NMP1-PT-003

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION UNIT 1

INSERVICE PRESSURE TESTING PROGRAM PLAN

THIRD TEN-YEAR INTERVAL

Revision 0

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ATTACHMENTS

1. SUMMARY OF CHANGES

	Description of Change	Reason For Change
0.	Original Issue, Third Interval Program. Incorporated following LDCRs: 1-93-ISI-002, 1-93-ISI-006, 1-94-IST-016, 1-97-IST-002, 1-97-IST-009, 1-99-IST-001, 1-99-IST-009	Incorporate new Code requirements per 10CFR50.55. Requirements based on 1989 Edition of ASME Section XI.

2. INTRODUCTION

Section XI of the ASME Boiler and Pressure Vessel Code, Rules for Inservice Inspection of Nuclear Power Plant Components (the Code), provides the requirements for verifying safety system component operability and structural integrity. The Code separates these requirements into testing and examinations. The testing requirements include: pumps, valves, snubbers, and pressure testing. The examination requirements include: visual, surface, and volumetric. The unique requirement for performance of pressure testing is that a visual examination (VT-2) must be performed in conjunction with the pressure test. The visual examination method is not governed by the Inservice Pressure Test (ISPT) Program.

This program plan update for the third ten-year interval was prepared in accordance with the rules of ASME Boiler & Pressure Vessel Code, Section XI, 1989 Edition, to comply with NRC requirements 10 CFR 50.55a(g), NMP1 Technical Specifications, and UFSAR commitments.

Niagara Mohawk Power Corporation (NMPC) was issued a Construction Permit for Nine Mile Point Unit 1 (NMP1) on April 12, 1965. The first ten-year inservice inspection (ISI) interval began on December 26, 1974 and was scheduled to end on December 25, 1984. The interval was extended due to a maintenance outage, and actually ended on June 26, 1986. The second ten-year inservice inspection interval began on June 27, 1986, and was scheduled to end on June 26, 1996. The second ten-year interval was extended until December 25, 1998, due to a 30-month maintenance outage. In accordance with IWA-2430, paragraph (d), the second ten-year interval was extended an additional period, not to exceed 12 months, to conclude on December 25, 1999. Therefore, the third ten-year interval begins on December 26, 1999.

ASME Code, Section XI, 1989 Edition, pressure testing requirements can be simplified by identifying that ISPT ASME Class boundaries should receive a pressure test for leakage tightness once each refueling outage (ASME Class 1) or once each period (ASME Class 2 and 3). Then once each interval (approximately 10 years), the ISPT ASME Class boundaries shall have their structural integrity verified by hydrostatic testing in conjunction with a VT-2 visual examination.

ASME Code, Section XI, 1989 Edition, pressure testing requirements for once each refueling outage (Class 1) or each period (Classes 2 and 3) are satisfied by scheduling and performing either a System Leakage Test (Class 1), or a System Inservice Test or System Functional Test (Classes 2 and 3).

ASME Code, Section XI, 1989 Edition, pressure testing requirements for once each interval are normally satisfied by scheduling and performing either a System Hydrostatic Test or System Pneumatic Test, unless relief has been granted.

Portions of piping that penetrate the containment are required to be designed to ASME Class 1 or 2. Penetrations that differ from the classification of the balance of the associated piping system do not change the overall system classification that determines the rules of Section XI (IWA-1320(d)). Therefore, the balance of a non-safety related system which penetrates containment is not upgraded to an ASME Class system simply because of the containment penetration, and, other than the containment penetration piping, no pressure testing is required. In most cases, these penetrations are 10 CFR 50 Appendix J tested to verify containment integrity. For penetrations not in the Appendix J Program, an NRC–approved relief request or an entry in the "Exclusions, Exceptions and Technical Positions" section constitutes the basis for the exception. In addition, ASME Code Case N-522 accepts Appendix J testing in lieu of Section XI pressure testing for those cases when the piping and isolation valves that are part of the containment system are Class 2 but the balance of the system is outside the scope of Section XI.

The ISPT Program Plan provides a detailed determination flow path (Attachment 3) to allow proper post maintenance testing following the disassembly of mechanical joints for a repair or replacement of the pressure boundary. It is the intent of this program plan to ensure that, whenever pressure retaining material is replaced or the pressure retaining boundary is repaired, the mechanical joints are pressure tested and VT-2 examined, since these activities could affect the fit-up of flanged surfaces. In addition, post–maintenance pressure testing is also required for the repair or replacement of a through–wall leak in a welded component.

The ASME Committee has developed and approved ASME Code Cases that affect pressure testing. These Code Cases are alternatives to existing code requirements. Therefore, in accordance with 10 CFR 50.55a requirements, either endorsement in Regulatory Guide 1.147 or specific NRC approval is necessary prior to their use. Nine Mile Point Unit 1 implementation of the following Code Cases is discussed in Section 4.3 of this document:

- Code Case N-416-1 - allows the use of a System Leakage Test and NDE using the 1992 Edition of Section XI to satisfy the Hydrostatic/Pneumatic Test for welded repairs and replacements. Revision 12 of Reg. Guide 1.147 endorsed the use of this Code Case with additional limitations.
- Code Case N-498-1 - allows the use of a System Leakage, Inservice, or Functional Test to satisfy the Hydrostatic/Pneumatic Test for the scheduled 10 year pressure test for ASME Class 1, 2, and 3 piping/components. Revision 12 of Reg. Guide 1.147 endorsed the use of this Code Case with no additional limitations.
- Code Case N-522 - allows the use of 10 CFR 50 Appendix J to satisfy the requirement for pressure testing when the piping and isolation valves that are part of the containment system are Class 2 but the balance of the system is outside the scope of Section XI. Revision 12 of Reg. Guide 1.147 endorsed the use of this Code Case with additional limitations.

3. DEFINITIONS

Alternative Examination

Alternative examination methods, a combination of methods, or newly developed techniques may be substituted for the methods specified in ASME Code, Section XI, provided the Inspector (ANII) is satisfied that the results are demonstrated to be equivalent or superior to those of the specified method [1989 Edition, Section XI, IWA-2240].

Authorized Nuclear Inservice Inspector (ANII)

A person who is employed and has been qualified by an Authorized Inspection Agency to verify that examinations, tests, and repairs (that do not include welding and brazing) are performed in accordance with the rules and requirements of ASME Code, Section XI [1989 Edition, Section XI, IWA-9000].

Component

An item in a nuclear power plant such as a vessel, pump, valve, or piping system [1989 Edition, Section XI, IWA-9000].

Identified Leakage

(1) Leakage into closed systems, such as pump seal or valve packing leaks that are captured, flow metered and conducted to a sump or collecting tank; or, (2) leakage into the primary containment atmosphere from sources that are both specifically located and known not to be from a through-wall crack in the piping within the reactor coolant pressure boundary. (NMP1 Technical Specification Definition 1.30).

Inservice Examination

Denotes the process of visual, surface, or volumetric examinations performed in accordance with ASME Code Section XI [1989 Edition, Section XI, IWA-9000].

Inservice Inspection

Methods and actions for assuring the structural and pressure-retaining integrity of safety-related nuclear power plant components in accordance with ASME Code Section XI [1989 Edition, Section XI, IWA-9000]

Inspection

Verification of the performance of examinations and tests by an Inspector [1989 Edition, Section XI, IWA-9000].

Leak Tightness

The ability of the component or component item to retain the fluid. This term is used to verify both structural pressure boundary material and non-structural pressure boundary material (e.g., packing, mechanical joints, gaskets, etc.) for leakage.

Nominal Operating Pressure

Nominal operating pressure is applicable to the ASME Class 1 Boundary and is associated with 100% rated reactor power. For Class 2 and 3 systems and components, the nominal operating pressure is a pressure within the range of the system pressure seen during the normal operation of that system or component.

Optionally Upgraded

Describes systems and components that are classed as ASME Class 2 or 3 at NMPC's discretion. NMP1 was licensed prior to the development of the ASME Code and the General Design Criteria. Initial ASME Classification was based on NRC Safety Guide 26 dated March 23, 1972 (now Reg. Guide 1.26). Reg. Guide 1.26 is applicable to water- and steam-containing (and later radioactive material) components important to safety of water-cooled nuclear power plants. Systems such as instrument air, nitrogen, containment atmosphere dilution, etc. are not within the scope of the Reg. Guide and are not required to be classified. NMPC regards these systems as ASME Class, as appropriate for their importance to safety, but reserves the right to restrict testing requirements per IWA-1320.

Pressure Boundary Leakage

Leakage through a non-isolable fault in a reactor coolant system component body, pipe wall, or vessel wall.

Pressure Retaining Boundary

The component and component items used to maintain the system fluid inside the component. These items are the component items that require VT-2 visual examination during a system pressure test [1989 Edition, ASME Section XI, Tables IWB-2500-1, IWC-2500-1, and IWD-2500-1 Examination Category, Pressure Retaining Components]. A pressure retaining boundary component and component item includes:

Component	Component Item
Piping System	Piping and branch connections
Vessels	Vessel, upper & lower head, and flange surface
Pump	Casing , bonnet, and flanged surface
Valve	Body, bonnet, and flanged surface

Pressure Retaining Material	Material normally purchased to ASME Code, Section III specifications and having the proper identification stamping (i. e., valve may include body, bonnet, disc, seat, bolting, studs, stem, nuts or plugs; pump may include casing, shaft, bolting, studs, nuts, stuffing box, thrust ring, clips or plugs; pressure vessel may include shells, heads, nozzles, cladding, bolting, studs, or nuts; control rod drives may include housing, head, indicator tube, nuts or plugs, etc.).
Repair	The process of restoring a non-conforming item by welding, brazing, or metal removal such that existing design requirements are met [1989 Edition, Section XI, IWA-9000].
Replacement	Replacement includes the addition of components, such as valves, and system changes, such as rerouting of piping, within the scope of ASME Code. The term "Replacement" includes modifications to Code Class items within a component (e.g. drilling a hole in a flex-wedge disk for bonnet over-pressure protection). The scope of "Replacement" activities is described in IWA-7110. Nonstructural pump and valve internals, except when the original equipment was constructed in accordance with a Construction Code or Code Case (i.e., see definition of pressure retaining material) are exempted from the replacement requirements of the above ASME Section XI Article except as follows: Prior to the return of the system to service, the preservice inspection requirements of IWA-7530 shall be met including pump or valve surveillance testing.
System Inservice Test Pressure	The system pressure at which an inservice pressure test is conducted; the nominal pressure observed during system operation shall be acceptable as the system test pressure.
System Functional Test Pressure	The system pressure at which a functional pressure test is conducted; the nominal pressure observed during system operation shall be acceptable as the system test pressure.
System Functional Pressure Test	A system pressure test conducted to verify operability of systems (or components) not required to operate during normal plant operation while under system operating pressure [1989 Edition, Section XI, IWA-5211(b)].

System Hydrostatic Pressure Test

A system pressure test conducted during a plant or system shutdown at a pressure above nominal operating pressure or system pressure for which overpressure protection is provided [1989 Edition, Section XI, IWA-5211(d)]. NMP1 uses Code Case N-498-1 in lieu of performing system hydrostatic pressure tests.

System Inservice Pressure Test

A system pressure test conducted to perform visual examination VT-2 while the system is in service under operating pressure [1989 Edition, Section XI, IWA-5211(c)].

System Leakage Pressure Test

A system pressure test conducted following the opening and re-closing of a component in a system after pressurization to nominal operating pressure [1989 Edition, Section XI, IWA-5211(a)].

When using Code Case N-416-1 the term "System Leakage Test" as defined in the 92 Edition is described as a system pressure test conducted during operation at nominal operating pressure, or when pressurized to nominal operating pressure and temperature. [1992 Edition, Section XI, IWA-5211(a)].

System Pneumatic Pressure Test

A system pressure test conducted using gas during a plant or system shutdown at a pressure above nominal operating pressure in lieu of a hydrostatic pressure test for components within the scope of IWC-and IWD-[1989 Edition, Section XI, IWA-5211(e)]. NMP1 uses Code Case N-498-1 in lieu of performing system hydrostatic pressure tests.

VT-2 Visual Examination (VT-2)

The visual examination conducted to locate evidence of leakage from pressure retaining components, or abnormal leakage from components with or without leakage collection systems as required during the conduct of system pressure test or functional test. [1989 Edition, Section XI, IWA-2212].

When using Code Case N-416-1 the VT-2 requirements, as defined in the 92 Edition, specify for direct examination, the table IWA-2210-1 maximum examination distance shall apply to the distance from the eye to the surfaces being examined. [1992 Edition, Section XI, IWA-2212].

VT–2 For Noninsulated Components [IWA-5241]

The VT-2 visual examination shall be conducted in accordance with IWA-5240. [1989 Edition, Section XI, IWA-2212].

(a) The visual examination VT-2 shall be conducted by examining the accessible external exposed surfaces of pressure retaining components for evidence of leakage.

(b) For components whose external surfaces are inaccessible for direct visual examination VT-2, only the examination of surrounding area (including floor areas or equipment surfaces located underneath the components) for evidence of leakage shall be required.

VT–2 For Insulated Components [IWA-5242]

(a) In systems borated for the purpose of controlling reactivity, insulation shall be removed from pressure retaining bolted connections for VT-2 visual examination.

For other insulated components, visual examination VT-2 may be conducted without the removal of insulation by examining the accessible and exposed surfaces and joints of the insulation. Essentially vertical surfaces of insulation need only be examined at the lowest elevation where leakage may be detectable. Essentially horizontal surfaces of insulation shall be examined at each insulation joint.

(b) When examining insulated components, the examination of surrounding area (including floor areas or equipment surfaces located underneath the components) for evidence of leakage, or other areas to which such leakage may be channeled, shall be required.

(c) Discoloration or residue on surfaces examined shall be given particular attention to detect evidence of boric acid accumulations from borated reactor coolant leakage.

VT–2 For Components With Leakage Collection Systems [IWA-5243]

Where leakage from components is normally expected and collected (such as valve stems, pump seals, or vessel flange gaskets) the visual examination VT-2 shall be conducted by verifying that the leakage collection system is operative.

VT–2 For Buried Components [IWA-5244]

Buried components requiring a visual examination shall receive the visual examination VT-2 as specified in IWA-5244.

VT–2 For Elevated Temperature Tests [IWA-5245]

Components requiring an elevated temperature visual examination shall receive the visual examination VT-2 as specified in IWA-5245.

VT–2 For Repaired or Replaced Components and Alteration of a System

The visual examination VT-2 following a repair or replacement of a component, or the alteration of a system, may be limited to the repaired or replaced components, or the altered portion of the system, but shall include any connection made to the existing system. [1989 Edition, Section XI, IWA-5246].

When using Code Case N-416-1, it should be noted that IWA-5246 does not exist in the 92 Edition. The requirements of IWA-5246 have been relocated to IWA-5120.

Except as noted in IWE-5222, regarding the containment, repairs or modifications to the pressure retaining boundary or replacement of Class MC or Class CC components shall be subjected to a pneumatic leakage test in accordance with the provisions of Title 10, Part 50 of the Code of Federal Regulations, Appendix J, Paragraph IV.A. [1992 Edition, ASME Section XI w/92 Addenda].

