



DRAFT REGULATORY GUIDE

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DRAFT REGULATORY GUIDE DG-1091

(Proposed Revision 13 of Regulatory Guide 1.147)

INSERVICE INSPECTION CODE CASE ACCEPTABILITY, ASME SECTION XI, DIVISION 1

A. INTRODUCTION

General Design Criterion (GDC) 1, "Quality Standards and Records," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires, in part, that structures, systems, and components important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Where generally recognized codes and standards are used, Criterion 1 requires that they be identified and evaluated to determine their applicability, adequacy, and sufficiency and be supplemented or modified as necessary to ensure a quality product in keeping with the required safety function.

Provisions of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code have been used since 1971 as one part of the framework to establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety. ASME standards committees develop, among other things, improved methods for the construction and inservice inspection (ISI) of ASME Class 1, 2, 3, MC (metal containment) and CC (concrete containment) nuclear power plant components. A broad spectrum of stakeholders participate in the ASME process, which helps to ensure that the various interests are considered.

In 10 CFR 50.55a, "Codes and Standards," paragraph (g), "Inservice Inspection Requirements," requires, in part, that Classes 1, 2, 3, MC, and CC Components and their supports meet the requirements of Section XI, "Rules for Inservice Inspection of Nuclear Power Plant

This regulatory guide is being issued in draft form to involve the public in the early stages of the development of a regulatory position in this area. It has not received complete staff review or approval and does not represent an official NRC staff position.

Public comments are being solicited on this draft guide (including any implementation schedule) and its associated regulatory analysis or value/impact statement. Comments should be accompanied by appropriate supporting data. Written comments may be submitted to the Rules and Directives Branch, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Comments may be submitted electronically or downloaded through the NRC's interactive web site at WWW.NRC.GOV through Rulemaking. Copies of comments received may be examined at the NRC Public Document Room, 11555 Rockville Pike, Rockville, MD. Comments will be most helpful if received by **March 25, 2002**.

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Components,”¹ of the ASME BPV Code or equivalent quality standards. Every three years the ASME publishes a new edition of the BPV Code, including Section XI, and new addenda are published every year. The latest editions and addenda of Section XI that have been approved for use by the NRC are referenced in 10 CFR 50.55a(b). The ASME also publishes Code Cases quarterly. Code Cases provide alternatives developed and approved by ASME or explain the intent of existing Code requirements. This regulatory guide identifies the Code Cases that have been determined by the NRC to be acceptable alternatives to applicable parts of Section XI. These Code Cases may be used by licensees without a request for authorization from the NRC, provided that they are used with any identified limitations or modifications. Section XI Code Cases not yet endorsed by the NRC may be implemented through 10 CFR 50.55a(a)(3), which permits the use of alternatives to the Code requirements referenced in 10 CFR 50.55a provided that the proposed alternatives result in an acceptable level of quality and safety and that their use is authorized by the Director of the Office of Nuclear Reactor Regulation.

The use of Code Cases contained in this guide is voluntary. The ASME Code is incorporated into 10 CFR 50.55a by reference. Code Cases approved by the NRC provide an acceptable voluntary alternative to the mandatory ASME Code provisions. Thus, generic approval of a Code Case through this guide of an alternative to compliance with these provisions must be accomplished through an amendment to 10 CFR 50.55a. The NRC plans to publish for public comment an amendment to 10 CFR 50.55a that would incorporate this guide by reference. The proposed amendment will state the requirements governing the use of Code Cases. Because of the continuing change in the status of Code Cases, periodic updates to 10 CFR 50.55a and this guide are planned to accommodate new Code Cases and any revisions of existing Code Cases.

This draft regulatory guide would decrease the burden on licensees who choose to use ASME Code Case N-532. The public burden reduction for this information collection is estimated to average 32 hours per request. Because the burden for this information collection is insignificant, Office of Management and Budget (OMB) clearance is not required. Existing requirements were approved by OMB, approval number 3150-011. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

B. DISCUSSION

For this Revision 13 of Regulatory Guide 1.147, the NRC staff reviewed the Section XI Code Cases listed in Supplement 4 to the 1992 Edition through Supplement 11 to the 1998 Edition. Appendix A to this guide lists the supplements reviewed, the edition, supplement number, and the ASME’s Board on Nuclear Codes and Standards approval date. Appendix B is a numerical list of the codes cases in these supplements. The guide lists Code Cases in four tables: Table 1, “Acceptable Section XI Code Cases,” contains the Code Cases that are acceptable to the NRC for implementation in the ISI of light-water-cooled nuclear power plants; Table 2, “Conditionally Acceptable Section XI Code Cases,” contains the Code Cases that are acceptable provided that they are used with the identified limitations or modifications, i.e., the Code Case is generally acceptable but the NRC has determined that the alternative requirements must be supplemented in order to provide an acceptable level of quality and

¹ Copies may be obtained from the American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990. Phone (212)591-8500; fax (212)591-8501.

safety; Table 3, “Annulled Section XI Code Cases,” contains the Code Cases that have been annulled by the ASME and may no longer be used once an ISI program is updated; and Table 4, “Section XI Code Cases That Have Been Superseded,” lists Code Cases that have been superseded through revision. Code Cases that the NRC determined to be unacceptable will be listed in a new regulatory guide that is being developed as DG-1112, “ASME Code Cases Not Approved for Use.”

Code Cases provide alternatives to existing Code requirements that were developed and approved by the ASME. The NRC plans to incorporate by reference into 10 CFR 50.55a the Code Cases listed as approved in Tables 1 and 2 of this guide. These Code Cases may be used voluntarily by licensees as an alternative to compliance with ASME Code provisions incorporated by reference into 10 CFR 50.55a.

