COVER SHEET

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CATAWBA NUCLEAR STATION UNITS 1 AND 2

FOURTH INTERVAL INSERVICE INSPECTION PLAN

Document No. CISI-1462.10.0040-ISI Plan

REVISION 1

Originated By: S H Clark Date 8/12/15

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Approved By: MARK A. PYNE Date 8/12/15

ISI PLAN REVISION DOCUMENTATION SHEET

Revision Number	Revision Date	Description of Revision	Special Instructions to Recipients of this Revision
0	07/23/15	This is the original publication for the fourth Interval ISI Plan for Catawba Nuclear Station Unit 1 and Unit 2. Prepared to support ASME Section XI 2007/2008a.	Original Publication
1	8/12/15	Revise page 3, remove 4th Interval end dates	

CATAWBA NUCLEAR STATION

GENERAL INFORMATION

Catawba Nuclear Station's Inservice Inspection Plan is contained in this document. In addition to the ISI Plan, separate ISI Schedules have been developed for each Unit.

Plant Location: 4800 Concord Road, York, South Carolina 29745

Commercial Service Date:	Catawba Unit 1	June 29, 1985
	Catawba Unit 2	August 19, 1986
Fourth Interval Start Date:	Catawba Unit 1	August 19, 2015
	Catawba Unit 2	August 19, 2015

Owner: Duke Energy Carolinas, LLC
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Charlotte, N. C. 28201-1006

Note: Owner shall be referred to as Duke Energy throughout this document.

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Inservice Inspection Schedules for Catawba Units 1 and 2[1]

The Inservice Inspection Schedules for Unit 1 and 2 are maintained in separate documents that are filed independently in Nuclear Fusion Electronic Document Management System (EDMS). Refer to the following documents for the Inservice Inspection Schedules:

1. CISI-1462.10-0040–UNIT 1, “Catawba Nuclear Station Unit 1 - Fourth Inspection Interval Inservice Inspection Schedule”
2. CISI-1462.10-0040–UNIT 2, “Catawba Nuclear Station Unit 2 - Fourth Inspection Interval Inservice Inspection Schedule”

[1] In addition to the listed ISI Schedules, separate documents may be maintained in Nuclear Fusion Electronic Document Management System (EDMS) that identify and provide explicit examination requirements for each refueling outage.

1.0 Applicable Codes and Standards for Inservice Inspection (ISI)

In accordance with the requirements of Paragraphs 10CFR50.55a (g)(4)(ii) (79 FR 73462, Dec. 11, 2014), the inservice inspection of Units 1 and 2 of the Catawba Nuclear Station shall be performed in accordance with the 2007 Edition of ASME Section XI, thru the 2008 Addenda, hereafter referred to as Section XI, subject to the following limitations and modifications:

Paragraph IWB-2500-1, Examination Category B-D (items B3.120 and B3.140), as defined in the 1998 Edition, shall be performed in accordance with 2007 Edition through 2008 addendum of ASME Section XI as required per Paragraph 50.55a(b)(2)(xxi)(A) of 10CFR Part 50. This paragraph allows a VT examination with enhanced magnification to be performed in lieu of the UT examination.

Ultrasonic procedures, personnel and equipment used to examine components listed in ASME Section XI, Appendix I as requiring use of Appendix VIII shall be qualified using the Performance Demonstration Initiative (PDI) Program as modified by 10CFR50.55a (b)(2)(xiv), (xv), and (xvi).

The Scope of this document does not include the Containment ISI Program, Pressure Testing ISI Program, Augmented ISI Program or Steam Generator Tubing program. These are described in the respective standalone program documents.

1.1 Inservice Inspection Basis Document

The technical basis for the information included in this document shall be contained in the Catawba Nuclear Station (CNS) Units 1 and 2, ASME Section XI Program, Basis Document for the 4th Inservice Inspection Interval, Document Number CISI-1462.10-0040 - BASISDOC. This basis document shall include detailed information regarding the ASME Section XI requirements in this ISI Plan.

1.2 Code of Federal Regulations 10CFR50.55a Conditions

The following mandatory and optional Code of Federal Regulations Conditions are included in 10CFR50.55a (79 FR 73462, Dec. 11, 2014),. These conditions were reviewed for inclusion in the ISI Program per document DUKE-008-001, Revision 0 and include only those 10CFR50.55a conditions applicable to the 2007 Edition with the 2008 Addenda of Section XI. Catawba shall implement these requirements for the Fourth Interval as follows:

1.2.1 **10CFR50.55a(b)(2)(ii) - Pressure-Retaining Welds in ASME Code Class 1 Piping (applies to Table IWB-2500 and IWB-2500-1 and Category B-J)**

Catawba Nuclear Station shall not utilize the option in 10CFR50.55a(b)(2)(ii), to examine Class 1 piping per ASME Section XI, 1974 Edition with the Summer 1975 Addenda.

1.2.2 **10CFR50.55a(b)(2)(ix) - Examination of Metal Containments and the Liners of Concrete Containments**

Catawba Nuclear Station condition is addressed in the Catawba Nuclear Station Containment Inservice Inspection Plan (CN-ISIC3-1042-0001).

1.2.3 **10CFR50.55a(b)(2)(x) - Quality Assurance**

Catawba Nuclear Station shall apply the requirements of 10CFR50 appendix B per the Duke QA Topical Report and as allowed per ASME Section XI IWA-1400(n)(1). Therefore, 10CFR50.55a(b)(2)(x) is not applicable.

1.2.4 **10CFR50.55a(b)(2)(xii) - Underwater Welding**

The requirements for performing underwater welding as stated in 10CFR50.55a(b)(2)(xii) are not addressed in the Catawba Nuclear Station ISI Plan. This condition applies to repair/replacement activities, which are addressed in Fleet Procedure AD-EG-ALL-1702 and applicable Station Procedures.

1.2.5 **10CFR50.55a(b)(2)(xiv) - Appendix VIII Personnel Qualification**

As allowed by 10CFR50.55a(b)(2)(xiv), for Appendix VIII Qualified Personnel, Catawba Nuclear Station shall use the annual practice requirements in VII-4240 of Section XI Appendix VII in place of the 8 hours of annual hands-on training (when deemed appropriate) as discussed in 10CFR50.55a(b)(2)(xiv). When utilizing this option, the annual practice requirements shall be performed on material or welds that contain cracks, or by analyzing prerecorded data from material or welds that contain cracks. All training shall be completed no earlier than 6 months prior to performing ultrasonic examinations. The implementation of ASME Section XI, Appendix VII and VIII requirements is addressed in the procedures listed in Section 3.7 of this document.

1.2.6 **10CFR50.55a(b)(2)(xv) - Appendix VIII specimen set and qualification requirements.**

Licensees using editions and addenda after 2001 Edition through the 2006 Addenda must use the 2001 Edition of Appendix VIII and may elect to comply with all of the provisions in paragraphs (b)(2)(xv)(A) through (M) of this section, except for paragraph (b)(2)(xv)(F) of this section, which may be used at the licensee's option.

These requirements shall be met during the Catawba 4th Inservice Inspection Interval.

1.2.7 **10CFR50.55a(b)(2)(xviii)(A) - Certification of NDE Personnel**

As required by 10CFR50.55a(b)(2)(xviii)(A), Level I and II nondestructive examination personnel at Catawba Nuclear Station shall be recertified on a 3-year interval in lieu of the 5-year interval specified in IWA-2314(a) and IWA-2314(b) of the 2007 Edition with the 2008 Addenda. The certification of nondestructive examination personnel is addressed in the procedures listed in Section 3.7 of this document.

1.2.8 **10CFR50.55a(b)(2)(xix) - Substitution of Alternative Methods**

As required by 10CFR50.55a(b)(2)(xix), Catawba Nuclear Station shall not apply the rules in IWA-4520(b)(2) and IWA-4521 of Section XI, 2007 Edition with the 2008 Addenda for the substitution of alternative examination methods during repair/replacement activities.

1.2.9 **10CFR50.55a(b)(2)(xx)(B) - System Leakage Tests**

As required by 10CFR50.55a(b)(2)(xx)(B), Catawba Nuclear Station shall apply the rules in IWA–4540(a)(2) of the 2002 Addenda of Section XI when performing system leakage tests after repair and replacement activities performed by welding or brazing on a pressure retaining boundary. This condition applies to repair/replacement activities, which are addressed in Fleet Procedure AD-EG-ALL-1702 and applicable Station Procedures.

1.2.10 **10CFR50.55a(b)(2)(xxi)(A) - Table IWB-2500-1 Examination Requirements**

As required by 10CFR50.55a(b)(2)(xxi)(A), the provisions of Table IWB-2500-1, Examination Category B-D, Full Penetration Welded Nozzles in Vessels, Items Nos.

B3.120 and B3.140 of Inspection Program B in the 1998 Edition shall be implemented by Catawba Nuclear Station.

As allowed optionally by 10CFR50.55a(b)(2)(xxi)(A), a visual examination with enhanced magnification that has a resolution sensitivity to detect a 1-mil width wire or crack, utilizing the allowable flaw length criteria in Table IWB-3512-1, 2007 Edition with 2008 Addenda, with a limiting assumption on the flaw aspect ratio (i.e., a/l = 0.5), may be performed in place of an ultrasonic examination. Catawba Nuclear Station may perform an enhanced VT examination when the inner radius surface is accessible. When the inner radius surface is not accessible, a UT examination shall be performed.

1.2.11 **10CFR50.55a(b)(2)(xxii) - Surface Examination**.

As required by 10CFR50.55a(b)(2)(xxii)(B), Catawba Nuclear Station shall not apply the rules in IWA-2220, "Surface Examination," of Section XI, 2007 Edition with the 2008 Addenda that allow use of an ultrasonic examination method.

1.2.12 **10CFR50.55a(b)(2)(xxiii) - Evaluation of Thermally Cut Surfaces**

Prohibition of the use of IWA-4461.4.2, which allows the elimination of mechanical processing of thermally cut surfaces as stated in 10CFR50.55a(b)(2)(xxiii) is not addressed in the Catawba Nuclear Station ISI Plan. This condition applies to repair/replacement activities, which are addressed in Fleet Procedure AD-EG-ALL-1702 and applicable Station Procedures.

1.2.13 **10CFR50.55a(b)(2)(xxv) - Mitigation of Defects by Modification**

Prohibition of the use of IWA-4340 for the mitigation of defects by modification as stated in 10CFR50.55a(b)(2)(xxv) is not addressed in the Catawba Nuclear Station ISI Plan. This condition applies to repair/replacement activities, which are addressed in Fleet Procedure AD-EG-ALL-1702 and applicable Station Procedures.

1.2.14 **10CFR50.55a(b)(2)(xxvi) - Pressure Testing Class 1, 2, and 3 Mechanical Joints**

Placing restrictions on the pressure testing of replaced components and appurtenances per IWA-4540(c) as stated in 10CFR50.55a(b)(2)(xxvi) is not addressed in the Catawba Nuclear Station ISI Plan. This condition applies to repair/replacement activities, which are addressed in Fleet Procedure AD-EG-ALL-1702 and applicable Station Procedures.

1.2.15 **10CFR50.55a(b)(2)(xxvii)-Removal of Insulation**

When performing visual examination in accordance with IWA–5240 of Section XI of the ASME B&PV Code, 2007 Edition with the 2008 Addenda Catawba Nuclear Station shall remove insulation from 17–4 PH or 410 stainless steel studs or bolts aged at a temperature below 1100 °F or having a Rockwell Method C hardness value above 30, and from A–286 stainless steel studs or bolts preloaded to 100,000 pounds per square inch or higher.