4. PROGRAM PLAN IMPLEMENTING DOCUMENTS

4.1 Implementing Documents

The NMP1 Inservice Pressure Testing Program is required to satisfy 10 CFR 50.55a(g). The 10 CFR 50.55a endorses and approves for use the ASME Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," the 1989 Edition, as the applicable Code Edition that specifies the inspection requirements.

4.2 Technical Specifications

NMP1 Technical Specifications for Section XI pressure testing is T/S 3/4.2.6.

4.2.1 TECHNICAL SPECIFICATION 3/4.2.6 INSERVICE INSPECTION AND TESTING

4.2.1.1 Technical Specification 3.2.6 Limiting Conditions for Operation

Applicability: Applies to components which are part of the reactor coolant pressure boundary and their supports and other safety-related pressure vessels, piping, pumps and valves.

Action:

a) Inservice Inspection

1. To be considered operable, Quality Group A, B and C components shall satisfy the requirements contained in Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda for continued service of ASME Code Class 1, 2 ands 3 components, respectively, except where relief has been granted by the commission pursuant to 10CFR50, Section 50.55a(g)(6)(i).

b) Inservice Testing

1. To be considered operable, Quality Group A, B and C pumps and valves shall satisfy the requirements contained in Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda for continued service of ASME Code Class 1, 2 ands 3 components, respectively, except where relief has been granted by the commission pursuant to 10CFR50, Section 50.55a(f)(6)(i).

c) Performance of the above inservice inspection and testing activities shall be in addition to other specified Surveillance Requirements.

d) Nothing in the ASME Boiler and Pressure Vessel Code shall be construed to supersede the requirements of any Technical Specification.

4.2.1.2 Technical Specification 4.2.6 Surveillance Requirements

Applicability: Applies to periodic inspection and testing of components which are part of the reactor coolant pressure boundary and their supports and other safety-related pressure vessels, piping, pumps and valves.

Requirements:

a) Inservice Inspection

1. Inservice inspection of Quality Group A, B and C components shall be performed in accordance with the requirements for ASME Code Class 1, 2 and 3 components, respectively, contained in Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10CFR50, Section 50.55a(g), except where relief has been granted by the commission pursuant to 10CFR50, Section 50.55a(g)(6)(i).

2. The Inservice Inspection Program for piping identified in NRC Generic Letter 88-01 shall be performed in accordance with the staff positions on schedule, methods, personnel and sample expansion included in this generic letter.

b) Inservice Testing

1. Inservice testing of Quality Group A, B and C pumps and valves shall be performed in accordance with the requirements for ASME Code Class 1, 2 and 3 components contained in Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10CFR50, Section 50.55a(f), except where relief has been granted by the commission pursuant to 10CFR50, Section 50.55a(f)(6)(i).

4.3 Inservice Inspection Requirements [10 CFR 50.55a(g)]

10 CFR 50.55a(g) details the inspection requirements for ASME Code, Section XI.

4.3.1 Section XI Edition Determination

NMP1 ISPT Program Plan and all supporting procedures are written to comply with the ASME Boiler and Pressure Vessel Code, Section XI (Subsections; IWA, IWB, IWC, IWD - 1989 Edition and IWE - 1992 Edition w/92 Addenda), for the third 120 month interval. This Program Plan and the system pressure tests conducted during the third interval must comply with the requirements of the latest edition and addenda of the code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the 120 month inspection interval starting date specified in paragraph 3, Introduction. The third 120 month inspection interval begins on December 26, 1999.

4.3.2 Section XI Alternative Requirements

Where compliance to 1989 Edition of ASME Code, Section XI, requirements is not practical, NMPC will submit a formal application to the NRC (i.e., submittal of information to

support determinations) requesting that relief from pressure testing and/or visual examination be granted per 10 CFR 50.55a(g)(5)(iii). The Commission evaluates determinations that code requirements are impractical and grants relief or imposes alternative requirements per 10 CFR 50.55a(g)(6)(i) or 10 CFR 50.55a(a)(3).

4.3.3 CODE CASE ACCEPTABILITY

10 CFR 50.55a Codes and Standards Footnote 6 applies to ASME Code Cases. ASME Code Cases that have been determined suitable for use by the Commission staff are listed in NRC Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability - ASME Section XI Division 1". The use of other Code Cases may be authorized by the Director of the Office of Nuclear Reactor Regulation upon request pursuant to 10 CFR 50.55a(a)(3).

4.3.3.1 Acceptable Code Cases

During the second ten-year interval the NRC staff authorized, pursuant to 10 CFR 50.55a(a)(3)(ii), the use of ASME Code Case N-416-1 and N-498-1. Use of ASME Code Case N-416-1 and N-498-1 at Nine Mile Point Unit 1 was authorized until such time as these Code Cases were published in a future revision of Regulatory Guide 1.147. (Reference NRC Safety Evaluation Reports dated October 18, 1994 and January 13, 1995). Reg. Guide 1.147 Revision 12 endorses the use of these Code Cases therefore Relief Requests are no longer required to use these Code Cases.

For the third 120 month interval, Nine Mile Point Unit 1 is using Reg. Guide 1.147 Revision 12 which endorses Code Cases N-416-1, N-498-1 and N-522.

4.3.3.1.1 Code Case N-416-1

The Issue: IWA-4000 requires a Hydrostatic Test after welded repairs or installation of replacement items by welding. This Code Case addresses alternatives to the IWA-4000 requirement.

The Response:

In lieu of performing the hydrostatic pressure test required by paragraph IWA-4000 for welded repairs or installation of replacement items by welding, a system leakage test may be used provided the following requirements are met:

a) NDE shall be performed in accordance with the methods and acceptance criteria of the applicable Subsection of the 1992 Edition of Section III.

b) Prior to or immediately upon return to service, a visual examination (VT-2) shall be performed in conjunction with a system leakage test, using the 1992 Edition of Section XI in accordance with paragraph IWA-5000, at nominal operating pressure and temperature.

c) Use of this Case shall be documented on an NIS-2 Form.

Additional Requirements:

In Revision 12 to Reg. Guide 1.147 the NRC imposed an additional requirement on the use of Code Case N-416-1. Additional surface examinations are required to be performed on the root (pass) layer of butt and socket welds on the pressure retaining boundary of Class 3 components when the surface examination method is used in accordance with Section III.

Clarification of System Leakage Test Requirement:

The System Leakage Test is specified in IWA-5000. The System Leakage Test performed to comply with Code Case N-416-1 shall comply with the requirements of IWA-5000, which are summarized as follows:

- The test pressure and temperature are specified in IWB-5000 (Class 1), IWC-5000 (Class 2), and IWD-5000 (Class 3).
- Holding Time for a System Leakage Test: no holding required after attaining test pressure and temperature conditions when the system has been in operation for at least 4 hours, otherwise, a 10 minute holding time for non-insulated systems or components, or 4 hours for insulated systems or components, is required after attaining system operating pressure. [1992 Edition, Section XI, IWA-5213]
- The pressurization test boundary shall be the one specified in the applicable Table in IWB-5000, IWC-5000, or IWD-5000.

Implementation:

This Code Case was approved for use in Revision 12 of Reg. Guide 1.147, dated May, 1999.

4.3.3.1.2 Code Case N-498-1

The Issue: Tables IWB-2500-1, IWC-2500-1 and IWD-2500-1 require a system hydrostatic test every ten (10) years. This Code Case addresses alternatives to the these requirements.

The Response:

In lieu of performing the 10-year system hydrostatic pressure test required by Tables IWB-2500-1(Category B-P), IWC-2500-1(Category C-H) and IWD-2500-1(Categories D-A, D-B or D-C), the following may be performed:

a) Class 1: A system leakage test (IWB-5221), conducted at or near the end of each inspection interval, prior to reactor startup.

b) Class 2 and 3: A system pressure test, conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

Requirements:

The following requirements apply:

a) Boundaries:

i) Class 1: The boundary subject to test pressurization during the system leakage test shall extend to all Class 1 pressure retaining components within the system boundaries.

ii) Class 2 and 3: The boundary subject to test pressurization during the system pressure test shall extend to all Class 2 (Class 3) components included in those portions of systems required to operate or support the safety system function up to, and including, the first normally closed valve, including a safety or relief valve, or valve capable of automatic closure when the safety function is required.

b) Holding Times:

i) For Class 1, 2, and 3 systems, the Code Case requires that the system be pressurized to nominal operating pressure for at least 4 hours for insulated systems and 10 minutes for noninsulated systems prior to performing the VT-2 visual examination.

ii) For Class 1, 2, and 3 systems, the Code Case requires that the system be maintained at nominal operating pressure during performance of the VT-2 visual examination.

c) Test Instrumentation:

i) The test instrumentation requirements of IWA-5260 are not applicable.

Additional Requirements:

Reg. Guide 1.147 Revision 12 specified no additional requirements to Code Case N-498-1.

Implementation:

This Code Case was approved for use in Revision 12 of Reg. Guide 1.147, dated May 1999.

4.3.3.1.3 Code Case N-522

The Issue: Pressure Testing of Containment Penetration Piping. This Code Case addresses alternatives to IWC-2500-1, Category C-H requirements.

The Response:

In lieu of performing the system pressure testing specified in IWC-2500-1, Category C-H, for pressure testing piping that penetrates a containment vessel, the requirements of 10 CFR 50, Appendix J may be used as an alternative.

Additional Requirements:

In Revision 12 to Reg. Guide 1.147 the NRC imposed an additional requirement on the use of Code Case N-522. The test is required to be conducted at the peak calculated containment pressure and the test procedure is required to permit the detection and

location of through-wall leakage in containment isolation valves (CIV's) and pipe segments between CIV's.

Implementation:

This Code Case was approved for use in Revision 12 of Reg. Guide 1.147, dated May 1999. Because the Code Case allows the use of an Appendix J Leak Rate Test, which allows some leakage from the test boundary, the additional NRC requirements are interpreted to require detection and location of through-wall leakage using soap bubble solution (Snoop™) or other qualified technique during the performance of the leak rate test. Although not specifically stated in the Reg. Guide, VT-2 Qualified personnel are expected to perform the additional requirements for location and detection of through-wall leakage.

4.3.4 SECTION XI SUBSEQUENT EDITION/ADDENDA

NMP1 may meet the examination of components and system pressure tests set forth in subsequent editions and addenda incorporated by 10 CFR 50.55a(b) subject to the limitations and modifications listed in paragraph (b) provided all related requirements of the respective edition/addenda are met and Commission approval is obtained. Any adopted latest edition/addenda of the code is identified in this Program Plan.

5. ISPT ASME CLASS BOUNDARIES

5.1 General Program Scope

The NMP1 ISPT Program Plan provides the ISPT ASME Class pressure boundaries using the guidelines provided within Regulatory Guide 1.26 and NMPC Engineering Design Standard 1M-EDS-003. The ISPT boundaries may not necessarily comply with NMP1 ASME boundary classifications. General ASME Class or system specific exceptions are discussed in Section 5.3, 5.4, and 9.2 of this document.

5.1.1 GENERAL CLASS BOUNDARY BREAK RULES:

a) ASME Section XI Code Classification Guideline, 1M-EDS-003, specifies that normally open manual valves and any class boundary not at a valve be justified by documenting that failure of the lower class system will not adversely affect the essential operation of the higher class system. This requirement is consistent with the rules contained in the Standard Review Plan, Section 3.2.2. Engineering Design Standard, 1M-EDS-003, Section 8.0, documents exceptions to the boundary break guidelines.

b) The ISPT boundary terminates at the excess flow check valve for sensing line and tubing that penetrate the primary containment.

c) For Class 1, 2 and 3 process piping except as stated above, the ISPT boundary terminates at the seat of the root valve for test, drain, and vent connections and for instrumentation.

d) The ISPT and the associated VT-2 examination boundaries are the ASME Section III Class breaks unless there is a normally closed valve or valve capable of automatic closure within the Class 2 or 3 boundary. For Class 2 and 3 systems, where double valves are designed as an isolation boundary, the ISPT boundary shall extend up to and include the first normally closed valve or valve capable of automatic closure. The boundary for open ended discharge lines will be the last shutoff valve.

e) The scope of ASME Section XI pressure testing includes Class 1, 2, and 3 systems. Therefore, Class 4 systems are exempt from ASME Section XI pressure testing and the boundary break will normally occur at the Class 1, 2, 3/Class 4 interface.

f) Atmospheric storage tanks included in the ISPT shall be tested at normal operating pressure (level) as part of the applicable system inservice or functional pressure test.

g) ISPT class boundary break rules under Code Case N-498-1.

   (1) For Class 1 systems, the boundary subject to test pressurization must include all Class 1 pressure retaining components within the system boundary.

   (2) For Class 2 systems, the boundary subject to test pressurization must include all Class 2 components included in those portions of systems required to operate or support the safety system function up to and including the first normally closed valve, including a safety or relief valve, or valve capable of automatic closure when the safety function is required.

(3) For Class 3 systems, the boundary subject to test pressurization must include all Class 3 components included in those portions of systems required to operate or support the safety system function up to and including the first normally closed valve, including a safety or relief valve, or valve capable of automatic closure when the safety function is required.

5.1.2 EXCLUSIONS, EXCEPTIONS, AND TECHNICAL POSITIONS

a. Class 2 Exceptions

In the event small branch lines (i.e., vent , drain, and instrument lines 1" NPS[1] or smaller) connected to the reactor coolant system are classified as ASME Class 2. These lines are part of the reactor coolant system hydrostatic test boundary and are hydrostatically tested to the Class 1 hydrostatic test requirements.

b. Class 2 and 3 Exclusions

1) Nine Mile Unit 1 was built prior to the development of the General Design Criteria, the ASME Boiler and Pressure Vessel Code or NRC Reg. Guide 1.26. Systems and components were designed per the requirements of ANSI B31.1. As part of the full power licensing process, NMPC classified systems in accordance with the guidance provided in Reg. Guide 1.26 (originally Safety Guide 26), *Quality Group Classifications and Standards*, to the maximum extent possible. This Reg. Guide "describes a quality classification system related to specified industry codes that may be used to determine quality standards that satisfy General Design Criterion 1 for other water- and steam-containing components important to safety of water-cooled nuclear power plants". The "other" pertains to water- and steam-containing components other than those associated with the reactor coolant pressure boundary. Several systems, for which Reg. Guide 1.26 is not applicable, were conservatively classified as ASME Code Class 2 or 3. These systems were "optionally upgraded" to provide greater controls on repair and replacement and/or inservice inspection, based on their importance to safety. Based on ASME XI, IWA-1320(e), periodic inservice, functional, and/or hydrostatic testing will not be performed on these systems. Systems included are listed below:

System Name	System Designation
Instrument Air	94
Containment Vent and Purge	201

[1] NPS (*Nominal Pipe Size*) — a designation assigned for the purpose of convenient specification of pipe size. The actual inside and outside dimensions are listed in applicable ANSI Standards.

