



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUESTS FOR RELIEF FROM ASME CODE SECTION XI, REQUIREMENTS

FOR CONTAINMENT INSPECTION

DETROIT EDISON COMPANY

FERMI 2

DOCKET NO. 50-341

1.0 INTRODUCTION

In the *Federal Register* (FR) dated August 8, 1996 (61 FR 41303), the Nuclear Regulatory Commission (NRC) amended its regulations to incorporate by reference the 1992 edition with 1992 addenda of Subsections IWE and IWL of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code (Code). Subsections IWE and IWL provide the requirements for inservice inspection (ISI) of Class CC (concrete containment), and Class MC (metallic containment) of light-water cooled power plants. The effective date for the amended rule was September 9, 1996, and it requires licensees to incorporate the new requirements into their ISI plans and to complete the first containment inspection by September 9, 2001. However, a licensee may propose alternatives to or submit a request for relief from the requirements of the regulation pursuant to 10 CFR 50.55a(a)(3) or (g)(5), respectively.

By letter dated September 17, 1999, as supplemented November 10, 1999, the Detroit Edison Company (the licensee) proposed several alternatives to the requirements of Subsections IWE and IWL of Section XI of the ASME Code for Fermi 2. The NRC's findings with respect to the proposed alternatives are discussed in this evaluation.

2.0 EVALUATION

2.1 Relief Request CISI-001:

2.1.1 Code Requirements:

IWE-2500, Table IWE-2500-1, requires seals and gaskets on airlocks, hatches, and other devices to be visually examined using VT-3 once each interval to assure containment leak-tight integrity.

**2.1.2 Specific Relief Requested:**

Relief is requested from performing the ASME Code-required visual examination, VT-3, on the above identified metal containment seals and gaskets.

**2.1.3 Licensee's Basis for Relief:**

The regulation at 10 CFR 50.55a was amended (61 FR 41303) to require the use of the 1992 edition, 1992 addenda, of Section XI when performing containment examinations. Seals and gaskets receive a 10 CFR Part 50, Appendix J, test. As noted in 10 CFR Part 50, Appendix J, the purpose is to measure leakage of containment or penetrations whose design incorporates resilient seals, gaskets, sealant compounds, and electrical penetrations utilizing flexible metal seal assemblies. Although not required by the ASME Code, practical examination considerations of seals and gaskets require the joints, which are proven adequate through Appendix J testing, to be disassembled. For electrical penetrations, this would involve a pre-maintenance Appendix J test, de-termination of cables at electrical penetrations (if enough cable slack is not available), disassembly of the joint, removal and examination of the seals and gaskets, reassembly of the joint, re-termination of the cables if necessary, post-maintenance testing of the cables, and a post-maintenance Appendix J test of the penetration. The work required for the containment hatches would be similar except for the de-termination, re-termination, and testing of cables. This imposes the risk that equipment could be damaged. The 1992 edition, 1992 addenda, of Section XI recognizes that disassembly of joints to perform these examinations is not warranted. Note 1 in Examination Category E-D was modified in the 1995 edition of Section XI to state that sealed or gasket connections need not be disassembled solely for performance of examinations. However, without disassembly, most of the surface of the seals and gaskets would be inaccessible.

For those penetrations that are routinely disassembled, a Type B test is required upon final assembly and prior to startup. Since the Type B test will assure the leak-tight integrity of primary containment, the performance of the visual examination would not increase the level of safety or quality.

Seals and gaskets are not part of the containment pressure boundary under current Code rules (NE-1220(b)). When the airlocks and hatches containing these materials are tested in accordance with 10 CFR Part 50, Appendix J, degradation of the seal or gasket material would be revealed by an increase in the leakage rate. Corrective measures would be applied and the component retested. Repair or replacement of seals and gaskets is not subject to Code (1992 edition, 1992 addenda) rules in accordance with Paragraph IWA-4111(b)(5) of ASME Section XI.

The visual examination of seals and gaskets in accordance with IWE-2500, Table IWE-2500-1, is a burden without any compensating increase in the level of safety or quality. This requirement is not included in the 1997 addenda of ASME Section XI.

The licensee requested relief in accordance with 10 CFR 50.55a(a)(3)(ii). Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Testing the seals and gaskets in accordance with 10 CFR Part 50, Appendix J, will provide adequate assurance of the leak-tight integrity of the seals and gaskets.

#### 2.1.4 Alternative Examination(s):

The licensee proposed to test the leak-tightness of seals and gaskets in accordance with 10 CFR Part 50, Appendix J. No additional alternatives to the visual examination, VT-3, of the seals and gaskets would be performed.

