

SOUTH CAROLINA ELECTRIC & GAS COMPANY
VIRGIL C. SUMMER NUCLEAR STATION
NUCLEAR OPERATIONS

FOR INFORMATION ONLY

NUCLEAR OPERATIONS

COPY NO. _____

GENERAL TEST PROCEDURE

CTP-304

INSERVICE INSPECTION SYSTEM PRESSURE TESTING

SECOND TEN YEAR INTERVAL

REVISION 6

FOR INFORMATION ONLY

SAFETY RELATED

Gerald A. Loring Jr.
DISCIPLINE SUPERVISOR

12/29/93
DATE

Gerald A. Loring Jr. for
APPROVAL AUTHORITY John Nesbitt

12/29/93
DATE

RECORD OF CHANGES

CHANGE LETTER	TYPE CHANGE	APPROVAL DATE	CANCELLATION DATE	CHANGE LETTER	TYPE CHANGE	APPROVAL DATE	CANCELLATION DATE
H	R	1-1-94	RR-Pt-2+1 NRC APPROVAL REPP				

INFORMATION USE

Procedure May Be Performed From Memory.
User Retains Accountability for Proper Performance.

NUCLEAR OPERATIONS

COPY NO. _____

SAP-139
ATTACHMENT IV
PAGE 1 OF 3
REVISION 16

PROCEDURE DEVELOPMENT FORM - A

I. DATE: <u>12-22-93</u>		PROC. # <u>GTP-304</u>		REV. # <u>6</u>		CHG. <u>A</u>		COMM. # _____																					
TITLE: <u>INSERVICE INSPECTION SYSTEM PRESSURE TESTING SECOND TEN YEAR INTERVAL</u>																													
NEW PROC _____		CHANGE <u>X</u>		PERMANENT _____		NRC _____		SAFETY RELATED <u>X</u>																					
REVISION _____		RESTRICTED <u>X</u>		FROM <u>1-1-94</u>		TO <u>APPROVAL</u>		QUALITY RELATED _____																					
						<u>RR-PT-2</u>		NON-SAFETY RELATED _____																					
						<u>RR-PT-1</u>																							
II. DESCRIPTION: <u>This restricted change is to REMOVE from use Relief Request RR-PT-1 AND RR-PT-2 until their use is permitted.</u>																													
REASON FOR CHANGE: <u>RR-PT-1 AND RR-PT-2 can not be used until APPROVED by the NRC.</u>																													
Associated PAGES: <u>Enclosure 7.6 PAGES 1-3, Text Page 10 of 19, 11 of 19 and 12 of 19.</u>																													
III. WILL THIS REVISION/CHANGE/NEW PROCEDURE:																													
				* YES		NO		N/A																					
1. Result in significant increased personnel radiation exposure? (ALARA review)				_____		<u>✓</u>		_____																					
2. Result in a release of effluents to the Environment?				_____		<u>✓</u>		_____																					
3. Degrade the effectiveness of the Radiation Emergency Plan?				_____		_____		<u>✓</u>																					
4. Degrade the safeguards effectiveness of the Physical Security, Safeguards Contingency or Training and Qualification Plans?				_____		_____		<u>✓</u>																					
* If any question 1 through 4 is answered "YES", refer to appropriate section of procedure for direction.																													
REQUIRED REVIEW AND COMMENT:																													
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VI. DISCIPLINE SUPERVISOR FINAL REVIEW:					VII. P/CAP ACCEPTABLE?																								
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IF YES, PRIOR TO PROCEDURE IMPLEMENTATION? YES _____ NO _____					N. YES _____ NO _____ RESP MGR _____ Date _____																								
P/CAP AFFECTED? YES _____ NO <u>✓</u>					VIII. FINAL QA REVIEW (As Applicable)																								
COMMENTS RESOLVED: <u>Sheld O. Longmire</u> 12/29/93 Discipline Supervisor Date					<u>Kary E. Blatch</u> 12/29/93 QA Concurrence Date																								
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PSRC Chairman _____ Date _____					Responsible Manager _____ Date _____																								
COMMENTS YES _____ NO _____					PSRC Chairman _____ Date _____																								

- E. Welded repairs or installation of replacement items by welding made in accordance with procedures which allow for exception from postweld heat treatment shall not be exempted from Hydrostatic Test.

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4.1.8 Test Gages, Instrumentation and Equipment

- A. Permanent plant instrumentation shall be acceptable for use in pressure tests other than System Hydrostatic and Pneumatic tests.
- B. System instrumentation, test instruments or test gages may be used for the System Hydrostatic and Pneumatic tests providing the applicable requirements of 4.1.8.C through 4.1.8.J have been satisfied.
- C. The test gages used in hydrostatic and pneumatic 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 instrumentation.
- D. All test gages shall be calibrated against a standard dead weight tester or a calibrated master gage. The test gages shall be calibrated before each test or before each series of tests. A series of tests is a group of tests that use the same pressure test gages and such tests are conducted within a period not exceeding two weeks.
- E. Indicating pressure gages used in Hydrostatic and Pneumatic Pressure Testing shall have their dials graduated over a range of at least 1.5 times, but not more than four times, the intended maximum test pressure.
- F. Digital pressure measuring instruments used in Hydrostatic and Pneumatic Pressure Testing shall be selected such that the intended maximum test pressure shall not exceed 70% of the calibrated range of the instrument.

- G. When testing an isolated component, the pressure measuring gage, instrument or sensor shall be connected as close to the component as practical.
- H. Gage elevation corrections, as necessary, shall be indicated on the appropriate data sheet of the GTP or STP utilized to perform the Hydrostatic Pressure Test. This is to ensure that the imposed pressure on any component, including static head, will not exceed 106% of the specified test pressure.
- I. If a component is being hydrostatically tested using a bench test, the elevation correction factor shall be included in the pressure calculation for performing the hydrostatic test.
- J. Any equipment required to perform pressure testing shall meet as a minimum, the cleanliness requirements of the system or component to be tested.

4.1.9 Corrective Measures

- A. The source of throughwall pressure boundary leakages identified during the performance of System Pressure Tests shall be located and evaluated for corrective measures in accordance with SAP-1141, Non-Conformance Control Program.
- B. Buried components with leakage losses in excess of limits acceptable for continued service shall be repaired or replaced.
- C. If leakage occurs at a bolted connection the bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100.