Drywell Vent and Purge	201.1
Drywell Vent and Purge/Containment Atmosphere Dilution (including H2/O2 Monitoring System)	201.2
Leak Rate Monitoring	201.5, 201.6
Containment Radiation Monitoring	201.7
Nitrogen Supply	201.8, 201.9, 201.11, 201.12

2) The Head Spray System (34) has been retired and partially dismantled. An isolated portion of the system exists at drywell penetration X-129 and is classified as ASME Class 2. This piping is virtually a spare penetration with a normally closed valve welded to the outboard end and a blind flange on the inboard end, with a check valve located between them (inside containment). This piping is tested in accordance with 10CFR 50, Appendix J. It is not included in the Pressure Testing Program as it is not an operable system.

c) Technical Positions

1) Sections of Spent Fuel Pool Filtering and Cooling System (54) piping to and from the fuel pool which are embedded in concrete without an annulus will be inspected as allowed by IWA-5244(c).

2) Hydrostatic Testing of Open Ended Systems:

Class 2 -

In accordance with IWC-5222(d), for all Class 2 open ended portions of systems downstream of the last shutoff valve, demonstration of an open flow path shall be performed in lieu of hydrostatic testing.

Examples of Class 2 open ended lines at NMP1 include but are not limited to:

1. Containment Spray System Spray Headers
2. Containment Spray Pump Test Line to the Torus
3. Core Spray Pump Test Lines to the Torus
4. Core Spray Minimum Flow Lines to the Torus
5. Containment Spray Heat Exchanger Vent Lines to Torus
6. Condensate Make-up to Torus
7. Torus Water Quality Return

In accordance with IWC-5222(c), lines which originate or terminate below the level of tanks (or the torus) shall be considered to be an extension of the tank (or torus) up to the first shutoff valve. The nominal hydrostatic pressure shall be that

pressure developed with the tank filled to design capacity. For the torus, the hydrostatic pressure shall be that pressure developed with the torus level in the normal range allowed by Technical Specifications.

Examples of such lines at NMP1 include, but are not limited to:

1. Core Spray Suction
2. Containment Spray Suction
3. Torus Drain Lines/Water Quality
4. Clean-up System Relief Valve Discharge/Emergency Condenser Vent

Class 3:

In accordance with IWD-5223(d), for all Class 3 open ended portions of discharge lines beyond the last shutoff valve, confirmation of adequate flow during system operation shall be acceptable in lieu of a system hydrostatic test.

Examples of Class 3 open ended lines at NMP1 include, but are not limited to:

1. Emergency Diesel Cooling Water to Discharge Tunnel
2. Containment Spray Raw Water to Discharge Tunnel

3) Drywell and Torus Vacuum Relief Piping – This piping is currently categorized as Class 2 per the ASME Section XI Boundary Diagrams however this portion of piping forms an extension of the containment structure. The containment structure is designed to operate at different pressures under several modes of plant operation and post accident conditions. The highest pressure this piping is exposed to is during the Appendix J Type A and Type C Leak Rate Tests. The inservice pressure during plant operation is approximately 1-2 psig. Code Case N-522 (endorsed per Reg. Guide 1.147, Revision 12, dated May 1999) applies to piping that penetrates a containment vessel, when the piping and isolation valves that are part of the Containment System are Class 2 but the balance of the piping system is outside the scope of Section XI. The Class 2 piping inboard of the inner most Containment Isolation Valve is part of the "Containment System" and therefore meets the description of Code Case N-522. The Appendix J Type "C" test will be used for the CIV's and piping segment in between the CIV's. The Appendix J Type "A" test will be used for the piping inboard of the innermost CIV.

4) Containment Penetration Piping - ASME Code Case N-522 addresses pressure testing of containment penetration piping for systems where the piping and isolation valves that are part of the containment system are Class 2 but the balance of the system is outside the scope of ASME Section XI. In the Code Case, the Code Committee stated that 10CFR50, Appendix J may be used as an alternative to the rules of Table IWC-2500-1, Category C-H, for pressure testing piping that

penetrates the containment vessel but is outside the scope of Section XI (i.e. outside the isolation valves). This Code Case has been approved for use by the NRC and is included in the latest Reg. Guide 1.147 list of acceptable Code Cases. ISPT Program Plan Section 4.3.3.1.3 documents use of this Code Case at NMP1. Systems included are listed below:

System Name	System Designation
Condensate Transfer to Torus	58.1
Drywell and Torus Vacuum Relief	68
Drywell Floor and Equipment Drain Sumps	83.1

5) Heat Exchanger Tubing – IWA-5000 of the Code requires a VT-2 visual examination during the conduct of system pressure tests and/or system hydrostatic tests. IWA-5240 states that the VT-2 visual examination is performed on "accessible external exposed surfaces of pressure retaining components." Since heat exchanger tubes are not accessible, external or exposed, they are not subject to a VT-2 visual examination during the performance of either a system pressure test or system hydrostatic test. Additionally, heat exchanger disassembly (e.g. manway removal) is not required by the Code to provide access to internal components. To meet Code requirements, the accessible portions of the endbell and heat exchanger shell will be VT-2 inspected during the applicable system/hydrostatic test. However, the heat exchanger tubes must be included within the pressurized boundary (e.g. the heat exchanger (tube side) cannot be isolated) during the conduct of the applicable test. The Code contains no requirement, implicit or explicit, to verify tube integrity by any other positive means.

6) For ASME Code Class 1, 2 and 3 systems - No System Leakage Test shall be required if the work performed is only the disassembly and re-assembly of mechanical joints (e.g., bolted connections, valve or pump packing, seats, seals, or gaskets) AND no repair or replacement is performed on any pressure retaining components (Reference: Interpretation XI-1-86-21R for Class 1 and NMPC Memo No. PTP 89-032, Interpretations XI-1-83-63R & XI-1-86-29 for Class 2 & 3 Systems)

5.1.3 AUGMENTED EXAMINATIONS

a. Control Rod Drive Scram Dump Volume (44) – In addition to the tests and examinations required of this Class 2 piping, one of the following inspections will be performed once per refueling outage (ref. NMPC Safety Evaluation 93-015, dated 2/18/93) to meet the requirements of NRC Generic Letter 86-01:

- A post-scram reset walkdown performed as soon as possible, but not more than 30 minutes, following the scram reset. This walkdown is performed specifically to

investigate evidence of leakage below the scram dump volume header and instrument volume by visual observation. Inspection personnel need not be VT-2 certified. Documentation of a satisfactory inspection may be via entry into SSS logbook. Leakage is to be reported via standard corrective action procedures. (Reference NMPC Letter NMP1L 0731, dated February 5, 1993)

- A system hydrostatic test performed in accordance with ASME Section XI, IWA-5000 and IWC-5000. (Reference NRC SER dated September 17, 1990 (TAC No. 71392 and NMPC Letter NMP1L 0488, dated April 2, 1990)

5.2 ASME Class 1

5.2.1 Reactor Coolant Pressure Boundary - Quality Group A Component [10 CFR 50.55a(c)]

Quality Group A components are referred to as the reactor coolant boundary; which means all those pressure-containing components of a boiling water reactor, such as vessels, piping, pumps and valves, which are part of reactor coolant system or connected to the reactor coolant system. As discussed in Reg. Guide 1.26, Quality Group A is synonymous with ASME Class 1.

ASME Class 1 components, as defined in 10 CFR 50.55a(c), need not meet the requirements of Class 1 provided:

a. In the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system; or

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

5.2.2 ASME Class 1 Boundary Break Rules

The ISPT Reactor Coolant Pressure Boundary means all those pressure-containing components of a boiling water reactor, such as pressure vessels, piping, pumps and valves, which are part of the reactor coolant system, or connected to the reactor coolant system, up to and including any and all of the following:

a. The outermost Containment isolation valve in system piping which penetrates primary reactor Containment,

b. The second of two valves normally closed during normal reactor operation in system piping which does not penetrate primary reactor Containment,

c. The reactor coolant system safety and relief valves.

5.2.3 INSERVICE INSPECTION AND TESTING

Technical Specification 3/4.2.6, Inservice Inspection and Testing, in general, discusses the ISPT Program for the ASME Class 1 components.

5.2.4 CLASS 1 EXAMINATIONS

5.2.4.1 Category B-E, Pressure Retaining Partial Penetration Welds in Vessels

B4.10 – Partial Penetration Welds

Extent of Examination – External surfaces shall be examined during the conduct of the System Hydrostatic Test by visual examination VT-2. Twenty-five percent of the vessel nozzles is not applicable to NMP1 in accordance with the ISI Program Plan. Twenty-five percent of the control rod drive Nozzles (B4.12), and the instrumentation nozzles (B4.13) shall be examined each 10-year inspection interval.

Frequency of Examination – 25% in each inspection interval. Deferral to the end of the interval is permissible.

B4.20 – Heater Penetration Welds

(Pressurized Water Reactors) – not applicable at NMP1.

5.2.4.2 Category B-P, All Pressure Retaining Components

B15.10 - System Leakage Test: Reactor Vessel Pressure Retaining Boundary

Extent of Examination - The reactor vessel is routinely leak tested (at nominal operating pressure) via the Code system leakage test. The boundary subject to test pressurization during a system leakage test shall correspond to the reactor coolant system boundary, with all valves in the normal position, which is required for normal reactor startup. The VT-2 examination shall extend to and include the second closed valve at the boundary extremity.

Frequency of Examination - prior to plant startup following each reactor refueling outage.

B15.11 - System Hydrostatic Test: Reactor Vessel Pressure Retaining Boundary

Extent of Examination - The Code requires that the reactor vessel be leak tested using a system hydrostatic test at or near the end of each 10-year interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system leakage test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization during this test shall include all Class 1 pressure retaining components within the system boundary.

Frequency of Examination - at or near the end of each 10-year interval, prior to reactor startup.

B15.20 - System Leakage Test: Pressurizers Pressure Retaining Boundary
(Pressurized Water Reactors) - not applicable at NMP1.

B15.21 - System Hydrostatic Test: Pressurizers Pressure Retaining Boundary (Pressurized Water Reactors) - not applicable at NMP1.

B15.30 - System Leakage Test: Steam Generators Pressure Retaining Boundary (Pressurized Water Reactors) - not applicable at NMP1.

B15.31 - System Hydrostatic Test: Steam Generators Pressure Retaining Boundary (Pressurized Water Reactors) - not applicable at NMP1.

B15.40 - System Leakage Test: Heat Exchangers Pressure Retaining Boundary (Pressurized Water Reactors) - not applicable at NMP1.

B15.41 - System Hydrostatic Test: Heat Exchangers Pressure Retaining Boundary (Pressurized Water Reactors) - not applicable at NMP1.

B15.50 - System Leakage Test: Piping Pressure Retaining Boundary

Extent of Examination - The boundary subject to test pressurization during a system leakage test shall correspond to the reactor coolant system boundary, with all valves in the normal position, which is required for normal reactor startup. The VT-2 examination shall extend to and include the second closed valve at the boundary extremity.

Frequency of Examination - prior to plant startup following each reactor refueling outage

B15.51 - System Hydrostatic Test: Piping Pressure Retaining Boundary

Extent of Examination - The Code requires that the reactor coolant piping be leak tested using a system hydrostatic test at or near the end of each 10-year interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system leakage test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization during this special system leakage test shall extend to all Class 1 pressure retaining components within the system boundary.

Although some instrument lines off Class 1 lines are Class 2, they will be pressure tested with the associated Class 1 process line pressure test. The test conditions will be identical to those required for Class 1 process lines.

Frequency of Examination - at or near the end of each 10-year interval, prior to reactor startup.

B15.60 - System Leakage Test: Pumps Pressure Retaining Boundary

Extent of Examination -The five reactor recirculation pumps are the only Class 1 pumps at NMP1. Each must be leak tested (at nominal operating pressure). The boundary subject to test pressurization during a system leakage test shall correspond to the reactor coolant system boundary, with all valves in the normal position, which is required for normal reactor startup. The VT-2 examination shall extend to and include the second closed valve at the boundary extremity.

Frequency of Examination - prior to plant startup following each reactor refueling outage

B15.61 - System Hydrostatic Test: Pumps Pressure Retaining Boundary

Extent of Examination - The Code requires that the reactor coolant piping be leak tested using a system hydrostatic test at or near the end of each 10-year interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system leakage test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization during this special system leakage shall extend to all Class 1 pressure retaining components within the system boundary.

Frequency of Examination - at or near the end of each 10-year interval.

B15.70 - System Leakage Test: Valves Pressure Retaining Boundary

Extent of Examination - Valves must be leak tested (at nominal operating pressure). The boundary subject to test pressurization during a system leakage test shall correspond to the reactor coolant system boundary, with all valves in the normal position, which is required for normal reactor startup. The VT-2 examination shall extend to and include the second closed valve at the boundary extremity.

Frequency of Examination - prior to plant startup following each reactor refueling outage

B15.71 - System Hydrostatic Test: Valves Pressure Retaining Boundary

Extent of Examination - The Code requires that the reactor coolant piping be leak tested using a system hydrostatic test at or near the end of each 10-year interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system leakage test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization during this special system leakage test shall extend to all Class 1 pressure retaining components within the system boundary.

Frequency of Examination - at or near the end of each 10-year interval.

5.3 ASME Class 2

5.3.1 Quality Group B Components [10 CFR 50.55a(d)]

Quality Group B systems are those systems or portions of systems important to safety that are designed for emergency core cooling, post-accident containment heat removal, post-accident fission product removal, reactor shutdown or residual heat removal. As discussed in Reg. Guide 1.26, Quality Group B is synonymous with ASME Class 2.

5.3.2 ASME Class 2 Boundary Break Rules

a) The pressure retaining boundary includes those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required (Reference 1989 Edition of ASME Section XI Table IWC-2500-1, Exam Category C-H Note 7).

b) ASME Section XI Code Classification Guideline, 1M-EDS-003, specifies that normally open manual valves and any class boundary not at a valve be justified by documenting that failure of the lower class system will not adversely affect the essential operation of the higher class system. This requirement is consistent with the rules contained in the

Standard Review Plan, Section 3.2.2. Engineering Design Standard, 1M-EDS-003, Section 8.0, documents exceptions to the boundary break guidelines.

c) No components within the pressure retaining boundary above are exempt or excluded from the examination requirements, except as specified for repairs and replacements (Reference 1989 Edition of ASME Section XI Table IWC-2500-1, Exam Category C-H Note 4). This has been clarified by issuing color coded ASME Section XI Boundary Diagrams. Refer to Section 9.0 for boundary diagram information.

5.3.3 INSERVICE INSPECTION AND TESTING

Technical Specification 3/4.2.6, Inservice Inspection and Testing, in general, discusses the ISPT Program for the ASME Class 2 components.

5.3.4 COMPONENTS SUBJECT TO EXAMINATION

ASME Class 2 components are classified in accordance with the criteria of Regulatory Guide 1.26 and NMPC Engineering Design Standard 1M-EDS-003. ASME Class 2 components will be inservice inspected in accordance with and to the extent required by the 1989 Edition of ASME XI, Subsection IWC-and Table IWC-2500-1 (except as noted in Section 5.1.2).