The proposed amendment to 10 CFR 50.55a being developed would require that when a licensee initially implements a Code Case, the most recent version of that Code Case as listed in Tables 1 and 2 be implemented. If a Code Case is implemented by a licensee and a later version of the Code Case is incorporated by reference into 10 CFR 50.55a and listed in Tables 1 and 2 during the licensee’s present ISI interval, that licensee will be able to use either the later version or the previous version (unless a specific limitation or condition is placed on the use of that Code Case, in which case the modification or limitation applies). Licensees who choose to continue use of the Code Case during the subsequent ISI interval will be required to implement the latest version incorporated by reference into 10 CFR 50.55a and listed in Tables 1 and 2.

Code Cases may be annulled because experience has shown that an examination or testing method is inadequate or the application for which it was specifically developed no longer exists. If a Code Case is incorporated by reference into 10 CFR 50.55a and later annulled by the ASME, the NRC will amend 10 CFR 50.55a and this guide to remove the approval of the annulled Code Case. Licensees should not begin to implement annulled Code Cases in advance of such rulemaking. After a Code Case is annulled and 10 CFR 50.55a and guide are amended, licensees may not implement that Code Case for the first time. However, a licensee who implemented the Code Case prior to annulment may continue to use that Code Case through the end of the present ISI interval unless 10 CFR 50.55a specifically prohibits further use of the annulled Code Case. An annulled Code Case cannot be used in the subsequent ISI interval unless implemented as an approved alternative under 10 CFR 50.55a(a)(3).

With regard to the use of any Code Case, it is the responsibility of the user to make certain that no regulatory requirements are violated and that there are no conflicts with other limitations resulting from Code Case usage.

C. REGULATORY POSITION

1. ACCEPTABLE SECTION XI CODE CASES

The Code Cases listed in the table below are acceptable to the NRC for application in licensees’ Section XI inservice inspection programs. The ASME issues a new edition of Section XI every three years, and supplements to the edition containing Section XI Code Cases are published quarterly. Hence, there are 12 supplements to each edition. To distinguish new and revised Code Cases, the Code Cases that are new or have been revised since Revision 12 of Regulatory Guide 1.147 was issued are shaded. The shading is meant

to focus attention during the public comment period on the changes to the guide. Column 3 of Table 1 lists the supplement and edition in which each Code Case was published (e.g., 7/95E means Code Case Supplement 7 to the 1995 Edition).

TABLE 1 - ACCEPTABLE SECTION XI CODE CASES

CODE CASE NUMBER	TABLE 1, ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
N-307-2	<i>Revised Ultrasonic Examination Volume for Class 1 Bolting, Table IWB-2500-1, Examination Category B-G-1, When the Examinations Are Conducted from the Center-Drilled Hole, Section XI, Division 1</i>	6/98E
N-311	<i>Alternative Examination of Outlet Nozzle on Secondary Side of Steam Generators, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	3/98E
N-389-1	<i>Alternative Rules for Repairs, Replacements, or Modifications, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	3/98E
N-408-3	<i>Rules for Examination of Class 2 Piping, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	4/98E
N-432	<i>Repair Welding Using Automatic or Machine Gas Tungsten-Arc Welding (GTAW) Temper Bead Technique, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	10/98E
N-435-1	<i>Examination Requirements for Vessels With Wall Thickness 2 in. Or Less, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	12/95E
N-457	<i>Qualification Specimen Notch Location for Ultrasonic Examination of Bolts and Studs, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	4/98E
N-458-1	<i>Magnetic Particle Examination of Coated Materials, Section XI, Division 1</i>	11/95E
N-460	<i>Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	9/98E
N-461-1	<i>Alternative Rules for Piping Calibration Block Thickness, Section XI, Division 1</i>	11/95E
N-463-1	<i>Evaluation Procedures and Acceptance Criteria for Flaws in Class 1 Ferritic Piping That Exceed the Acceptance Standards of IWB-3514.2, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	12/95E

CODE CASE NUMBER	TABLE 1, ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
N-471	<i>Acoustic Emission for Successive Inspections, Section XI, Division 1</i> (Approved in Revision 12 of this guide)	3/98E
N-479-1	<i>Boiling Water Reactor (BWR) Main Steam Hydrostatic Test, Section XI, Division 1</i> (Approved in Revision 12 of this guide)	3/98E
N-481	<i>Alternative Examination Requirements for Cast Austenitic Pump Casings, Section XI, Division 1</i> (Approved in Revision 12 of this guide)	1/98E
N-485-1	<i>Eddy Current Examination of Coated Ferritic Surfaces as an Alternative to Surface Examination, Section XI, Division 1</i> (Approved in Revision 12 of this guide)	9/98E
N-489	<i>Alternative Rules for Level III NDE Qualification Examinations, Section XI, Divisions 1, 2, and 3</i> (Approved in Revision 12 of this guide)	4/98E
N-490-1	<i>Alternative Vision Test Requirements for Nondestructive Examiners, Section XI, Divisions 1, 2, and 3</i> (Approved in Revision 12 of this guide)	9/98E
N-491-2	<i>Rules for Examination of Class 1, 2, 3, and MC Component Supports of Light-Water Cooled Power Plants, Section XI, Division 1</i>	8/95E
N-494-3	<i>Pipe Specific Evaluation Procedures and Acceptance Criteria for Flaws in Class 1 Ferritic Piping that Exceed the Acceptance Standards of IWB-3514.2, Section XI, Division 1</i>	4/98E
N-495	<i>Hydrostatic Testing of Relief Valves, Section XI, Division 1</i> (Approved in Revision 12 of this guide)	3/98E
N-498-1	<i>Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1</i> (Approved in Revision 12 of this guide)	9/92E
N-503	<i>Limited Certification of Nondestructive Examination Personnel, Section XI, Division 1</i> (Approved in Revision 12 of this guide) Note: Because of the statistical screening criteria used for Appendix VIII to Section XI qualifications, this Code Case is not applicable to Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems."	10/95E
N-504-2	<i>Alternative Rules for Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping, Section XI, Division 1</i>	8/95E
N-508-1	<i>Rotation of Serviced Snubbers and Pressure Relief Valves for the Purpose of Testing, Section XI, Division 1</i>	9/92E