CHG
A

- D. Repairs to components shall be performed in accordance with the requirements of SAP-642, SAP-643 and other criteria of the applicable design specifications. |CHG
A
- E. Replacement of components shall be performed in accordance with IWA-7000 and SAP-643. |CHG
A
- F. The detection of boric acid residues on ferritic steel components shall require the location of the leakage source and any areas of general corrosion. Components or other items with local areas of general corrosion that reduce the wall thickness by more than 10% or that would inhibit the capability of such items or components to perform their intended function, an NCN shall be generated to obtain analysis by Engineering Services to determine whether the component may be acceptable for continued service, or if repair or replacement is required. |CHG
A

4.2 Code Class 1 System Pressure Testing Requirements

- 4.2.1 The pressure retaining components shall be tested at the frequency stated in ASME Section XI 1989 Edition Table IWB-2500-1, Examination Category B-P, All Pressure Retaining Components.
- 4.2.2 The required tests and frequencies are as follows, refer to Section 4.1:
 - A. **System Leakage Test**, each Refuel Outage.
 - B. **System Hydrostatic Test**, one test per Interval.
- 4.2.3 Reactor Coolant shall be used as the pressurizing medium.
- 4.2.4 **System Leakage Test** shall be performed at a test pressure not less than nominal operating pressure associated with 100% rated Reactor Power. The system test pressure and temperature shall be attained at a rate within the heatup limitations specified for the Reactor Coolant System.
- 4.2.5 Code Case N-498, Alternative Rules for 10 Year Hydrostatic Pressure Testing for Class 1 and 2 Systems, may be used in lieu of the 10 year Hydrostatic Test. Reference Enclosure 7.1.
- 4.2.6 Class 1 System Leakage Test temperature and pressure shall not exceed the Limiting Conditions for Operation specified in the plant Technical Specifications.

RELIEF REQUEST

RR-PT-1

Subject: Pressure test requirements for welded repairs or installation of replacement items by welding.

Component Identification: All Class 1 and 2 components which receive welded repairs or are installed by welding as replacements.

Code Requirements: After repairs by welding on the pressure retaining boundary, a System Hydrostatic Test shall be performed in accordance with IWA-5000.

Approval Status: This Relief Request has been submitted to the Nuclear Regulatory Commission for review and approval. Implementation and usage of this relief request is pending their approval.

RELIEF REQUEST

RR-PT-2

Subject: Bolting examination (VT-3) following bolted connection leakage occurring during a System Pressure Test.

Component Identification: All bolting associated with Class 1, 2 and 3 connections which receive a VT-2 Visual Examination during the performance of System Pressure Testing.

Code Requirements: If leakage occurs at a bolted connection, the bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100. (IWA-5250(a)(2) Corrective Measures)

Approval Status: This Relief Request has been submitted to the Nuclear Regulatory Commission for review and approval. Implementation and usage of this relief request is pending their approval.

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ATTACHMENTS

- ATTACHMENT I - ASME Section XI, Code Class 1, 2, and 3 Component Post
Maintenance Pressure Test Record
- ATTACHMENT II - Non-ASME Section XI External Leakage Test Record

1.0 PURPOSE

- 1.1 This procedure provides the necessary controls for System Pressure Tests and Visual Examinations required by ASME Section XI for Code Class 1, 2, and 3 Pressure Retaining Components.
- 1.2 This procedure also provides the necessary controls for System Pressure Tests and Visual Inspections required to be performed by codes or standards other than ASME Section XI.

2.0 REFERENCES AND GLOSSARY

2.1 References

- 2.1.1 ASME Boiler and Pressure Vessel Code Section XI, 1989 Edition.
- 2.1.2 ASME Boiler and Pressure Vessel Code B31.1 Power Piping.
- 2.1.3 NFPA 13, Standard for the Installation of Sprinkler Systems.
- 2.1.4 NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.
- 2.1.5 Southern Building Code Congress, Standard Plumbing Code.
- 2.1.6 GTP-214, Post Maintenance Testing.
- 2.1.7 GTP-249, Hydrostatic/Pneumatic Pressure Testing.
- 2.1.8 SAP-117, Statement of Responsibilities - Technical Services.
- 2.1.9 SAP-139, Procedure Development, Review, Approval and Control.
- 2.1.10 SAP-141, Control and Calibration of Measuring and Test Equipment.
- 2.1.11 SAP-145, Inservice Testing Second Ten Year Interval.
- 2.1.12 SAP-642, Administration of Welding.
- 2.1.13 SAP-643, ASME Code, Section XI Repair Program.
- 2.1.14 SAP-1141, Non-Conformance Control Program.
- 2.1.15 QSP-505, Visual Examination.
- 2.1.16 10 CFR 50.55a.
- 2.1.17 10 CFR 50 Appendix A and J.
- 2.1.18 Code Case N-498, Alternative Rules for 10-Year Hydrostatic Pressure Testing for Class 1 and 2 Systems, Section XI, Division 1.

2.2 Glossary

2.2.1 **ASME Code (Code)** - An approved ANSI document published by the American Society of Mechanical Engineers including, but not limited to, specific construction requirements, pre-service inspection requirements and inservice inspection requirements for certain classified pressure systems, components and their supports.

2.2.2 **Code Class** - A classification of items and components based upon the ASME Section III construction code subsection used to fabricate and as applicable install such items.

	<u>ASME CODE CLASS</u>	<u>V.C. Summer</u>
A.	Class 1	Safety Class 1
B.	Class 2	Safety Class 2a
C.	Class 3	Safety Class 2b and 3

2.2.3 **Inservice Inspection (ISI)** - Those scheduled inspection activities performed during the plant lifetime as outlined in ASME Code, Section XI.

2.2.4 **Inservice Inspection Program** - Those planned and systematic actions performed to:

- A. Categorize the area subject to inspection.
- B. Document responsibilities, and quality personnel.
- C. Provide for accessibility.
- D. Apply examination methods and procedures.
- E. Establish frequency of inspection
- F. Establish and maintain record keeping and reporting requirements
- G. Perform evaluation of inspection results and, if necessary subsequent disposition and corrective action of such results.
- H. Document a repair program.

2.2.5 **Inspection Interval** - That amount of time approximately equal to 1/4 of expected plant life, 10 years. Refer to Enclosure 7.2.

2.2.6 **Inspection Period** - That amount of time in calendar years or months approximately equal to 1/3 of an inspection interval, three to four years. Refer to Enclosure 7.2.

2.2.7 **Regulatory Authority** - A Federal Government Agency such as the United States Nuclear Regulatory Commission (USNRC).

- 2.2.8 **Replacement** - A spare component, parts of such component, or subsystem as defined by ASME Section XI, IWA-7110 but not the addition of new systems.
- 2.2.9 **Repair** - Welding, brazing, or metal removal activities, including initial and surface finishing processes, required to return an item to a condition acceptable to the Code.
- 2.2.10 **Design Temperature and Pressure** - The design temperature and pressure of a specified section of piping shall be taken from the design data section "UPSET" temperature and pressure of the corresponding system flow diagram, or as documented by Engineering Services.
- 2.2.11 **Nominal Temperature and Pressure** - The affected system or component is lined up and exposed to normal system source pressure and temperature conditions.
- 2.2.12 **Insulated Pipe** - A covering over a pipe that is absorbent or contains significant voids that would prohibit the detection of a leak in ten minutes, but could reasonably be expected to show leakage in four hours or less.
- A. Examples of Insulation: Fiberglass wool or mat, diatomaceous earth, boot and wool pipe penetrations, mirror insulation, kaowool.
 - B. Examples of covering that is not Insulation: Paint, elastomeric covering, tar paper wrap, concrete, bisco.
- 2.2.13 **Buried Pipe** - pipe that is enclosed in material that would prohibit the detection of leaks due to massive voids or paths that could reasonably conceal signs of leakage for four or more hours.
- A. Examples of Buried Piping: Pipe entering a construction void or going behind a false wall, pipe entering a room with no access, pipe buried in dirt or gravel, pipe being covered with or surrounded by concrete.
 - B. Examples of Piping that is not considered buried: Pipe that travels through a concrete wall penetration structure that contains no massive voids or which would reasonably be expected to conduct any leakage to the exterior wall. Bisco is not considered a barrier to any System Pressure Test leakage when the test is done at any pressure greater than 3.5 psig.
- 2.2.14 **General Corrosion** - An approximate uniform wastage of the surface of a component, through chemical or electrochemical reaction, free of deep pits or cracks.