5.3.5 CLASS 2 EXAMINATIONS

5.3.5.1 Category C-B, Pressure Retaining Nozzle Welds in Vessels

C2.30 – Nozzles With Reinforcing Plate in Vessels> ½ in. Nominal Thickness

(Not applicable to NMP1)

C2.33 – Nozzle-to-Shell (or Head) Welds When Inside of Vessel Is Inaccessible

(Not applicable to NMP1)

5.3.5.2 Category C-H, All Pressure Retaining Components

C7.10 - System Pressure Test: Pressure Vessel Pressure Retaining Boundary

Extent of Examination - ASME Code Class 2 pressure vessels are pressure tested (at nominal operating pressure). The boundary subject to test pressurization shall include those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

Frequency of Examination - each inspection period.

C7.20 - System Hydrostatic Test: Pressure Vessel Pressure Retaining Boundary

Extent of Examination - The Code requires that Class 2 pressure vessels be leak tested using a system hydrostatic test at or near the end of each 10-year interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system pressure test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization shall include those portions of the system required to operate

or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

Frequency of Examination – at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

C7.30 - System Pressure Test: Piping Pressure Retaining Boundary

Extent of Examination - Piping is pressure tested (at nominal operating pressure). The boundary subject to test pressurization shall include those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

Frequency of Examination - each inspection period.

C7.40 - System Hydrostatic Test: Piping Pressure Retaining Boundary

Extent of Examination - The Code requires that Class 2 piping be leak tested using a system hydrostatic test at or near the end of each 10-year interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system pressure test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization shall include those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

Frequency of Examination – at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

C7.50 - System Pressure Test: Pumps Pressure Retaining Boundary

Extent of Examination - Pumps are pressure tested at nominal operating pressure. The boundary subject to test pressurization shall include those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

Frequency of Examination - each inspection period.

C7.60 - System Hydrostatic Test: Pumps Pressure Retaining Boundary

Extent of Examination - The Code requires that Class 2 pumps be leak tested using a system hydrostatic test at or near the end of each 10-year interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system pressure test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization shall include those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

Frequency of Examination – at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

C7.70 - System Pressure Test: Valves Pressure Retaining Boundary

Extent of Examination - Valves are pressure tested at nominal operating pressure. The boundary subject to test pressurization shall include those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

Frequency of Examination - each inspection period.

C7.80 - System Hydrostatic Test: Valves Pressure Retaining Boundary

Extent of Examination - The Code requires that Class 2 valves be leak tested using a system hydrostatic test at or near the end of each 10-year interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system pressure test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization shall include those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

Frequency of Examination – at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

5.4 ASME Class 3

5.4.1 Quality Group C Components [10 CFR 50.55a(e)]

Quality Group C systems are those systems or portions of systems important to safety that are not part of the reactor coolant pressure boundary or included in quality group B but are part of cooling water systems designed for emergency core cooling, post accident heat removal, spent fuel storage heat removal, seal water systems, or are systems which support a reactor shutdown function. As discussed in Reg. Guide 1.26, Quality Group C is synonymous with ASME Class 3.

5.4.2 ASME Class 3 Boundary Break Rules

a. The pressure retaining boundary extends up to and includes the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function.

b. ASME Section XI Code Classification Guideline, 1M-EDS-003, specifies that normally open manual valves and any class boundary not at a valve be justified by documenting that failure of the lower class system will not adversely affect the essential operation of the higher class system. This requirement is consistent with the rules contained in the Standard Review Plan, Section 3.2.2. Engineering Design Standard, 1M-EDS-003, Section 8.0, documents exceptions to the boundary break guidelines.

c. There are no exemptions or exclusions from these requirements above except as specified for repairs and replacements.

5.4.3 INSERVICE INSPECTION AND TESTING

Technical Specification 3/4.2.6, Inservice Inspection and Testing, in general, discusses the ISPT of Class 3 components.

5.4.4 COMPONENTS SUBJECT TO EXAMINATION

ASME Class 3 components are classified in accordance with the criteria of Regulatory Guide 1.26 and NMPC Engineering Design Standard 1M-EDS-003. ASME Class 3 components will be inservice inspected in accordance with and to the extent required by 1989 Edition of ASME XI, Subsection IWD-and Table IWD-2500-1 (except as noted in Section 5.1.2).

5.4.5 CLASS 3 EXAMINATIONS

5.4.5.1 Category D-A, Systems In Support Of Reactor Shutdown Function

Item D1.10 - Pressure Retaining Components

Extent of Examination - Pressure retaining components are pressure tested at nominal operating pressure. The system boundary extends up to and includes the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function.

Frequency of Examination - each inspection period.

The Code requires that pressure retaining components be leak tested using a system hydrostatic test at or near the end of each inspection interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system pressure test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization during a system pressure test extends up to and includes the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function.

Frequency of Examination – at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

5.4.5.2 Category D-B, Systems In Support Of Emergency Core Cooling, Containment Heat Removal, Atmosphere Cleanup, And Reactor Residual Heat Removal

Item D2.10 - Pressure Retaining Components

Extent of Examination - Pressure retaining components are pressure tested at nominal operating pressure. The system boundary extends up to and includes the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function. .

Frequency of Examination - each inspection period.

The Code requires that pressure retaining components be leak tested using a system hydrostatic test at or near the end of each inspection interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system pressure test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization during a system pressure test extends up to and includes the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function.

Frequency of Examination – at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

5.4.5.3 Category D-C, Systems In Support Of Residual Heat Removal From Spent Fuel Storage Pool

Item D3.10 - Pressure Retaining Components

Extent of Examination - Pressure retaining components are pressure tested at nominal operating pressure. The system boundary extends up to and includes the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function. .

Frequency of Examination - each inspection period.

The Code requires that pressure retaining components be leak tested using a system hydrostatic test at or near the end of each inspection interval. NMPC uses ASME XI Code Case N-498-1, which allows the substitution of a system pressure test as an alternative to the 10-year system (elevated pressure) hydrostatic test. The boundary subject to test pressurization during a system pressure test extends up to and includes the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function.

Frequency of Examination – at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

6. PRESSURE TESTING REQUIREMENTS

6.1 General Requirements [IWA-5200]

System Pressure Tests requirements are delineated in 1989 Edition of ASME Section XI Article IWA-5000. System pressure test requirements for test condition holding time and test pressurization boundaries are discussed by ASME Class. The required test records are covered in Section 8 of this ISPT Program Plan, "Scheduling and Reporting."

Since the adoption and approval by ASME of Code Case N-498-1, the hydrostatic and pneumatic pressure test requirements for test pressurization boundaries and gauges is not applicable when using this Code Case (reference: Code Case N-498-1). When the hydrostatic or pneumatic pressure test is performed in lieu of the alternative provided by Code Case N-498-1, the requirements of IWA-5260 apply. The visual examination (VT-2) requirements define the examination method and are documented in procedure NDEP-VT-2.01, "ASME Section XI Visual Examination Procedure". The requirements for system pressure tests following repairs and replacements are covered in Section 7 of the ISPT Program Plan, "Repair and Replacement."

6.1.1 VISUAL EXAMINATION VT–2

A visual examination VT-2 shall be conducted in accordance with Section XI, Article IWA-2212 and Article IWA-5240. Table IWA-5210-1 provides the reference paragraphs for System Pressure Tests and Visual Examinations (VT-2) requirements. Refer to ISPT Program Plan Section 7.0 for specific 92 Edition ASME Section XI Code requirements when using Code Case N-416-1 for repairs and replacements.

6.1.2 CLASS 1

Although not referenced in Table IWA-5210-1, Table IWB-2500-1, Category B-E contains VT-2 requirements for partial penetration welds. Table IWB-2500-1 lists VT-2 as the examination method and IWB-3522 as the acceptance standard for all Category B-E examinations.

Table IWA-5210-1 references Table IWB-2500-1, Category B-P for the Examination Category. Table IWB-2500-1 lists VT-2 as the Examination Method and IWB-3522 as the acceptance standard for all Category B-P Examinations.

Paragraph IWB-3522 lists the standards for the Visual Examination, VT-2, performed on Category B-P Examinations. The following relevant conditions[2] that may be detected during the conduct of system pressure tests shall require correction to meet the requirements of IWA-5250 prior to continued service:

(a) leakage from non-insulated components (IWA-5241).

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[2] Relevant conditions are defined in IWA-9000; they do not include conditions that result in condensation on components, normal collection of fluid in sumps, and drips from open drains.

(b) leakage in excess of permissible levels defined by the Owner from components provided with leakage limiting devices (IWA-5243);

(c) leakage[3] from insulated components or inaccessible components that will require locating the leakage source (IWA-5242);

(d) areas of general corrosion of a component resulting from leakage [IWA5250(b)];

(e) discoloration or accumulated residues on surfaces of components, insulation, or floor areas that may be evidence of borated water leakage[3] [IWA-5242(c)];

(f) leakage or flow test results from buried components (IWA-5244) in excess of limits established by the Owner.

6.1.3 CLASS 2

Although not referenced in Table IWA-5210-1, Table IWC-2500-1, Category C-B contains VT-2 requirements for nozzles with reinforcing plate in vessels > ½ inch nominal thickness. Table IWC-2500-1 lists VT-2 as the examination method and "no leakage" as the acceptance standard for Category C-B, item C-2.33 examinations. The NMP1 ISI Program Plan specifies this code item is not applicable to NMP1 (specifically item C2.30).

Table IWA-5210-1 references Table IWC-2500-1, Category C-H for the Examination Category. Table IWC-2500-1 lists VT-2 as the Examination Method and IWC-3516 as the acceptance standard for all Category C-H Examinations.

Paragraph IWC-3516, Standards for Examination Category C-H, All Pressure Retaining Components, states, "These standards are in the course of preparation. The standards of IWB-3522 may be used."

6.1.4 CLASS 3

Table IWA-5210-1 references Table IWD-2500-1, Category D-A, D-B, and D-C for the Examination Category. Table IWD-2500-1 lists VT-2 as the Examination Method for pressure-retaining components, and IWD-3000 as the acceptance standard for all Category D-A, D-B, and D-C Examinations.

Article IWD-3000, Acceptance Standards, states, "This Article is in the course of preparation. The rules of IWB-3000 may be used."

6.1.5 ACCEPTANCE CRITERIA

a. The Code-specified acceptance criteria for the Visual Examination, VT-2, are found in IWB-3522. These acceptance criteria apply to Class 1, 2, and 3 pressure-retaining components.

b. Pressure boundary material shall have no through–wall leakage.

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[3] The leakage is the through-wall leakage that penetrates the pressure retaining membrane.

6.1.6 CORRECTIVE MEASURES [IWA-5250]

(a) The source of leakage detected during the conduct of a system pressure test shall be located and evaluated by NMPC for corrective measures as follows:

(1) Buried components with leakage losses in excess of limits acceptable for continued service shall be repaired or replaced;

(2) During the performance of a System Pressure Test required by Section XI in accordance with this Pressure Test Program Plan, if leakage occurs at a bolted connection, corrective actions will be evaluated in accordance with General Relief Request No. GPTRR-1. Repairs or replacements of components shall be performed in accordance with the 1989 Edition of ASME Section XI, IWA-4000 or IWA-7000, respectively. Refer to ISPT Program Plan Section 7.0 for repair/replacement details.

(b) If boric acid residues are detected on components, the leakage source and the areas of general corrosion shall be located. Components with local areas of general corrosion that reduce the wall thickness by more than 10% shall be evaluated to determine whether the component may be acceptable for continued service or whether repair or replacement is required.

(c) The visual examination shall be declared unacceptable if :

i) there is evidence of through-wall leakage; or

ii) the leakage at any bolted connection is excessive; or

iii) the observable local areas of external general corrosion are excessive.

If a visual examination is declared unacceptable, the pressure-retaining component or the bolted connection shall immediately be declared inoperable.

6.1.7 INSTRUMENTS FOR PRESSURE TESTS [IWA-5260]

(When not using Code Case N-498-1)

(a) Type [IWA-5261] – Any pressure measuring instrument or sensor, analog or digital, including the pressure measuring instrument of the normal operating system instrumentation (such as control room instruments), may be used, provided the requirements of IWA-5260 are met.

(b) Accuracy [IWA-5262] – The pressure measuring instrument or sensor used in pressure testing shall provide results accurate to within 0.5% of full scale for analog gages and 0.5% over the calibrated range for digital instruments.

(c) Calibration [IWA-5363] – All pressure measuring instruments shall be calibrated against a standard deadweight tester or calibrated master gage. The test gages shall be calibrated before each test or series of tests. A series of tests is a group of

tests that use the same pressure measuring instruments and that are conducted within a period not exceeding 2 weeks.

(d) Ranges [IWA-5264] – Analog pressure gages used in testing shall have dials graduated over a range of at least 1.5 times, but not more than 4 times, the intended maximum test pressures. Digital pressure measuring instruments used in testing shall be selected such that the intended maximum test pressure shall not exceed 70% of the calibrated range of the instrument.

(e) Location [IWA-5265] – When testing an isolated component, the pressure measuring instrument or sensor shall be connected close to the component. When testing a group of components or a multi-component system, the pressure measuring instrument or sensor shall be connected to any point within the pressure boundary of the components or system such that the imposed pressure on any component, including static head, will not exceed 106% of the specified test pressure for the system.

6.1.8 ALTERNATIVE EXAMINATION

Alternative Examination is defined in Section 3 of this Program Plan. The ISPT Program Plan recognizes Leakage Tests (that is, Leak Rate Testing) as an alternative to a VT-2 visual examination. Except that the additional requirements of R.G. 1.147 must be met when using code case N-522.

6.2 ASME Class 1 System Pressure Tests

6.2.1 INSPECTION SCHEDULE

Paragraph IWB-2420, Successive Inspections, specifies that, "The sequence of component examinations established during the first inspection interval shall be repeated during each successive inspection interval, to the extent practical." This Program Plan commits to follow the sequence of ASME Class 1 component examinations established during the first inspection interval, to the extent practical.

6.2.2 TESTS TO BE PERFORMED

The pressure retaining components shall be tested at the frequency stated in Table IWB-2500-1, Examination Category B-E and B-P, and visually examined by VT-2:

(1) System Leakage Test, IWA-5211(a)

(2) System Hydrostatic Test, IWA-5211(d)

The system pressure tests and visual examinations shall be conducted in accordance with Article IWA-5000 and Article IWB-5000. Reactor coolant shall be used as the pressurizing medium.

6.2.3 EXTENT OF EXAMINATION

a. The pressure retaining boundary during the system leakage test shall correspond to the reactor coolant system boundary, with all valves in the normal position, which is required for normal reactor operation startup. The VT-2 examination shall, however, extend to and include the second closed valve at the boundary extremity. (Reference 1989 Edition of ASME Section XI Table IWB-2500-1, Category B-P, Note 1)

b. The boundary subject to test pressurization during a System Leakage Test [IWA-5211(a)] shall extend to the pressure retaining components within the system boundary. containing pressurized reactor coolant under the plant mode of normal reactor startup.

c. The pressure retaining boundary during the system hydrostatic test shall include all ASME Class 1 components within the system boundary. (Reference 1989 Edition of ASME Section XI Table IWB-2500-1, Category B-P, Note 2)

6.2.4 TEST PRESSURE AND TEMPERATURE

a. The system leakage test shall be conducted at a test pressure not less than the nominal operating pressure associated with 100% rated reactor power.

b. The system test pressure and temperature shall be attained at a rate in accordance with the heat-up limitations of the system.

c. A System Hydrostatic Test (IWB-5222) and the accompanying VT-2 examination are acceptable in lieu of the System Leakage Test (IWB-5221) and VT-2 examination. (Reference 1989 Edition of ASME Section XI, Table IWB-2500-1, Category B-P, Note 7)

d. When performed, the system hydrostatic test shall be conducted at a temperature and pressure permitted by IWB-5222, Table IWB-5222-1, and Nine Mile Point Unit 1 Technical Specifications. The requirements of IWA-5260 "Instruments for Pressure Tests" apply.

e. A system leakage test (IWB-5221), to include all ASME Class 1 components within the system boundary, and the accompanying VT-2 examination may be conducted in lieu of a hydrostatic test (Reference Code Case N-498-1). The requirements of IWA-5260 are not applicable.

f. The test temperature shall be consistent with IWB-5230 and Nine Mile Point Unit 1 Technical Specifications.