CODE CASE NUMBER	TABLE 1, ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
N-509	<i>Alternative Rules for the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments, Section XI, Division 1</i>	1/98E
N-514	<i>Low Temperature Overpressure Protection, Section XI, Division 1 (Approved in Revision 12)</i>	3/98E
N-515	<i>Class 1 Mechanical Joint Pressure Tests, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	3/98E
N-521	<i>Alternative Rules for Deferral of Inspections of Nozzle-to-Vessel Welds, Inside Radius Sections, and Nozzle-to-Safe End Welds of a Pressurized Water Reactor (PWR) Vessel, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	6/92E
N-523-2	<i>Mechanical Clamping Devices for Class 2 and 3 Piping, Section XI, Division 1</i>	11/98E
N-524	<i>Alternative Examination Requirements for Longitudinal Welds in Class 1 and 2 Piping, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	6/92E
N-526	<i>Alternative Requirements for Successive Inspections of Class 1 and 2 Vessels, Section XI, Division 1</i>	6/98E
N-534	<i>Alternative Requirements for Pneumatic Pressure Testing, Section XI, Division 1</i>	11/92E
N-535	<i>Alternative Requirements for Inservice Inspection Intervals, Section XI, Division 1</i>	11/95E
N-537	<i>Location of Ultrasonic Depth-Sizing Flaws, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	11/95E
N-538	<i>Alternative Requirements for Length Sizing Performance Demonstration in Accordance with Appendix VIII, Supplements 2, 3, 10, 11, and 12, Section XI, Division 1</i>	3/95E
N-541	<i>Alternative Requirements for Performance Demonstration in Accordance with Appendix VIII, Supplements 4 and 6, Section XI, Division 1 (Approved in Revision 12 of this guide)</i>	12/95E
N-543	<i>Alternative to Performing Periodic Calibration Checks, Section XI, Division 1</i>	12/95E
N-544	<i>Repair/Replacement of Small Items, Section XI, Division 1</i>	1/98E
N-545	<i>Alternative Requirements for Conduct of Performance Demonstration Detection Test of Reactor Vessel, Section XI, Division 1</i>	1/98E

CODE CASE NUMBER	TABLE 1, ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
N-553	<i>Inservice Eddy Current Surface Examination of Pressure Retaining Pipe Welds and Nozzle-to-Safe End Welds, Section XI, Division 1</i>	3/98E
N-555	<i>Use of Section II, V, and IX Code Cases, Section XI, Division 1</i>	3/95E
N-556	<i>Alternative Requirements for Verification of Acceptability of Replacements, Section XI, Division 1</i>	4/95E
N-563	<i>Grading of Examinations, IWA-2320, Section XI, Division 1</i>	5/95E
N-566-1	<i>Corrective Action for Leakage Identified at Bolted Connections, Section XI, Division 1</i>	3/98E
N-573	<i>Transfer of Procedure Qualification Records Between Owners, Section XI, Division 1</i>	8/95E
N-588	<i>Attenuation to Reference Flaw Orientation of Appendix G for Circumferential Welds in Reactor Vessels, Section XI, Division 1</i>	11/95E
N-592	<i>ASNT Central Certification Program, Section XI, Division 1</i>	11/95E
N-598	<i>Alternative Requirements to Required Percentages of Examinations, Section XI, Division 1</i>	12/95E
N-601	<i>Extent and Frequency of VT-3 Visual Examination for Inservice Inspection of Metal Containments, Section XI, Division 1</i>	12/95E
N-603	<i>Alternative to the Requirements of IWL-2421, Sites with Two Plants, Section XI, Division 1</i>	12/95E
N-604	<i>Alternative to Bolt Torque or Tension Test Requirements of Table IWE-2500-1, Category E-G, Item E8.20, Section XI, Division 1</i>	2/98E
N-605	<i>Alternative to the Requirements of IWE-2500(c) [sic, should state WE-2500(b)] for Augmented Examination of Surface Areas, Section XI, Division 1</i> [Note: Draft Regulatory Guide DG-1070, "Sampling Plans Used for Dedicating Simple Metallic Commercial Grade Items for Use in Nuclear Power Plants," is being developed to provide acceptable guidelines for sampling criteria.]	12/95E
N-609	<i>Alternative Requirements to Stress-Based Selection Criteria for Category B-J Welds, Section XI, Division 1</i>	2/98E
N-617	<i>Alternative Examination Distribution Requirements for Table IWE-2500-1, Examination Category C-G, Pressure Retaining Welds in Pumps and Valves, Section XI, Division 1</i>	3/98E

CODE CASE NUMBER	TABLE 1, ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
N-623	<i>Deferral of Inspections of Shell-to-Flange and Head-to-Flange Welds of a Reactor Vessel, Section XI, Division 1</i>	4/98E
N-624	<i>Successive Inspections, Section XI, Division 1</i>	8/98E
N-627	<i>VT-1 Visual Examination in Lieu of Surface Examination for RPV Closure Nuts, Section XI, Division 1</i>	5/98E
N-629	<i>Use of Fracture Toughness Data to Establish Reference Temperature for Pressure Retaining Materials, Section XI, Division 1</i>	5/98E
N-638	<i>Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique, Section XI, Division 1</i>	6/98E
N-640	<i>Alternative Reference Fracture Toughness for Development of P-T Limit Curves, Section XI, Division 1</i>	4/98E
N-641	<i>Alternative Pressure-Temperature Relationship and Low Temperature Overpressure Protection System Requirements, Section XI, Division 1</i>	8/98E
N-643	<i>Fatigue Crack Growth Rate Curves for Ferritic Steels in PWR Water Environment, Section XI, Division 1</i>	10/98E

2. CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES

The Code Cases listed in Table 2 below are acceptable to the NRC for application in licensees' Section XI inservice inspection programs within the limitations imposed by the NRC staff. Unless otherwise stated, limitations imposed by the NRC are in addition to the conditions specified in the Code Case. A new edition of Section XI is published every three years, and the ASME issues Section XI Code Cases quarterly in supplements to a specific edition. Hence, there are 12 supplements to each edition. To distinguish new and revised Code Cases from those approved in previous versions of the guide, the new and revised Code Cases are shaded when they are new or revised in this Revision 13 of this guide. The shading is meant to focus attention during the public comment period on the changes to the guide. Column 3 of the table lists the supplement and edition in which each Code Case was published (e.g., 7/95E means Code Case Supplement 7 to the 1995 Edition).

TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES

CODE CASE NUMBER	TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
	CONDITION	
N-198-1	<i>Exemption from Examination for ASME Class 1 and 2 Piping Located at Containment Penetrations, Section XI, Division 1</i>	12/95E
	This Code Case may only be used for low- and moderate-energy Class 2 piping systems (less than or equal to 200°F and 275 psig). The Code Case cannot be applied to any Class 1 system or to Class 2 high-energy systems. This Code Case would permit high-energy piping welds at containment penetrations to go unexamined in (1) boiling water reactors (BWRs) that are subject to intergranular stress corrosion cracking (IGSCC) and (2) BWRs and pressurized water reactors (PWRs) that may be part of the break exclusion zone. Sufficient clearance is present to permit UT examination of these critical welds. [Note: conditions contained in 10 CFR 50.55a].	

CODE CASE NUMBER	TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
	CONDITION	
N-334	<i>Examination Requirements for Integrally Welded or Forged Attachments to Class 2 Piping at Containment Penetrations, Section XI, Division 1</i>	10/98E
	Code Case may only be used for low- and moderate-energy Class 2 piping systems (less than or equal to 200 degrees F and 275 psig). This Code Case would permit high-energy piping welds at containment penetrations to go unexamined in (1) boiling water reactors (BWRs) that are subject to intergranular stress corrosion cracking (IGSCC) and (2) BWRs and pressurized water reactors (PWRs) that may be part of the break exclusion zone. Sufficient clearance is present to permit UT examination of these critical welds. [Note: conditions contained in 10 CFR 50.55a].	
N-416-2	<i>Alternative Pressure Test Requirements for Welded Repairs or Installation of Replacement Items by Welding, Class 1, 2, and 3, Section XI, Division 1</i>	9/98E
	(1) Additional surface examinations must be performed on the root (pass) layer of butt and socket welds of the pressure-retaining boundary of Class 3 components when the surface examination method is used in accordance with Section III. [Note: condition stated in Revision 12]. (2) A 4-hour hold time must be maintained prior to the VT-2 visual examination. [Note: Condition consistent with established regulatory position.]	
N-512-1	<i>Assessment of Reactor Vessels With Low Upper Shelf Charpy Impact Energy Levels, Section XI, Division 1</i>	1/98E
	The material properties and transient selection must follow the guidance in Regulatory Guide 1.161, "Evaluation of Reactor Pressure Vessels with Charpy Upper-Shelf Energy Less Than 50 Ft-lb," or an equivalent method approved by the NRC staff. [Note: Condition consistent with established regulatory position.]	

CODE CASE NUMBER	TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
	CONDITION	
N-513	<i>Evaluation Criteria for Temporary Acceptance of Flaws in Class 3 Piping, Section XI, Division 1</i>	10/95E
	(1) Specific safety factors in paragraph 4.0 must be satisfied. (2) Code Case N-513 may not be applied to: (a) Components other than pipe and tube. (b) Leakage through a gasket. (c) Threaded connections employing nonstructural seal welds for leakage prevention (through seal weld leakage is not a structural flaw; thread integrity must be maintained). (d) Degraded socket welds. [Note: conditions contained in 10 CFR 50.55a(b)(2)(xiii)].	
N-516-2	<i>Underwater Welding, Section XI, Division 1</i>	8/98E
	When welding is to be performed on high neutron fluence Class 1 material, then a mockup, using material with similar fluence levels, is to be welded to verify that adequate crack prevention measures were used. [Note: this condition contained in Revision 12, N-516].	
N-517-1	<i>Quality Assurance Program Requirements for Owners, Section XI, Division 1</i>	2/98E
	The Owner's Quality Assurance (QA) Program that is approved under Appendix B to 10 CFR Part 50 must address the use of this Code Case and any unique QA requirements identified by the Code Case that are not contained in the owner's QA Program description. This would include the activities performed in accordance with this Code Case that are subject to monitoring by the Authorized Nuclear Inspector.	
N-522	<i>Pressure Testing of Containment Penetration, Section XI, Division 1</i>	3/98E
	The test must be conducted at the peak calculated containment pressure and the test procedure must permit the detection and location of through-wall leakage in containment isolation valves (CIVs) and pipe segments between the CIVs. [Note: condition contained in Revision 12 of this guide].	
N-528-1	<i>Purchase, Exchange, or Transfer of Material Between Nuclear Plant Sites, Section XI, Division 1</i>	5/98E

CODE CASE NUMBER	TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
	CONDITION	
	The requirements of 10 CFR Part 21 are to be applied to the nuclear plant site supplying the material as well as to the nuclear plant site receiving the material that has been purchased, exchanged, or transferred between sites.	
N-532	<i>Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000, Section XI, Division 1</i>	11/92E
	An Owner's Activity Report Form OAR-1 is required to be prepared and certified upon completion of each refueling outage. The Code Case does not designate a time frame for submission to the regulatory authority. Thus, the OAR-1 must be submitted within 90 days.	
N-533-1	<i>Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections, Section XI, Division 1</i>	4/98E
	A 4-hour hold time must be maintained prior to the VT-2 visual examination. [Note: conditioned consistent with established regulatory position].	
N-546	<i>Alternative Requirements for Qualification of VT-2 Examination Personnel, Section XI, Division 1</i>	1/98E
	(1) Qualify examination personnel by test to demonstrate knowledge of Section XI and plant specific procedures for VT-2 visual examination. (2) Requalify examination personnel by examination every three years. (3) This Code Case is applicable only to the performance of VT-2 examinations.	