1.2.16 **10CFR50.55a(b)(2)(xxviii) - Analysis of Flaws**

Catawba Nuclear Station shall implement the following conditions when implementing Equation (2) of A-4300(b)(1) of Appendix A:

For $R < 0$, ΔK_I depends on the crack depth (a), and the flow stress (σ_f). The flow stress is defined by $\sigma_f = ½(\sigma_{ys} + \sigma_{ult})$, where σ_{ys} is the yield strength and σ_{ult} is the ultimate tensile strength in units ksi (MPa) and (a) is in units in. (mm). For $–2 \le R \le 0$ and $K_{max} – K_{min} \le 0.8 \times 1.12\ \sigma_f \sqrt{(\pi a)}$, S = 1 and $\Delta K_I = K_{max}$. For $R < –2$ and $K_{max} – K_{min} \le 0.8 \times 1.12$

$\sigma_f \sqrt{(\pi a)}$, S = 1 and $\Delta K_I = (1 - R)\ K_{max}/3$. For R < 0 and $K_{max} - K_{min} > 0.8 \times 1.12\ \sigma_f \sqrt{(\pi a)}$, S = 1 and $\Delta K_I = K_{max} - K_{min}$.

1.2.17 **10CFR50.55a(b)(2)(xxix) - Nonmandatory Appendix R**

When implementing Nonmandatory Appendix R, "Risk-Informed Inspection Requirements for Piping," of Section XI, 2007 Edition with the 2008 Addenda, Catawba Nuclear Station shall request and receive prior NRC authorization of this proposed alternative in accordance with paragraph 10CFR50.55a(z).

1.2.18 **10CFR50.55a(g)(6)(ii)(D) - Reactor Vessel Head Inspections**

Catawba Nuclear Station shall meet the criteria of 10CFR50.55a(g)(6)(ii)(D) for the performance of reactor vessel head inspections. These examinations are addressed in the Augmented ISI program document (Doc No. CISI-1462.10-0030-AUGISI-U1&U2).

1.2.19 **10CFR50.55a(g)(6)(ii)(E) - Reactor Coolant Pressure Boundary Visual Inspections**

Catawba Nuclear Station shall meet the criteria of 10CFR50.55a(g)(6)(ii)(E) for the performance of reactor coolant pressure boundary visual inspections. These examinations are addressed in the Augmented ISI program document(Doc No. CISI-1462.10-0030-AUGISI-U1&U2).

1.2.20 **10CFR50.55a(g)(6)(ii)(F)** - **Examination Requirements for Class 1 Piping and Nozzle Dissimilar-Metal Butt Welds**

Catawba Nuclear Station shall meet the criteria of 10CFR50.55a(g)(6)(ii)(F) for the examination of Class 1 piping and nozzle dissimilar-metal butt welds. These examinations are addressed in the Augmented ISI program document (Doc No. CISI-1462.10-0030-AUGISI-U1&U2).

.1.3 Additional Codes and Standards Used

Inspections performed in addition to those required by Section XI are described in Section 7.0 of this Plan. The following codes and standards apply to these inspections:

1.3.1 Steam generator tubing shall be inspected as required by ASME Section XI and the Catawba Technical Specifications for Catawba Nuclear Station. The Steam Generator Maintenance and Engineering Section/Engineering Support GO have overall responsibility for this inspection. This work is planned, implemented, documented and reported independently from this document.

1.3.2 Augmented examinations on certain systems or components shall be performed in accordance with other editions or addenda of ASME Section XI, as identified in the governing commitment. The Augmented Program is outside the scope of the ISI program. See Fleet procedure AD-EG-ALL-1704 and CISI-1462.10-0030-AUGISI-U1-U2.

1.3.3 Owner Elective examinations on certain systems or components shall be performed in accordance with other editions or addenda of ASME Section XI, as identified in the governing commitment.

1.3.4 Ultrasonic procedures, personnel and equipment used to examine components listed in ASME Section XI, Appendix I as requiring use of Appendix VIII shall be qualified using the Performance Demonstration Initiative (PDI) Program as modified by 10CFR50.55a (b)(2)(xiv), (xv), and (xvi).

1.4 Code Cases Applicable to the ASME Boiler and Pressure Vessel Code Section XI

All ASME Code Cases listed in Table1 and Table 2 of NRC Regulatory Guide 1.147, Rev. 17 are approved for use during the Catawba Units 1 and 2 4th Inservice Inspection Interval and may be used, even if they are not listed below, provided the Code Case revision is applicable to the 2007 Edition with the 2008 Addenda.

The following specific code cases shall be used for the Fourth Interval Inservice Inspection Program at Catawba Units 1 and 2:

CODE CASE	TITLE	APPLICABILITY
N-513-3	Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or Class 3 Piping, Section XI, Division 1. This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 2, with the following condition: The repair or replacement activity temporarily deferred under the provisions of this Code Case shall be performed during the next scheduled outage.	1983 Edition with the Winter 1985 Addenda through the 2007 Edition with the 2008 Addenda
N-532-5	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 (This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 1).	1995 Edition with the 1996 Addenda through the 2010 Edition
N-586-1	Alternative Additional Examination Requirements for Classes 1, 2 and 3 Piping, Components, and Supports, Section XI, Division 1. (This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 1).	1977 Edition with the Summer 1978 Addenda through the 2007 Edition with the 2008 Addenda
N-613-1	Ultrasonic Examination of Full Penetration Nozzles in Vessels, Examination Category B-D, Item No's B3.10 and B3.90, Reactor Nozzle-To-Vessel Welds, Figs. IWB-2500-7(a), (b), and (c) Section XI, Division 1. (This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 1).	1989 Edition with the 1989 Addenda through the 2007 Edition with the 2008 Addenda

CODE CASE	TITLE	APPLICABILITY
N-639	Alternative Calibration Block Material, Section XI, Division 1. This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 2, with the following condition: Chemical ranges of the calibration block may vary from the materials specification if (1) it is within the chemical range of the component specification to be inspected, and (2) the phase and grain shape are maintained in the same ranges produced by the thermal process required by the material specification.	1986 Edition with the 1987 Addenda through the 2013 Edition
N-643-2	Fatigue Crack Growth Rate Curves for Ferritic Steels in PWR Water Environment, Section XI, Division 1. (This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 1).	1977 Edition with the Summer 1978 Addenda through the 2013 Edition
N-648-1	Alternate Requirements for Inner Radius Examination of Class 1 Reactor Vessel Nozzles, Section XI Division 1. This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 2, with the following condition: In lieu of a UT examination, licensees may perform a VT-1 examination in accordance with the code of record for the Inservice Inspection Program utilizing the allowable flaw length criteria of Table IWB-3512-1 with limiting assumptions on the flaw aspect ratio.	1977 Edition with the Summer 1978 Addenda through the 2013 Edition
N-663	Alternative Requirements for Classes 1 and 2 Surface Examinations Section XI, Division 1 (applies to category B-F, B-J, C-F-1, and C-F-2). (This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 1).	1986 Edition through the 2010 Edition with the 2011 addenda
N-706-1	Alternative Examination Requirements of Table IWB-2500- I and Table IWC-2500-1 for PWR Stainless Steel Residual and Regenerative Heat Exchangers, Section XI, Division I (This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 1).	1977 Edition through the 2010 Edition with the 2011 Addenda

CODE CASE	TITLE	APPLICABILITY
N-712	Class 1 Socket Weld Examination.(This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 1).	1986 Edition through the 2010 Edition with the 2011 Addenda
N-722-1	Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials, Section XI, Division 1. [Mandated by 10CFR50.55a(g)(6)(ii)(E) with conditions]	1980 Edition Through the 2013 Edition
N-729-1	Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial- Penetration Welds, Section XI, Division 1. [Mandated by 10CFR50.55a(g)(6)(ii)(D) with conditions]	1980 Edition Through the 2004 Edition.
N-735	Successive Inspections of Class 1 and Class 2 Piping Welds. (This Code Case is approved for use in Regulatory Guide 1.147, Revision 17, Table 1).	1995 Edition with the 1996 Addendum through the 2013 Edition
N-770-1	Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated With UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities Section XI, Division 1. [Mandated by 10CFR50.55a(g)(6)(ii)(F) with conditions].	1989 Edition through the 2013 Edition.

1.5 Applicable Duke Energy Administrative Procedures

The following administrative procedures apply to the Catawba 4th Interval Inservice Inspection Plan:

PROCEDURE NO.	TITLE
PD-EG-ALL-1701	ASME Section XI Program
AD-EG-ALL-1702	ASME Section XI Inservice Inspection Program Administration

1.6 License Renewal

1.6.1 The Inservice Inspection Plans are credited in the Catawba license renewal application (LRA), as described in UFSAR Section 18.2.15, with managing aging effects associated with the Reactor Coolant System pressure retaining components (including Class 2 portions of the steam generators), their integral attachments, and other structural components within the jurisdiction of ASME Section XI. Refer to UFSAR Section 18.2.15 prior to making changes to the ISI Plan. AR No.1898156 assignment #11 (Reference PIP No.C-12-3009, CA#11)

2.0 System Boundaries Subject to Inspection

The boundaries of Class 1, 2 and 3 non-exempt systems are shown on ISI NDE Boundary Drawings listed in Section 11 and 12. Unless otherwise noted, systems designated as Class1 or Class A are equivalent to ASME Class 1, Class 2 or Class B are equivalent to ASME Class 2, and Class 3 or Class C are equivalent to ASME Class 3.

2.1 Class 1 Components Exempted From Volumetric and Surface Examination

2.1.1 Components that are connected to the reactor coolant system and part of the reactor coolant pressure boundary, and that are of such a size and shape so that upon postulated rupture the resulting flow of coolant from the reactor coolant system under normal plant operating conditions is within the capacity of make-up systems that are operable from on-site emergency power. The emergency core cooling systems are excluded from the calculation of makeup capacity. Reference Section XI, Paragraph IWB-1220(a).

2.1.2 Piping of NPS 1″ and smaller, except for steam generator tubing. Reference Section XI, Paragraph IWB-1220(b)(1).

2.1.3 Components and piping segments which have one inlet and one outlet, both of which are NPS 1 (DN25) and smaller. Reference Section XI, Paragraph IWB-1220(b)(2).

2.1.4 Components and piping segments which have multiple inlets or multiple outlets whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 1 pipe. Reference Section XI, Paragraph IWB-1220(b)(3).

2.1.5 Reactor vessel head connections and associated piping, NPS 2″ and smaller, made inaccessible by control rod drive penetrations. Reference Section XI, Paragraph IWB-1220(c).

2.1.6 Welds or portions of welds that are inaccessible due to being encased in concrete, buried underground, located inside a penetration, or encapsulated by guard pipe. Reference Section XI, Paragraph IWB-1220(d).

2.2 Class 2 Components within Residual Heat Removal (RHR), Emergency Core Cooling (ECC), and Containment Heat Removal (CHR) Systems Exempted From Volumetric and Surface Examination

2.2.1 Components and piping segments NPS 4″ and smaller in all systems except high pressure safety injection systems. Reference Section XI, Paragraph IWC-1221(a)(1).

2.2.2 Components and piping segments which have one inlet and one outlet, both of which are NPS 4″ and smaller in all systems except high pressure safety injection systems. Reference Section XI, Paragraph IWC-1221(a)(2).

2.2.3 Components and piping segments which have multiple inlets or multiple outlets, whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 4 pipe in all systems except high pressure safety injection systems. IWC-1221(a)(3), Footnote (2) clarifies that for heat exchangers, the shell side and the tube side may be considered separate components. Reference Section XI, Paragraph IWC-1221(a)(3).

2.2.4 Components and piping segments 1 1/2″ and smaller in high pressure safety injection systems. Reference Section XI, Paragraph IWC-1221(b)(1).

2.2.5 Components and piping segments which have one inlet and one outlet, both of which are 1 1/2″ and smaller in high pressure safety injection systems. Reference Section XI, Paragraph IWC-1221(b)(2).

2.2.6 Components and piping segments which have multiple inlets or multiple outlets, whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of 1 1/2″ pipe. IWC-1221(b)(3), Footnote (2) clarifies that for heat exchangers, the shell side and the tube side may be considered separate components. Reference Section XI, Paragraph IWC-1221(b)(3).