6.2.5 Test Condition Holding Times

a. *System Leakage Tests* – No holding time is required after attaining test pressure and temperature conditions. Refer to ISPT Program Plan Section 7.0 for specific requirements when using Code Case N-416-1 and "System Leakage Tests" using the 92 Code Section XI.

b. *System Hydrostatic Tests* – In those instances where NMP1 performs the system hydrostatic test in lieu of using the alternative requirements of Code Case N-498-1, the holding time after attaining test pressure and temperature conditions remains four hours for insulated systems (or portions thereof) and 10 minutes for non-insulated systems (or portions thereof) in accordance with IWA-5213*(d)*.

6.2.6 Frequency

a. The system leakage Test (IWB-5221) shall be conducted prior to plant startup following each reactor refueling outage. (Reference 1989 Edition of ASME Section XI, Table IWB-2500-1, Category B-P, Note 5)

b. In those instances where NMP1 elects to perform the system hydrostatic test in lieu of the alternative requirements described in Code Case N-498-1, the test shall be conducted at or near the end of each inspection interval.

6.3 ASME Class 2 System Pressure Tests

6.3.1 Inspection Schedule

Paragraph IWC-2420, Successive Inspections, specifies that, "The sequence of component examinations established during the first inspection interval shall be repeated during each successive inspection interval, to the extent practical." This Program Plan commits to follow the sequence of ASME Class 2 component examinations established during the second inspection interval, to the extent practical.

6.3.2 Tests To Be Performed

The pressure retaining components within each system boundary shall be subjected to the following system pressure tests and visually examined by VT-2, as specified in Table IWC-2500-1, Examination Category C-H (Category C-B, Item C2.33 is not applicable to NMP1):

(1) a system pressure test conducted during a system functional test [IWA-5211(b)] of those systems (or components) not required to operate during normal plant operation but for which periodic system (or component) functional tests are performed to meet other requirements.

(2) a system pressure test conducted during a system inservice test [IWA-5211(c)] for those systems required to operate during normal plant operation.

(3) a system hydrostatic pressure test [IWA-5211(d)] for each system or portions of systems.

The system pressure tests and visual examinations shall be conducted in accordance with IWA-5000 and IWC-5000.

6.3.3 EXTENT OF EXAMINATION

a. No components within the pressure retaining boundary are exempt or excluded from the examination requirements, except as specified in IWA-5214(c). (1989 Edition of ASME Section XI, Table IWC-2500-1, Category C-H, Note 4)

b. The pressure retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required. (1989 Edition of ASME Section XI, Table IWC-2500-1, Category C-H, Note 7)

6.3.4 TEST PRESSURE AND TEMPERATURE

a. The nominal operating pressure of the system functional test shall be acceptable as the system test pressure.

b. The nominal operating pressure during system operation shall be acceptable as the test pressure for system inservice test.

c. A system hydrostatic test (IWC-5222) and accompanying VT-2 examination are acceptable in lieu of the system pressure test (IWC-5221).

d. When performed, the system hydrostatic test pressure shall comply with the requirements of IWC-5222, System Hydrostatic Test. The requirements of IWA-5260, "Instruments for Pressure Tests" apply.

e. A System Pressure Test (IWC-5221) and the accompanying VT-2 examination may be conducted in lieu of a hydrostatic test per Code Case N-498-1. The requirements of IWA-5260 are not applicable.

6.3.5 TEST CONDITION HOLDING TIMES

c. *System Functional Tests* – Ten minute holding time required after attaining the system operating pressure.

d. *System Inservice Tests* – No holding time required, provided the system has been in operation for at least four hours.

e. *System Hydrostatic Tests* – In those instances where NMP1 performs the system hydrostatic test in lieu of using the alternative requirements of Code Case N-498-1, the holding time after attaining test pressure and temperature conditions remains four hours for insulated systems (or portions thereof) and 10 minutes for non-insulated systems (or portions thereof) in accordance with IWA-5213*(d)*.

6.3.6 FREQUENCY

a. The System Pressure Test during system functional tests and system inservice tests shall be conducted at least once every inspection period.

b. In those instances where NMP1 elects to perform the system hydrostatic test in lieu of the alternative requirements described in Code Case N-498-1, it shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval.

6.4 ASME Class 3 System Pressure Tests

6.4.1 INSPECTION SCHEDULE

Paragraph IWD-2400, Inspection Schedule, does not specify that the sequence of component examinations established during the first inspection interval be repeated during each successive inspection interval. This Program Plan nevertheless commits to follow the sequence of component examinations established during the first inspection interval, to the extent practical.

6.4.2 TESTS TO BE PERFORMED

The pressure retaining components within the boundary of each system specified in the Examination Categories of Table IWD-2500-1 shall be subjected to the following system pressure tests and visually examined by VT-2, as specified in Table IWD-2500-1 during the following tests:

(1) system inservice test, IWA-5211(c)

(2) system functional test, IWA-5211(b)

(3) system hydrostatic test, IWA-5211(d)

The system hydrostatic test shall be conducted in accordance with IWA-5000, as applicable. The contained fluid in the system shall serve as the pressurizing medium.

6.4.3 EXTENT OF EXAMINATION

a. The system boundary extends up to and includes the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function. (1989 Edition of ASME Section XI, Table IWD-2500-1, Category D-A, D-B, and D-C, Note 1)

b. There are no exemptions or exclusions from these requirements except as specified in IWA-5214(c). (1989 Edition of ASME Section XI, Table IWD-2500-1, Category D-A, D-B, and D-C, Note 4)

6.4.4 TEST PRESSURE AND TEMPERATURE

a. The inservice operating pressure during system operation shall be acceptable as the system test pressure for the System Inservice Test.

b. The nominal operating pressure of the system functional test shall be acceptable as the system test pressure for the System Functional Test.

c. A system hydrostatic test (IWD-5223) and accompanying VT-2 examination are acceptable in lieu of the system pressure test (IWD-5220).

d. When performed, the system hydrostatic test pressure shall be consistent with the requirements of IWD-5223, System Hydrostatic Test. The requirements of IWA-5260, "Instruments for Pressure Tests" apply.

e. A System Pressure Test (IWD-5220) and the accompanying VT-2 examination may be conducted in lieu of a hydrostatic test per Code Case N-498-1. The requirements of IWA-5260 are not applicable.

f. The system test temperature shall be consistent with the requirements of IWD-5230, Temperature.

6.4.5 TEST CONDITION HOLDING TIMES

a. *System Functional Tests* – Ten minute holding time required after attaining the system operating pressure.

b. *System Inservice Tests* – No holding time required, provided the system has been in operation for at least four hours.

c. *System Hydrostatic Tests* – In those instances where NMP1 elects to perform the system hydrostatic test rather than the alternative requirements of Code Case N-498-1, the holding time after attaining test pressure and temperature conditions remains at 4 hours for insulated systems and 10 minutes for non-insulated systems in accordance with IWA-5213*(d)*.

6.4.6 FREQUENCY

a. The pressure retaining components in Examination Category D-A shall receive a System Inservice Test at least once each inspection period.

b. The pressure retaining components in Examination Category D-B shall receive a System Functional Test at least once each inspection period.

c. The pressure retaining components in Examination Category D-C shall receive a System Inservice Test at least once each inspection period.

d. In those instances where NMP1 elects to perform the system hydrostatic test rather than the alternative requirements of Code Case N-498-1, it shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval.

7. REPAIR AND REPLACEMENT

7.1 General Requirement

When a repair or replacement is performed on components or component parts within the design ASME Class, the rules of pressure testing of the 1989 Edition of ASME Section XI are used to satisfy the pressure testing post maintenance requirement. Use of other documents may be authorized by the NRC in accordance with 10 CFR 50.55a(a)(3)(ii).

No pressure test will be required following maintenance if:

- only disassembly and re-assembly of mechanical joints of a component are involved, AND
- no repair or replacement of the component was involved. [4]

For example, a relief valve is removed from the system by disassembly of its intake flange. Its set pressure is adjusted, and it is replaced in the system. In this case, no pressure test is required. However, if the relief valve is replaced with a different relief valve, or if the relief valve is repaired (by welding, brazing or grinding), then a pressure test would be required.

A bolt removed, inspected, and replaced in accordance with the Corrective Measures described in Section 6 of this Program Plan does not require a pressure test.

Except as noted in IWE-5222, regarding the containment, repairs or modifications to the pressure retaining boundary or replacement of Class MC or Class CC components shall be subjected to a pneumatic leakage test in accordance with the provisions of Title 10, Part 50 of the Code of Federal Regulations, Appendix J, Paragraph IV.A. [1992 Edition, ASME Section XI w/92 Addenda].

7.1.1 APPLICABILITY OF CODE CASE N-416-1 TO REPAIR AND REPLACEMENT

Reg. Guide 1.147 Revision 12 dated May, 1999 endorses the use of ASME Code Case N-416-1 as an alternative to a hydrostatic pressure test for welded repairs or installation of replacement items by welding for the Code Class 1, 2, and 3 systems.

Code Case N-416-1 permits the use of a system leakage test in lieu of the hydrostatic test for welded repairs or installation of replacement items by welding for the Code Class 1, 2, and 3 systems.

Additionally, NDE shall be performed in accordance with the methods and acceptance criteria of the applicable subsection of the 1992 Edition of Section III.

In Revision 12 to Reg. Guide 1.147, the NRC imposed an additional requirement on the use of Code Case N-416-1. "Use of Code Case N-416-1 is authorized provided that additional surface examinations are performed on the root (pass) layer of butt and socket

[4] Refer to interpretations XI-1-86-21R and XI-1-86-29 for Class 1, 2 & 3 applicability.

welds on the pressure retaining boundary of Class 3 components when the surface examination method is used in accordance with Section III."

The Code Case Reply requires that "*Prior to or immediately upon return to service*, a visual examination (VT-2) shall be performed in conjunction with a system leakage test, using the 1992 Edition of Section XI, in accordance with IWA-5000, at nominal operating pressure and temperature."

In its implementation of this requirement, Nine Mile Point Unit 1 shall perform the applicable system pressure test and the visual examination (VT-2) prior to or immediately upon returning the system to service and declaring it operable. The VT-2 examination shall be conducted in accordance with IWA-5000 of the 92 Edition, Section XI. For direct examination, Table IWA-2210-1 maximum distance shall apply to the distance from the eye to the surfaces being examined.

The System Leakage Test is specified in IWA-5000. The System Leakage Test performed to meet the requirements of Code Case N-416-1 shall comply with the requirements of IWA-5000, which are summarized as follows:

- The test pressure and temperature are specified in IWB-5000 (Class 1), IWC-5000 (Class 2), and IWD-5000 (Class 3).
- No holding time is required after attaining test pressure and temperature conditions when the system has been in operation for at least 4 hours, otherwise, a 10 minute holding time for non-insulated system or components, or 4 hours for insulated systems or components, is required after attaining system operating pressure.
- The pressurization test boundary shall be the one specified in the applicable Table in IWB-5000, IWC-5000, or IWD-5000.

7.1.2 Dispositions of Repair and Replacement

A repair or replacement shall be dispositioned in accordance with the guidance provided in NIP–IIT–01, ASME Section XI Programs.

7.1.2.1 Repair Evaluation

Repair evaluation requirements are addressed in NIP–IIT–01, Requirements for Developing ASME Section XI Work Plans.

7.1.2.2 Replacement Evaluation

Replacement evaluation requirements are addressed in NIP–IIT–01, Requirements for Developing ASME Section XI Work Plans.

7.2 Repair Post Maintenance Test

7.2.1 REPAIR

a. Repair is defined in Section 3 of the ISPT Program. After repair(s) by welding, brazing or grinding on the pressure retaining boundary, pressure testing shall be performed in accordance with Section XI, IWA-5000, IWE-5000 or, paragraph 7.1.1 of this Program Plan.

b. The following may be exempted from the *system hydrostatic tests*:

(1) cladding repair*s*

(2) heat exchanger tube plugging

(3) piping, pump, and valve repair*s* that do not penetrate through the pressure boundary

(4) pressure vessel repair*s* where the repaired cavity does not exceed 10% of the minimum design wall thickness

(5) component connections, piping, and associated valve repairs that are 1" NPS and smaller

(6) tube-to-tubesheet repair welds where such welds are made on the cladding.

c. Repairs made in accordance with the procedures of IWA-4510, IWA-4520, or IWA-4530 shall not be exempted from the system hydrostatic test, or, if invoked in lieu of the system hydrostatic test, the alternative (Reference Code Case N-416-1) authorized, as noted in Reg. Guide 1.147 Revision 12 dated May, 1999.

d. For post maintenance test of a repair, the following must be satisfied:

(1) the test boundary shall be extended to the affected component or component part requiring post maintenance test,

(2) a 10 minute hold for non-insulated components or a four hour hold for insulated components shall be satisfied (Code Case N-416-1),

(3) the pressure test shall be conducted at operating pressure, or when pressurized to nominal operating pressure (and temperature for Class 1 Systems) (Code Case N-416-1).

e. Test pressurization boundary is the repaired component and its disassembled bolted connections, if applicable. If the component and its bolted connections, if applicable, is isolable within a portion of the system, only that portion needs to be pressure tested.

7.2.2 EXAMPLES

The following are examples of post maintenance test required for repairs. The System Pressure Test Flow Path (Attachment 3) should be referenced in the determination of post maintenance test.

7.2.2.1 Example No. 1

Event:	The Outboard MSIV was identified to have a through wall leak during the performance of a LLRT (local leak rate test) for 10 CFR 50 Appendix J. A repair by welding was performed using a Work Order (WO) and corrected this condition.
Question:	What post-repair testing, if any, is required?
Determination:	Using the System Pressure Test Flow Path the following logic would be applied.
Step 1:	**Post maintenance test**, Work per WO or Modification is classified as a Retest.
Step 2:	**Yes**, component is within the design ASME Class boundary.
Step 3:	**Yes**, Work meets the definition of a Repair on the pressure retaining boundary.
Step 4:	**No**, ISPT paragraph 7.2.1, Repair, does not exempt the component.
Step 5:	**No**, Work activity requires more than disassembly of mechanical joints.
Conclusion:	Perform a ASME Class 1 system leakage test as described in ISPT paragraph 6.2.3.1. This pressure test satisfies the ASME Class 1 System Hydrostatic Pressure Test requirements in accordance with Code Case N-416-1.