2.2.15 **Reactor Building Containment Penetrations** - These penetrations are completely encapsulated in metal. Any leakage will be captured and contained in them until the drain plug is removed. In addition, some of the penetrations contain insulation.

A. For pressure tests:

1. The time at pressure will reflect the presence or absence of insulation.
2. The plug will be removed to check for process pipe leakage inside the penetration.

2.2.16 **External Leakage Test** - The measurement and recording of leakage from a component or system to surrounding atmosphere while operating at nominal operating pressure. This is not an ASME Section XI test.

2.2.17 **NDE** - Nondestructive Examination.

3.0 RESPONSIBILITIES

3.1 SAP-145 establishes the responsibilities associated with the System Pressure Testing Program.

4.0 INSERVICE INSPECTION TESTING AND EXAMINATION

4.1 General Requirements, Code Class 1, 2, and 3.

4.1.1 Visual Examination VT-2

- A. The VT-2 visual examination shall be conducted to locate evidence of leakage from pressure retaining components with or without leakage collection systems as required during the conduct of System Pressure Tests.
- B. The VT-2 visual examination shall be conducted by examining the accessible external exposed surfaces of pressure retaining components for evidence of leakage.
- C. For components whose external surfaces are not accessible for direct VT-2 visual examination, only the examination of surrounding area, including floor areas or equipment surfaces located underneath the components, for evidence of leakage shall be required.
- D. For borated systems insulation shall be removed from pressure retaining bolted connections for VT-2 visual examination.

- E. For other components, VT-2 visual examination 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 shall be examined at each insulation joint.
- F. 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 leakage may be channeled, shall be required.
- G. Discoloration or residue on surfaces examined shall be given particular attention to detect evidence of boric acid accumulation.
- H. Where leakage from components are normally expected and collected, such as valve stems, pump seals, or vessel flange gaskets, the VT-2 visual examination shall be conducted by verifying that the leakage collection system is functioning properly.
- I. For buried components in non-redundant systems where the buried portion is isolable by means of valves, the VT-2 visual examination shall consist of a leakage test that determines the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components. The acceptable rate of pressure loss or flow shall be established and documented in the associated test procedure.
- J. For buried components in redundant systems where the buried portion is non-isolable, the VT-2 visual examination shall consist of a test that determines the change in flow between the ends of the buried components. In cases where an annulus surrounds the buried components, the areas at each end of the buried components shall be visually examined for evidence of leakage in lieu of a flow test. In cases where a static volume may be measured, a volume leak rate test may be used in lieu of a flow test.
- K. For buried components in non-redundant systems where the buried components are non-isolable, such as return lines to the heat sink, the test shall consist only of a verification that the flow during operation is not impaired.
- L. The VT-2 visual examination conducted following a repair or replacement of a component, or the alternation 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.

4.1.2 Pressure Test and Visual Examination Scheduling

- A. System Pressure Tests and VT-2 visual examinations shall be performed and completed during each period or interval, as applicable, during the service lifetime of the plant except as otherwise noted in paragraph 4.1.2.B.
 - 1. Tests performed in lieu of system pressure tests, such as the demonstration of unimpaired flow for open ended portions of discharge lines in non-closed systems, shall be performed at least once each interval.
- B. Each inspection interval may be decreased or extended (but not cumulatively) by as much as one year. If the plant is out of service continuously for six months or more, the inspection interval during which the outage occurred may be extended for a period of time equivalent to the outage.
- C. The inspection interval and period is determined by the number of calendar years following placement of the plant into commercial service. Enclosure 7.2, tabulates four consecutive intervals.
- D. Inspection intervals for repaired items, component replacements, additions, and alterations shall coincide with the remaining intervals as originally scheduled prior to such repairs, replacements, additions or alterations.
- E. The required system pressure tests and concurrent VT-2 visual examinations shall be identified and scheduled in accordance with the requirements of Table IWA-5210-1, Reference Paragraphs For System Pressure Tests And Visual Examinations (VT-2) Requirements, unless specific relief has been granted by the Regulatory Authority.
- F. Repaired components, replacements, additions, and alterations shall receive a VT-2 visual examination in conjunction with a System Pressure Test prior to or immediately upon return to service.

4.1.3 Test Descriptions

- A. The pressure retaining components within each system boundary shall be subject to System Pressure Tests under which conditions a VT-2 visual examination is performed in accordance with 4.1.1 to detect leakages.

- B. The required system pressure tests and VT-2 visual examinations as referenced in Table IWA-5210-1, Reference Paragraphs For System Pressure Tests and Visual Examinations (VT-2) Requirements, may be conducted in conjunction with one or more of the following system tests or operation.
1. A System Leakage Test conducted following opening and reclosing of a component in the system after pressurization to nominal plant operating pressure.
 2. A System Functional Test conducted to verify operability in systems or components not required to operate during normal plant operation while under system operating pressure.
 3. A System Inservice Test conducted to perform VT-2 visual examination while the system is in service under operating pressure.
 4. A System Hydrostatic Test conducted during a plant shutdown at a pressure above nominal operating pressure or system pressure for which overpressure protection is provided.
 5. A System Pneumatic Test conducted in lieu of a hydrostatic pressure test for components within the scope of 4.3 and 4.4.

4.1.4 Test Pressure and Temperature

- A. System Leakage Tests, shall be conducted at the conditions of pressure and temperatures as specified in Section 4.2.
- B. System Functional Tests, refer to Section 4.3 and Section 4.4.
- C. System Inservice Tests, refer to Section 4.3 and Section 4.4.
- D. System Hydrostatic Tests shall be conducted at the conditions of pressure and temperature as specified in Section 4.2, 4.3 and 4.4.
- E. System Pneumatic Tests shall be conducted at the conditions of pressure as specified in Section 4.3 and Section 4.4.
- F. The "Hydro" pressures and temperatures listed on the Piping System Flow Diagrams (302 series drawings) are for ASME Section III hydrostatic tests and are not to be used for ASME Section XI System Hydrostatic or Pneumatic Tests.

4.1.5 Test Condition Holding Time

- A. System Leakage Test - no holding time required after attaining test pressure and temperature conditions.

- B. System Functional Test - ten minutes hold time required after attaining test pressure and temperature conditions.
- C. System Inservice Test - no holding time required, provided the system has been in operation for at least four hours.
- D. System Hydrostatic Test - four hour holding time required after attaining the test pressure and temperature conditions for insulated systems, and ten minute for noninsulated systems or components.
- E. System Pneumatic Test - ten minutes hold time required after attaining test pressure.

