
250	Mandatory Appendix I, Supplement 1	Subparagraph (a)(4) added
255	Form NIS-2	Revised
256	Table II-1	Descriptions of Reference Numbers (1) through (3) and (8) revised
257	Form OAR-1	"Certificate of Inservice Inspection" revised
259	Table II-2	Descriptions of Reference Numbers (26) and (27) revised
264	III-3411	Subparagraph (e) revised
270	Mandatory Appendix III, Supplement 1	Subparagraph (b)(4) revised
274	Table IV-3110-1	Second column heading editorially revised
304	Table VIII-3110-1	Second column heading editorially revised

Page	*Location*	*Change*
312	Mandatory Appendix VIII, Supplement 2, 2.0	Revised
313	Mandatory Appendix VIII, Supplement 4, 2.1	Subparagraph (i) revised
315	Mandatory Appendix VIII, Supplement 4, 4.3	Subparagraph (a) revised
316	Mandatory Appendix VIII, Supplement 5, 3.1	Subparagraph (h) revised
318	Mandatory Appendix VIII, Supplement 6, 2.1	Subparagraph (e)(2) revised
322	Mandatory Appendix VIII, Supplement 8, 3.1	First sentence revised
324	Mandatory Appendix VIII, Supplement 10, 3.0	Subparagraph (a) revised
326	Mandatory Appendix VIII, Supplement 11	Revised in its entirety
329	Mandatory Appendix VIII, Supplement 14, 3.0	Subparagraph (b) revised
331	Mandatory Appendix VIII, Supplement 15, 3.0	Subparagraph (a) revised
336	Article XI-2000	In subpara. (d), last sentence revised
348	A-3412	In second and last sentences, table cross-references revised
411	A-3630	Revised
419	Table A-3630-9	Added
420	Table A-3630-10	Added
421	Table A-3630-11	Added
422	Table A-3630-12	Added
423	Table A-3630-13	Added
424	Table A-3630-14	Added
425	Table A-3630-15	Added
426	Table A-3630-16	Added
435	A-3650	Revised
443	Table A-3650-9	Added
444	Table A-3650-10	Added
445	Table A-3650-11	Added
446	Table A-3650-12	Added
447	Table A-3650-13	Added
448	Table A-3650-14	Added
449	Table A-3650-15	Added
450	Table A-3650-16	Added

Page	*Location*	*Change*
461	A-4300	*(1)* Revised in its entirety *(2)* Figures A-4300-1 through A-4300-2M revised and moved to Nonmandatory Appendix Y
463	A-5200	In subparas. (a), (b)(1)(-a), (b)(2)(-a), and (b)(2)(-b), cross-references revised
467	Nonmandatory Appendix C	Equations renumbered throughout
468	C-1300	Nomenclature revised
471	C-2200	Subparagraph (d) revised
475	Figure C-2200-1	Revised
479	Figure C-2400-3	Revised
480	C-3210	Subparagraphs (a) and (b) revised
480	C-3220	In subpara. (a)(2), cross-references revised
498	Table C-5310-1	*(1)* Spanner column heading revised *(2)* Note (4) deleted and subsequent Note renumbered
499	Table C-5310-2	*(1)* Spanner column heading revised *(2)* Note (4) deleted and subsequent Note renumbered
500	Table C-5310-3	*(1)* Spanner column heading revised *(2)* Note (4) deleted and subsequent Note renumbered
501	Table C-5310-4	*(1)* Spanner column heading revised *(2)* Note (4) deleted and subsequent Note renumbered
502	Table C-5310-5	*(1)* Spanner column heading revised *(2)* Note (3) deleted and subsequent Note renumbered
520	C-8400	*(1)* Revised in its entirety *(2)* Figures C-8410-1 through C-8410-2M revised and moved to Nonmandatory Appendix Y
520	C-8500	*(1)* Revised in its entirety *(2)* Tables C-8510-1 through C-8520-1M and Figures C-8510-1 through C-8520-1M revised and moved to Nonmandatory Appendix Y
530	G-2215	Last sentence of subpara. (b) revised
531	G-2216	In U.S. Customary nomenclature after eq. (2), "φ," the symbol for neutron flux, added by errata
580	L-1300	Definition of n revised
598	O-3220	In subpara. (b), cross-reference revised
599	O-3230	In subpara. (c), cross-reference revised
609	Table R-1320-1	Note (1) revised
610	R-2420	Subparagraph (a) revised
645	Form RRA-1	"Certificate of Compliance" and "Certificate of Inspection" revised
647	Table T-1	Description of Reference Number (9) revised
649	U-S1-3	Definitions of C, da/dt, $K_{\max}$, n, S_T, and T deleted