CODE CASE NUMBER	TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
	CONDITION	
N-552	<i>Alternative Methods - Qualification for Nozzle Inside Radius Section from the Outside Surface, Section XI, Division 1</i>	3/98E
	<p>To achieve consistency with the 10 CFR 50.55a rule change published September 22, 1999, incorporating Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," to Section XI, add the following to the specimen requirements:</p> <p>"At least 50 percent of the flaws in the demonstration test set must be cracks and the maximum misorientation must be demonstrated with cracks. Flaws in nozzles with bore diameters equal to or less than 4 inches may be notches.</p> <p>Add to detection criteria, "The number of false calls must not exceed three."</p>	
N-554-2	<i>Alternative Requirements for Reconciliation of Replacement Items, Section XI, Division 1</i>	9/98E
	The component used for repair/replacement must be manufactured, procured, and controlled as a safety-related component under an NRC-approved Quality Assurance program meeting the requirements of Appendix B to 10 CFR Part 50.	
N-557-1	<i>In-Place Dry Annealing of a PWR Nuclear Reactor Vessel, Section XI, Division 1</i>	7/95E
	The secondary stress allowable of $3S_m$, shown in Figure 1 of the Code Case, must be applied to the entire primary plus secondary stress range during the anneal.	
N-567-1	<i>Alternative Requirements for Class 1, 2, and 3 Replacement Components, Section XI, Division 1</i>	4/98E
	The component used for repair/replacement must have been manufactured, procured, and controlled as a safety-related component under an NRC-approved Quality Assurance program meeting the requirements of Appendix B to 10 CFR Part 50.	

CODE CASE NUMBER	TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
	CONDITION	
N-569-1	<i>Alternative Rules for Repair by Electrochemical Deposition of Class 1 and 2 Steam Generator Tubing, Section XI, Division 1</i>	5/98E
	NOTES: Steam generator tube repair methods require prior NRC approval through the Technical Specifications. This Code Case does not address certain aspects of this repair, e.g., the qualification of the inspection and plugging criteria necessary for staff approval of the repair method. In addition, if the user plans to "reconcile," as described in Footnote 2, the reconciliation is to be performed in accordance with IWA-4200 in the 1995 Edition, 1996 Addenda of ASME Section XI.	
N-576-1	<i>Repair of Class 1 and 2 SB-163, UNS N06600 Steam Generator Tubing, Section XI, Division 1</i>	5/98E
	NOTES: Steam generator tube repair methods require prior NRC approval through the Technical Specifications. This Code Case does not address certain aspects of this repair, e.g., the qualification of inspection and plugging criteria necessary for staff approval of the repair method. In addition, if the user plans to "reconcile," as described in the footnote, the reconciliation is to be performed in accordance with IWA-4200 in the 1995 Edition, 1996 Addenda of ASME Section XI.	
N-593	<i>Alternative Examination Requirements for Steam Generator Nozzle to Vessel Welds, Section XI, Division 1</i>	11/95E
	Essentially 100 percent (not less than 90 percent) of the examination volume A-B-C-D-E-F-G-H must be inspected.	
N-597	<i>Requirements for Analytical Evaluation of Pipe Wall Thinning, Section XI, Division 1</i>	12/95E
	Since inspection requirements and wall thinning rate are not addressed, use of the Code Case is subject to NRC review and approval. [Note: condition consistent with established regulatory position.]	

CODE CASE NUMBER	TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES	SUPPLEMEN T/EDITION
	CONDITION	
N-599	<i>Alternatives to Qualification of Nondestructive Examination Personnel for Inservice Inspection of Metal (Class MC) and Concrete (Class CC) Containments, Section XI, Division 1</i>	2/98E
	This Code Case may not be used when a licensee updates to the 1992 or later Edition of Section XI that requires the use of ANSI/ASNT CP-189, "Standard for Qualification and Certification of Nondestructive Testing Personnel." [Note: condition consistent with established regulatory position].	
N-606-1	<i>Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique for BWR CRD Housing/Stub Tube Repairs, Section XI, Division 1</i>	6/98E
	A VT-1 surface examination, in accordance with IWA-2210, must be performed prior to welding to ensure that the surface is free from contaminants (e.g., oil, grease, dirt), and that the surface is properly contoured so that an acceptable weld can be produced.	
N-616	<i>Alternative Requirements for VT-2 Visual Examination of Classes 1, 2, 3 Insulated Pressure Retaining Bolted Connections, Section XI, Division 1</i>	6/98E
	(1) Insulation must be removed for VT-2 examination during the system pressure test for any 17-4 PH stainless steel of 410 stainless steel stud or bolt aged at a temperature below 1100°F or with hardness above R _c 30. (2) For A-286 stainless steel studs or bolts, the preload must be verified to be below 100 Ksi or the thermal insulation must be removed and the joint visually examined. (3) For nuts conforming to SA-194, removal of the insulation for visual inspection is not necessary. (4) A 4-hour hold time at operating temperature and pressure is required prior to conducting the VT-2 examination. [Note: condition consistent with established regulatory position.]	

