UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE FIRST TEN-YEAR INTERVAL INSERVICE INSPECTION

REQUESTS FOR RELIEF NOS. NR-20, NR-21, AND NR-22

COMMONWEALTH EDISON COMPANY

BRAIDWOOD STATION, UNITS 1 AND 2

DOCKET NOS. STN 50-456 AND STN 50-457

1.0 INTRODUCTION

The Technical Specifications for Braidwood Station, Units 1 and 2, state that the inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Code and applicable Addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first ten-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) on the date twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for Braidwood Station, Units 1 and 2, first 10-year ISI interval is the 1983 Edition through Summer 1983 Addenda. The first 10-year interval will end on July 28, 1998, and October 16, 1998, for Units 1 and 2, respectively. Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request

Enclosure

made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

In a letter dated April 18, 1995, the Commonwealth Edison Company (the licensee) submitted Requests for Relief Nos. NR-20 (Unit 1), NR-21 (Unit 1 and 2), and NR-22 (Unit 1 and 2) which are associated with the first ten-year interval ISI program plan for Braidwood Station, Units 1 and 2.

2.0 EVALUATION AND CONCLUSION

The staff, with technical assistance from its contractor, the Idaho National Engineering Laboratory (INEL), has evaluated the information provided by the licensee in support of its first ten-year interval ISI program plan, Requests for Relief Nos. NR-20 (Unit 1), NR-21 (Units 1 and 2), and NR-22 (Units 1 and 2) for Braidwood Station, Units 1 and 2.

Based on the information submitted, the staff adopts the contractor's conclusions and recommendations presented in the Technical Letter Report (TLR) attached. The staff has concluded, as set forth in the TLR, that compliance with the Code requirements would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety, and that the proposed alternatives contained in Requests for Relief Nos. NR-20 (Unit 1), NR-21 (Units 1 and 2), and NR-22 (Units 1 and 2) will provide reasonable assurance of operational readiness of the subject plant systems. Therefore, the proposed alternatives contained in Requests for Relief Nos. NR-20 (Unit 1), NR-21 (Units 1 and 2), and NR-22 (Units 1 and 2) are authorized pursuant to 10 CFR 50.55a(a)(3)(ii). In view of the foregoing, the relief requested is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest, giving due consideration to the burden on the licensee that could result if the requirements were imposed on the Braidwood Station.

Attachment: Technical Letter Report

Principle Contributor: T.K. McLellan

Dated: September 1, 1995

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TECHNICAL LETTER REPORT ON THE FIRST 10-YEAR INTERVAL INSERVICE INSPECTION PLAN REQUESTS FOR RELIEF NR-20, NR-21, AND NR-22 FOR COMMONWEALTH EDISON COMPANY, BRAIDWOOD STATION, UNITS 1 AND 2 DOCKET NOS. STN 50-456 AND STN 50-457

1.0 INTRODUCTION

By letter dated April 18, 1995, the licensee, Commonwealth Edison Company, submitted requests for Relief NR-20, NR-21, and NR-22 in the *Braidwood Nuclear Generating Station, Units 1 and 2, First 10-Year Interval Inservice Inspection Plan*, Revision 3. The Idaho National Engineering Laboratory (INEL) staff has evaluated the subject requests for relief in the following sections.

2.0 EVALUATION

The code of record for Braidwood Station, Units 1 and 2, first 10-year inservice inspection (ISI) interval is the *American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code, Section XI*, 1983 Edition through Summer 1983 Addenda. The first 10-year interval will end on July 28, 1998, and October 16, 1998, for Units 1 and 2, respectively. The information provided by the licensee in support of the request for relief from impractical requirements has been evaluated and the bases for granting relief from those requirements are documented below.

A. Request for Relief NR-20, (Unit 1 Only) Examination Category B-D, Item B3.140, Steam Generator Nozzle Inner Radius Examinations and Examination Category C-B, Item C2.22, Nozzle Inner Radius Section Examinations

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.140, Steam Generator Nozzle Inner Radius, requires 100 percent volumetric examination of the nozzle inner radius sections as defined in Figure IWB-2500-7, as applicable. Table IWC-2500-1, Examination Category C-B, Item C2.22 requires 100 percent volumetric examination of Class 2 nozzle inner radius sections as defined by Figure IWC-2500-4(a) or (b), as applicable.