4.1.6 Test Pressurization Boundaries

- A. System Leakage Test - The boundary subject to test pressurization during a System Leakage Test shall extend to the pressure retaining components within the system boundary containing pressurized reactor coolant under the plant mode of normal reactor startup.
- B. System Functional Test - The boundary subject to test pressurization during a System Functional Test shall include only those pressure retaining components within the system boundary pressurized under the test mode required during the performance of a periodic system or component functional test.
- C. System Inservice Test - The boundary subject to test pressurization during a System Inservice Test shall extend to those pressure retaining components under operating pressure during normal system service.
- D. System Hydrostatic Test:
 - 1. The boundary subject to test pressurization during a System Hydrostatic Test shall be defined by the system boundary, or each portion of the boundary, within which the components have the same minimum required classification and are designed to the same primary pressure rating as governed by the system function and the internal fluid operating conditions, respectively.
 - 2. Systems which share safety functions for different modes of plant operation, and within which the component classifications differ, shall be subject to separate system pressure tests of each portion of the system boundary having the same minimum required component classifications.

3. Systems designed to operate at different pressures under several modes of plant operation or post accident conditions shall be subject to a system pressure test within the test boundary defined by the operating mode with the higher pressure.
4. Where the respective system primary pressure ratings of the suction and discharge sides of system pumps differ, the system test boundary shall be divided into two separate boundaries.
 - a. In the case of positive displacement pumps, the boundary shall be considered as the pump.
 - b. In the case of centrifugal pumps, the boundary interface shall be the first shutoff valve on the discharge side of the pump.

4.1.7 Welded Repairs and Replacements

- A. After performing repairs by welding on the pressure retaining boundary, a System Hydrostatic Test shall be performed in accordance with Section 4.1, 4.2, 4.3 or 4.4 as applicable.
- B. Where repaired or replaced components are isolable within a portion of a system, only that portion of the system needs to be pressure tested in accordance with 4.1.7.A.
- C. Where the System Hydrostatic Test of 4.1.7.A imposed system conditions which conflict with limitations in the plant Technical Specifications, a System Inservice Test performed in accordance with 4.1.4.C and 4.1.5.C at nominal operating temperature shall be acceptable in lieu of the System Hydrostatic Test.
- D. The following may be exempted from the required System Hydrostatic Test of 4.1.7.A:
 1. Cladding repairs.
 2. Heat exchanger tube plugging.
 3. Piping, pump and valve repairs that do not penetrate through the pressure boundary.
 4. Pressure vessel repairs where the repaired cavity does not exceed 10% of the minimum design wall thickness.
 5. Component connections, piping and associated valves that are 1" nominal pipe size and smaller.
 6. Tube-to-tubesheet repair welds where such welds are made on the cladding.

- E. Welded repairs or installation of replacement items by welding made in accordance with procedures which allow for exception from postweld heat treatment shall not be exempted from Hydrostatic Test.
- F. After welded repairs or installation of replacement items by welding, a System Functional Test, System Inservice Test or System Leakage Test may be performed in lieu of a System Hydrostatic Test in accordance with Relief Request RR-PT-2, providing the following requirements are met:
 - 1. The NDE shall be performed in accordance with requirements and acceptance criteria of the 1989 Edition of ASME Section III.
 - 2. Prior to or immediately upon return to service, a VT-2 visual examination, shall be performed in conjunction with a pressure test at nominal operating pressure and temperature.
 - 3. The use of nominal operating pressure to satisfy the requirements of IWA-4700(a) shall be documented on the NIS-2 Form in accordance with Relief Request RR-PT-2.

4.1.8 Test Gages, Instrumentation and Equipment

- A. Permanent plant instrumentation shall be acceptable for use in pressure tests other than System Hydrostatic and Pneumatic tests.
- B. System instrumentation, test instruments or test gages may be used for the System Hydrostatic and Pneumatic tests providing the applicable requirements of 4.1.8.C through 4.1.8.J have been satisfied.
- C. The test gages used in hydrostatic and pneumatic 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 instrumentation.
- D. All test gages shall be calibrated against a standard dead weight tester or a calibrated master gage. The test gages shall be calibrated before each test or before each series of tests. A series of tests is a group of tests that use the same pressure test gages and such tests are conducted within a period not exceeding two weeks.
- E. Indicating pressure gages used in Hydrostatic and Pneumatic Pressure Testing shall have their dials graduated over a range of at least 1.5 times, but not more than four times, the intended maximum test pressure.
- F. Digital pressure measuring instruments used in Hydrostatic and Pneumatic Pressure Testing shall be selected such that the intended maximum test pressure shall not exceed 70% of the calibrated range of the instrument.

- G. When testing an isolated component, the pressure measuring gage, instrument or sensor shall be connected as close to the component as practical.
- H. Gage elevation corrections, as necessary, shall be indicated on the appropriate data sheet of the GTP or STP utilized to perform the Hydrostatic Pressure Test. This is to ensure that the imposed pressure on any component, including static head, will not exceed 106% of the specified test pressure.
- I. If a component is being hydrostatically tested using a bench test, the elevation correction factor shall be included in the pressure calculation for performing the hydrostatic test.
- J. Any equipment required to perform pressure testing shall meet as a minimum, the cleanliness requirements of the system or component to be tested.

4.1.9 Corrective Measures

- A. The source of throughwall pressure boundary leakages identified during the performance of System Pressure Tests shall be located and evaluated for corrective measures in accordance with SAP-1141, Non-Conformance Control Program.
- B. Buried components with leakage losses in excess of limits acceptable for continued service shall be repaired or replaced.
- C. If leakage occurs at a bolted connection, an evaluation shall be performed to determine that the bolting is not susceptible to corrosion in accordance with Relief Request RR-PT-2. The evaluation shall consider as a minimum:
 - 1. Type and location of the leakage.
 - 2. Historical leakage.
 - 3. Bolting material and its resistance to corrosion by the leaking fluid.
 - 4. Visual evidence of corrosion.
 - 5. History of the bolting material degradation due to corrosion in a similar environment.
 - 6. Justification for Continued Service, if the bolted connection is to remain in service.
- D. If the evaluation, performed in accordance with 4.1.9.C, indicates that the bolting material is not susceptible to corrosion, the removal of bolting and associated examination in accordance with IWA-5250 (a) (2) is not required.

- E. If the evaluation, performed in accordance with 4.1.9.C, indicates the need for examination, the bolt closest to the source of the leakage shall be removed, receive a VT-1 Examination and be evaluated in accordance with IWA-3100 (a). If the bolted connection is in service, and an examination is required, bolt removal may be deferred to no later than the next refueling outage only if the evaluation, performed in accordance with 4.1.9.C, justifies continued service. When the removed bolt has evidence of degradation, all remaining bolting shall be removed, VT-1 examined and evaluated in accordance with IWA-3100 (a).
- F. Repairs to components shall be performed in accordance with the requirements of SAP-642, SAP-643 and other criteria of the applicable design specifications.
- G. Replacement of components shall be performed in accordance with IWA-7000 and SAP-643.
- H. The detection of boric acid residues on ferritic steel components shall require the location of the leakage source and any areas of general corrosion. Components or other items with local areas of general corrosion that reduce the wall thickness by more than 10% or that would inhibit the capability of such items or components to perform their intended function, an NCN shall be generated to obtain analysis by Engineering Services to determine whether the component may be acceptable for continued service, or if repair or replacement is required.