2.2.7 Vessels, piping, pumps, valves, and other components and their connections of any size in statically pressurized, passive (i.e., no pumps) safety injection systems. Reference Section XI, Paragraph IWC-1221(c).

2.2.8 Piping and other components of any size beyond the last shutoff valve in open ended portions of systems that do not contain water during normal plant operation. Reference Section XI, Paragraph IWC-1221(d).

2.3 Class 2 Components within Systems Other Than RHR, ECC, and CHR Exempted From Volumetric and Surface Examination

2.3.1 For systems, except auxiliary feedwater systems: components and piping segments, NPS 4 and smaller. Reference Section XI, Paragraph IWC-1222(a)(1).

2.3.2 For systems, except auxiliary feedwater systems: components and piping segments which have one inlet and one outlet, both of which are NPS 4″ and smaller. Reference Section XI, Paragraph IWC-1222(a)(2).

2.3.3 For systems, except auxiliary feedwater systems: components and piping segments which have multiple inlets or multiple outlets, whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 4 pipe. IWC-1222(a)(3), Footnote (2) clarifies that for heat exchangers, the shell side and the tube side may be considered separate components. Reference Section XI, Paragraph IWC-1222(a)(3).

2.3.4 For auxiliary feedwater systems: Components and piping segments 1 1/2″ and smaller. Reference Section XI, Paragraph IWC-1222(b)(1).

2.3.5 For auxiliary feedwater systems: components and piping segments which have one inlet and one outlet, both of which are 1 1/2″ and smaller. Reference Section XI, Paragraph IWC-1222(b)(2).

2.3.6 For auxiliary feedwater systems: components and piping segments which have multiple inlets or multiple outlets, whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 1-1/2″ pipe. IWC-1222(b)(3), Footnote (2) clarifies that for heat exchangers, the shell side and the tube side may be considered separate components. Reference Section XI, Paragraph IWC-1222(b)(3).

2.3.7 Vessels, piping, pumps, valves, other components, and component connections of any size in systems or portions of systems that operate (when the system function is required) at a pressure equal to or less than 275 psig and at a temperature equal to or less than 200° F. Reference Section XI, Paragraph IWC-1222(c).

2.3.8 Piping and other components of any size beyond the last shutoff valve in open ended portions of systems that do not contain water during normal plant operating conditions. Reference Section XI, Paragraph IWC-1222(d).

2.4 Class 2 Inaccessible Welds

Welds or portions of welds that are inaccessible due to being encased in concrete, buried underground, located inside a penetration, or encapsulated by guard pipe are exempted from examination requirements. Reference Section XI, Paragraph IWC-1223.

2.5 Class 3 Components Exempted From Examination

2.5.1 The requirements of Subsection IWD apply only to those Class 3 components and welded attachments that support the following functions:

(a) reactor shutdown
(b) emergency core cooling
(c) containment heat removal
(d) atmosphere cleanup
(e) reactor residual heat removal
(f) residual heat removal from spent fuel storage pool

2.5.2 Components and piping segments NPS 4 (DN 100) and smaller. Reference Section XI, Paragraph IWD-1220(a)

2.5.3 Components and piping segments which have one inlet and one outlet, both of which are NPS 4 (DN 100) and smaller. Reference Section XI, Paragraph IWD-1220(b).

2.5.4 Components and piping segments which have multiple inlets or multiple outlets whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 4 (DN 100) pipe. Reference Section XI, Paragraph IWD-1220(c).

2.5.5 Components that operate at a pressure of 275 psig or less and at a temperature of 200°F or less in systems (or portions of systems) whose function is not required in support of reactor residual heat removal, containment heat removal, and emergency core cooling. Reference Section XI, Paragraph IWD-1220(d).

2.5.6 Welds or portions of welds that are inaccessible due to being encased in concrete, buried underground, located inside a penetration, or encapsulated by guard pipe. Reference Section XI, Paragraph IWD-1220(e).

2.6 Class 1, 2, and 3 Supports Exempted From VT-3 Examination

Supports exempt from the examination requirements of IWF-2000 are those connected to piping and other items exempted from volumetric, surface, or VT-1 or VT-3 visual examination by IWB-1220, IWC-1220, and IWD-1220. In addition, portions of supports that are inaccessible by being encased in concrete, buried underground, or encapsulated by guard pipe are also exempt from the examination requirements of IWF-2000. Reference Section XI, Paragraph IWF-1230.

2.7 Examination Boundaries

Section 11 and 12 contain a listing of ISI Boundary Diagrams that are color-coded to identify Class 1, 2, and 3 components that are subject to the requirements of the ASME Code, Section XI. Color coding on these drawings is used to depict the following:

Red	Class 1 Components, not exempted
Yellow	Class 2 Components, not exempted
Green	Class 3 Components, not exempted
Blue	Class 1, 2, or 3 Components that are exempt from examination requirements of IWB-2000, IWC-2000, and IWD-2000, respectively.
Black	Components that have not been classified as ASME Class 1, 2, or 3 for application of Section XI rules and are not subject to ASME Section XI Requirements.

Revisions to the plant system flow diagrams are reviewed for additions/changes to the ISI boundaries. These additions/changes are incorporated into the ISI NDE Boundary Drawings and the ISI Plan as necessary. These ISI NDE Boundary Drawings are stored electronically and can be found in the Nuclear Fusion Electronic Document Management System (EDMS).

2.8 Inspection Interval and Inspection Periods

Reference Section 8.0 for a matrix of end of cycle vs. outage nomenclature.

Fourth Inspection Interval

Unit 1

Start Date			End Date
08/19/2015	08/19/2018	8/19/2022	12/06/2024
1ST Period	2ND Period	3RD Period	
Outage 1 (EOC 22)	Outage 3 (EOC 24)	Outage 6 (EOC 27)	
Outage 2 (EOC 23)	Outage 4 (EOC 25)	Outage 7 (EOC 28)	
	Outage 5 (EOC 26)		

Unit 2

Start Date			End Date
08/19/2015	08/19/2018	1/19/2023	02/24/2026
1ST Period	2ND Period	3RD Period	
Outage 1 (EOC 21)	Outage 3 (EOC 23)	Outage 6 (EOC 26)	
Outage 2 (EOC 22)	Outage 4 (EOC 24)	Outage 7 (EOC 27)	
	Outage 5 (EOC 25)		

Note: The Interval end dates for Unit 1 and 2 are set per AR#1897281 assignment # 8 (PIP C-14-9325) and align with the NRC commitment on start dates for Catawba Nuclear Station Unit 1 period of extended operation of 12/6/2024 and Unit 2 start date for period of extended operation of 02/24/2026.

3.0 Examination Methods and Procedures to be used for Inservice Inspection

Inservice inspection of Catawba Units 1 and 2 shall be performed using procedures which comply with the requirements of the applicable codes and code cases referenced in Section 1.0 of this plan. Volumetric, surface, and visual methods of examination shall be used as required. Each examination shall be performed under the QA Program of the organization performing the examination.

A specific examination procedure is referenced for each examination method listed in Section 8.0 of this Plan. Procedures beginning with “NDE or “PDI” are found in the Duke Energy NDE Procedure Manuals. Vendor inspection procedures that are to be used shall be listed in Section 3.7 of this plan as they become identified or included in the vendor contract documentation. Duke Energy examination procedures shall also be listed in Section 3.7 of this plan.

3.1 Volumetric Examination

Volumetric examination shall be performed by manual and/or automated ultrasonic methods, except in some cases where ultrasonic methods are not practical. Radiographic examinations shall be used in these cases in lieu of ultrasonic examinations. Examination of reactor vessel welds shall be performed using an automated ultrasonic inspection device.

Steam generator tubing shall be examined using eddy current inspection methods as outlined in the Catawba Technical Specifications. The Steam Generator Maintenance and Engineering Section/Engineering Support GO have overall responsibility for implementing and reporting any examinations pertaining to the Steam Generator Tubes. This work is planned, implemented, documented and reported independently from this document.

3.2 Surface Examination

Surface examination shall be performed using either liquid penetrant or magnetic particle methods. The liquid penetrant method shall be used for all surface examinations on austenitic steels and may also be used on ferritic steel. The magnetic particle method shall only be used on ferritic steel.

3.3 Visual Examination

Inservice visual examinations shall be performed using direct methods where practical. Remote visual examinations may be used in some cases. Enhanced visual methods may be used in lieu of ultrasonic for some examinations, as permitted by ASME Section XI and/or 10CFR50.55a.

3.7 Examination Procedures

PROCEDURE NO.	TITLE
NDE-12	General Radiography Procedure for Preservice and Inservice Inspection
NDE-25	Magnetic Particle Examination
NDE-35	Liquid Penetrant Examination
NDE-62	Visual Examination (VT-1 and VT-3) of Bolting

PROCEDURE NO.	TITLE
NDE-63	Remote Visual Examination (VT-1 and VT-3) of Reactor Pressure Vessel Internals
NDE-64	Visual Examination (VT-3) of Pump and Valve Internals
NDE-65	Visual Examination (VT-1) of Class 3 Welded Attachments and Pump Casing Welds
NDE-66	Visual Examination (VT-3) of Hangers, Restraints, Supports and Snubbers
NDE-68	VT-2, Visual Examination for Leakage
NDE-69	VE Visual Examination of Reactor Pressure Vessel Bottom Mounted Instrument Penetration
NDE-70	Visual Examination of Reactor Pressure Vessel Upper Head Penetrations
NDE-600	Ultrasonic Examination of Similar Metal Welds in Wrought Ferritic and Austenitic Piping
NDE-620	Ultrasonic Examination of Welds in Ferritic Pressure Vessels Greater than 2 Inches in Thickness
NDE-640	Ultrasonic Examination using Longitudinal Wave and Shear Wave, Straight Beam Technique
NDE-670	Ultrasonic Sizing of Flaws in Wrought Piping
NDE-680	Ultrasonic Examination of Nozzle Inner Radii in Ferritic Pressure Vessels
NDE-820	Ultrasonic Examination of Welds in Ferritic Pressure Vessels Greater Than 2 Inches in Thickness
NDE-830	Ultrasonic Examination of Cast Austenitic Welds Using Refracted Longitudinal Waves at Catawba Nuclear Station
NDE-940	Ultrasonic Thickness Measurement and Stud Location and examination of Lifting Rig Pins.
NDE-998	Ultrasonic Examination of Mid and Large Diameter Piping Butt Welds and Base Material for Thermal Fatigue Damage
NDE-3630	Ultrasonic Examination of Welds in Pressure Vessels 2 Inches and Less in Thickness
PDI-UT-1	PDI Generic Procedure for The Ultrasonic Examination of Ferritic Pipe Welds
PDI-UT-2	PDI Generic Procedure for The Ultrasonic Examination of Austenitic Pipe Welds
PDI-UT-3	PDI Generic Procedure for the Ultrasonic Through Wall Sizing In Pipe Welds
PDI-UT-4	PDI Generic Procedure for The Ultrasonic Examination of Studs and Bolts from the Bore
PDI-UT-5	PDI Generic Procedure for Straight Beam Ultrasonic Examination of Bolts and Studs

PROCEDURE NO.	TITLE
PDI-UT-6	PDI Generic Procedure for The Manual Ultrasonic Examination of Reactor Vessel Welds
PDI-UT-7	PDI Generic Procedure for the Manual Ultrasonic Through Wall and Length Sizing of Ultrasonic Indications in Reactor Pressure Vessel Welds
PDI-UT-8	PDI-Generic Procedure for the Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal
PDI-UT-10	PDI Generic Procedure for The Ultrasonic Examination of Dissimilar Metal Piping Welds
PDI-UT-12	Procedure for Manual Phased Array Ultrasonic Examination of Reactor Vessel Welds
54-PT-200	Color Contrast Solvent Removable Liquid Penetrant Examination of Components
EPRI-DMW-PA-1	Procedure for Manual Phased Array Ultrasonic Testing of Dissimilar Metal Welds

Note: For Catawba Nuclear Station Units 1 and 2 the latest revision of each procedure that has been approved shall be used. These procedures shall have Duke Energy approval prior to implementation. All Vendor procedures with Duke approvals shall be included in contract final report documentation. If used to perform examinations in accordance with the 4th Interval ISI Plan, this list shall be updated to include all vendor procedures used during the 4th Interval.