Page	*Location*	*Change*
652	U-S1-4.2.3	*(1)* Revised in its entirety *(2)* Figures U-S1-4.2.3-1 and U-S1-4.2.3-2 revised and moved to Nonmandatory Appendix Y
660	U-S2-3	Definitions of C, da/dt, $K_{\max}$, n, S_T, and T deleted
661	U-S2-5	Subparagraph (b) revised
667	Article W-1000	Subparagraphs (d) and (e) revised
669	W-3100	First sentence revised
672	Article W-6000	Subparagraph (a) revised and subpara. (d) added
673	Nonmandatory Appendix Y	Revised in its entirety
715	Article Z-2000	Subparagraphs (c) through (e) revised

CROSS-REFERENCING IN THE ASME BPVC (23)

Paragraphs within the ASME BPVC may include subparagraph breakdowns, i.e., nested lists. The following is a guide to the designation and cross-referencing of subparagraph breakdowns:

(a) Hierarchy of Subparagraph Breakdowns

(1) First-level breakdowns are designated as (a), (b), (c), etc.

(2) Second-level breakdowns are designated as (1), (2), (3), etc.

(3) Third-level breakdowns are designated as (-a), (-b), (-c), etc.

(4) Fourth-level breakdowns are designated as (-1), (-2), (-3), etc.

(5) Fifth-level breakdowns are designated as (+a), (+b), (+c), etc.

(6) Sixth-level breakdowns are designated as (+1), (+2), etc.

(b) Cross-References to Subparagraph Breakdowns. Cross-references within an alphanumerically designated paragraph (e.g., PG-1, UIG-56.1, NCD-3223) do not include the alphanumerical designator of that paragraph. The cross-references to subparagraph breakdowns follow the hierarchy of the designators under which the breakdown appears. The following examples show the format:

(1) If X.1(c)(1)(-a) is referenced in X.1(c)(1), it will be referenced as (-a).

(2) If X.1(c)(1)(-a) is referenced in X.1(c)(2), it will be referenced as (1)(-a).

(3) If X.1(c)(1)(-a) is referenced in X.1(e)(1), it will be referenced as (c)(1)(-a).

(4) If X.1(c)(1)(-a) is referenced in X.2(c)(2), it will be referenced as X.1(c)(1)(-a).

DIVISION 1
RULES FOR INSPECTION AND TESTING OF COMPONENTS OF LIGHT-WATER-COOLED PLANTS

SUBSECTION IWA
GENERAL REQUIREMENTS

ARTICLE IWA-1000
SCOPE AND RESPONSIBILITY

IWA-1100 SCOPE

This Division provides requirements for inservice inspection and testing of light-water-cooled nuclear power plants. The requirements identify the areas subject to inspection, responsibilities, provisions for accessibility and inspectability, examination methods and procedures, personnel qualifications, frequency of inspection, record keeping and report requirements, procedures for evaluation of inspection results and subsequent disposition of results of evaluations, and repair/replacement activity requirements, including procurement, design, welding, brazing, defect removal, fabrication, installation, examination, and pressure testing.

IWA-1200 JURISDICTION

The jurisdiction of this Division covers individual components and complete plants that have met all the requirements of the Construction Code, commencing when the Construction Code requirements have been met, irrespective of physical location. When portions of systems or plants are completed at different times, jurisdiction of this Division shall cover only those portions for which all of the construction requirements have been met. Prior to installation, an item that has met all requirements of the Construction Code may be corrected using the rules of either the Construction Code or this Division, as determined by the Owner.

IWA-1300 APPLICATION

IWA-1310 COMPONENTS SUBJECT TO INSPECTION AND TESTING

Components identified in this Division for inspection and testing shall be included in the inservice inspection plan. These components include nuclear power plant items such as vessels, containments, piping systems, pumps, valves, core support structures, and storage tanks, including their respective supports.

IWA-1320 CLASSIFICATIONS (23)

(a) Application of the rules of this Division shall be governed by the group classification criteria of the regulatory authority having jurisdiction at the plant site as follows.

(1) The rules of Subsection IWB shall be applied to those systems whose components are classified ASME Class 1.

(2) The rules of Subsection IWC shall be applied to those systems whose components are classified ASME Class 2, with the exception that those portions of Class 3 systems that penetrate the containment and are