4.2 Code Class 1 System Pressure Testing Requirements

- 4.2.1 The pressure retaining components shall be tested at the frequency stated in ASME Section XI 1989 Edition Table IWB-2500-1, Examination Category B-P, All Pressure Retaining Components.
- 4.2.2 The required tests and frequencies are as follows, refer to Section 4.1:
 - A. **System Leakage Test**, each Refuel Outage.
 - B. **System Hydrostatic Test**, one test per interval.
- 4.2.3 Reactor Coolant shall be used as the pressurizing medium.
- 4.2.4 **System Leakage Test** shall be performed at a test pressure not less than nominal operating pressure associated with 100% rated Reactor Power. The system test pressure and temperature shall be attained at a rate within the heatup limitations specified for the Reactor Coolant System.
- 4.2.5 Code Case N-498, Alternative Rules for 10 Year Hydrostatic Pressure Testing for Class 1 and 2 Systems, may be used in lieu of the 10 year Hydrostatic Test. Reference Enclosure 7.1.
- 4.2.6 Class 1 System Leakage Test temperature and pressure shall not exceed the Limiting Conditions for Operation specified in the plant Technical Specifications.

- 4.2.7 Class 1 System Hydrostatic Tests shall be performed at a test pressure of 1.10 times the system nominal operating pressure (P_o) that corresponds with 100% rated Reactor Power or may be conducted at temperatures above 100°F in accordance with the following temperature-pressure criteria except as modified in 4.2.7.A and 4.2.7.B, as applicable. Linear interpolation at intermediate test temperatures is permissible:

<u>Test Temperature</u>	<u>Test Pressure</u>
200°F	1.08 P_o
300°F	1.06 P_o
400°F	1.04 P_o
500°F	1.02 P_o

- A. System Hydrostatic Tests shall meet the requirements as specified by fracture prevention criteria applicable to ferritic materials of system components.
- B. Test temperature shall be modified as required by the results obtained from each set of material surveillance specimens withdrawn from the Reactor Vessel during the service lifetime.
- C. Where the required System Hydrostatic Test pressure and temperature are unknown, contact Engineering Services to obtain the proper hydrostatic test pressure and temperature.
- D. When System Hydrostatic Tests are necessary they may be performed using GTP-249.
- E. The VT-2 visual examination for bolted components which have been opened and reclosed may be performed during or before the required System Pressure Test and the results recorded on Attachment I. A completed copy of Attachment I will be attached to the appropriate MWR or PM task sheet before the work packages can be signed off.
- F. For VT-2 visual examinations required after opening and reclosing a system or component, Enclosure 7.5 shall be used to determine the maximum leakage rate permitted without further Engineering Evaluation.

4.3 Code Class 2 System Pressure Testing Requirements

- 4.3.1 The pressure retaining components shall be tested at the frequency stated in ASME Section XI 1989 Edition Table IWC-2500-1, Examination Category C-H, All Pressure Retaining Components, utilizing the stated test and examination method.
- 4.3.2 The required tests are as follows, refer to Section 4.1:
- A. **System Functional Test** - A system pressure test conducted during a System Functional Test of those systems or components not required to operate during normal plant operations but for which periodic system or component functional tests are performed to meet the Owner's requirements.
 - B. **System Inservice Test** - A system pressure test conducted during a System Inservice Test for those systems required to operate during normal plant operations.
 - C. **System Hydrostatic Test.**
 - D. **System Pneumatic Test.**
- 4.3.3 The contained fluid in the system shall serve as the pressurizing medium, except that in steam systems either water or air may be used. Where air is used, the test procedure shall provide for the detection and location of through-wall leakage in components of the system tested.
- 4.3.4 The nominal operating pressure during system operation shall be acceptable as the test pressure for the System Functional Test.
- 4.3.5 The nominal operating pressure during system operation shall be acceptable as the test pressure for the System Inservice Test.
- 4.3.6 Code Case N-498, Alternative Rules for 10 Year Hydrostatic Pressure Testing for Class 1 and 2 Systems, may be used in lieu of the 10 Year Hydrostatic Test. Reference Enclosure 7.1.
- 4.3.7 The System Hydrostatic Test pressure shall be determined as follows, except as described in section 4.3.7.A through 4.3.7.D, where P_{SV} is the lowest pressure setting of the safety or relief valves provided for overpressure protection within the boundary of the system to be tested. Alternatively, if a system safety or relief valve is not installed, upset pressure may be considered for use as P_{SV} to determine test pressure. Where upset pressure is unknown, contact Engineering Services to obtain proper hydrostatic test pressure.

<u>Upset Temperature</u>	<u>Test Pressure</u>
$\leq 200^{\circ}\text{F}$	$1.10 P_{SV}$
$> 200^{\circ}\text{F}$	$1.25 P_{SV}$

- A. In the case of Class 2 atmospheric storage tanks, hydrostatic pressure developed with the tank filled to its design capacity shall be the acceptable test pressure.
- B. For 0 - 15 PSi Class 2 storage tanks the test pressure shall be 1.1 times P_G where P_G is the design pressure of the vapor or gas space above the liquid level for which overpressure protection is provided.
- C. Open ended portions of a suction or drain line from a Class 2 storage tank extending to the first shutoff valve shall be considered as an extension of the storage tank.
- D. For open ended portions of discharge lines in non-closed systems, such as the Reactor Building Spray Header, any test that demonstrates unimpaired flow shall be acceptable in lieu of a System Pressure Test.

4.3.8 The test temperature for Class 2 systems and components containing ferritic steel items shall meet the requirements specified by fracture prevention criteria. In systems containing ferritic steel components in which fracture toughness or fracture prevention criteria were neither specified nor required, the system test temperature shall be determined by Engineering Services. There is no established limit on system or component test temperature for systems or components constructed entirely of austenitic steel materials.

4.3.9 All Class 2 Containment Penetration piping and valves whereas the inboard and outboard piping outside of the Containment Isolation valves is classified as non-safety related shall be tested as follows:

- A. All Class 2 Containment Penetration piping and boundary valves shall be tested pursuant to 10CFR50, Appendix J in accordance with Technical Specification Surveillance Requirements 4.6.1.1, 4.6.1.2 and 4.6.1.3 at the specified intervals.
- B. Repairs or modifications to the pressure retaining boundary or the replacement of components shall be subject to a VT-2 visual examination conducted in conjunction with a pneumatic leakage test performed in accordance with the provisions of 10CFR50, Appendix J.