4.0 Description of Inservice Inspection Plan for ASME Class 1 Components

The inservice inspection of ASME Class 1 Components shall be performed in accordance with the requirements of Article IWB-2000 of Section XI. A description of examination listings and schedules are found in Section 8.0 of this Plan. Class 1 examinations were scheduled for the Fourth Inspection Interval in accordance with the following table from ASME Section XI Inspection Program:

Table IWB-2411-1

Inspection Interval	Inspection Period, Calendar Years of Plant Service Within the Interval	Minimum Examinations Completed, %	Maximum Examinations Credited, %
4rd	3	16	50
	7	50 (Note 1)	75
	10	100	100

Note 1: If the first period completion percentage for any examination category exceeds 34%, at least 16% of the required examinations shall be performed in the second period.

4.1 Examination Categories and Requirements

The examination categories to be used are those listed in Table IWB-2500-1 of Section XI. Specific examinations shall be identified by a Summary Number similar to those listed in Table IWB-2500-1 of Section XI, which is preceded by a C1 or a C2 to designate Catawba Unit 1 or Catawba Unit 2, plus an additional number to uniquely identify that examination. (Example: C1.B1.22.0003)

Class 1 Components to be inspected include:

Category B-A **Pressure Retaining Welds in Reactor Vessel**

IWB-2500-1 Item No.	Component To Be Examined	Comments
B1.10	**Shell Welds**	
B1.11	Circumferential	
B1.12	Longitudinal	N/A for Catawba 1
B1.20	**Head Welds**	
B1.21	Circumferential	
B1.22	Meridional	
B1.30	**Shell-to-Flange Weld**	
B1.40	**Head-to-Flange Weld**	
B1.50	**Repair Welds**	
B1.51	Beltline region	N/A for Catawba 1 and 2

Category B-B Pressure Retaining Welds in Vessels Other Than Reactor Vessels

IWB-2500-1 Item No.	Component To Be Examined	Comments
	Pressurizer	
B2.10	**Shell-to-Head**	
B2.11	Circumferential	
B2.12	Longitudinal	
B2.20	**Head Welds**	
B2.21	Circumferential	N/A for Catawba 1 and 2
B2.22	Meridional	N/A for Catawba 1 and 2
	Steam Generators (Primary Side)	
B2.30	**Head Welds**	
B2.31	Circumferential	N/A for Catawba 1 and 2
B2.32	Meridional	N/A for Catawba 1 and 2
B2.40	**Tubesheet-to-Head Weld**	
	Heat Exchangers (Primary Side) - Head	
B2.50	**Head Welds**	
B2.51	Circumferential	N/A for Catawba 1 and 2
B2.52	Meridional	N/A for Catawba 1 and 2
	Heat Exchangers (Primary Side) - Shell	
B2.60	Tubesheet-to-Head Welds	N/A for Catawba 1 and 2
B2.70	Longitudinal Welds	N/A for Catawba 1 and 2
B2.80	Tubesheet-to-Shell Welds	N/A for Catawba 1 and 2

Category B-D Full Penetration Welded Nozzles in Vessels

IWB-2500-1 Item No.	Component To Be Examined	Comments
	Reactor Vessel	
B3.90	Nozzle-to-Vessel Welds	
B3.100	Nozzle Inside Radius Section	
	Pressurizer	
B3.110	Nozzle-to-Vessel Welds	
B3.120	Nozzle Inside Radius Section	See Note
	Steam Generators (Primary Side)	
B3.130	Nozzle-to-Vessel Welds	N/A for Catawba 1 and 2
B3.140	Nozzle Inside Radius Section	See Note
	Heat Exchangers (Primary Side)	
B3.150	Nozzle-to-Vessel Welds	N/A for Catawba 1 and 2
B3.160	Nozzle Inside Radius Section	N/A for Catawba 1 and 2

Note: Item Nos. B3.120 and B3.140 of Inspection Program B in the 1998 Edition are included in the table above because of the condition imposed by 10 CFR 50.55a(b)(2)(xxi)(A).

Category B-F	Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles	
IWB-2500-1 Item No.	**Component To Be Examined**	**Comments**
	Reactor Vessel	
B5.10	NPS 4 or Larger Nozzle-to-Safe End Butt Welds	
B5.20	Less Than NPS 4 Nozzle-to-Safe End Butt Welds	N/A for Catawba 1 and 2
B5.30	Nozzle-to-Safe End Socket Welds	N/A for Catawba 1 and 2
	Pressurizer	
B5.40	NPS 4 or Larger Nozzle-to-Safe End Butt Welds	
B5.50	Less Than NPS 4 Nozzle-to-Safe End Butt Welds	N/A for Catawba 1 and 2
B5.60	Nozzle-to-Safe End Socket Welds	N/A for Catawba 1 and 2
	Steam Generator	
B5.70	NPS 4 or Larger Nozzle-to-Safe End Butt Welds	
B5.80	Less Than NPS 4 Nozzle-to-Safe End Butt Welds	N/A for Catawba 1 and 2
B5.90	Nozzle-to-Safe End Socket Welds	N/A for Catawba 1 and 2
	Heat Exchangers	
B5.100	NPS 4 or Larger Nozzle-to-Safe End Butt Welds	N/A for Catawba 1 and 2
B5.110	Less Than NPS 4 Nozzle-to-Safe End Butt Welds	N/A for Catawba 1 and 2
B5.120	Nozzle-to-Safe End Socket Welds	N/A for Catawba 1 and 2

Category B-G-1 Pressure Retaining Bolting, Greater Than 2 in. In Diameter

IWB-2500-1 Item No.	Component To Be Examined	Comments
	Reactor Vessel	
B6.10	Closure Head Nuts	
B6.20	Closure Studs	
B6.40	Threads in Flange	
B6.50	Closure Washers, Bushings	
	Pressurizer	
B6.60	Bolts and Studs	N/A for Catawba 1 and 2
B6.70	Flange Surface, when connection disassembled	N/A for Catawba 1 and 2
B6.80	Nuts, Bushings, and Washers	N/A for Catawba 1 and 2
	Steam Generators	
B6.90	Bolts and Studs	N/A for Catawba 2
B6.100	Flange Surface, when connection disassembled	N/A for Catawba 2
B6.110	Nuts, Bushings, and Washers	N/A for Catawba 2
	Heat Exchangers	
B6.120	Bolts and Studs	N/A for Catawba 1 and 2
B6.130	Flange Surface, when connection disassembled	N/A for Catawba 1 and 2
B6.140	Nuts, Bushing, and Washers	N/A for Catawba 1 and 2
	Piping	
B6.150	Bolts and Studs	N/A for Catawba 1 and 2
B6.160	Flange Surface, when connection disassembled	N/A for Catawba 1 and 2
B6.170	Nuts, Bushing, and Washers	N/A for Catawba 1 and 2
	Pumps	
B6.180	Bolts and Studs	
B6.190	Flange Surface, when connection disassembled	
B6.200	Nuts, Bushings, and Washers	N/A for Catawba 1 and 2
	Valves	
B6.210	Bolts and Studs	N/A for Catawba 1 and 2
B6.220	Flange Surface, when connection disassembled	N/A for Catawba 1 and 2
B6.230	Nuts, Bushings, and Washers	N/A for Catawba 1 and 2

Category B-G-2 Pressure Retaining Bolting, 2 in. And Less In Diameter

IWB-2500-1 Item No.	Component To Be Examined	Comments
	Reactor Vessel	
B7.10	Bolts, Studs, and Nuts	
	Pressurizer	
B7.20	Bolts, Studs, and Nuts	
	Steam Generators	
B7.30	Bolts, Studs, and Nuts	N/A for Catawba 1
	Heat Exchangers	
B7.40	Bolts, Studs, and Nuts	N/A for Catawba 1 and 2
	Piping	
B7.50	Bolts, Studs, and Nuts	
	Pumps	
B7.60	Bolts, Studs, and Nuts	
	Valves	
B7.70	Bolts, Studs, and Nuts	

Category B-J Pressure Retaining Welds in Piping

IWB-2500-1 Item No.	Component To Be Examined	Comments
B9.10	**NPS 4 or Larger**	
B9.11	Circumferential Welds	
B9.20	**Less Than NPS 4**	
B9.21	Circumferential Welds other than PWR HPI Systems	
B9.22	Circumferential Welds of PWR HPI Systems	Item No. is new In 4th Interval
B9.30	**Branch Pipe Connection Welds**	
B9.31	NPS 4 or Larger	
B9.32	Less Than NPS 4	
B9.40	Socket Welds	

Category B-K Welded Attachments for Vessels, Piping, Pumps, and Valves

IWB-2500-1 Item No.	Component To Be Examined	Comments
	Pressure Vessels	
B10.10	Welded Attachments	
	Piping	
B10.20	Welded Attachments	N/A for Catawba 1 and 2
	Pumps	
B10.30	Welded Attachments	N/A for Catawba 1 and 2
	Valves	
B10.40	Welded Attachments	N/A for Catawba 1 and 2

Category B-L-2 Pump Casings

B-M-2 Valve Bodies

IWB-2500-1 Item No.	Component To Be Examined	Comments
	Pumps	
B12.20	Pump Casing (B-L-2)	
	Valves	
B12.50	Valve Body, Exceeding NPS 4 (B-M-2)	

Category B-N-1 Interior of Reactor Vessel

B-N-2 Welded Core Support Structures and Interior Attachments to Reactor Vessels

B-N-3 Removable Core Support Structures

IWB-2500-1 Item No.	Component To Be Examined	Comments
	Reactor Vessel	
B13.10	Vessel Interior (B-N-1)	Each Inspection Period
	Reactor Vessel (PWR)	
B13.50	Interior Attachments Within Beltline Region (B-N-2)	N/A for Catawba 1 and 2
B13.60	Interior Attachments Beyond Beltline Region (B-N-2)	
B13.70	Core Support Structure (B-N-3)	

Category B-O Pressure Retaining Welds in Control Rod Drive and Instrument Nozzle Housings

IWB-2500-1 Item No.	Component To Be Examined	Comments
	Reactor Vessel	
B14.20	Welds in CRD Housings	
B14.21	Welds in In-Core Instrumentation Nozzle Housings > NPS 2 inch.	

Category B-P All Pressure Retaining Components

IWB-2500-1 Item No.	Component To Be Examined	Comments
B15.10	Pressure Retaining Components	Reference Duke Energy Corporation 4th Interval Inservice Inspection Pressure Test Plan
B15.20	Pressure Retaining Components	Reference Duke Energy Corporation 4th Interval Inservice Inspection Pressure Test Plan

Note: Catawba Pressure Testing Plan for 4th Interval is CISI-1462.20.0040-PTPLAN

Category B-Q Steam Generator Tubing

IWB-2500-1 Item No.	Component To Be Examined	Comments
B16.10	Steam Generator Tubing in Straight Tube Design	N/A for Catawba 1 and 2
B16.20	Steam Generator Tubing in U-Tube Design	Reference SG ISI Plan Document

Category F-A Supports

IWF-2500-1 Item No.	Component To Be Examined	Comments
F1.10	Class 1 Piping Supports (Category A)	See Note
F1.11	Class 1 Piping Supports (Category B)	See Note
F1.12	Class 1 Piping Supports (Category C)	See Note
F1.40	Supports Other Than Piping Supports (Class 1)	

Note: Duke has established Item numbers as shown to categorize support types as specified in Table IWF-2500-1, Footnote (1).

Categories Q-A Appendix Q Welds are inactive in the 4th Interval. These items were examined during the previous interval in accordance with Appendix Q (1998 edition with 2000 Addenda of Section XI) and are now addressed in fleet Procedure AD-EG-ALL-1704, Augmented Inspection Program Administration and are documented in CISI-1462.10-0030-AUGISI-U1&U2, Catawba Nuclear Station Augmented Inservice Inspection Plan and Schedule.