Licensee's Code Relief Request: The licensee requested relief from the Code-required volumetric examinations of the nozzle inner radius section examinations for the following steam generator nozzles:

Component Number	Weld Number
1RC01BA	1SG-01-SGN-01A(IR)
	1SG-01-SGN-01B(IR)
	1SG-01-SGN-02(IR)
1RC01BB	1SG-02-SGN-01A(IR)
	1SG-02-SGN-01B(IR)
1RC01BC	1SG-03-SGN-01A(IR)
	1SG-03-SGN-01B(IR)
1RC01BD	1SG-04-SGN-01A(IR)
	1SG-04-SGN-01B(IR)

Licensee's Basis for Requesting Relief (as stated):

"Relief is requested from examining the IRS of eight (8) primary nozzles on four (4) steam generators and one (1) feedwater nozzle on the 'A' steam generator on the basis that compliance with the ASME Section XI requirement would result in hardship or unusual difficulty without a compensating increase in the level of plant quality and safety.

"In accordance with the requirements of ASME Section XI 1983 Edition through Summer 1983 Addenda, a volumetric examination of IRS of the subject nozzles is required once for each Inspection Interval. Performing the volumetric examination on the IRS of the subject nozzles will subject plant personnel to high radiation exposure. The total radiation exposure to personnel to build scaffolding, remove and reinstall insulation, prepare the surface for examinations, and examine the subject nozzles on four (4) steam generators is estimated to be at least eight (8) person-rems. This radiation exposure is not justifiable since these steam generators will be replaced during the A1R07 refuel outage, currently scheduled for 1998.

"The subject nozzle inner radius sections are not susceptible to thermal fatigue cracking because the primary nozzles do not experience thermal stratification or high thermal gradient during operation, and the feedwater nozzles have a thermal sleeve connected to the 'wrapper barrel' that minimizes thermal cycling due to cooler feedwater back splashing. Stress Corrosion Cracking (SCC) in the stainless steel cladding of the primary nozzle inner radius sections is unlikely because of low oxygen content of the primary water. The feedwater nozzles have no stainless steel cladding and are made of low alloy steel that is not susceptible to SCC. To date, cracking in the IRS of similar steam generator nozzles has not been a problem. Recent state-of-the-art IRS examinations conducted on eight (8) steam generator primary nozzles and on (1) feedwater nozzle at another Commonwealth Edison pressurized

water reactor of the same vintage as that of Braidwood Unit 1 reinforces this experience.

"This relief request will only apply to Braidwood Unit 1 steam generators that will be replaced in 1998. The IRS of the nozzles on the new steam generators that will be installed in Braidwood Unit 1 will be subject to the applicable requirements of ASME Section XI for the second ten-year Inspection Interval."

Licensee's Proposed Alternative Examination (as stated):

"Periodic visual examination (VT-2) of the nozzles' outside surface will be performed in accordance with the requirements of ASME Section XI, Table IWB-2500-1, Examination Category B-P and Table IWC-2500-1, Examination Category C-H, including applicable Code Case(s).

"Prior to the Braidwood Unit 1 steam generators replacement, if future IRS examinations of Braidwood Unit 2 and Byron Unit 2 steam generator nozzles (primary and feedwater nozzles) reveal flaws that exceed the applicable acceptance criteria of ASME Section XI IWB-3500, appropriate Braidwood Unit 1 steam generator nozzle IRS will be examined in accordance with the applicable requirements of ASME Section XI."

Evaluation: Section XI of the Code requires that the subject steam generator nozzle inner radius sections receive 100 percent volumetric examinations. Because the licensee has scheduled the replacement of Braidwood Unit 1 steam generators in 1998, the licensee believes that the Code-required examinations will result in a burden from unnecessary radiation exposures.

The licensee has proposed as an alternative to the Code-required volumetric examinations, periodic visual examinations (VT-2) of the nozzle surfaces. In addition, where the licensee is examining similar components at other plants, if flaws are detected that exceed the applicable acceptance criteria, the licensee will expand its examinations to include Braidwood Unit 1 steam generators.