CODE CASE NUMBER	TABLE 2, CONDITIONALLY ACCEPTABLE SECTION XI CODE CASES	SUPPLEMENT/EDITION
	CONDITION	
N-630	<i>Alternatives to VT-1C and VT-3C Visual Examination for Inservice Inspection of Concrete and VT-1 Visual Examination for Inservice Inspection of Anchorage Hardware and Surrounding Concrete for Concrete Containments, Section XI, Division 1</i>	5/98E
	The Responsible Engineer's written practice must define qualification requirements for concrete and tendon hardware examination personnel in accordance with IWA-2300 in lieu of the Owner defined qualification requirements specified in Paragraph (c) of the Code Case. However, limited certification in accordance with IWA-2350 is permitted. [Note: conditions contained in 10 CFR 50.55a].	
N-639	<i>Alternative Calibration Block Material, Section XI, Division 1</i>	6/98E
	The chemical analysis must be within the material specification, and the microstructure (phase and grain shape) must be the same as the material being examined.	
N-647	<i>Alternative to Augmented Examination Requirements of IWE-2500, Section XI, Division 1</i>	11/98E
	A VT-1 examination is to be used in lieu of the "detailed visual examination." [Note 1: conditions contained in 10 CFR 50.55a]. [Note 2: Draft Regulatory Guide DG-1070, "Sampling Plans Used for Dedicating Simple Metallic Commercial Grade Items for Use in Nuclear Power Plants," is being developed to provide acceptable guidelines for sampling criteria.]	

3. ANNULLED CODE CASES

Table 3 lists the Section XI Code Cases contained in Supplement 4 to the 1992 Edition through Supplement 11 to the 1998 Edition that were annulled by the ASME.

TABLE 3, ANNULLED SECTION XI CODE CASES

CODE CASE NUMBER	TABLE 3, ANNULLED SECTION XI CODE CASES	ANNULMENT DATE (SUPPLEMENT /EDITION)
N-98	<i>Ultrasonic Examination - Calibration Block Tolerances, Section XI, Division 1</i>	8/9/96 (6/95E)

CODE CASE NUMBER	TABLE 3, ANNULLED SECTION XI CODE CASES	ANNULMENT DATE (SUPPLEMENT /EDITION)
N-113-1	<i>Basic Calibration Block for Ultrasonic Examination of Weld 10 in. To 14 in. Thick, Section XI, Division 1</i>	8/9/96 (6/95E)
N-211	<i>Recalibration of Ultrasonic Equipment Upon Change of Personnel, Section XI, Division 1</i>	4/30/96 (5/95E)
N-235	<i>Ultrasonic Calibration Checks per Section V, Section XI, Division 1</i>	8/9/96 (6/95E)
N-236-1	<i>Repair and Replacement of Class MC Vessels, Section XI, Division 1</i>	8/5/97 (9/95E)
N-335-1	<i>Rules for Ultrasonic Examination of Similar and Dissimilar Metal Piping Welds, Section XI, Division 1</i>	5/11/97 (9/95E)
N-355	<i>Calibration Block for Angle Beam Ultrasonic Examination of Large Fittings in Accordance with Appendix III-3410, Section XI, Division 1</i>	8/9/96 (6/95E)
N-356	<i>Certification Period for Level III NDE Personnel, Section XI, Division 1</i>	8/5/97 (9/95E)
N-401-1	<i>Eddy Current Examination, Section XI, Division 1</i>	5/11/97 (8/95E)
N-402-1	<i>Eddy Current Calibration Standards, Section XI, Division 1</i>	5/11/97 (8/95E)
N-409-3	<i>Procedure and Personnel Qualification Requirements for Ultrasonic Detection and Sizing of Flaws in Piping Welds, Section XI, Division 1</i>	4/30/96 (5/95E)
N-415	<i>Alternative Rules for Testing Pressure Relief, Section XI, Division 1</i>	8/14/94 (10/92E)
N-419	<i>Extent of VT-1 Examinations, Category B-G-1 of Table IWB-2500-1, Section XI, Division 1</i>	5/13/94 (9/92E)
N-426	<i>Extent of VT-1 Examinations, Category B-G-2 of Table IWB-2500-1, Section XI, Division 1</i>	5/13/94 (9/92E)
N-427	<i>Code Cases to Inspection Plans, Section XI, Division 1</i>	12/16/94 (11/92E)
N-429-1	<i>Alternative Rules for Ultrasonic Instrument Calibration, Section XI, Division 1</i>	7/27/95 (1/95E)
N-437	<i>Use of Digital Readout and Digital Measurement Devices for Performing Pressure Tests, Section XI, Division 1</i>	7/30/95 (1/95E)

CODE CASE NUMBER	TABLE 3, ANNULLED SECTION XI CODE CASES	ANNULMENT DATE (SUPPLEMENT /EDITION)
N-448	<i>Qualification of VT-2 and VT-3 Visual Examination Personnel, Section XI, Division 1</i>	4/30/96 (5/95E)
N-449	<i>Qualification of VT-4 Visual Examination Personnel, Section XI, Division 1</i>	4/30/96 (5/95E)
N-472	<i>Use of Digital Readout and Digital Measurement Devices for Performing Pump Vibration Testing, Section XI, Division 1</i>	8/14/97 (10/95E)
N-473	<i>Alternative Rules for Valve Testing, Section XI, Division 1</i>	12/16/94 (11/92E)
N-478	<i>Inservice Inspection for Class CC Concrete Components of Light-Water Cooled Power Plants, Section XI, Division 1</i>	3/2/98 (12/95E)
N-496-1	<i>Helical-Coil Threaded Inserts, Section XI, Division 1</i>	5/11/97 (8/95E)

4. CODE CASES THAT HAVE BEEN SUPERSEDED

Table 4 lists Code Cases that have been superseded by revised Code Cases. Column 3 indicates the date on which each Code Case was superseded as well as whether it was approved in a previous version of this guide, the supplement in which the Code Case was reaffirmed, and the date that the ASME approved the revised Code Case. Note: Some of these Code Cases were not approved for use by the NRC in previous versions of Regulatory Guide 1.147.