7.2.2.2 Example No. 2

Event: The Reactor Coolant Recirculation Pump Thrust Ring was removed to eliminate an indication which would be considered a defect. This work was performed by a WO requiring both grinding and welding.

Question: What post-repair testing, if any, is required?

Determination: Using the System Pressure Test Flow Path the following logic would be applied.

Step 1: **Post Maintenance Test**, Work per WO is classified as a post maintenance test.

Step 2: **Yes**, Component is within the design ASME Class boundary.

Step 3: **No**, A RCS thrust ring is not part of the pressure retaining boundary as defined in ISPT Section 3.0.

Conclusion: ASME Code Pressure Test not required.

Important: Reference ASME Code, Section XI, Interpretation No. XI-1-86-13R which comes to the same conclusion for pressure boundary opening and closing following a non-Section XI repair.

7.3 Replacement Post Maintenance Test

7.3.1 REPLACEMENT

The test pressurization boundary shall include the replaced component (and its disassembled bolted connections, if applicable.) If the component (and its bolted connections, if applicable) is isolable within a portion of the system, only that portion need be pressure tested.

The following items are exempt from the requirements of Article IWA-7000, (reference IWA-7400, Exemptions):

(1) gaskets

(2) instruments

(3) electrical conducting and insulating material

(4) piping, valves, and fittings NPS[5] 1" and smaller, except that materials and primary stress levels shall be consistent with the requirements of the applicable construction code.

The following items and parts are exempt from the requirements of Article IWA-7000, except that the requirements of IWA-7530 (Preservice Inspection) shall be met:

(1) nonstructural pump and valve internals, except when the original equipment was constructed in accordance with a Construction Code or Code Case

(2) pump seal package and valve packing

[5] NPS (*Nominal Pipe Size*) — a designation assigned for the purpose of convenient specification of pipe size. The actual inside and outside dimensions are listed in applicable ANSI Standards.

7.3.2 EXAMPLES

7.3.2.1 Example No. 1

Event:	An Emergency Service Water Pump Discharge Check Valve cover requires replacement using a certified spare from the warehouse.
Question:	What post-replacement testing, if any, is required?
Determination:	Using the System Pressure Test Flow Path the following logic would be applied.
Step 1:	**Retest**, Work per WO or Modification is classified as a Retest.
Step 2:	**Yes**, component part is within the design ASME Class boundary.
Step 3:	**Yes**, Work meets the definition of a Replacement and does affect the pressure retaining material.
Step 4:	**No**, ISPT paragraph 7.3.1, Replacement, does not exempt the component or component part.
Step 5:	**Yes**, Work activity only required disassembly of mechanical joints.
Step 6:	**No**, ESW is not ASME Class 1.
Step 7:	**Yes**, ESW is ASME Class 3.
Conclusion:	Perform a ASME Class 3 System Inservice Test or ASME Class 3 Functional Test (ISPT paragraph 6.4). This pressure test satisfies the ASME Class 3 System Hydrostatic Pressure Test requirements in accordance with Code Case N-416-1.

7.3.2.2 Example No. 2

Event:	The RCS Reactor Recirculation Pump requires replacement of four of the cover to bowl studs with no disassembly required. Four certified spare studs are used as replacements per WO.
Question:	What post-replacement testing, if any, is required?
Determination:	Using the System Pressure Test Flow Path the following logic would be applied.
Step 1:	**Post Maintenance Test**, Work per WO or Modification is classified as a post maintenance test.
Step 2:	**Yes**, Component part is within the design ASME Class boundary.
Step 3:	**Yes**, Work meets the definition of a Replacement and <u>does</u> affect pressure retaining material.
Step 4:	**No**, Replacement of studs is <u>not</u> exempt from pressure testing in accordance with ISPT paragraph 7.3.1
Step 5:	**Yes**, requires only mechanical disassembly and re-assembly.
Step 6:	**Yes**, ASME Class 1
Conclusion:	ASME Code Pressure Test is required.

7.3.2.3 Example No. 3

Event:	The Reactor Vessel Bottom Head Drain Isolation Valve disk requires replacement. A certified disk (i.e., stamped) is used as a replacement and installed per a WO.
Question:	What post-replacement testing, if any, is required?
Determination:	Using the System Pressure Test Flow Path the following logic would be applied.
Step 1:	**Post Maintenance Test**, Work per WO or Modification is classified as a post maintenance test.
Step 2:	**Yes**, component part is within the ISPT Boundary.
Step 3:	**Yes**, Work meets the definition of a Replacement and does affect the pressure retaining material.
Step 4:	**No**, ISPT paragraph 7.3.1, Replacement, does not exempt the component or component part.
Step 5:	**Yes**, Work activity only required disassembly of mechanical joints.
Step 6:	**Yes**, RR is ASME Class 1.
Conclusion:	Perform a ASME Class 1 System Leakage Test, (ISPT paragraph 6.2.3.1).

8. SCHEDULING AND REPORTING

8.1 Scheduling

8.1.1 INSPECTION PROGRAM B

Nine Mile Point Unit 1 is using Inspection Program B (IWA-2432) of the 1989 Edition of ASME XI.

The Nine Mile Point Unit 1 position regarding allowable overlapping time between inspection periods is up to one year. That is, a subsequent period may start even though some tests are not yet performed for the previous period.

8.1.2 INSPECTION INTERVAL

a. The Third Inspection Interval starts on December 26, 1999 and lasts for ten (10) years.

b. The inspection interval may be decreased or extended by as much as one (1) year. Adjustments shall not cause successive intervals to be altered by more than one year from the original pattern of intervals. (reference: 1989 Edition of ASME Section XI, IWA-2430(d)).

c. In addition to item b above, for power units that are out of service continuously for 6 months or more, the inspection interval during which the outage occurred may be extended for a period equivalent to the outage and the original pattern of intervals extended accordingly for successive intervals. (reference: 1989 Edition of ASME Section XI IWA-2430(e)).

8.1.3 INSPECTION PERIOD

The Third Inspection Interval under Inspection Program B consists of a sequence of three periods, as follows: [1989 Edition of ASME Section XI Table IWB-2412-1, Table IWC-2412-1 and Table IWD-2412-1]

	Begins	**Ends**
First period (3 yr.)	December 26, 1999	December 25, 2002
Second period (4 yr.)	December 26, 2002	December 25, 2006
Third period (3 yr.)	December 26, 2006	December 25, 2009

8.2 Reporting

8.2.1 COMPLETED PRESSURE TEST

a. NIS-1 Form, Owner's Report for Inservice Inspections, is used to report scheduled pressure tests conducted since the previous summary report (Reference ASME Section XI, IWA-6220(d)).

b. Summary Report Submittal is to be within 90 days of the completion of the inservice inspection (i.e., date returned to commercial power) conducted during a refueling outage (Reference ASME Section XI, IWA-6230).

8.2.2 POST-MAINTENANCE PRESSURE TEST

NIS-2 Form, Owner's Report for Repairs or Replacements, is used to report Post-Maintenance pressure tests (Reference ASME Section XI, IWA-6220(d)).

9. ASME SECTION XI BOUNDARY DIAGRAMS

9.1 General Information

The ASME Section XI Boundary Diagrams are derived from the plant P&IDs and their control and upgrade are controlled with the similar level of importance. Attachment 1, ASME Section XI Boundary Diagrams, identifies the drawings which pertain to ISPT ASME Class Boundaries. The ISPT boundaries are used to identify the scope of Inservice Pressure Testing at NMP1 and are not used to change the Design ASME Class. The ASME Class Boundaries are used to identify the scope of pressure test requirements; the design ASME Class is used to identify Post-Maintenance pressure test requirements.

9.2 Drawing Legend

The ASME Section XI Boundary Diagrams use a color code scheme to identify different Code classifications. The color code for ASME Class 1 systems is green, for ASME Class 2 is red and for ASME Class 3 is blue. The color code for the IWE Containment Boundary is (later). All items shown in black are exempted from ISPT program requirements.

9.2.1 General Class Break Identifiers

- ASME Class 1 (Quality Group A) - ASME Sec. III Class 1 - Green Color
- ASME Class 2 (Quality Group B) - ASME Sec. III Class 2 - Red Color
- ASME Class 3 (Quality Group C) - ASME Sec. III Class 3 - Blue Color
- ASME IWE Containment Boundary Classification – (later) Color

9.2.2 Exceptions

a. The ASME Class breaks generally occur at the first normally-closed valve for ASME Class 2 and 3 connections making the piping downstream of the valve ISPT exempt.

b. Although some piping that branches off ASME Class 1 and is one inch NPS or smaller is designated ASME Class 2; however, it is tested and VT-2 examined with ASME Class 1 (Reference Section 5.2.4 of the program plan).

c. For system safety or relief valves which relieve to the design Quality Group D (non-ASME) systems, the ASME Class 2 or 3 boundary is at the valve itself, making the exhaust piping ISPT exempt.

d. For excess flow check valves, the ASME Class break occurs at the excess flow check valve.

10. RELIEF REQUESTS

10.1 General Requirements

Where compliance with ASME Code, Section XI, requirements is not practical, NMPC will submit an application to the NRC requesting relief in accordance with 10 CFR 50.55a(g)(5)(iii). The commission evaluates and determines that the code requirements are impractical and grants relief in accordance with 10 CFR 50.55a(g)(6)(i) or imposes alternative requirements in accordance with 10CFR 50.55a(a)(3)(i).

10.2 Periodic Review

The relief requests contained in this program plan shall be reviewed for continued applicability as well as potential withdrawal on a periodic basis[6].

The review cycles shall correspond with the generation of the ASME XI or required Summary Report; that is, on a refueling outage basis. The review shall consider such factors as system safety classification, Codes, and regulatory changes.

10.3 Relief Requests

Relief requests fall into two broad categories: general relief requests and system specific relief requests. General relief requests are used when the relief request applies to multiple systems or multiple Code class components such as Class 2 containment penetrations in non-safety related systems. Specific relief requests are used to provide relief for specific systems.

The format for General Relief Requests is as follows:

GPTRR-Y where:

GPTRR = General Pressure Testing Relief Request;

Y = Sequential Number

The format for Specific Relief Requests is as follows:

XXX-PTRR-Y where:

XXX = System Designation

PTRR = Pressure Testing Relief Request

Y = Sequential Relief Request Number in any System

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[6] This requirement is derived from the disposition to NMPC Deviation/Event Report #1-93-0308. This DER stated that NMP1 Second Ten Year Program Plan was deficient in the area of relief request submittal/review. The disposition required the ISPT Program Plan to be revised to incorporate a requirement for the periodic review of relief requests.

10.3.1 NEW RELIEF REQUESTS/AUTHORIZED ALTERNATIVES FOR THIRD TEN YEAR INTERVAL

Nine Mile Point Unit 1 is submitting the following relief requests/proposed alternatives for the third ten-year interval:

- General relief to use Section XI IWA-5250 from the 1992 Edition of ASME in lieu of Section XI IWA-5250 from the 1989 Edition of ASME (GPTRR-1).

- Specific relief for Reactor Recirculation Pump seal package replacements to perform a VT-2 examination at a reduced reactor pressure, between 200 to 500 psig, while the Mode Switch is in START-UP, during the normal drywell closeout inspection (RR-PTRR-1).

General Relief Request No. GPTRR-1

Components:	Class 1, 2, and 3 Systems
Code Class:	~~1~~, 2, and 3
Examination Requirement:	IWA-5250(a)(2)
Basis for Relief:	Relief is requested from ASME Section XI, IWA-5250(a)(2), as allowed by 10 CFR 50.55a(a)(3).

ASME Section XI, 1989 Edition, Subarticle IWA-5250(a)(2) requires removal of all bolting when leakage occurs at a bolted connection.

ASME Section XI, 1992 Edition, Subarticle IWA-5250(a)(2) states that if leakage occurs at a bolted connection during a system pressure test, the bolt nearest the source of leakage shall be removed, VT-3 examined, and evaluated for degradation in accordance with IWA-3100.

Code Case N-566, Corrective Action for Leakage Identified at Bolted Connections, states that as an alternative to the requirements of IWA-5250(a)(2), one of the following requirements shall be met for leakage at bolted connections:

(a) The leakage shall be stopped, and the bolting and component material shall be reviewed for integrity.

(b) If the leakage is not stopped, the joint shall be evaluated in accordance with IWB-3142.4 for joint integrity. This evaluation shall include consideration of the number and condition of bolts, leaking medium, bolt and component material, system function, and leakage monitoring.

The NRC's Second Ten-Year Interval Safety Evaluation of Code Case N-416-1 states that, "The corrective actions with respect to removal of bolts from leaking bolted connections has been relaxed in the 1992 Edition of ASME Section XI, but [nevertheless] use of this change has been accepted by the staff in previous Safety Evaluations."

Removal of bolting pursuant to the requirements of IWA-5250(a)(2) is not always the most prudent, effective or efficient course of action to determine the condition of the bolting and to determine the cause of the leak. A situation which may be encountered involves a leaking connection following complete replacement of bolting materials (studs, bolts, nuts, washers, etc.). When the associated system process piping is pressurized during plant start-up, the connection leaks. The root cause of this leakage may be thermal expansion of

General Relief Request No. GPTRR-1

the piping and bolting materials, causing process fluid seepage at the gasket. In such cases, re-torquing the joint usually stops the leak. Removing any of the joint bolting to evaluate for corrosion would be unwarranted in this situation if the bolting material is new. ASME Section XI Interpretation XI-1-91-01 recognizes this situation as one in which the requirements of IWA-5250(a)(2) do not apply:

Interpretation: XI-1-92-01 Section XI, IWA-5250; Corrective Measures- Bolting (1983 Edition with Winter 1984 Addenda, and Later Editions and Addenda Through the 1990 Addenda), Issued September 10, 1991.

> Question: Do the bolting requirements of Section XI, IWA-5250(a)(2) apply to bolting that either was installed as new bolting or has received a VT-3 examination prior to installation and has not been inservice?
> Reply: No.

Additionally, IWA-5250(a)(2) does not address other factors which may indicate the condition of the mechanical connection bolting. NMPC considers this requirement to be unnecessarily prescriptive and restrictive. Other factors which should be considered when evaluating the bolting condition at a leaking mechanical connection include, but are not limited to:

- Joint bolting materials;
- Service age of the joint bolting materials;
- Location of the leakage;
- History of leakage at the joint;
- Evidence of corrosion with the joint assembled;
- Corrosiveness of the process fluid;
- Plant/industry studies of similar bolting materials in similar environments.

General Relief Request No. GPTRR-1

Alternate Examination:

In lieu of ASME Section XI, IWA-5250(a)(2), when leakage is identified at bolted connections by VT-2 visual examination during system pressure testing, an evaluation will be performed. The evaluation will:

- Determine the susceptibility of the bolting to corrosion;
- Assess the potential for failure;
- Identify appropriate corrective actions.

The following factors will be considered, as necessary, when evaluating the leakage:

1) Bolting materials;
2) Leakage location;
3) Leakage history at the connection;
4) Condition and leakage history of adjacent components;
5) Visual evidence of corrosion at the connection (connection assembled);
6) Corrosiveness of the process fluid;
7) Industry studies and history of similar bolting in similar environments.