Considering the timing of the scheduled steam generator replacements relative to the end of the first 10-year interval, the INEL staff concurs with the licensee that performing the subject nozzle inner radius examinations will result in unnecessary radiation exposures without a compensating increase in quality and safety. Therefore, it is recommended that the licensee's proposed alternative to the Code-required volumetric examination be authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for Braidwood, Unit 1.

B. Request for Relief NR-21, Alternative Pressure Test Requirements for Welded Repaired or Replaced Class 1, 2, and 3 Components

Code Requirement: Section XI, IWA-4400(a) requires that a system hydrostatic test be performed in accordance with IWA-5000 after repairs by welding on the pressure-retaining boundary.

Licensee's Code Relief Request: The licensee requested relief from the ASME Section XI Class 1, 2 and 3 hydrostatic test requirements following repairs/replacements.

Licensee's Basis for Requesting Relief (as stated):

"Elevated pressure hydrostatic tests are difficult to perform and often represent a true hardship. Some of the difficulties associated with hydrostatic testing include:

- Complicated or abnormal valve line-ups to provide system draining, filling, venting, and system/component isolation.

- Relief valves with setpoints lower than the hydrostatic test pressure must be blocked closed, or removed and blank flanged. This process requires draining, refilling of the system prior to the test and draining, valve restoration, and refilling once more for system restoration. Improper blocking or gagging can result in damage to the relief valve.

- Valves that are not normally used for isolation are often required to provide pressure isolation for a hydrostatic test. In order to provide tight isolation, time consuming valve maintenance would be required prior to a hydrostatic test.

- The radiation exposure required to setup and perform a hydrostatic pressure test is quite high in comparison to an operational pressure test due to time required for valve manipulation, filling and venting, valve maintenance, etc.

"The difficulties encountered in performing a hydrostatic pressure test are prohibitive when weighed against the benefits. Industry experience, which is supported by ComEd experience, shows that most through wall leakage is detected during system operation as opposed to during the elevated pressure tests associated with the ten-year hydrostatic test.

"Little benefit is gained from the added challenge to the piping system provided by an elevated pressure hydrostatic test when compared to an operational test. The piping stress experienced by a hydrostatic test does not include the significant stresses associated with thermal growth and dynamic loading during operation or a design basis event. Therefore, the system is more likely to leak at operating conditions, due to operational dynamic and thermal loading, than during the careful, slow pressurization associated with a hydrostatic test.

"The acceptability of performing nominal operating pressure tests in lieu of hydrostatic tests is also supported by the recent approval by the Board of Nuclear Codes and Standards of ASME Code Case N-416-1, 'Alternate Pressure Test Requirement for Welded Repairs or Installation of Replacement Items by Welding for Class 1, 2, and 3 Systems, Section XI, Division 1'. This Code

Case allows a system leakage test at nominal operating pressure and temperature, in accordance with IWA-5000 of the 1992 Edition of Section XI, to be performed in lieu of a hydrostatic test, provided that Non Destructive Examination (NDE) of the weld(s) is performed in accordance with the methods and acceptance criteria of the applicable subsection of the 1992 Edition of Section III.

"Based on the above, Braidwood Station requests relief from the ASME Section XI Class 1, 2 and 3 repair/replacement elevated pressure hydrostatic testing requirements."

Licensee's Proposed Alternative Examination (as stated):

"As an alternate to the existing ASME Section XI requirements, Braidwood Station will adopt the provisions of Code Case N-416-1, as approved by the Board of Nuclear Codes and Standards, with additional NDE requirements. Listed below are the proposed alternate provisions to be performed, which is a summary of Code Case N-416-1 requirements with additional NDE requirements imposed by Braidwood Station.

- "A VT-2 visual examination will be performed at nominal operating pressure and temperature in conjunction with a system leakage test in accordance with IWA-5000 of the 1992 Edition of Section XI. The examination will be performed prior to or immediately upon return of the component to service.