TABLE 4 - SECTION XI CODE CASES THAT HAVE BEEN SUPERSEDED

CODE CASE NUMBER	TABLE 4, SECTION XI CODE CASES THAT HAVE BEEN SUPERSEDED	DATE
N-307-1	<i>Revised Ultrasonic Examination Volume for Class 1 Bolting, Table IWB-2500-1, Examination Category B-G-1, When the Examinations Are Conducted from the Center-Drilled Hole, Section XI, Division 1</i>	Approved Rev. 12; Reaffirmed 6/95E; N-307-2 Published on 9/24/99
N-408-2	<i>Rules for Examination of Class 2 Piping, Section XI, Division 1</i>	Approved Rev. 11; Reaffirmed 4/92E; N-408-3 Published on 8/9/93
N-416-1	<i>Alternative Pressure Test Requirements for Welded Repairs or Installation of Replacement Items by Welding, Class 1, 2, and 3, Section XI, Division 1</i>	Approved Rev. 12; Reaffirmed 8/92E; N-416-2 Published on 5/5/00
N-465	<i>Alternative Rules for Pump Testing, Section XI, Division 1</i>	Approved Rev. 12; Reaffirmed 10/92E; N-465-1 Published on 8/14/97
N-491-1	<i>Rules for Examination of Class 1, 2, 3, and MC Component Supports of Light-Water Cooled Power Plants, Section XI, Division 1</i>	Approved Rev. 12; Reaffirmed 5/92E; N-491-2 Published on 3/12/97
N-494-2	<i>Pipe Specific Evaluation Procedures and Acceptance Criteria for Flaws in Class 1 Ferritic Piping that Exceed the Acceptance Standards of IWB-3514.2, Section XI, Division 1</i>	Approved Rev. 12; Reaffirmed 7/92E; N-494-3 Published on 9/9/96
N-496	<i>Helical-Coil Threaded Inserts, Section XI, Division 1</i>	Approved Rev. 11; Reaffirmed 7/92E; N-496-1 Published on 5/11/94; N-496-1 Annulled on 5/11/97
N-504-1	<i>Alternative Rules for Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping, Section XI, Division 1</i>	Approved Rev. 12; Reaffirmed 6/92E; N-504-2 Published on 3/12/97
N-508	<i>Rotation of Serviced Snubbers and Pressure Relief Valves for the Purpose of Testing, Section XI, Division 1</i>	Published in 4/92E; N-508-1 Published on 5/11/94

CODE CASE NUMBER	TABLE 4, SECTION XI CODE CASES THAT HAVE BEEN SUPERSEDED	DATE
N-516 N-516-1	<i>Underwater Welding, Section XI, Division 1</i>	N-516 Approved Rev. 12; Reaffirmed 6/92E; N-516-1 Published on 12/31/96; N-516-2 Published on 1/17/00
N-517	<i>Quality Assurance Program Requirements for Owners, Section XI, Division 1</i>	Approved Rev. 12; Reaffirmed 8/92E; N-517-1 Published on 7/30/98
N-523	<i>Mechanical Clamping Devices for Class 2 and 3 Piping, Section XI, Division 1</i>	Published 10/92E; N-523-1 Published on 8/24/95
N-533	<i>Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections, Section XI, Division 1</i>	Published 11/95E; N-533-1 Published 2/26/99
N-554 N-554-1	<i>Alternative Requirements for Reconciliation of Replacement Items, Section XI, Division 1</i>	N-554 Published 3/98E; N-554-1 Published 7/98E; N-554-2 Published on 2/25/00
N-557	<i>In-Place Dry Annealing of a PWR Nuclear Reactor Vessel, Section XI, Division 1</i>	Published 4/95E; N-557-1 Published on 12/31/96
N-560 N-560-1	<i>Alternative Examination Requirements for Class 1, Category B-J Piping Welds</i>	N-560 Published 6/95E; N-560-1 Published 7/98E; N-560-2 Published on 3/28/00
N-561	<i>Alternative Requirements for Wall Thickness Restoration of Class 2 and High Energy Class 3 Carbon Steel Piping, Section XI, Division 1</i>	Published 7/95E; N-561-1 Published on 12/31/96
N-562	<i>Alternative Requirements for Wall Thickness Restoration of Class 3 Moderate Energy Carbon Steel Piping, Section XI, Division 1</i>	Published 7/95E; N-561-1 Published on 12/31/96
N-566	<i>Corrective Action for Leakage Identified at Bolted Connections, Section XI, Division 1</i>	Published 6/95E; N-566-1 Published on 2/15/99
N-567	<i>Alternative Requirements for Class 1, 2, and 3 Replacement Components, Section XI, Division 1</i>	Published 10/95E; N-567-1 Published on 2/26/99

CODE CASE NUMBER	TABLE 4, SECTION XI CODE CASES THAT HAVE BEEN SUPERSEDED	DATE
N-569	<i>Alternative Rules for Repair by Electrochemical Deposition of Class 1 and 2 Steam Generator Tubing, Section XI, Division 1</i>	Published 6/95E; N-569-1 Published on 5/7/99
N-576	<i>Repair of Class 1 and 2 SB-163, UNS N06600 Steam Generator Tubing, Section XI, Division 1</i>	Published 8/95E; N-576-1 Published on 5/7/99
N-577	<i>Risk-Informed Requirements for Class 1, 2, and 3 Piping, Method A, Section XI, Division 1</i>	Published 10/95E; N-577-1 Published on 3/28/00
N-578	<i>Risk-Informed Requirements for Class 1, 2, and 3 Piping, Method B, Section XI, Division 1</i>	Published 10/95E; N-578-1 Published on 3/28/00
N-606	<i>Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique for BWR CRD Housing/Stub Tube Repairs, Section XI, Division 1</i>	Published 12/95E; N-606-1 Published on 9/24/99