4.3.10 When System Hydrostatic Tests are necessary they may be performed using GTP-249.

4.4 Code Class 3 System Pressure Testing Requirements

- 4.4.1 The pressure retaining components shall be tested at the frequency stated in ASME Section XI 1989 Edition Table IWD-2500-1, Test and Examination Categories, utilizing the stated test and examination method:
- A. Examination Category D-A, System In Support of Reactor Shutdown Function.
 - B. Examination Category D-B, System In Support of Emergency Core Cooling, Containment Heat Removal, Atmosphere Cleanup, and Reactor Residual Heat Removal.
 - C. Examination Category D-C, System In Support of Residual Heat Removal From Spent Fuel Storage pool.
- 4.4.2 The required tests are as follows, refer to Section 4.1:
- A. System Functional Test.
 - B. System Inservice Test.
 - C. System Hydrostatic Test.
 - D. System Pneumatic Test.
- 4.4.3 The contained fluid in the system shall serve as the pressurizing medium.
- 4.4.4 The nominal operating pressure during system operation shall be acceptable as the test pressure for the System Functional Test.
- 4.4.5 The nominal operating pressure during system operation shall be acceptable as the test pressure for the System Inservice Test.
- 4.4.6 The System Hydrostatic or Pneumatic Test pressures shall be determined as follows, except as described in Section 4.5.5 through 4.5.8 where P_{SV} is the lowest pressure setting of the safety or relief valves provided for overpressure protection within the boundary of the system to be tested. Alternatively, if a system safety or relief valve is not installed, upset pressure may be considered for use as P_{SV} to determine test pressure. Where upset pressure is unknown, contact Engineering Services to obtain the proper hydrostatic test pressure.

<u>Upset Temperature</u>	<u>Test Pressure</u>
$\leq 200^{\circ}\text{F}$	$1.10 P_{SV}$
$> 200^{\circ}\text{F}$	$1.25 P_{SV}$

- A. In the case of Class 3 atmospheric storage tanks, hydrostatic pressure developed with the tank filled to its design capacity shall be the acceptable test pressure.

- B. For 0 - 15 PSI Class 3 storage tanks the test pressure shall be 1.1 times P_G where P_G is the design pressure of the vapor or gas space above the liquid level for which overpressure protection is provided.
- C. Open ended portions of a suction or drain line from a Class 3 storage tank extending to the first shutoff valve shall be considered as an extension of the storage tank.
- D. For open ended portions of discharge lines in non-closed systems, such as the Service Water System, any test that demonstrates unimpaired flow shall be acceptable in lieu of a system pressure test.

4.4.7 The test temperature for Class 3 systems and components containing ferritic steel items shall meet the requirements specified by fracture prevention criteria. In systems containing ferritic steel components in which fracture toughness or fracture prevention criteria were neither specified nor required, the system test temperature shall be determined by Engineering Services. There is no established limit on system or component test temperature for systems or components constructed entirely of austenitic steel materials.

4.4.8 When System Hydrostatic or Pneumatic Tests are necessary they may be performed via a STP-249 series test procedure or GTP-249.

4.5 Non-ASME Section XI System Pressure Testing Requirements

4.5.1 This section shall apply to all system pressure testing and visual inspection requirements not required to be performed by ASME Section XI.

4.5.2 In addition to ASME Section XI, there are other codes and standards that are applicable to plant systems and components. System pressure testing and the required examinations should be performed as required per the applicable code or standards. Some of these additional codes and standards are listed but not limited to the following:

- A. ASME Boiler and Pressure Vessel Code B31.1, Power Piping.
- B. NFPA 13, Standard for the Installation of Sprinkler Systems.
- C. NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.
- D. Southern Building Code Congress, Standard Plumbing Code.

4.5.3 Testing performed in accordance with Section 4.5.2 will be conducted in accordance with the applicable code or standard using an approved plant procedure, MRF, NCN, or GTP-249.

4.5.4 Testing performed in accordance with Section 4.5.2 will have specified test acceptance criteria stated in the associated plant procedure, MRF, NCN, or GTP-249.

- 4.5.5 Where the required hydrostatic pressure is unknown, contact Engineering Services to obtain the proper hydrostatic test pressure.
- 4.5.6 Open/Reclose Testing
 - A. An External Leakage Test shall be performed as required by GTP-214, Post Maintenance Testing, with the results recorded on Attachment II.
 - B. The completed Attachment II will be attached to the associated MWR or PM task sheet before the work package can be signed off.
 - C. Enclosure 7.5 is available for use to determine the maximum leakage rate permitted without further Engineering Evaluation if the maximum leakage rate permitted is not specified on the associated work document.

5.0 DOCUMENTATION

- 5.1 Examinations, test plans and schedules shall be developed, approved and distributed in accordance with the requirements of this procedure.
- 5.2 Surveillance Test Procedures used for System Pressure Tests during Inservice Inspection will be prepared and approved in accordance with SAP-139 prior to performing the applicable tests.
- 5.3 NDE Personnel Qualification records shall be maintained in accordance with the requirements of Operations and Station Quality Control Procedures, as applicable.
- 5.4 System Pressure Tests shall be documented in accordance with the requirements of this procedure or the applicable test procedure, MRF, NCN, or GTP-249.
- 5.5 When required, Radiation Work Permits will be initiated and completed in accordance with Health Physics Procedures.
- 5.6 When required, safety tags will be issued, and filed in accordance with SAP-201.
- 5.7 A copy of the evaluation and, if required, disposition and corrective measure records shall become part of the Surveillance Test record.
- 5.8 Surveillance Test and GTP-249 records as applicable shall be submitted to Quality Control (QC) within 45 days after completion of the Inservice Inspection Outage.
- 5.9 Test, evaluation, disposition and corrective measure records shall be maintained for the service lifetime of the component.
- 5.10 VT-2 visual examination records shall be maintained in accordance with the applicable Surveillance Test Procedure or GTP-249.
- 5.11 Any VT-2 visual examinations performed by Operations, QC, or Test Unit Personnel shall be reviewed for acceptability by VT-2 Qualified QC or Test Unit Personnel.

- 5.12 When required, a non-conforming condition shall be documented in accordance with the requirements of SAP-1141.
- 5.13 Flow drawings, as referenced in the associated Surveillance Test Procedure, or GTP-249, shall be available for review during system pressure testing activities.

6.0 RESULTS

- 6.1 Evaluation of ASME Section XI pressure test and examination data shall be performed in accordance with the requirements of the applicable code, standard or specification and included as part of the Surveillance Test Procedure Record as described in 5.7.
- 6.2 Disposition and corrective measures, as a result of unacceptable tests or examinations, may be implemented using original design data, improved design data, newly developed techniques, appropriate standards and codes, or a combination thereof.

7.0 ENCLOSURES

- 7.1 Code Case N-498.
- 7.2 Code Class 1, 2 and 3 Component Inspection Program.
- 7.3 Hydrostatic and Pneumatic Testing Index.
- 7.4 System Leak Testing Index.
- 7.5 System Pressure Test Acceptance Criteria.
- 7.6 Relief Request.

8.0 REVISION SUMMARY

- 8.1 Revised procedure to conform to the requirements of ASME Section XI, 1989 Edition for the second ten year interval.