- Non-Destructive Examination will be performed on the repair/replacement welds or welded areas with the methods and acceptance criteria of the applicable Subsection of the 1992 Edition of Section III. In addition, when NDE is required by ND-5222 for Class 3 components, an additional surface examination will be performed on the root (pass) layer. A surface examination will also be performed on Class 3 socket/fillet welds.

- The use of this relief request shall be documented on the applicable NIS-2 Form.

- If the previous version of Code Case N-416 were used to defer a Class 2 hydrostatic test, the deferred test may be eliminated when requirements of this relief request are met. In addition, the NDE methods and acceptance criteria of the Code Edition and addenda used for the repair must be reconciled to those of the 1992 Edition of Section III."

Evaluation: Section XI of the Code requires a system hydrostatic test to be performed in accordance with IWA-5000 after repairs by welding on the pressure-retaining boundary.

The licensee has proposed using Code Case N-416-1 along with the additional non-destructive examination to be performed on the Class 3 repair/replacement welds or welded areas, consisting of an additional surface examination on the

root pass layer. A surface examination will also be performed on the final Class 3 socket/fillet welds.

Hardships are generally encountered with the performance of hydrostatic testing performed in accordance with the Code. For example, since hydrostatic test pressure would be higher than nominal operating pressure, hydrostatic pressure testing frequently requires significant effort to set up and perform. The need to use special equipment, such as temporary attachment of test pumps and gages, and the need for unique valve lineups can cause the testing to be on critical path.

Code Case N-416-1 specifies that NDE of the welds be performed in accordance with the applicable subsection of the 1992 Edition of Section III. This code case also allows a VT-2 visual examination to be performed at nominal operating pressure and temperature in conjunction with a system leakage test, in accordance with paragraph IWA-5000 of the 1992 Edition of Section XI.

The 1989 Edition of Sections III and XI are the latest Code editions referenced in 10 CFR 50.55a. The NRC staff has compared the system pressure test requirements of the 1992 Edition of Section XI to those of the 1989 Edition of Section XI. In summary:

1) The test frequencies and the pressure conditions associated with these tests have not changed;

2) the hold times have either remained unchanged or increased;

3) the terminology associated with the system pressure test requirements for all three Code classes has been clarified and streamlined; and

4) the NDE requirements for welded repairs remain the same.

Piping components are designed for a number of loadings that would be postulated to occur under the various modes of plant operation. However, hydrostatic testing only subjects the piping components to a small increase in pressure over the design pressure and, therefore, does not present a significant challenge to pressure boundary integrity. Accordingly, hydrostatic pressure testing is primarily regarded as a means to enhance leak detection during the examination of components under pressure, rather than as a measure of the structural integrity of the components.

Following the performance of welding, the Code requires volumetric examination (depending on wall thickness) of repairs or replacements in Code Class 1 and 2, but only requires a surface examination of the final weld pass in Code Class 3 piping components. There are no ongoing NDE requirements for Code Class 3 components except for VT-2 visual examination for leaks in conjunction with the 10-year hydrostatic tests and the periodic pressure tests.

Considering the NDE performed on Code Class 1 and 2 systems and that the hydrostatic pressure tests rarely result in pressure boundary leaks that would

not occur during system leakage tests, the INEL staff believes that increased assurance of the integrity of Class 1 and 2 welds is not commensurate with the burden of performing hydrostatic testing. In addition, when a surface examination is performed on the root pass layer of butt and socket welds on the pressure retaining boundary of Class 3 components, it is also believed that possible increased assurance of the integrity of Class 3 welds is not commensurate with the burden of performing hydrostatic testing.

It is concluded that compliance with the Code-required hydrostatic testing requirements for welded repairs or replacements of Code Class 1, 2, and 3 components would result in hardships without a compensating increase in the level of quality and safety. Therefore, it is recommended that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii). Use of Code Case N-416-1, with provision as noted above, should be authorized until such time as the Code Case is published in a future revision of Regulatory Guide (RG) 1.147. At that time, if the licensee intends to continue to implement this code case, the licensee should follow all provisions in Code Case N-416-1, with limitations issued in RG 1.147, if any.