4.2 Selection of Piping Stress Welds for Inservice Inspection

Piping welds whose stresses exceed limits specified in Table IWB-2500-1, Examination Category B-J, Footnote (2)(b) shall be selected for inservice inspection in accordance with Article IWB-2000 of Section XI. The selection criteria for each category of Table IWB-2500-1 shall be applied. The specification for identification of Class 1 piping stress welds is Duke Energy Piping Analysis Specification Catawba Nuclear Station CNS-1206.02-01-0008, Section 3.8.7. These are weld locations where the primary plus secondary stress intensity (ASME Section III, Eq. 10, NB-3653.1) is greater than 2.4 S_m for ferritic and austenitic steels, and where the cumulative usage factor (U) exceeded 0.40. Class 1 piping welds that exceed the stress criteria given above are listed below:

4.2.1 Catawba 1

Item Number	Weld Number	Piping Isometric	NDE Boundary Drawings
B09.021.008	1NC40-8	CN-1NC-40	CN- ISIN4-1553-1.0
B09.021.029	1NV201-1	CN-1NV-201	CN- ISIN4-1554-1.0
B09.021.030	1NV201-2	CN-1NV-201	CN- ISIN4-1554-1.0
B09.022.010	1NC42-1	CN-1NC-42	CN- ISIN4-1553-1.0
B09.022.011	1NC43-11	CN-1NC-43	CN- ISIN4-1553-1.0
B09.022.014	1NC51-1	CN-1NC-51	CN- ISIN4-1553-1.0
B09.022.015	1NC56-1	CN-1NC-56	CN- ISIN4-1554-1.0
B09.022.021	1NC82-1	CN-1NC-82	CN- ISIN4-1553-1.0
B09.022.031	1NV310-1	CN-1NV-310	CN- ISIN4-1554-1.0
B09.022.032	1NV310-2	CN-1NV-310	CN- ISIN4-1554-1.0
B09.040.013	1NC88-1	CN-1NC-88	CN- ISIN4-1553-1.1
B09.040.014	1NC88-2	CN-1NC-88	CN- ISIN4-1553-1.1
B09.040.015	1NC88-3	CN-1NC-88	CN- ISIN4-1553-1.1
B09.040.016	1NC88-9	CN-1NC-88	CN- ISIN4-1553-1.1
B09.040.017	1NC88-10	CN-1NC-88	CN- ISIN4-1553-1.1
B09.040.018	1NC88-11	CN-1NC-88	CN- ISIN4-1553-1.1
B09.040.019	1NC88-12	CN-1NC-88	CN- ISIN4-1553-1.1
B09.040.046	1NV307-12	CN-1NV-307	CN- ISIN4-1554-1.0

4.2.2 Catawba 2

Item Number	Weld Number	Piping Isometric	NDE Boundary Drawings
B09.021.017	2NC51-1	CN-2NC-51	CN-ISIN4-2553-1.0
B09.022.007	2NC52-8	CN-2NC-52	CN-ISIN4-2553-1.0
B09.021.028	2NV119-1	CN-2NV-119	CN-ISIN4-2554-1.0
B09.021.029	2NV119-2	CN-2NV-119	CN-ISIN4-2554-1.0
B09.022.018	2NV185-1	CN-2NV-185	CN-ISIN4-2554-1.0
B09.022.019	2NV185-2	CN-2NV-185	CN-ISIN4-2554-1.0
B09.040.009	2NC74-1	CN-2NC-74	CN-ISIN4-2553-1.0

Note: For the Catawba 4th Interval this list of stress welds could not be validated as accurate and was brought forward from the 3rd Interval ISI Document CISI-1462.10.0030- GEN REQ Section 4.2. AR# 01937922 was generated for CNS Design Engineering to provide validation documentation for the 4th Interval ISI Plan.

5.0 Description of Inservice Inspection Plan for ASME Class 2 Components

The inservice inspection of ASME Class 2 Components shall be performed in accordance with the requirements of Article IWC-2000 of Section XI. A description of examination listings and schedules are found in Section 8.0 of this Plan. Class 2 examinations were scheduled for the Fourth Inspection Interval in accordance with the following table from ASME Section XI Inspection Program:

Table IWC-2411-1

Inspection Interval	Inspection Period, Calendar Years of Plant Service Within the Interval	Minimum Examinations Completed, %	Maximum Examinations Credited, %
4th	3	16	50
	7	50 Note 1	75
	10	100	100

Note 1: If the first period completion percentage for any examination category exceeds 34%, at least 16% of the required examinations shall be performed in the second period.

5.1 Examination Categories and Requirements

The examination categories to be used are those listed in Table IWC-2500-1 of Section XI. Specific examinations shall be identified by a Summary Number, similar to those listed in Table IWC-2500-1 of Section XI, which is preceded by a C1 or a C2 to designate Catawba Unit 1 or Catawba Unit 2, plus an additional number to uniquely identify that examination. (Example C2.C1.10.0001)

Class 2 Components to be inspected include:

Category C-A Pressure Retaining Welds in Pressure Vessels

IWC-2500-1 Item No.	Component To Be Examined	Comments
C1.10	Shell Circumferential Welds	
C1.20	Head Circumferential Welds	
C1.30	Tube sheet-to-Shell Weld	

Category C-B Pressure Retaining Nozzle Welds in Vessels

IWC-2500-1 Item No.	Component To Be Examined	Comments
C2.10	**Nozzles in Vessels ≤ 1/2 in. Nominal Thickness**	
C2.11	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Weld	
C2.20	**Nozzles Without Reinforcing Plate in Vessels > 1/2 in. Nominal Thickness**	
C2.21	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Weld	
C2.22	Nozzle Inside Radius Section	
C2.30	**Nozzles With Reinforcing Plate in Vessels > 1/2 in. Nominal Thickness**	
C2.31	Reinforcing Plate Welds to Nozzle and Vessel	
C2.32	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Welds When Inside of Vessel is Accessible	N/A for Catawba 1 and 2
C2.33	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Welds When Inside of Vessel is Inaccessible	Reference Duke Energy Corporation Inservice Inspection Pressure Test Plan

Note: Catawba Pressure Testing Plan for 4th Interval is CISI-1462.20.0040-PTPLAN

Category C-C Welded Attachments for Vessels, Piping, Pumps, and Valves

IWC-2500-1 Item No.	Component To Be Examined	Comments
	Pressure Vessels	
C3.10	Welded Attachments	
	Piping	
C3.20	Welded Attachments	
	Pumps	
C3.30	Welded Attachments	
	Valves	
C3.40	Welded Attachments	

Category C-D **Pressure Retaining Bolting Greater Than 2 in. In Diameter**

IWC-2500-1 Item No.	Component To Be Examined	Comments
	Pressure Vessels	
C4.10	Bolts and Studs	N/A for Catawba 1 and 2
	Piping	
C4.20	Bolts and Studs	N/A for Catawba 1 and 2
	Pumps	
C4.30	Bolts and Studs	N/A for Catawba 1 and 2
	Valves	
C4.40	Bolts and Studs	N/A for Catawba 1 and 2

Category C-F-1 **Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping**

IWC-2500-1 Item No.	Component To Be Examined	Comments
C5.10	**Piping Welds $\geq$ $^{3}/_{8}$ in. Nominal Wall Thickness for Piping > NPS 4**	
C5.11	Circumferential Weld	
C5.20	**Piping Welds >$^{1}/_{5}$ in. Nominal Wall Thickness for Piping $\geq$ NPS 2 and $\leq$ NPS 4**	
C5.21	Circumferential Weld	
C5.30	Socket Welds	
C5.40	**Pipe Branch Connections of Branch Piping $\geq$ NPS 2**	
C5.41	Circumferential Weld	

Category C-F-2 Pressure Retaining Welds in Carbon or Low Alloy Steel Piping

IWC-2500-1 Item No.	Component To Be Examined	Comments
C5.50	**Piping Welds ≥ 3/8 in. Nominal Wall Thickness for Piping > NPS 4**	
C5.51	Circumferential Weld	
C5.60	**Piping Welds >1/5 in. Nominal Wall Thickness for Piping ≥ NPS 2 and ≤ NPS 4**	
C5.61	Circumferential Weld	
C5.70	**Socket Welds**	
C5.80	**Pipe Branch Connections of Branch Piping ≥ NPS 2**	
C5.81	Circumferential Weld	

Category C-H All Pressure Retaining Components

IWC-2500-1 Item No.	Component To Be Examined	Comments
C7.10	Pressure retaining components	Reference Duke Energy Corporation Inservice Inspection Pressure Test Plan

Note: Catawba Pressure Testing Plan for 4th Interval is CISI-1462.20.0040-PTPLAN

CATEGORY F-A SUPPORTS

IWF-2500-1 Item No.	Component To Be Examined	Comments
F1.20	Class 2 Piping Supports (Category A)	See Note
F1.21	Class 2 Piping Supports (Category B)	See Note
F1.22	Class 2 Piping Supports (Category C)	See Note
F1.40	Supports Other Than Piping Supports (Class 2)	

Note: Duke has established Item numbers as shown to categorize support types as specified in Table IWF-2500-1, Footnote (1).

6.0 Description of Inservice Inspection Plan for ASME Class 3 Components

The inservice inspection of ASME Class 3 Components shall be performed in accordance with the requirements of Article IWD-2000 of Section XI. A description of examination listings and schedules are found in Section 8.0 of this Plan. Class 3 examinations were scheduled for the Fourth Inspection Interval in accordance with the following table from ASME Section XI Inspection Program:

Table IWD-2411-1

Inspection Interval	Inspection Period, Calendar Years of Plant Service Within the Interval	Minimum Examinations Completed, %	Maximum Examinations Credited, % [Note 1]
4th	3	16	50
	7	50 Note 1	75
	10	100	100

Note 1: If the first period completion percentage for any examination category exceeds 34%, at least 16% of the required examinations shall be performed in the second period.

6.1 Examination Categories and Requirements

The examination categories to be used are those listed in Table IWD-2500-1 of Section XI. Specific examinations shall be identified by a Summary Number, similar to those listed in Table IWD-2500-1 of Section XI, which is preceded by a C1 or a C2 to designate Catawba Unit 1 or Catawba Unit 2, plus an additional number to uniquely identify that examination; Example, (C1.D1.10.0001).

Class 3 Components to be inspected include:

Category D-A **Welded Attachments for Vessels, Piping, Pumps, and Valves**

IWD-2500-1 Item No.	Component to be Examined	Comments
	Pressure Vessels	
D1.10	Welded Attachments	
	Piping	
D1.20	Welded Attachments	
	Pumps	
D1.30	Welded Attachments	
	Valves	
D1.40	Welded Attachments	N/A for Catawba 1 and 2

Category D-B All Pressure Retaining Components

IWD-2500-1 Item No.	Component To Be Examined	Comments
D2.10	Pressure retaining components	Reference Duke Energy Corporation Inservice Inspection Pressure Test Plan

Note: Catawba Pressure Testing Plan for 4th Interval is CISI-1462.20.0040-PTPLAN

Category F-A Supports

IWF-2500-1 Item No.	Component to be Examined	Comments
F1.30	Class 3 Piping Supports (Category A)	See Note
F1.31	Class 3 Piping Supports (Category B)	See Note
F1.32	Class 3 Piping Supports (Category C)	See Note
F1.40	Supports Other than Piping Supports (Class 3)	

Note: Duke has established Item numbers as shown to categorize support types as specified in Table IWF-2500-1, Footnote (1).

7.0 Augmented and Elective Inservice Inspections

7.1 Augmented inservice inspections are addressed in fleet Procedure AD-EG-ALL-1704, Augmented Inspection Program Administration and are documented in CISI-1462.10-0030-AUGISI-U1&U2, Catawba Nuclear Station Augmented Inservice Inspection Plan and Schedule.