APPENDIX A

SUPPLEMENTS ADDRESSED IN PROPOSED REVISION 13 TO REGULATORY GUIDE 1.147

EDITION	SUPPLEMEN T NUMBER	BNCS ^a APPROVAL DATE OF CODE CASES IN SUPPLEMENT ^b
1992	4	February 12, 1993
1992	5	April 27, 1993
1992	6	August 9, 1993
1992	7	December 9, 1993
1992	8	February 15, 1994
1992	9	May 11, 1994
1992	10	August 5, 1994
1992	11	December 12, 1994
1992	12	March 14, 1995
1995	1	June 9, 1995
1995	2	August 24, 1995
1995	3	December 12, 1995
1995	4	March 19, 1996
1995	5	May 24, 1996
1995	6	August 9, 1996
1995	7	December 31, 1996
1995	8	March 12, 1997
1995	9	May 26, 1997
1995	10	August 14, 1997
1995	11	December 12, 1997
1995	12	March 2, 1998
1998	1	May 20, 1998
1998	2	July 30, 1998
1998	3	February 15, 1999
1998	4	February 26, 1999

EDITION	SUPPLEMEN T NUMBER	BNCS ^a APPROVAL DATE OF CODE CASES IN SUPPLEMENT ^b
1998	5	May 7, 1999
1998	6	September 24, 1999
1998	7	November 11, 1999
1998	8	January 17, 2000
1998	9	March 28, 2000
1998	10	October 2, 2000
1998	11	December 8, 2000

^a BNCS - ASME Board on Nuclear Codes and Standards

^b Publication generally is 3 months after BNCS approval.

Appendix B

Numerical Listing of Section XI Code Cases in Supplement 4, 1992 Edition, through Supplement 11, 1998 Edition

N-98	N-489	N-544	N-599
N-113-1	N-490-1	N-545	N-601
N-198-1	N-491-1	N-546	N-603
N-211	N-491-2	N-547*	N-604
N-235	N-494-2	N-552	N-605
N-236-1	N-494-3	N-553	N-606
N-307-1	N-495	N-554	N-606-1
N-307-2	N-496	N-554-1	N-609
N-311	N-496-1	N-554-2	N-613*
N-322*	N-498-1	N-555	N-616
N-323-1*	N-498-2*	N-556	N-617
N-334	N-498-3*	N-557	N-619*
N-335-1	N-498-4*	N-557-1	N-622*
N-356	N-503	N-560	N-623
N-389-1	N-504-1	N-560-1*	N-624
N-401-1	N-504-2	N-560-2*	N-627*
N-402-1	N-508	N-561*	N-629
N-408-2	N-508-1	N-561-1*	N-630
N-408-3	N-509	N-562*	N-638
N-409-3	N-512	N-562-1*	N-639
N-415	N-512-1	N-563	N-640
N-416-1	N-513	N-566	N-641
N-416-2	N-514	N-566-1	N-643
N-419	N-515	N-567	N-647
N-426	N-516	N-567-1	N-648*
N-427	N-516-1	N-568*	
N-429-1	N-516-2	N-569	
N-432	N-517	N-569-1	
N-435-1	N-517-1	N-573	
N-437	N-521	N-574*	
N-448	N-522	N-575*	
N-449	N-523	N-576	
N-457	N-523-1	N-576-1	
N-458-1	N-523-2	N-577*	
N-460	N-524	N-577-1*	
N-461-1	N-526	N-578*	
N-463-1	N-528	N-578-1*	
N-465*	N-528-1	N-583*	
N-465-1*	N-532	N-586*	
N-471	N-533	N-587*	
N-472	N-533-1	N-588	
N-473*	N-534	N-589*	
N-473-1*	N-535	N-590*	
N-478	N-537	N-591*	
N-479-1	N-538	N-592	
N-480*	N-541	N-593	
N-481	N-542*	N-597	
N-485-1	N-543	N-598	

* Code Case is unacceptable for use; See Draft Regulatory Guide DG-1112.

DRAFT IMPACT STATEMENT

A draft impact statement has been prepared for the publication for public comment of proposed revisions to Regulatory Guides 1.84, "Design and Fabrication Code Case Acceptability, ASME Section III" (DG-1090), and 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1" (DG-1091), and one proposed regulatory guide. The proposed Revision 32 of Regulatory Guide 1.84 will combine Regulatory Guides 1.84 and 1.85. The new proposed guide is DG-1089, "Operation and Maintenance Code Case Acceptability, ASME OM Code."

ASME Code Cases provide alternatives to existing requirements contained in the ASME BPV and OM Codes, which have already been incorporated by reference into 10 CFR 50.55a. Hence, the inservice examinations and inservice testing provisions incorporated into 10 CFR 50.55a are currently being performed by licensees. Use of these alternatives, therefore, does not result in associated installation or continuing costs. In addition, since many Code Cases provide more efficient and effective examinations and tests or were developed for the purpose of reducing occupational exposure, the implementation of Code Cases reduces the burden on industry.

A copy of the Draft Impact Statement is available for inspection or copying for a fee in the NRC's Public Document Room at 11555 Rockville Pike, Rockville, MD. The PDR's mailing address is USNRC PDR, Washington, DC 20555; telephone (301)415-4737 or 1-(800)397-4209; fax (301)415-3548; e-mail <PDR@NRC.GOV> . The Draft Impact Statement is also available through the NRC's Electronic Reading Room under accession number ML012690636.