C. Request for Relief NR-22, Request for Authorization to Use ASME Code Case N-498-1

Code Requirement: Table IWD-2500-1, Examination Category D-A, Items D1.10, D2.10, and D3.10 require that a system hydrostatic test be performed in accordance with IWA-5000 once each 10-year interval.

Licensee's Code Relief Request: The licensee requested approval to use Code Case N-498-1 in lieu of performing the Code-required hydrostatic pressure test.

Licensee's Basis for Requesting Relief (as stated):

"Elevated pressure hydrostatic tests are difficult to perform and often represent a true hardship without benefits gained. Some of the difficulties associated with 10 year system hydrostatic testing include:

- Complicated or abnormal valve line-ups to provide system draining, filling, venting, and system isolation.

- Relief valves with setpoints lower than the hydrostatic test pressure must be blocked closed, or removed and blank flanged. This process requires draining, refilling of the system prior to the test and draining, valve restoration, and refilling once more for system restoration. Improper blocking or gaging can result in damage to the relief valve.

- Valves that are not normally used for isolation are often required to provide pressure isolation for a hydrostatic test. In order to provide tight isolation, time consuming valve maintenance would be required prior to a hydrostatic test.

- The radiation exposure required to perform hydrostatic testing is quite high in comparison to operational pressure testing due to time required for valve manipulation, filling and venting, valve maintenance, etc.

"At hydrostatic test pressures required by ASME Section XI, 10 percent and 25 percent over the piping design pressure, a hydrostatic test does not induce significantly more stresses in the system than in a system operation test. Also the system stresses associated with the hydrostatic test do not compare to the stress associated with thermal growth and dynamic loading during design basis events. Therefore, little benefit is gained from the hydrostatic test over the nominal operational pressure test.

"Industry experience, which ComEd Stations experience supports, indicates that most through wall leakage is detected during system operation as opposed to hydrostatic testing at elevated pressure.

"These arguments are also supported by ASME Code Case N-498-1, 'Alternate Rules for 10 Year Hydrostatic Pressure Testing for Class 1, 2, and 3 Systems, Section XI, Division 1', and ASME Code Case N-498, 'Alternate Rules for 10 Year Hydrostatic Pressure Testing for Class 1 and 2 Systems, Section XI, Division 1'. Code Case N-498-1 has been reviewed and approved by the Board of Nuclear Codes and Standards (BNCS). Code Case N-498 for Class 1 and 2 systems had previously been approved and accepted for industry use in Regulatory Guide 1.147, Revision 10.

"Based on the above, Braidwood Station requests relief from the ASME Section XI Class 3 10 Year System Hydrostatic Pressure Testing requirements."

Licensee's Proposed Alternative Examination (as stated):

"A system pressure test with a VT-2 visual examination will be performed with the Class 3 system pressurized to a test pressure equal to nominal operating pressure. The visual examination will be conducted after the system has been pressurized to test pressure for a minimum of 10 minutes for noninsulated components or 4 hours for insulated components prior to examination. The system will be maintained at test pressure for the duration of the VT-2 visual examination. Hydrostatic test instrumentation requirements of IWA-5260 are not applicable as test parameter recording is performed by normal operating system instrumentation or equivalent.

"The system pressure test will be conducted at or near the end of the inspection interval or during the same inspection period of each inspection interval.

"The boundary subject to test pressurization and VT-2 visual examination during the system pressure test shall extend to 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 safety or relief valve) or valve capable of automatic closure when the safety function is required."

Evaluation: Section XI of the Code requires a system hydrostatic test to be performed on Class 1, 2, and 3 systems, in accordance with IWA-5000 once each 10-year interval.

The licensee requested approval to use Code Case N-498-1 in lieu of performing the Code-required hydrostatic pressure tests.

Currently, licensees incur considerable time and radiation dose carrying out hydrostatic test requirements. A significant amount of effort may be necessary (depending on system, plant configuration, Code class, etc.) to temporarily remove or disable code safety and/or relief valves to meet test pressure requirements. The safety assurance provided by the enhanced leakage gained from a slight increase in system pressure during a hydrostatic test may be offset or negated by the following factors: having to gag or remove code safety and/or relief valves, placing the system (and thus the plant) in an off-normal state, erecting temporary supports in steam lines, possible extension of refueling outages, and resource requirements to set up testing with special equipment and gages.