7.2 Elective inservice inspections are contained within the Inservice Inspection Plan, but are not required by the ASME Code, Section XI. These examinations are exempt from ANII review, verification and/or record certification. Elective inservice inspections included in the 4th Interval Inservice Inspection Plan are documented in this section:

7.2.1 NI Cold Leg Accumulator Welds Subject to Unanalyzed Thermal Transients (Summary number series H1.1)

Ultrasonic examination shall be performed on specified Class 1 Piping circumferential welds long seam weld and base material.

Exam required is: UT of weld, base metal and longitudinal seam welds.

Frequency is: Once per Interval

Reference: ER-CNS-99-01 Rev 01

Applicable to Unit 1 and Unit 2.

7.2.2 Thermal Fatigue Volumetric examination per MRP 192 (Summary number series H2.1 Unit 1 and H3.1 Unit 2)

Volumetric examination shall be performed on specified circ welds and base material

Applicable to Unit 1 and Unit 2.

Exam required is: UT

Frequency is: Every 6 years

Reference: Unit 1 and 2 ER-CNS-10-05 and ER-CNS-12-02

Interval 3 Unit 1 ISI Plan Addenda 3CNS1-028,3CNS1-037,3CNS1-066

Interval 3 Unit 2 ISI Plan Addenda 3CNS2-035, 3CNS2-072, 3CNS2-079, and 3CNS2-084

7.2.3 Welded attachment 2-R-NC-1929 – Unit 2 only Surface examination (Summary number series Unit 2 H2.1)

Surface examination shall be performed on specified Class 1 Welded Attachment

Applicable to Unit 2 only.

Exam required is: Surface Exam

Frequency is: Once per Interval

Reference: ER-CNS-99-02

7.2.4 Westinghouse Technical Bulletin TB-07-02 Rev 01 CRDM Nozzle Interface enhanced video (Summary number series H4.1)

Video Visual exam per TB-0702 Rev 1 and evaluation of results documented in engineering evaluation. These exams to be performed at same time as C1.B4.20.001 and C2.B4.20.001. Remote video inspection of the thermal sleeve to CRDM nozzle interface looking for signs of wear. Physical UT measurements are required to be taken if wear is found. This work would be in scope to RPV internal examination vendor.

Applicable to Unit 1 and Unit 2.

Exam required is: Video Visual exam evaluation by engineering results

Frequency is: Once per Interval
Reference: ER-CNS-14-02

8.0 Description of Examination Listings

All ASME Class 1, 2, and 3 systems and components have been reviewed to determine the inservice examination requirements for Catawba Units 1 and 2. Examination Listing and Schedules referenced by this section were written in accordance with the criteria found in Sections 3.0, 4.0, 5.0, 6.0 and 7.0 of this Plan.

For administrative purposes, the printouts identifying NDE examinations to be performed during each Refueling Outage that accompany this ISI Plan (ISI Schedules) shall reflect the refueling outages as shown below. These numbers shall correlate back to the End of Cycles Number for Units 1 and 2.

Unit 1

Outage No.	1	2	3	4	5	6	7
End of Cycle No.	22	23	24	25	26	27	28

Unit 2

Outage No.	1	2	3	4	5	6	7
End of Cycle No.	21	22	23	24	25	26	27

8.1 Examination Information

The following information is listed for each examination where applicable:

8.1.1 Summary Number

The Summary Number for each examination is composed of three sections. The first section of the Summary number designates the Plant and Unit. The second section designates the Code Item Number for ASME Class 1, Class 2, and Class 3. ASME Class 1, Class 2, and Class 3 Item Numbers are similar to Item numbers assigned in Tables IWB-2500-1, IWC-2500-1 and IWD-2500-1 of Section XI. The third section of the Summary Number designates the unique number for the item. Example C1.B9.11.0001.

Item Numbers for Class 1, 2, and 3 piping supports (IWF-2500-1) are identified as follows:

Class 1

F1.10	=	Category A	(One directional support)
F1.11	=	Category B	(Multi-directional support)
F1.12	=	Category C	(Thermal movement, i.e. springs, snubbers and constant supports)

Class 2

F1.20	=	Category A	(One directional support)
F1.21	=	Category B	(Multi-directional support)
F1.22	=	Category C	(Thermal movement, i.e. springs, snubbers and constant supports)

Class 3

F1.30	=	Category A	(One directional support)
F1.31	=	Category B	(Multi-directional support)
F1.32	=	Category C	(Thermal movement, i.e. springs, snubbers and constant supports)

8.1.2 Component ID Number

The Component ID Number is selected so that, by using the specified reference drawing(s) and any applicable comments, the area to be examined can be accurately identified. Several different weld identification systems were used by various equipment vendors. A consistent system of weld or component identification has been developed and is described below:

8.1.2.1 The first character of each Component ID Number indicates the Plant and Unit to which the examination applies.

8.1.2.2 The Unit Number is followed by a combination of letters to indicate the component or system to be examined. Some of the abbreviations used are:

Catawba 1

Abbreviation	**System or Component**
RPV	Reactor Pressure Vessel
PZR	Pressurizer
SGA	Steam Generator A
SGB	Steam Generator B
SGC	Steam Generator C
SGD	Steam Generator D
RCP	Reactor Coolant Pump
CA	Auxiliary Feedwater System
CF	Main Feedwater System
FD	Diesel Generator Engine Fuel Oil System
FW	Refueling Water System
KC	Component Cooling System
KD	Diesel Generator Engine Cooling Water System
LD	Diesel Generator Engine Lube Oil System
NC	Reactor Coolant System
ND	Residual Heat Removal System
NI	Safety Injection System
NS	Containment Spray System

Abbreviation	System or Component
NV	Chemical and Volume Control System
RN	Nuclear Service Water System
SA	Auxiliary Steam System
SM	Main Steam System
SV	Main Steam Vent to Atmosphere System
TE	FDWP Turbine Exhaust System
VN	Diesel Generator Engine Air Intake & Exhaust System
YC	Control Area Chilled Water System
NSHX	Containment Spray Heat Exchanger
RHRHX	Residual Heat Removal Heat Exchanger
SWINJF	Seal Water Injection Filter
CBD	Cation Bed Demineralizer
CCP	Centrifugal Charging Pump Support
CRD	CRD Housing
CRACC	Control Room Area Chiller Condenser
CRACWP	Control Room Area Chill Water Pump
CRAHU	Control Room Air Handling Unit
DGE	Diesel Generator Engine
DGEES	Diesel Generator Engine Exhaust Silencer
DGEJWC	Diesel Generator Engine Jacket Water Cooler
DGEJWSTP	Diesel Generator Engine Jacket Water Standpipe
EVAPC	Evaporator Cooler
FWST	Refueling Water Storage Tank
LDCA	Diesel Generator Engine Lube Oil Cooler A
LDSA1	Diesel Generator Engine Lube Oil Strainer 1A1
LDSTA	Diesel Generator Engine Lube Oil Sump A
DGEJWL	Diesel Generator Engine Jacket Water
DGELOC	Diesel Generator Engine Lube Oil Cooler
DGELOF	Diesel Generator Engine Lube Oil Tank
DGELOS	Diesel Generator Engine Lube Oil Strainer
DGELOST	Diesel Generator Engine Lube Oil Sump Tank

Abbreviation	System or Component
DGPOS	Diesel Generator Prelube Oil Strainer
DGEESA	Diesel Generator Engine Exhaust Silencer
DGEIAF	Diesel Generator Engine Intake Air Filter
ELDHX	Excess Letdown Heat Exchanger
FPCP	Fuel Pool Cooling Pump
KCHX	Component Cooling Heat Exchanger
KCP	Component Cooling Pump
KCST	Component Cooling Surge Tank
KFHX	Fuel Pool Cooling Heat Exchanger
LDF	Diesel Generator Lube Oil Filter
LDHX	Vertical Letdown Heat Exchanger
MBD	Mixed Bed Demineralizer
MDCAP	Motor Driven Aux. FDW Pump
NSHX	Containment Spray Heat Exchanger
NSP	Containment Spray Pump
PDARCP	Pulsation Dampener Assembly Reciprocating Charging Pump
REPEC	Recycle Evaporator Package Evaporator Condenser
REGHX	Regenerative Heat Exchanger
RHRHX	RHR Heat Exchanger
RHRP	Residual Heat Removal
RNP	Nuclear Service Water Pump
RNS	Nuclear Service Water Strainer
SIP	Safety Injection Pump
SWHX	Seal Water Heat Exchanger
TDCAP	Turbine Driven Auxiliary Feedwater Pump
VCT	Volume Control Tank
WEPEC	Waste Evaporator Package Evaporator Condenser

Catawba 2

Abbreviation	System or Component
RPV	Reactor Pressure Vessel
PZR	Pressurizer
SGA	Steam Generator A
SGB	Steam Generator B
SGC	Steam Generator C
SGD	Steam Generator D
RCP	Reactor Coolant Pump
CA	Auxiliary Feedwater System
CF	Main Feedwater System
FD	Diesel Generator Engine Fuel Oil System
FW	Refueling Water System
KC	Component Cooling System
KD	Diesel Generator Engine Cooling Water System
LD	Diesel Generator Engine Lube Oil System
NC	Reactor Coolant System
ND	Residual Heat Removal System
NI	Safety Injection System
NS	Containment Spray System
NV	Chemical and Volume Control System
RN	Nuclear Service Water System
SA	Auxiliary Steam System
SM	Main Steam System
SV	Main Steam Vent to Atmosphere System
TE	FDWP Turbine Exhaust System
VN	Diesel Generator Engine Air Intake & Exhaust System
YC	Control Area Chilled Water System
NSHX	Containment Spray Heat Exchanger "A"
RHRHX	Residual Heat Removal Heat Exchanger
SWINJF	Seal Water Injection Filter
CBD	Cation Bed Demineralizer
CCP	Centrifugal Charging Pump

Abbreviation	System or Component
CRD	CRD Housing
DGE	Diesel Generator Engine Turbocharger / Aftercooler / Engine Jacket / Engine Driven Lube Oil Pump
DGEJWC	Diesel Generator Engine Jacket Water Cooler
DGEJWLA	Diesel Generator Jacket Water
DGEJWSTP	Diesel Generator Engine Jacket Water Standpipe
DGELOC	Diesel Generator Engine Lube Oil Cooler
DGELOF	Diesel Generator Engine Lube Oil Tank
DGLOS	Diesel Generator Engine Lube Oil Strainer
DGLOST	Diesel Generator Engine Lube Oil Sump Tank
DGPOS	Diesel Generator Prelube Oil Strainer
DGEES	Diesel Generator Engine Exhaust Silencer
DGEIAF	Diesel Generator Engine Intake Air Filter
ELDHX	Excess Letdown Heat Exchanger
FWST	Refueling Water Storage Tank
FPCP	Fuel Pool Cooling Pump
KCHX	Component Cooling Heat Exchanger
KCP	Component Cooling Pump
KCST	Component Cooling Surge Tank
KFHX	Fuel Pool Cooling Heat Exchanger
LDC	Diesel Generator Engine Lube Oil Cooler
LDF	Diesel Generator Lube Oil Filter
LDHX	Vertical Letdown Heat Exchanger
LDS	Diesel Generator Engine Lube Oil Strainer
LDST	Diesel Generator Engine Lube Oil Sump Tank
MBD	Mixed Bed Demineralizer
MDCAP	Motor Driven Aux. FDW Pump
NSHX	Containment Spray Heat Exchanger
NSP	Containment Spray Pump
PDARCP	Pulsation Dampener Assembly Reciprocating Charging Pump
REGHX	Regenerative Heat Exchanger
RHRHX	RHR Heat Exchanger

Abbreviation	System or Component
RHRP	Residual Heat Removal Pump
RNP	Nuclear Service Water Pump
RNS	Nuclear Service Water Strainer
SIP	Safety Injection Pump
SWHX	Seal Water Heat Exchanger
TDCAP	Turbine Driven Auxiliary Feedwater Pump / Auxiliary Feedwater Pump Turbine Engine
VCT	Volume Control Tank

8.1.2.3 The remainder of the ID Number shall indicate the exact weld or component to be examined, as shown on the reference drawings. Additional information shall be included in the comments space when necessary to positively identify the area to be examined.