CODE CASE N-498

Alternative Rules for 10-year Hydrostatic Pressure Testing for Class 1 and 2 Systems,
Section XI, Division 1.

CODE CLASS 1

1. A System Leakage Test (IWB-5221) shall be conducted at or near the end of each inspection interval, prior to reactor startup.
2. The boundary subject to test pressurization during the System Leakage Test shall extend to all Class 1 pressure retaining components within the system boundary.
3. Prior to performing VT-2 visual examination, the system shall be pressurized to nominal operating pressure for at least four hours for insulated systems and 10 minutes for noninsulated systems. The system shall be maintained at nominal operating pressure during the performance of the VT-2 visual examination.
4. Test temperature and pressure shall not exceed limiting conditions for hydrostatic test curve as contained in the plant Technical Specifications.
5. The VT-2 visual examination shall include all components within the boundary identified in (2) above.

CODE CLASS 2

1. A System Pressure Test (IWC-5221) shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B. Reference Enclosure 7.2.
2. The boundary subject to test pressurization during the System Pressure Test shall extend to all Class 2 components included in those portions of systems required to operate to 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. Prior to performing VT-2 visual examination, the system shall be pressurized to nominal operating pressure for a minimum of four hours for insulated systems and 10 minutes for noninsulated systems. The system shall be maintained at nominal operating pressure during the performance of the VT-2 visual examination.
4. The VT-2 visual examination shall include all components within the boundary identified in (2) above.

CODE CLASS 1, 2, AND 3 COMPONENT INSPECTION PROGRAM

Inspection Intervals	Inspection Period (Calendar Years of Plant Service)
1st	3 7 10
2nd	13 17 20
3rd	23 27 30
4th	33 37 40

HYDROSTATIC AND PNEUMATIC TESTING INDEX

<u>STP NO.</u>	<u>DESCRIPTION</u>	<u>CODE CLASS</u>
249.001	Hydrostatic Test of Component Cooling Water Loops A, B and C Suction and Discharge Piping	3
249.002	Static Test of Component Cooling Water Surge Tank	3
249.003	Hydrostatic Testing of Component Cooling Water Piping to and from Reactor Building Penetrations XRP0312 and XRP0330.	2/3
249.005	Hydrostatic Testing of Component Cooling Water Piping to the Reactor Building Penetration XRP0204.	3
249.006	Hydrostatic Testing of Component Cooling to Non-Essential Equipment	3
249.019	Hydrostatic Testing of Chemical and Volume Control Low Pressure Letdown and Mixed Bed Demineralizer Line	2/3
249.021	Hydrostatic Testing of the Boric Acid Transfer Pump Suction and Discharge Piping	3
249.023	Hydrostatic Testing of the Boric Acid Storage Tanks	3
249.033	Hydrostatic Testing of Diesel Generator A Fuel Oil Transfer Pump Discharge Piping	3
249.034	Hydrostatic Testing of Diesel Generator B Fuel Oil Transfer Pump Discharge Piping	3
249.035	Static Head Test of Diesel Generator B Day Tank and Piping	3
249.036	Static Head Test of Diesel Generator A Day Tank and Piping	3
249.037	Pneumatic Testing of Diesel Generator A Starting Air System	3
249.038	Pneumatic Testing of Diesel Generator B Starting Air System	3
249.039	Hydrostatic Testing of Diesel Generator A Oil Separator and Piping	3
249.040	Hydrostatic Testing of Diesel Generator B Oil Separator and Piping	3
249.041	Static Testing of Diesel Generator A Jacket Cooling Water System	3
249.042	Static Testing of Diesel Generator B Jacket Cooling Water System	3
249.043	Hydrostatic Testing of Emergency Feedwater Pump Suction Piping	3
249.044	Hydrostatic Testing of Emergency Feedwater Pumps and Discharge Piping	3
249.054	Static Head Test of the Reactor Makeup Water Storage Tank	3

HYDROSTATIC AND PNUEMATIC TESTING INDEX

<u>STP NO.</u>	<u>DESCRIPTION</u>	<u>CODE CLASS</u>
249.064	Hydrostatic Testing of the Spent Fuel Cooling Train A and B	3
249.076	Hydrostatic Testing of the Reactor Building Spray System Sodium Hydroxide Storage Tank and Supply Piping	3
249.086	Hydrostatic Testing of Chilled Water System Loop B	3
249.087	Hydrostatic Testing of Chilled Water System Loop A	3
249.095	Hydrostatic Testing of the Service Water Traveling Screen A Wash Header Piping	3
249.096	Hydrostatic Testing of the Service Water Traveling Screen B Wash Header	3
249.097	Hydrostatic Testing of the Service Water Traveling Screen C Wash Header Piping.	3
249.098	Hydrostatic Testing of the Fire Service to "B" Diesel Generator	3
249.131	Static Head Test of Diesel Generator Fuel Oil Storage Tank A	3
249.132	Static Head Test of Diesel Generator Fuel Oil Storage Tank B	3

SYSTEM LEAK TESTING INDEX

DESCRIPTION

<u>STP NO.</u>	
250.001	Reactor Coolant System Leak Test
250.002	Safety Injection/Chemical and Volume Control Leak Test
250.003A	Safety Injection Accumulator Leak Test
250.003B	Safety Injection Accumulator Fill & Nitrogen Supply Penetrations Leak Test
250.004A	Residual Heat Removal System Plant Cooldown Piping Leak Test
250.005A	Component Cooling Water System Leak Test
250.006A	Reactor Building Spray System Leak Test
250.007	Service Water System Leak Test Outside of Reactor Building
250.008	Emergency Diesel Generator A Support Systems Leak Test
250.009	Emergency Diesel Generator B Support Systems Leak Test
250.010	Emergency Feedwater System Leak Test
250.011	Feedwater (Nuclear) System Leak Test
250.012	Main Steam/Steam Generators Leak Test
250.013	Chilled Water System Leak Test
250.014	Reactor Building Cooling System Leak Test
250.015	Spent Fuel Cooling System Leak Test
250.016	Post Accident H ₂ (Hydrogen) Removal Analyzer A and B Leak Test
250.017	Boron Recycle System Leak Test
250.018	Reactor Makeup Water System Leak Test
250.019	Liquid/Solid Waste Disposal System Leak Test
250.020	Gaseous Waste Disposal System Leak Test
250.021	Nuclear Sample System Leak Test

SYSTEM PRESSURE TEST ACCEPTANCE CRITERIA

ITEM NOMINAL SIZE (1)(2)	MAXIMUM LEAKAGE (cc/min) (3)	ITEM NOMINAL SIZE (1)(2)	MAXIMUM LEAKAGE (cc/min) (3)
1/8"	10	8"	1180
1/4"	30	10"	1475
3/4"	50	12"	1769
1"	200	14"	2064
1-1/2"	250	16"	2359
2"	300	18"	2654
3"	450	32"	4718
4"	590	36"	5308
6"	885	VESSELS	5308

NOTE: (1) ITEM NOMINAL SIZE:

- A. Piping, Tubing, Pipe Flanges, and Mechanical fittings - Nominal size of pipe.
 - B. Pumps, Valves and Filters - Nominal pipe size of the inlet connection.
- (2) For those sizes not listed, the MAXIMUM LEAKAGE rate may be extrapolated. For valves with limits specified by Technical Specifications, the Technical Specification limit takes precedence over the values in this enclosure.
- (3) Does not apply to weld or through wall leakage.