Information prepared in conjunction with ASME Code Case N-498-1 notes that the system hydrostatic test is not a test of the structural integrity of the system, but rather an enhanced leakage test, as indicated in a paper by S. H. Bush and R. R. Maccary, *"Development of In-Service Inspection Safety Philosophy for U.S.A. Nuclear Power Plants,"* ASME, 1971. Piping components are designed for a number of loadings that are postulated to occur under the various modes of plant operation. However, hydrostatic testing only subjects the piping components to a small increase in pressure over the design pressure and, therefore, does not present a significant challenge to pressure boundary integrity since piping dead weight, thermal expansion, and seismic loads, which may present far greater challenges to the structural integrity of a system than fluid pressure, are not part of the loading imposed during a hydrostatic test. Accordingly, hydrostatic pressure testing is primarily regarded as a means to enhance leak detection during the examination of components under pressure, rather than as a measure to determine the structural integrity of the components.

The licensee requested approval for use of ASME Code, Section XI, Case N-498-1, "*Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems*" dated May 11, 1994, in lieu of the Code requirements for 10-year hydrostatic testing of Class 1, 2, and 3 systems. Code Case N-498, "*Alternative Rules for 10-Year System Hydrostatic Testing for Class 1 and 2 Systems*," has previously been approved for use. (Code Case N-498 for Class 1 and 2 systems was previously approved by the NRC in RG 1.147, Revision 9.) The rules for Code Classes 1 and 2 in N-498-1 are unchanged from N-498. The NRC staff found N-498 acceptable because the alternative provided adequate assurance.

Revision N-498-1 specifies requirements for Class 3 that are identical to those for Class 2 components. In lieu of 10-year hydrostatic pressure testing at or near the end of the 10-year interval, Code Case N-498-1 requires a VT-2

visual examination at nominal operating pressure and temperature in conjunction with a system leakage testing in accordance with paragraph IWA-5000 of the 1992 Edition of Section XI.

Class 3 systems do not normally receive the amount and/or type of nondestructive examinations that Class 1 and 2 systems receive. While Class 1 and 2 system failures are relatively uncommon, Class 3 leaks occur more frequently and are caused by different failure mechanisms. Based on a review of Class 3 system failures requiring repair during the last 5 years that are documented in Licensee Event Reports and the Nuclear Plant Reliability Data System databases, the most common causes of failures are erosion-corrosion (EC), microbiologically-induced corrosion (MIC), and general corrosion. Licensees generally have programs in place for prevention, detection, and evaluation of EC and MIC. Leakage from general corrosion is readily apparent to inspectors when performing a VT-2 examination during system pressure tests. The industry indicates that experience has demonstrated that leaks are not being discovered as a result of hydrostatic test pressures propagating a preexisting flaw through the wall, but in most cases, leaks are being found when the system is at normal operating pressure.

Giving consideration to the minimal amount of increased assurance provided by the increased pressure associated with a hydrostatic test versus the pressure for the system leakage test and the hardship associated with performing the ASME Code required hydrostatic test, the INEL staff finds that compliance with the Section XI hydrostatic testing requirements results in hardship and/or unusual difficulty for the licensees without a compensating increase in the level of quality and safety. Therefore, it is recommended that the use of Code Case N-498-1 for Code Class 1, 2, and 3, be authorized pursuant to 10 CFR 50.55a(a)(3)(ii) until such time as the Code Case is published in a future revision of RG 1.147. At that time, if the licensee intends to continue to implement this Code Case, the licensee should be required to follow all provisions in Code Case N-498-1, with limitations issued in RG 1.147, if any.

3.0 CONCLUSION

The INEL staff has reviewed the licensee's submittal in the *Braidwood Station, Units 1 and 2, First 10-Year Interval Inservice Inspection Plan*, Revision 3, and recommends that Requests for Relief NR-20 (Unit 1 only), NR-21, and NR-22 be authorized with the conditions stated in the evaluations as applicable, pursuant to 10 CFR 50.55a(a)(3)(ii).