8.1.3 Drawing Numbers

At least one Duke Energy Drawing Number is listed for each examination, if available. Drawing numbers beginning with "CNM" are vendor's component drawings. Drawing numbers beginning with "CN-ISIN4-" followed by a four digit number are ISI boundary drawings. All listed drawings are available at Catawba Nuclear Station.

8.1.4 Location (Optional)

Location of Item: building, degree, elevation, axis, etc.

8.1.5 Examination Required / Configuration (Pipe to Elbow, Valve to Pipe, Flange to Tee, etc.)

The following abbreviations are used to describe the type of inspection required for each item:

ECT	Eddy Current Testing
EVT-1	Enhanced VT-1 Inspection (ISI Visual Inspection)
PT	Liquid Penetrant Inspection
MT	Magnetic Particle Inspection
RT	Radiographic Inspection
UT	Ultrasonic Inspection
VT-1	ISI Visual Inspection
VT-3	ISI Visual Inspection (General Condition of Components and Supports)

8.1.6 Procedure

The procedures to be used for the examinations were selected by the NDE Level III, for the inspection methods discussed in Section 3 of this plan. The designation "TBD" (to be determined) is used to indicate cases where the procedure is in the process of being written.

8.1.7 Material Type/Grade

The following abbreviations are used to indicate the type of material to be examined:

CS Carbon Steel

SS Stainless Steel

IN Inconel

8.1.8 Diameter

The nominal pipe size (NPS) is listed for all valves and piping welds up to 24-inch NPS. The nominal inside diameter is listed for all vendor supplied piping larger than 24-in NPS. The actual outside diameter is listed for all other piping welds.

The nominal outside diameter is listed for examinations of bolts and studs.

For integrally-welded supports or cladding, the smaller weld or area dimension is listed in this category.

8.1.9 Thickness

The dimension listed for component or piping welds is the nominal thickness at the weld.

The overall length of bolts or studs is listed in this category when applicable.

The dimension listed for support attachment welds is the thickness of the attachment base material.

8.1.10 Calibration Block

The calibration block(s) to be used for the UT examinations were selected by the NDE Level III, from the calibration block listing shown in Section 10 of this plan. The designation "TBD" is used to indicate cases where the calibration block is still being designed and / or fabricated.

8.1.11 Comments

Additional information about the specified examination shall be included here when needed.

8.2 Examination Listings

8.2.1 The schedules for all examinations are specified in the following:

- CISI-1462.10-0040–UNIT 1, 4th ISI Interval Schedule
- CISI-1462.10-0040–UNIT 2, 4th ISI Interval Schedule

8.2.1 Unless otherwise specified in the above documents, examinations may be performed in any refueling outage within the specified Inspection Period.

9.0 Requests for Relief from ASME Code Requirements

Each request for relief from a requirement of the ASME Section XI Code specified in Section 1 of this plan shall be submitted by the Station Regulatory Affairs Section to the Nuclear Regulatory Commission for approval.. The list below contains all requests for relief that affect Inservice Inspection at Catawba Nuclear Station. For a listing of requests for relief pertaining to topics other than Inservice Inspection, contact the Catawba Nuclear Station Regulatory Affairs Section.

Serial Number	Description	Units Affected	Date RFR Submitted	Date SER Approved	Comments
14-CN-002	Continued Use of High Density Polyethylene (HDPE) Material in Nuclear Safety Related Piping Application.	1 and 2	09/15/2014	06/19/2015	

10.0 Calibration Standards

10.1 Ultrasonic Calibration Standards

10.1.1 Calibration standards are prepared for each UT examination listed in this plan. All calibration standards are designed in accordance with the requirements of ASME Section XI.

10.1.2 Catawba Fourth ten year inspection interval intermediate Reactor Pressure Vessel examinations shall be performed using the calibration blocks listed in the Inservice Inspection Plan.

10.1.3 Calibration standards for UT examination shall be selected per the Calibration Block Listing below. The number of the calibration standard used shall be recorded on the inspection data.

10.1.4 Procedure NDE-600 is written to meet the requirements of Appendix VIII and does not require the use of a calibration block. In cases where NDE-600 is specified for use, the calibration block field shall show “Component”. NDE-600 is for the examination of similar metal piping welds e.g., stainless to stainless pipe welds and carbon to carbon pipe welds.

10.2 Eddy Current Calibration Standards

Eddy Current calibration standards are maintained by the Nuclear NDE Inspection Services. Eddy Current Examinations for Steam Generator tubing are scheduled and performed per the Catawba Improved Technical Specifications.

10.3 Calibration Block Listing

For the specific calibration block listing assigned to the examination see the summary number details in the unit schedules for all examinations in the following:

- CISI-1462.10-0040–UNIT 1, 4th ISI Interval Schedule
- CISI-1462.10-0040–UNIT 2, 4th ISI Interval Schedule

11.0 Inservice Inspection Reference Drawings - Unit 1

The following is a list of ISI NDE Reference Drawings used as a reference for Catawba Unit 1 for the Fourth Interval Inservice Inspection Plan. These drawings are color-coded in accordance with Section 2.0 of the ISI Plan.

These ISI NDE Reference Drawings are stored electronically and can be found in the Nuclear Fusion Electronic Document Management System (EDMS).

System	Drawing No.	Revision[1]	Class 1[2]	Class 2[2]	Class 3[2]
Reactor Coolant System (NC)	CN-ISIN4-1553-1.0	0	X	X	
Reactor Coolant System (NC)	CN-ISIN4-1553-1.1	0	X	X	X
Reactor Coolant System (NC)	CN-ISIN4-1553-1.2	0		X	
Reactor Coolant System (NC)	CN-ISIN4-1553-1.3	0		X	
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.0	0	X	X	
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.1	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.2	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.3	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.4	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.5	0	X	X	
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.6	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.7	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-1554-1.8	0		X	
Boron Thermal Regeneration System (NR)	CN-ISIN4-1555-1.1	0		X	
Boron Recycle System (NB)	CN-ISIN4-1556-1.0	0		X	X
Boron Recycle System (NB)	CN-ISIN4-1556-1.1	0			X
Boron Recycle System (NB)	CN-ISIN4-1556-1.2	0			X
Boron Recycle System (NB)	CN-ISIN4-1556-1.3	0			X
Boron Recycle System (NB)	CN-ISIN4-1556-1.4	0			X
Boron Recycle System (NB)	CN-ISIN4-1556-1.6	0			X
Boron Recycle System (NB)	CN-ISIN4-1556-2.0	0		X	
Containment Air Return Exchange & Hydrogen Skimmer System (VX)	CN-ISIN4-1557-1.0	0		X	
ICE Condenser Refrigeration System (NF)	CN-ISIN4-1558-2.0	0		X	
Containment Hydrogen Sample& Purge System (VY)	CN-ISIN4-1559-1.0	0		X	
Residual Heat Removal System (ND)	CN-ISIN4-1561-1.0	0	X	X	
Residual Heat Removal System (ND)	CN-ISIN4-1561-1.1	0	X	X	
Safety Injection System (NI)`	CN-ISIN4-1562-1.0	0	X	X	
Safety Injection System (NI)	CN-ISIN4-1562-1.1	0	X	X	

System	Drawing No.	Revision[1]	Class 1[2]	Class 2[2]	Class 3[2]
Safety Injection System (NI)	CN-ISIN4-1562-1.2	0	X	X	
Safety Injection System (NI)	CN-ISIN4-1562-1.3	0	X	X	
Safety Injection System (NI)	CN-ISIN4-1562-1.4	0		X	
Containment Spray System (NS)	CN-ISIN4-1563-1.0	0		X	
Annulus Ventilation System (VE)	CN-ISIN4-1564-1.0	0			X
Liquid Radwaste System (WL)	CN-ISIN4-1565-1.1	0			X
Liquid Radwaste System (WL)	CN-ISIN4-1565-1.4	0			X
Liquid Radwaste System (WL)	CN-ISIN4-1565-1.5	0			X
Liquid Radwaste System (WL)	CN-ISIN4-1565-2.0	0		X	X
Liquid Radwaste System (WL)	CN-ISIN4-1565-2.1	0		X	
Liquid Radwaste System (WL)	CN-ISIN4-1565-2.2	0			
Liquid Radwaste System (WL)	CN-ISIN4-1565-2.4	0			X
Liquid Radwaste System (WL)	CN-ISIN4-1565-2.6	0		X	
Waste Gas System (WG)	CN-ISIN4-1567-1.0	0		X	X
Waste Gas System (WG)	CN-ISIN4-1567-1.1	0		X	X
Waste Gas System (WG)	CN-ISIN4-1567-1.2	0			X
Waste Gas System (WG)	CN-ISIN4-1567-1.3	0		X	X
Waste Gas System (WG)	CN-ISIN4-1567-1.4	0			X
Equipment Decontamination System (WE)	CN-ISIN4-1568-1.0	0		X	X
Containment Valve Injection Water System (NW)	CN-ISIN4-1569-1.0	0		X	X
Spent Fuel Cooling System (KF)	CN-ISIN4-1570-1.0	0		X	X
Spent Fuel Cooling System (KF)	CN-ISIN4-1570-1.1	0			X
Refueling Water System (FW)	CN-ISIN4-1571-1.0	0		X	
Nuclear Sampling System (NM)	CN-ISIN4-1572-1.0	0		X	
Nuclear Sampling System (NM)	CN-ISIN4-1572-1.1	0		X	
Nuclear Sampling System (NM)	CN-ISIN4-1572-1.2	0		X	
Nuclear Sampling System (NM)	CN-ISIN4-1572-1.4	0		X	
Component Cooling System (KC)	CN-ISIN4-1573-1.0	0			X
Component Cooling System (KC)	CN-ISIN4-1573-1.1	0			X
Component Cooling System (KC)	CN-ISIN4-1573-1.2	0			X
Component Cooling System (KC)	CN-ISIN4-1573-1.3	0		X	X
Component Cooling System (KC)	CN-ISIN4-1573-1.4	0		X	X
Component Cooling System (KC)	CN-ISIN4-1573-1.5	0		X	X
Component Cooling System (KC)	CN-ISIN4-1573-1.6	0			X

System	Drawing No.	Revision[1]	Class 1[2]	Class 2[2]	Class 3[2]
Component Cooling System (KC)	CN-ISIN4-1573-1.7	0		X	X
Component Cooling System (KC)	CN-ISIN4-1573-1.9	0			X
Component Cooling System (KC)	CN-ISIN4-1573-2.0	0			X
Component Cooling System (KC)	CN-ISIN4-1573-2.1	0			X
Component Cooling System (KC)	CN-ISIN4-1573-2.2	0			X
Component Cooling System (KC)	CN-ISIN4-1573-2.3	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-1.0	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-1.1	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-1.2	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-1.4				X
Nuclear Service Water System (RN)	CN-ISIN4-1574-1.5	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-2.0	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-2.1	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-2.2	0		X	
Nuclear Service Water System (RN)	CN-ISIN4-1574-2.4	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-2.5	0			X
Nuclear Service Water System (RN)	CN-ISIN4-1574-2.8	0		X	
Containment Purge System (VP)	CN-ISIN4-1576-1.0	0		X	
Auxiliary Building Ventilation System (VA)	CN-ISIN4-1577-1.2	0			X
Fuel Handling Area Ventilation System (VF)	CN-ISIN4-1577-2.0	0			X
Control Room Area Ventilation System (VC)	CN-ISIN4-1578-1.0	0			X
Control Area Chilled Water System (YC)	CN-ISIN4-1578-2.0	0			X
Control Area Chilled Water System (YC)	CN-ISIN4-1578-2.1	0			X
Control Area Chilled Water System (YC)	CN-ISIN4-1578-2.2	0			X
Control Area Chilled Water System (YC)	CN-ISIN4-1578-2.3	0			X
Control Area Chilled Water System (YC)	CN-ISIN4-1578-2.4	0			X
Control Area Chilled Water System (YC)	CN-ISIN4-1578-2.5	0			X
Steam Generator Blow Down System (BB)	CN-ISIN4-1580-1.0	0		X	
Ground Water Drainage System (WZ)	CN-ISIN4-1581-1.0	0			X
Steam Generator Wet Lay Up Recirculation System (BW)	CN-ISIN4-1584-1.0	0		X	
Containment Air Release And Addition System (VQ)	CN-ISIN4-1585-1.0	0		X	
Feedwater System (CF)	CN-ISIN4-1591-1.1	0		X	X
Auxiliary Feedwater System (CA)	CN-ISIN4-1592-1.0	0			X
Auxiliary Feedwater System (CA)	CN-ISIN4-1592-1.1	0		X	X