Furthermore, if the initial evaluation indicates the need for a more in-depth evaluation, the actions specified in Section XI, 1992 Edition, Subarticle IWA-5250(a)(2) will be performed.

Relief Request No. RR-PTRR-1

Components:	Reactor Recirculation Pumps 32-187, 32-188, 32-189, 32-190, 32-191
Code Class:	1
Examination Requirement:	IWA-5214(e), IWB-5221(a) and IWA-7400(b)(2)

Basis for Relief:

Relief is requested from ASME Section XI, IWA-5214(e) and IWB-5221(a), as allowed by 10 CFR 50.55a(a)(3).

ASME Section XI, 1989 Edition, Subarticle IWA-5214(e) allows a system pressure test of IWA-5211(a), (b), or (c) in lieu of the system hydrostatic test when only disassembly and re-assembly of mechanical joints are involved.

ASME Section XI, 1989 Edition, Subarticle IWB-5221(a) requires that the system leakage test be conducted at a pressure not less than the nominal operating pressure associated with 100% rated reactor power.

ASME Section XI, 1989 Edition, Subarticle IWA-7400(b)(2) exempts a pump seal package replacement from the requirements of IWA-7000, Replacements.

The seal cartridge assembly for the reactor recirculation pump contains, among other components a seal flange and seal flange cap screws. These components are identified as pressure retaining parts. Replacing the seal cartridge assembly is performed under an ASME Replacement Plan since pressure-retaining parts are involved. It is recognized that IWA-7400(b)(2) exempts the replacement of a pump seal package however the practice has been to require the system pressure test of IWA-5214(e) since an ASME XI Replacement Plan was used to perform the disassembly and replacement.

The reactor recirculation pumps are Class 1 components and as such ASME Section XI Subarticle IWB-5221(a) requires that the system leakage test be conducted at a pressure not less than the nominal operating pressure associated with 100% rated reactor power.

The seal cartridge assembly consists of two seal cavities where reactor pressure is reduced from approximately 1030 psig to 500 psig at the first seal cavity and then from 500 psig to approximately zero at the second seal cavity seal flange.

Relief Request No. RR-PTRR-1

Performing a system leakage test at 1030 psig following a seal cartridge replacement which includes pressure retaining parts that see near zero pressure during the test introduces a Code test requirement that is impractical and burdensome without a commensurate increase in the level of quality and safety. If performed during plant startup at a reactor pressure of 1030 psig as part of the drywell closeout inspection, the radiation exposure increases from approximately 300mr at 200 psig to about 1400mr at 1030 psig without a commensurate increase in the level of quality and safety.

Alternate Examination:

This alternate examination is only applicable in the situation where the Refueling Outage Class 1 System Leakage Test is not required to be performed.

In lieu of performing the system pressure test, for pump seal package replacements that include pressure retaining parts, required by ASME Section XI, IWA-5214 at the nominal pressure associated with 100% rated reactor power required by IWB-5221(a), a VT-2 examination may be performed at a reduced reactor pressure, between 200 to 500 psig, while the Mode Switch is in START-UP, at approximately 1-2% Reactor Thermal Power, during the normal drywell closeout inspection.

10.3.2 PREVIOUSLY APPROVED RELIEF REQUESTS/ALTERNATIVES

Nine Mile Point Unit 1 continues to implement the following Reg. Guide 1.147 approved alternatives for the third ten-year interval previously approved as Relief Requests for the Second Ten-Year Interval:

- ASME Code Case N-416-1 allows the use of a system leakage test in lieu of a hydrostatic pressure test following repairs to Class 1, 2 and 3 components and is currently included in revision 12 of NRC Regulatory Guide 1.147. During the Second Ten-Year Interval the NRC approved the Code Case for use at NMP1 by letter dated October 18, 1994; Subject: *Nine Mile Point Nuclear Station, Unit Nos. 1 and 2, Requesting Approval of Code Case N-416-1 as an Alternative to Hydrostatic Pressure Test (TACS NOS. M90232 and M90233)*; provided additional surface examinations are performed on the root (pass) layer of butt and socket welds on the pressure retaining boundary of Class 3 components when the surface examination method is used in accordance with ASME Section III.
- ASME Code Case N-498-1 allows the use of system leakage tests in lieu of 10-year hydrostatic pressure tests and is currently included in revision 12 of NRC Regulatory Guide 1.147. During the Second Ten-Year Interval the NRC approved the Code Case for use at NMP1 by letter dated January 13, 1995; Subject: *Nine Mile Point Nuclear Station, Unit Nos. 1 and 2 (NMP-1 and NMP-2), Approval of Code Case N-498-1 as an Alternative to the Required Hydrostatic Pressure Test (TACS NOS. M90232 and M90233).*

Nine Mile Point Unit 1 continues to implement the following "Authorized Alternative" for the Third Ten-Year Interval:

- Specific authorization to allow use of alternative leakage limits and corrective actions in lieu of Section XI, IWA-5250(a)(3) for control rod drive (CRD) stub tubes (CRD-PTAA-1). The NRC approved this position by letter dated March 25, 1987; Subject: *Request to Utilize an Alternative to the Requirements of 10 CFR 50.55a(g) (TAC 61181).*

Specific Authorized Alternative No. CRD-PTAA-1

Components: Control Rod Drive Stub Tubes

Code Class: 1

Examination Requirement: IWA-5250(a)(3)

Basis for Alternative:

Relief is requested from ASME Section XI, IWA-5250(a)(3), as allowed by 10 CFR 50.55a(a)(3). IWA-5250(a)(3) states that repairs or replacements of components shall be performed in accordance with IWA-4000 or IWA-7000, respectively.

During the Nine Mile Point Unit 1 Spring 1984 Refueling and Maintenance Outage, leakage from several control rod drive (CRD) penetrations was observed. The ASME Code IWA-5250(a)(3) acceptable repair for this leakage would require welding and machining. The technology and tools to perform this repair do not exist or are highly developmental at present. A weld repair would require the installation of a dry caisson around the stub tubes in which to perform the welding and remote machining and welding equipment to fit within the constraints of the caisson.

Because of these constraints, NMPC implemented a program to address the problem of leakage associated with stub tube cracking. This program consists of the development of rolling tools and procedures to roll expand the CRD housing into the reactor vessel bore in order to limit leakage. The examinations and repairs performed on the penetrations were thoroughly reviewed by the NRC Staff and approved in a USNRC Safety Evaluation dated June 29, 1984. As discussed in that safety evaluation, leakage from the penetrations does not represent a significant safety consideration.

The proposed leakage acceptance criteria for inspections performed during the longer scheduled outages (greater than 7 days) is more conservative due to the following:

1. During short outages, drywell temperatures and humidity levels are higher. These factors compound worker discomfort, safety and stress as the repair is conducted underneath the vessel in rubber suits and respirators. These conditions resulted in several workers suffering from severe heat exhaustion during the stub tube repair conducted in August 1986.
2. During short outages, radiation levels are higher, resulting in increased radiation exposure to personnel. Stub tube repairs conducted during a refueling outage resulted in exposures of

Specific Authorized Alternative No. CRD-PTAA-1

approximately 3 man-rem per repair compared to 5 man-rem per repair observed during the short outage in August 1986.

3. During short outages, there is less time for planning, training, and coordinating the repair activities, as the team and tools must be mobilized in 24 hours or less. These time restraints could result in further increasing personnel exposure and increasing the potential for procedural error or industrial accident.

4. During refueling outages when the reactor vessel head is removed, workers on the refueling floor can assist workers under the vessel if problems arise during the repair process. This situation occurred during the 1986 refueling outage when the rolling tool lodged in the penetration and required removal from the refueling floor. During a short outage, this kind of problem would result in significantly extending the outage.

The safety implications of the stub tube cracks have been previously reviewed and found not to be a significant safety concern (NRC letter to NMPC, dated June 29, 1984, Docket No. 50-220). This determination was based on:

1. The cracks are located in the stub tube base material, which is not considered part of the vessel reinforcement, and, therefore, do not affect the structural integrity of the reactor vessel pressure boundary.

2. Stub tube cracks will not affect the ability of the CRD to perform its intended safety function (i.e. no adverse effect on the CRD operability or ability to scram).

3. A CRD housing ejection is not possible since the housing to stub tube J-weld is not damaged. The stub tube is loaded in compression and is not affected by cracks, and the shoot-out steel beneath the vessel serves as a back-up.

In addition, the small amount of allowable leakage from stub tube penetrations is well within the capacity of the normal make-up system. If leakage were to increase, it would be detected by using one of three drywell unidentified leakage measuring systems. Furthermore, plant Technical Specifications limit reactor coolant unidentified leakage to five (5) gpm maximum and a two (2) gpm increase in unidentified leakage in any twenty-four (24) hour period.

Alternate Examination:

In lieu of ASME Section XI, IWA-5250(a)(3), Nine Mile Point Unit 1 proposes to inspect and repair leaking CRD stub tubes as described

Specific Authorized Alternative No. CRD-PTAA-1

in Tables 1 or 2 below. The proposed limits would be used as acceptance criteria for inspection of the CRD penetrations for leakage. These inspections would be performed in accordance with the Nine Mile Point Inservice Inspection Program, during refueling and maintenance outages and during mid-cycle shutdowns when the drywell is de-inerted. If a penetration exhibits leakage in excess of these limits, it would be repaired as described in Table 1 or 2, and then retested. The leakage limit of 0.1 gpm will apply to penetrations that have been rolled over a 4-1/2 inch length, and then subsequently rerolled with increased wall thinning of 5-1/2% to 6-1/2%. In addition, if more than five (5) CRDs exhibit leakage, Niagara Mohawk will implement a contingency plan to repair the penetrations at the earliest possible refueling outage.

This alternative examination was previously approved in USNRC letter R. Auluck (USNRC) to C. V. Mangan (NMPC) dated March 25, 1987; Subject: *Request to Utilize an Alternative to the Requirements of 10 CFR 50.55a(g) (TAC 61181)*; with attached Safety Evaluation Report.

Specific Authorized Alternative No. CRD-PTAA-1

TABLE 1

CRD PENETRATIONS
ALLOWABLE LEAKAGE RATES

OUTAGES < 7 DAYS

Conditions	ALLOWABLE LEAK RATES (1)		REPAIR ACTIONS (4)
	900-1200 PSIG	DEPRESSURIZED	
Previously Unrolled (2)	5 drops / sec	1 drop / sec	Roll Expand Over 4-1/2" Length
Rolled Once	50 drops / sec	10 drops / sec	Reroll With Increasing Wall Thinning
Rerolled	0.1 gpm (3) 500 drops / sec	0.02 gpm (3) 100 drops / sec	Contingency Plan

Notes:

(1) Leakage rates are based on a vessel internal pressure of approximately 1000 psig. The allowable leak rate when the vessel is depressurized is based on the square root of the pressure ratio between the test pressure and depressurized condition.

(2) Also applies to housings which have been previously roll expanded over a three-inch (3") length.

(3) With 5 being the maximum number of leaking CRD stub tube penetrations.

(4) Repair action will be initiated if leak rates are in excess of the allowables specified.

Specific Authorized Alternative No. CRD-PTAA-1

TABLE 2

CRD PENETRATIONS
ALLOWABLE LEAKAGE RATES

OUTAGES > 7 DAYS

Conditions	ALLOWABLE LEAK RATES (1)		REPAIR ACTIONS (5)
	900-1200 PSIG	DEPRESSURIZED	
Previously Unrolled (3)	No evidence of leakage (2)	No evidence of leakage (2)	Roll Expand Over 4-1/2" Length
Rolled Once	5 drops / sec	1 drops / sec	Reroll With Increasing Wall Thinning
Rerolled	0.1 gpm (4) 500 drops / sec	0.02 gpm (4) 100 drops / sec	Contingency Plan

Notes:

(1) Leakage rates are based on a vessel internal pressure of approximately 1000 psig. The allowable leak rate when the vessel is depressurized is based on the square root of the pressure ratio between the test pressure and depressurized condition.

(2) Secondary signs of leakage, such as dried water stains or dried corrosion products around housings and penetrations, do not necessarily require corrective action. Repairs will be considered as part of preventive maintenance as long as the outage schedule permits.

(3) Also applies to housings which have been previously roll expanded over a three-inch (3") length.

(4) With 5 being the maximum number of leaking CRD stub tube penetrations.

(5) Repair action will be initiated if leak rates are in excess of the allowables specified.

11. REFERENCES

1. Code of Federal Regulation (Title 10, Energy)
   - 10 CFR 50.2(v),,Reactor Coolant Pressure Boundary definition.
   - 10CFR36, Technical Specifications.
   - 10 CFR 50.55a, Codes and Standards.
   - 10 CFR 50.55a(b), Approved ASME Boiler and Pressure Vessel Code approved for incorporation by reference by the Director of the Federal Register.
   - 10 CFR 50.55a(a)(3), Proposed alternatives to the ASME Code requirements conditions of approval.
   - 10 CFR 50.55a(c), Reactor Coolant Pressure Boundary scope.
   - 10 CFR 50.55a(d), Quality Group B components scope.
   - 10 CFR 50.55a(e), Quality Group C components scope.
   - 10 CFR 50.55a(g), Inservice Inspection requirements.
   - 10 CFR 50.55a Footnote 6, ASME Code Cases that have been determined suitable for use by the Commission.
   - 10 CFR 50.55a Footnote 9, Guidance for quality group classifications of components.
   - 10 CFR 50 Appendix A, General Design Criteria for Nuclear Power Plants.
   - 10 CFR 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants.
   - 10 CFR 50 Appendix J, Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactor.
2. Safety Guide 26, Quality Group Classifications and Standards, March 23, 1972.
3. Regulatory Guide 1.26, Quality Group Classifications and Standards for Water-, Steam-, and Radiological-Waste-Containing Components of Nuclear Power Plants.
4. Regulatory Guide 1.147, Inservice Inspection Code Case Acceptability ASME Section XI Division 1.
5. NUREG-0800, Section 3.2.2, Standard Review Plan for Review of Safety Analysis Reports for Nuclear Power Plants.
6. NUREG-0800, Section 5.2.4, Standard Review Plan for Review of Reactor Coolant Pressure Boundary Inservice Inspection and Testing.
7. NUREG-0800, Section 5.4.8, Standard Review Plan for Review of Reactor Water Cleanup System.
8. NUREG-0800, Section 6.6, Standard Review Plan for Review of Inservice Inspection of Class 2 and 3 components.