RELIEF REQUEST

RR-PT-1

Subject: Pressure test requirements for welded repairs or installation of replacement items by welding.

Component Identification: All Class 1 and 2 components which receive welded repairs or are installed by welding as replacements.

Code Requirements: After repairs by welding on the pressure retaining boundary, a System Hydrostatic Test shall be performed in accordance with IWA-5000.

Alternative Testing: In lieu of performing a Hydrostatic Pressure Test as required by IWA-4700(a) for welded repairs or replacement items installed by welding, a System Pressure Test (Inservice or Functional) shall be performed in addition to the following requirements.

- 1) NDE shall be performed in accordance with the requirements of the 1989 Edition of Section III.
- 2) NDE acceptance criteria shall be in accordance with the requirements of the 1989 Edition of Section III.
- 3) Prior to or immediately upon return to service, a VT-2 Visual Examination shall be performed in conjunction with a System Leakage, Functional, or Inservice Test as per the 1989 Edition of Section XI, IWA-5000, at nominal operating pressure and temperature.
- 4) The NIS-2 Form shall properly reflect that pressure testing was performed at nominal operating pressure in accordance with this request for relief or subsequent to approval of any associated Code Case

Basis for Relief: Class 1 and 2 pressure boundary replacements requiring installation by welding are normally constructed and supplied in accordance with the requirements of Section III which provides for hydrostatic testing at the manufacturers. Subsequent to installation hydrostatic pressure testing is a means of proving weld integrity. Performing NDE and invoking acceptance criteria in accordance with current ASME III requirements in addition to a System Pressure Test provides reasonable assurance that weld integrity is maintained at an acceptable level of quality. It is the position of SCE&G that the performance of hydrostatic testing subsequent to weld repairs and the installation of welded replacements is an impractical requirement which could not only expose a component to unnecessary stress but, provides little or no enhancement to the level of quality or safety. The proposed alternative testing provides an equivalent level of quality and safety as that provided by the Code.

RELIEF REQUEST

RR-PT-2

Subject: Bolting examination (VT-3) following bolted connection leakage occurring during a System Pressure Test.

Component Identification: All bolting associated with Class 1, 2 and 3 connections which receive a VT-2 Visual Examination during the performance of System Pressure Testing.

Code Requirements: If leakage occurs at a bolted connection, the bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100. (IWA-5250(a)(2) Corrective Measures)

Alternative Testing: If leakage occurs at a bolted connection, during the performance of a System Pressure Test, an evaluation shall be performed to determine if the associated bolting is not susceptible to corrosion resulting in further degradation and increased leakage. This evaluation shall address at a minimum:

- Type and location of the leakage.
- Historical leakage.
- Bolting material and its resistance to corrosion by the leaking fluid.
- Visual evidence of leakage.
- History of bolting material degradation due to corrosion in a similar environment.

If the evaluation indicates that the bolting is not susceptible to corrosion, then bolt removal for associated examination and further evaluation is not required. However, termination of leakage shall be addressed at the next available opportunity. If the evaluation indicates a need for examination, one bolt closest to the source of leakage shall be removed, VT-1 visually examined per IWA-2211(a), and evaluated in accordance with IWA-3100(a). If the examination is required, based on the initial evaluation, and the leakage is identified when the bolted connection is in service, justification for continued operation may be provided by the information contained in the evaluation. Deferral of the bolt removal for VT-1 examination and evaluation may be acceptable until the next time that portion of the system is out of service, but no later than the next Refueling Outage. When the removed bolt has evidence of degradation, all remaining bolting shall be removed, VT-1 examined, and evaluated in accordance with IWA-3100(a). All evaluations shall be traceable to the VT-2 examination.

RELIEF REQUEST

Basis for Relief: Current Code requirement specifies that all bolting must be removed in the event of a bolted connection leak for the purpose of VT-3 examination and evaluation. This would require placing the associated component or portion of piping out of service possibly resulting in a plant shutdown, delaying plant startup, or placing the plant in an unsafe condition for continued operation, as all VT-2 examinations are preferably performed at nominal operating pressure. Additionally, removal of all bolting is unnecessary if there is reasonable assurance that bolting material is of a specification which is not susceptible to corrosion when in contact with the leaking fluid. It is the position of SCE&G that the proposed alternate testing provides an acceptable level of quality and safety as that provided by the Code.

ASME SECTION XI, CODE CLASS 1, 2 AND 3
COMPONENT POST MAINTENANCE PRESSURE TEST RECORD

A. GENERAL

1. Component Description _____ System _____ I.D. Number _____ MWR No. _____

Continuation Sheet Required: Yes ☐ No ☐

2. Justification.

a. Replacement ☐ b. Rework ☐ c. Inspection ☐
d. Investigation ☐ e. Other (Specify) ☐ _____

3. Test Type

a. System Leakage Test ☐ b. System Inservice Test ☐
c. System Functional Test ☐

4. Test Condition Holding Time

a. 10 minutes ☐ b. 4 hours ☐ c. None Required ☐

VT-2 Qualified Test Performer / Date

B. LINEUP

1. Component is at Normal Operating Pressure and Temperature.

SS/CRS / Date

C. TEST DATA

ITEM I.D. NUMBER	ITEM NOMINAL SIZE ENCLOSURE 7.5	ACTUAL LEAK RATE (cc/min)	MAX. LEAK RATE PERMITTED (cc/min) ENCLOSURE 7.5	SAT	UNSAT

Continuation Sheet Required: Yes ☐ No ☐

VT-2 Qualified Test Performer / Date

REVIEWED BY:

Test Unit Supervisor or
QC Supervisor / Date

A. GENERAL

MWR No.

[illegible][illegible]

NON-ASME SECTION XI EXTERNAL LEAKAGE TEST RECORD

A. GENERAL

1. Component Description _____ System _____ I.D. Number _____ MWR No. _____

Continuation Sheet Required: Yes ☐ No ☐

2. Justification.

- a. Replacement ☐ b. Rework ☐ c. Inspection ☐
 d. Investigation ☐ e. Other (Specify) ☐ _____

Test Performer _____ Date _____

B. LINEUP

1. Component is at Normal Operating Pressure and Temperature.

SS/CRS _____ Date _____

C. TEST DATA

ITEM I.D. NUMBER	ITEM NOMINAL SIZE ENCLOSURE 7.5	ACTUAL LEAK RATE (cc/min)	MAX. LEAK RATE PERMITTED (cc/min) ENCLOSURE 7.5	SAT	UNSAT

Continuation Sheet Required: Yes ☐ No ☐

Test Performer _____ Date _____

REVIEWED BY:

Test Unit Supervisor or
QC Supervisor _____ Date _____

[illegible]