System	Drawing No.	Revision[1]	Class 1[2]	Class 2[2]	Class 3[2]
Auxiliary Feedwater System (CA)	CN-ISIN4-1592-1.2	0			X
Main Steam System (SM) , Main Steam Vent to Atmosphere System (SV)	CN-ISIN4-1593-1.0	0		X	
Main Steam to Auxiliary Equipment System (SA) Main Steam By-Pass to Condenser System (SB)	CN-ISIN4-1593-1.1	0		X	X
Steam Supply to FDWP Turbine System (SP) FDWP Turbine Exhaust System (TE)	CN-ISIN4-1593-1.2	0			X
Main Steam System (SM)	CN-ISIN4-1593-1.7	0		X	
Main Steam System (SM)	CN-ISIN4-1593-1.8	0			X
Fire Protection System (RF)	CN-ISIN4-1599-2.1	0		X	
Fire Protection System (RF)	CN-ISIN4-1599-2.2	0		X	
Makeup Demineralized Water System (YM)	CN-ISIN4-1601-3.1	0		X	
Instrument Air System (VI)	CN-ISIN4-1605-1.4	0		X	
Instrument Air System (VI)	CN-ISIN4-1605-1.14	0			X
Station Air System (VS)	CN-ISIN4-1605-2.1	0		X	
Breathing Air System (VB)	CN-ISIN4-1605-3.2	0		X	
Diesel Generator Engine Cooling Water System (KD)	CN-ISIN4-1609-1.0	0			X
Diesel Generator Engine Lube Oil System (LD)	CN-ISIN4-1609-2.0	0			X
Diesel Generator Engine Lube Oil System (LD)	CN-ISIN4-1609-2.2	0			X
Diesel Generator Engine Fuel Oil System (FD)	CN-ISIN4-1609-3.0	0			X
Diesel Generator Engine Fuel Oil System (FD)	CN-ISIN4-1609-3.1	0			X
Diesel Generator Engine Starting Air System (VG)	CN-ISIN4-1609-4.0	0			X
Diesel Generator Engine Starting Air System (VG)	CN-ISIN4-1609-4.1	0			X
Diesel Generator Engine Air Intake & Exhaust System (VN)	CN-ISIN4-1609-5.0	0			X
Diesel Generator Engine Crank Case Vacuum System (ZD)	CN-ISIN4-1609-6.0	0			X
Diesel Generator Engine Room Sump Pump System (WN)	CN-ISIN4-1609-7.0	0			X

[1] The ISI NDE Boundary Drawings revision number provides a baseline for the development of the ISI Plan. As such, the revision numbers listed need not be updated as each ISI NDE Boundary Drawings is revised.

[2] Class 1, 2, and 3 components shown on these drawings are subject to change. Please refer to the specific drawings listed to determine the scope of Class 1, 2, and 3 components shown on these drawings.

12.0 Inservice Inspection Reference Drawings - Unit 2

The following is a list of ISI NDE Reference Drawings used for Catawba Unit 2 for the Fourth Interval Inservice Inspection Plan. These drawings are color-coded in accordance with Section 2.0 of the ISI Plan.

These ISI NDE Reference Drawings are stored electronically and can be found in the Nuclear Fusion Electronic Document Management System (EDMS).

System	Drawing No.	Revision[1]	Class 1[2]	Class 2[2]	Class 3[2]
Reactor Coolant System (NC)	CN-ISIN4-2553-1.0	0	X	X	
Reactor Coolant System (NC)	CN-ISIN4-2553-1.1	0	X	X	X
Reactor Coolant System (NC)	CN-ISIN4-2553-1.2	0		X	
Reactor Coolant System (NC)	CN-ISIN4-2553-1.3	0		X	
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.0	0	X	X	
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.1	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.2	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.3	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.4	0			X
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.5	0	X	X	
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.6	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.7	0		X	X
Chemical and Volume Control System (NV)	CN-ISIN4-2554-1.8	0		X	
Boron Thermal Regeneration System (NR)	CN-ISIN4-2555-1.1			X	
Boron Recycle System (NB)	CN-ISIN4-2556-2.0	0		X	
Containment Air Return Exchange & Hydrogen Skimmer System (VX)	CN-ISIN4-2557-1.0	0		X	
ICE Condenser Refrigeration System (NF)	CN-ISIN4-2558-2.0	0		X	
Containment Hydrogen Sample& Purge System (VY)	CN-ISIN4-2559-1.0	0		X	
Residual Heat Removal System (ND)	CN-ISIN4-2561-1.0	0	X	X	
Residual Heat Removal System (ND)	CN-ISIN4-2561-1.1	0	X	X	
Safety Injection System (NI)`	CN-ISIN4-2562-1.0	0	X	X	
Safety Injection System (NI)	CN-ISIN4-2562-1.1	0	X	X	
Safety Injection System (NI)	CN-ISIN4-2562-1.2	0	X	X	
Safety Injection System (NI)	CN-ISIN4-2562-1.3	0	X	X	
Safety Injection System (NI)	CN-ISIN4-2562-1.4	0		X	
Containment Spray System (NS)	CN-ISIN4-2563-1.0	0		X	
Annulus Ventilation System (VE)	CN-ISIN4-2564-1.0	0			X

System	Drawing No.	Revision[1]	Class 1[2]	Class 2[2]	Class 3[2]
Liquid Radwaste System (WL)	CN-ISIN4-2565-2.0	0		X	X
Liquid Radwaste System (WL)	CN-ISIN4-2565-2.1	0		X	
Liquid Radwaste System (WL)	CN-ISIN4-2565-2.2	0			X
Liquid Radwaste System (WL)	CN-ISIN4-2565-2.4	0		X	
Liquid Radwaste System (WL)	CN-ISIN4-2565-2.6	0		X	
Equipment Decontamination System (WE)	CN-ISIN4-2568-1.0	0		X	X
Containment Valve Injection Water System (NW)	CN-ISIN4-2569-1.0	0		X	X
Spent Fuel Cooling System (KF)	CN-ISIN4-2570-1.0	0		X	X
Spent Fuel Cooling System (KF)	CN-ISIN4-2570-1.1	0			X
Refueling Water System (FW)	CN-ISIN4-2571-1.0	0		X	
Nuclear Sampling System (NM)	CN-ISIN4-2572-1.0	0		X	
Nuclear Sampling System (NM)	CN-ISIN4-2572-1.1	0		X	
Nuclear Sampling System (NM)	CN-ISIN4-2572-1.2	0		X	
Nuclear Sampling System (NM)	CN-ISIN4-2572-1.4	0		X	
Component Cooling System (KC)	CN-ISIN4-2573-1.0	0			X
Component Cooling System (KC)	CN-ISIN4-2573-1.1	0			X
Component Cooling System (KC)	CN-ISIN4-2573-1.2	0			X
Component Cooling System (KC)	CN-ISIN4-2573-1.3	0		X	X
Component Cooling System (KC)	CN-ISIN4-2573-1.4	0		X	X
Component Cooling System (KC)	CN-ISIN4-2573-1.5	0		X	X
Component Cooling System (KC)	CN-ISIN4-2573-1.7	0		X	X
Component Cooling System (KC)	CN-ISIN4-2573-2.0	0			X
Component Cooling System (KC)	CN-ISIN4-2573-2.1	0			X
Component Cooling System (KC)	CN-ISIN4-2573-2.2	0			X
Component Cooling System (KC)	CN-ISIN4-2573-2.3	0			X
Nuclear Service Water System (RN)	CN-ISIN4-2574-2.0	0			X
Nuclear Service Water System (RN)	CN-ISIN4-2574-2.1	0			X
Nuclear Service Water System (RN)	CN-ISIN4-2574-2.2	0		X	
Nuclear Service Water System (RN)	CN-ISIN4-2574-2.4	0			X
Nuclear Service Water System (RN)	CN-ISIN4-2574-2.5	0			X
Nuclear Service Water System (RN)	CN-ISIN4-2574-2.7	0		X	
Containment Purge System (VP)	CN-ISIN4-2576-1.0	0		X	
Fuel Handling Area Ventilation System (VF)	CN-ISIN4-2577-2.0	0			X

System	Drawing No.	Revision[1]	Class 1[2]	Class 2[2]	Class 3[2]
Steam Generator Blow Down System (BB)	CN-ISIN4-2580-1.0	0		X	
Steam Generator Wet Layup Recirculation System (BW)	CN-ISIN4-2584-1.0	0		X	
Containment Air Release And Addition System (VQ)	CN-ISIN4-2585-1.0	0		X	
Feedwater System (CF)	CN-ISIN4-2591-1.1	0		X	X
Auxiliary Feedwater System (CA)	CN-ISIN4-2592-1.0	0			X
Auxiliary Feedwater System (CA)	CN-ISIN4-2592-1.1	0		X	X
Auxiliary Feedwater System (CA)	CN-ISIN4-2592-1.2	0			X
Main Steam System (SM) , Main Steam Vent to Atmosphere System (SV)	CN-ISIN4-2593-1.0	0		X	
Main Steam to Auxiliary Equipment System (SA) Main Steam By-Pass to Condenser System (SB)	CN-ISIN4-2593-1.1	0		X	X
Steam Supply to FDWP Turbine System (SP) FDWP Turbine Exhaust System (TE)	CN-ISIN4-2593-1.2	0			X
Main Steam System (SM)	CN-ISIN4-2593-1.7	0		X	
Main Steam System (SM)	CN-ISIN4-2593-1.8	0			X
Instrument Air System (VI)	CN-ISIN4-2605-1.5	0		X	
Breathing Air System (VB)	CN-ISIN4-2605-3.2	0		X	
Diesel Generator Engine Cooling Water System (KD)	CN-ISIN4-2609-1.0	0			X
Diesel Generator Engine Lube Oil System (LD)	CN-ISIN4-2609-2.0	0			X
Diesel Generator Engine Lube Oil System (LD)	CN-ISIN4-2609-2.2	0			X
Diesel Generator Engine Fuel Oil System (FD)	CN-ISIN4-2609-3.0	0			X
Diesel Generator Engine Fuel Oil System (FD)	CN-ISIN4-2609-3.1	0			X
Diesel Generator Engine Starting Air System (VG)	CN-ISIN4-2609-4.0	0			X
Diesel Generator Engine Starting Air System (VG)	CN-ISIN4-2609-4.1	0			X
Diesel Generator Engine Air Intake & Exhaust System (VN)	CN-ISIN4-2609-5.0	0			X
Diesel Generator Engine Crank Case Vacuum System (ZD)	CN-ISIN4-2609-6.0	0			X
Diesel Generator Engine Room Sump Pump System (WN)	CN-ISIN4-2609-7.0	0			X

[1] The ISI NDE Boundary Drawings revision number provides a baseline for the development of the ISI Plan. As such, the revision numbers listed need not be updated as each ISI NDE Boundary Drawings is revised.

[2] Class 1, 2, and 3 components shown on these drawings are subject to change. Please refer to the specific drawings listed to determine the scope of Class 1, 2, and 3 components shown on these drawings.

13.0 Miscellaneous Information and Attachments

13.1 This section is for future use. The original issue of this document did not have information that was needed for this section.