9. NMP1 Technical Specifications
10. NMP1 Updated Final Safety Analysis Report
11. American Society of Mechanical Engineers (ASME): Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Components, 1989 Edition and 1992 Edition.
12. ASME Code Case N-416-1
13. ASME Code Case N-498-1
14. ASME Code Case N-522
15. ASME Code Case N-566
16. SER by the Office of Nuclear Reactor Regulation on ASME Code Case N-416-1 for NMPC Nine Mile Point Nuclear Station Unit 1 and 2 dated October 18, 1994.
17. SER by the Office of Nuclear Reactor Regulation on ASME Code Case N-498-1 for NMPC Nine Mile Point Nuclear Station Unit 1 and 2 dated January 13, 1995.
18. NDD-IIT, Inservice Inspection and Testing
19. NIP–IIT–01, ASME Section XI Programs
20. 1M-EDS-003, ASME Section XI Code Classification Guideline.
21. NDEP-VT-2.01, ASME Section XI Visual Examination Procedure.
22. Letter NMPC to USNRC, File Code NMP1L 0731, dated February 5, 1993.
23. Internal Correspondence, File Code 54299, K.B. Thomas to P.F. Francisco, dated February 13, 1990: Subject: Instrument Air and Containment Atmosphere Dilution (CAD) Systems
24. Internal Correspondence, File Code (no code), D.J. Wolniak to K.B. Thomas, dated February 21, 1990: Subject: ASME Classification of Instrument Air and Nitrogen Systems
25. Internal Correspondence, File Code (SM-ISI92-0061), M.S. Leonard to D.J. Wolniak, dated March 2, 1992: Subject: ASME Classification of Gas Systems - Unit 1
26. USNRC Generic Letter No. 86-01, dated January 3, 1996; Subject : Safety Concerns Associated with Pipe Breaks in the BWR Scram System.
27. Letter C. D. Terry to USNRC, File Code NMP1L 0488, dated April 2, 1990.
28. Letter R. E. Martin (USNRC to L. Burkhardt (NMPC), dated September 17, 1990; Subject: Response to Generic Letter 86-01, "Safety Concerns Associated with Pipe Breaks in the BWR Scram System". Nine Mile Point Unit 1 (TAC No. 71392); with attached Safety Evaluation Report.

29. Letter C. V. Mangan (NMPC) to J. A. Zwolinski (USNRC), File Code NMP1L 0116, dated December 11, 1986; Subject: Alternate Acceptance Criteria for the Hydrostatic Pressure Testing of Control Rod Drive Stub Tubes.

30. Letter P. Auluck (USNRC) to C. V. Mangan (NMPC), dated March 25, 1987; Subject: Request to Utilize an Alternative to the Requirements of 10 CFR 50.55a(g) (TAC 61181); with attached Safety Evaluation Report.

31. Letter D. Vassallo (NRC) to B. Hooten (NMPC), dated June 29, 1984; Subject: Control Rod Drive Penetration Leakage from Stub Tube Cracking.

32. Internal Correspondence, File Code PTP 89-032, K. Thomas/C. R. Chapman to Distribution, dated June 5, 1989; Subject: Pressure Test Requirements For Post Maintenance Tests.

33. Internal Correspondence, File Code ES99-60, G. Perkins to R. Corieri, dated March 26, 1999; Subject: Pressure Testing of Heat Exchanger Tubes.

34. NMPC Safety Evaluation, 93-015, Post Scram Walkdown of the SDV Header and Instrument Volume, dated 2/18/93.

ATTACHMENT 1
ASME SECTION XI BOUNDARY DIAGRAMS

ATTACHMENT 1

ASME SECTION XI BOUNDARY DIAGRAMS

SYSTEM TITLE	BOUNDARY DIAGRAM
Main Steam and H.P. Turbine	F-63002-C, SH 1
Condensate Flow	F-63003-C
Feed Water Flow High Pressure	F-63005-C, SH 1
Feed Water Flow High Pressure	F-63005-C, SH 2
Drywell and Torus Isolation Valves	F-63006-C, SH 1
Drywell and Torus Isolation and Blocking Valves	F-63006-C, SH 2
Drywell and Torus Isolation Valves	F-63006-C, SH 3
Reactor Core Spray	F-63007-C, SH 1, SH 2
Spent Fuel Storage Pool, Filtering and Cooling System	F-63008-C
Reactor Cleanup System	F-63009-C, SH 1, SH 2
Instrument Air System	F-63011-C, SH 2
Reactor Containment Spray System	F-63012-C, SH 1, SH 2
Reactor Building Heating Cooling and Ventilating System	F-63013-C
Reactor Cont. (Drywell and Torus) Inert Gas Purge and Fill Drywell Cooling System	F-63014-C, SH 1
Drywell and Torus Leak Rate and Analyzer System, T.I.P. System Elect Pens and N_2 Supply	F-63014-C, SH 2
Reactor Containment Drywell and Torus Inert Gas N2 Supply No. 11	F-63014-C, SH 3
Reactor Containment Drywell and Torus Inert Gas N2 Supply No. 12	F-63014-C, SH 4
Reactor Vessel Instrumentation	F-63015-C
Control Rod Drive	F-63016-C, SH 1
Control Rod Drive Scram Dump Volume	F-63016-C, SH 2
Emergency Cooling System	F-63017-C
Reactor Shutdown Cooling	F-63018-C, SH 1
Reactor Shutdown Cooling System Reactor Vessel Hydro Heatup System	F-63018-C, SH 2
Reactor Liquid Poison System	F-63019-C

ATTACHMENT 1

ASME SECTION XI BOUNDARY DIAGRAMS

SYSTEM TITLE	BOUNDARY DIAGRAM
Reactor Recirculation Loops (Typ. of 5)	F-63020-C
Turbine Building Heating, Cooling and Ventilating Systems Air Conditioning System for Laboratory Areas	F-63021-C, SH 2
Service Water Reactor & Turbine Buildings	F-63022-C, SH 1
Reactor Building Closed Loop Cooling System	F-63022-C, SH 2
Turbine Building Closed Loop Cooling System	F-63022-C, SH 3
Emergency Diesel Generator #102 Starting Air, Cooling Water Lube Oil and Fuel	F-63026-C, SH 1
Emergency Diesel Generator #103 Starting Air, Cooling Water Lube Oil and Fuel	F-63026-C, SH 2
Service Water Turbine and Administration Buildings	F-63027-C, SH 1
Service Water Reactor Building	F-63027-C, SH 2
Resin Transfer Regeneration	F-63035-C
Sealing Water for Turbine Bldg., Waste Bldg., Reactor Bldg., and Screen House	F-63036-C
Sampling Points Liquids - Shutdown Cooling, Fuel Pool, Clean-Up, and Liquid Poison	F-63041-C, SH 2
Sampling Points Reactor Vessel Post Accident	F-63041-C, SH 7
Waste Disposal System	F-63045-C, SH 9, SH 7
Air Conditioning System - Admin. Bldg. Heat and Vent System - Shop Stores/Locker Rms.	F-63046-C, SH 1
Control Rooms Heating Ventilating and Air Conditioning System	F-63047-C
Condensate Transfer System Pump Discharge	F-63048-C
Primary Containment Atmosphere H2 02 Monitor System #12	F-63939-C
Primary Containment Atmosphere H2 02 Monitor System #11	F-63949-C

ATTACHMENT 2
ASME SECTION XI REQUIRED TEST INDEX

ATTACHMENT 2.0

ASME SECTION XI REQUIRED TEST INDEX

SYSTEM NUMBER[1]	SYSTEM DESCRIPTION	CODE CLASS	TEST TYPE			
			LEAKAGE	INSERVICE	FUNCTIONAL	HYDRO
01	RPV,CLASS 1 AND NON-ISOLABLE CLASS 2	1	YES	NA	NA	N-498-1
		2	YES	NA	NA	N-498-1
01	MAIN STEAM, RPV TO CIV'S	1	YES	NA	NA	N-498-1
05, 05.1, 05.2	EMERGENCY CONDENSER VENT TO MAIN STEAM/TORUS	2	NA	YES	YES	N-498-1
31	HP FEEDWATER TO RPV FROM CIV'S	1	YES	NA	NA	N-498-1
32	REACTOR RECIRC	1	YES	NA	NA	N-498-1
33	REACTOR WATER CLEAN UP TO CIV'S	1	YES	NA	NA	N-498-1
36	REACTOR VESSEL INSTRUMENTATION	1	YES	NA	NA	N-498-1
37	REACTOR VENT AND DRAIN	1	YES	NA	NA	N-498-1
38	SHUTDOWN COOLING TO CIV'S	1	YES	NA	NA	N-498-1
39	EMERGENCY CONDENSER	1	YES	NA	NA	N-498-1
		2	NA	YES	NA	N-498-1

[1] NOTE: The boundary diagrams illustrate specific boundaries. The system numbers identified indicate the principle system to be tested. Boundaries may include valves or piping with other system number designations, especially at system interfaces.

ATTACHMENT 2.0

ASME SECTION XI REQUIRED TEST INDEX

SYSTEM NUMBER[1]	SYSTEM DESCRIPTION	CODE CLASS	TEST TYPE			
			LEAKAGE	INSERVICE	FUNCTIONAL	HYDRO
40, 40.1	CORE SPRAY	1	YES	NA	NA	N-498-1
		2	NA	NA	YES	N-498-1
41	LIQUID POISON	2	NA	YES	NA	N-498-1
42, 42.1	LIQUID POISON	1	YES	NA	NA	N-498-1
		2	NA	NA	YES	N-498-1
44, 44.1, 44.2	CONTROL ROD DRIVE AND SCRAM VOLUME	1	YES	NA	NA	N-498-1
		2	NA	YES	NA	N-498-1
54	SPENT FUEL POOL COOLING	3	NA	YES	NA	N-498-1
50, 53, 57, 57.1	CONDENSATE STORAGE AND TRANSFER	3	NA	YES	NA	N-498-1
58.1	CONDENSATE MAKEUP TO TORUS	2	NA	N-522	N-522	N-522
58		3	NA	YES	NA	N-498-1
59	CONDENSATE MAKEUP FROM CST'S	3	NA	YES	NA	N-498-1
60, 60.1	EMERGENCY CONDENSER MAKEUP	3	NA	NA	YES	N-498-1
63, 63.1, 63.2	RWCU SAFETY VALVE DISCH TO TORUS	2	NA	NA	YES	N-498-1
66	MAIN STEAM ERV DISCHARGE TO TORUS	2	NA	NA	NA	N-498-1
68	DRYWELL AND TORUS VACUUM RELIEF	2	NA	N-522	N-522	N-522

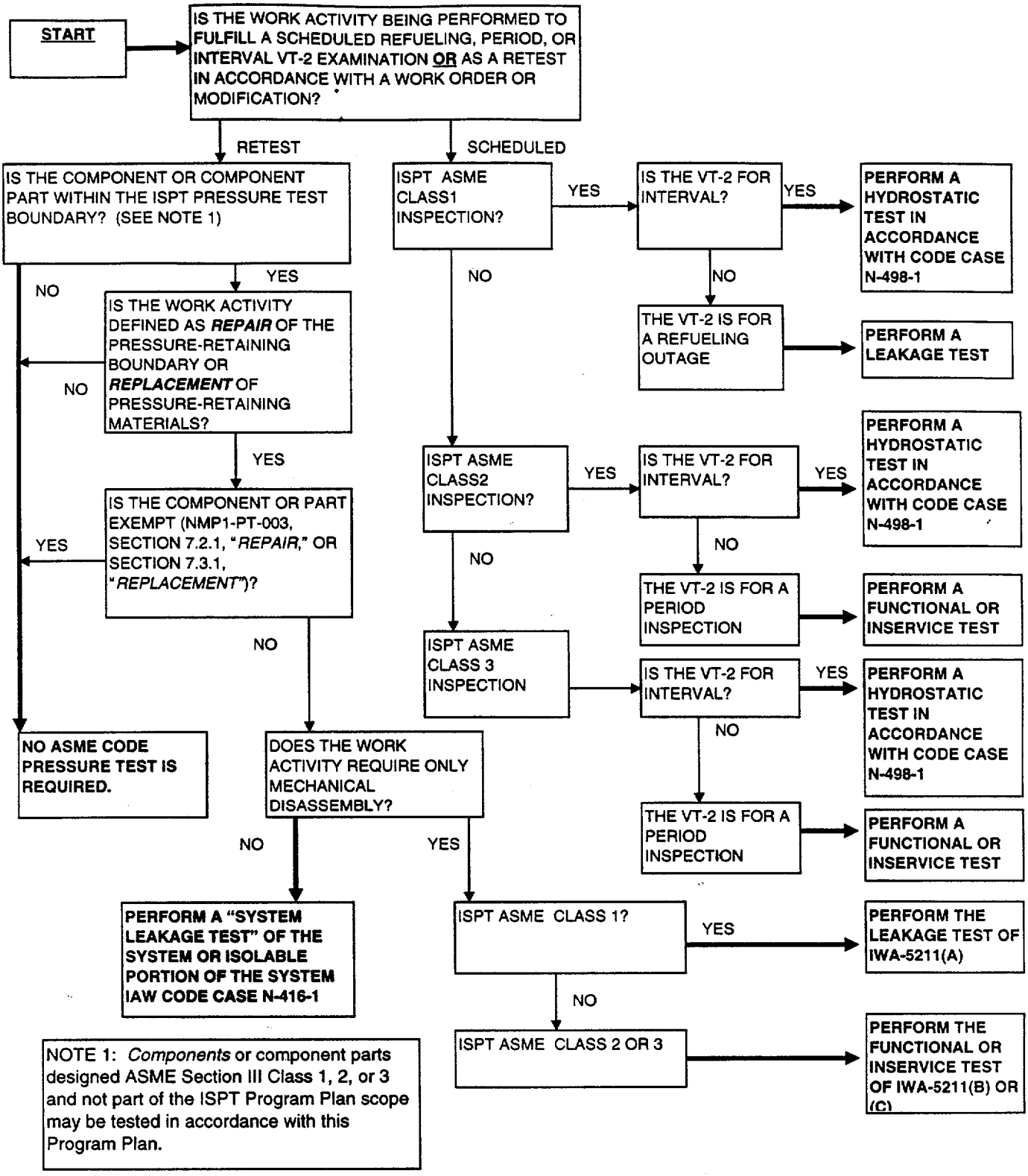
ATTACHMENT 2.0

ASME SECTION XI REQUIRED TEST INDEX

SYSTEM NUMBER[1]	SYSTEM DESCRIPTION	CODE CLASS	TEST TYPE			
			LEAKAGE	INSERVICE	FUNCTIONAL	HYDRO
70	REACTOR BUILDING CLOSED LOOP COOLING	2	NA	YES	NA	N-498-1
		3	NA	YES	NA	N-498-1
72	SERVICE WATER TO EMER SW PUMPS/HX'S	3	NA	YES	YES	N-498-1
79	DIESEL GENERATOR COOLING WATER	3	NA	NA	YES	N-498-1
80, 80.1	CONTAINMENT SPRAY	2	NA	NA	YES	N-498-1
81, 81.1	CORE SPRAY	2	NA	NA	YES	N-498-1
83.1	DRYWELL SUMP	2	NA	N-522	N-522	N-522
91	CONDENSATE TRANSFER/SEAL WATER	3	NA	YES	NA	N-498-1
93, 93.1	CONTAINMENT SPRAY RAW WATER	3	NA	NA	YES	N-498-1
110	REACTOR WATER SAMPLE	1	YES	NA	NA	N-498-1
121	TORUS DRAIN/WATER QUALITY	2	NA	YES	NA	N-498-1
210	CONTROL ROOM VENTILATION COOLING WATER SYSTEM	3	NA	YES	NA	N-498-1

ATTACHMENT 3
SYSTEM PRESSURE TEST FLOW PATH

System Pressure Test Flow Path



ATTACHMENT 4
NRC SERs, CODE CASES, and REGULATORY GUIDES

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