#### 2.1.5 Staff Evaluation of CISI-001:

The licensee proposes, in lieu of performing the VT-3 examinations for containment penetration seals and gaskets, to use the current program for leakage testing containment penetrations in accordance with 10 CFR Part 50, Appendix J.

The NRC staff does not agree with the licensee's statement that the penetration seals and gaskets are not part of the containment pressure boundary. However, the staff agrees with the licensee's justification that because the seals and gaskets associated with these penetrations are not accessible for examination when the penetration is assembled, containment penetrations seals and gaskets must be disassembled and reassembled for the purpose of performing the VT-3 visual examination. These activities (disassembly and reassembly of seals and gaskets) associated with a VT-3 visual examination would introduce the possibility of component damage that would not otherwise occur. The periodic testing of penetrations in accordance with 10 CFR Part 50, Appendix J, will detect local leaks and measure leakage across the leakage-limiting boundary of containment penetrations whose design incorporates resilient seals, gaskets, sealant compounds, and electrical penetrations fitted with flexible metal seal assemblies. If unacceptable leakage is identified during the test, corrective measures would be taken.

The staff realizes that the 1992 edition, 1993 addenda, of ASME Code, Section XI, has recognized that disassembly of joints for the sole purpose of performance of the visual examination is unwarranted. Also, as stated in the "Licensee's Basis for Relief" above, this requirement was removed in the 1997 addenda of ASME Code, Section XI, and is not included in the 1998 edition. Requiring the licensee to disassemble components for the sole purpose of inspecting seals and gaskets would place a significant hardship on the licensee without a compensating increase in quality and safety.

On the basis discussed above, the staff concludes that the alternative proposed by the licensee will provide reasonable assurance of the leak-tight integrity of the containment penetration seals and gaskets through the use of the Type B testing required by 10 CFR Part 50, Appendix J. Therefore, the request for relief is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific requirements of the Code would result in hardship without a compensating increase in the level of quality and safety.

## 2.2 Relief Request CISI-002:

### 2.2.1 Code Requirements:

Subarticle IWA-2300, requires qualification of nondestructive examination (NDE) personnel to CP-189, as amended by ASME Code, Section XI.

### 2.2.2 Specific Relief Requested:

Relief is requested from the provisions of Subarticle IWA-2300, "Qualification of Nondestructive Examination Personnel." This requires NDE personnel to be qualified and certified using a written practice in accordance with CP-189, "Standard for Qualification and Certification of Nondestructive Testing Personnel," as amended by the requirements of Section XI of the ASME Code.

### 2.2.3 Licensee's Basis for Relief:

The regulation at 10 CFR 50.55a was amended (61 FR 41303) to require the use of the 1992 edition, 1992 addenda, of Section XI when performing containment examinations. A written practice based on the requirements of CP-189, as amended by the requirements of the Subarticle IWA-2300, to implement Subsections IWE and IWL duplicates efforts already in place for all other subsections. The regulation at 10 CFR 50.55a references the 1989 edition of ASME Code, Section XI, for all other subsections. Subarticle IWA-2300 of the 1989 edition requires a written practice based on SNT-TC-1A, as amended by the requirements of Subarticle IWA-2300. Further, Subarticle IWA-2300 of the 1992 edition, 1992 addenda, states, "Certification based on SNT-TC-1A are valid until re-certification is required." Visual examination is the primary NDE method required by Subsections IWE and IWL. Neither CP-189 nor SNT-TC-1A specifically includes visual examination; thus, the Code requires qualification and certification to comparable levels as defined in CP-189 or SNT-TC-1A, as applicable, and the employer's written practice. Development and administration of a second program would not enhance safety or quality and would serve as a burden, particularly in developing a second written practice, tracking of certifications, and duplication of paperwork. This duplication would also apply to NDE vendor programs. Updating to the 1992 edition, 1992 addenda, for Subsections IWB and IWC would require a similar request for relief.

Relief is requested in accordance with 10 CFR 50.55a(a)(3)(ii). Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

### 2.2.4 Alternative Examination(s):

Examinations required by Subsection IWE and IWL shall be conducted by personnel qualified and certified to a written practice based on SNT-TC-1A to the current Section XI Code of record for Subsections IWB and IWC. All VT-certified personnel will be trained and tested on the requirements of IWE. The implementation of the proposed alternative is scheduled for the first inspection interval of the containment ISI program.

### 2.2.5 Staff Evaluation of CISI-002:

In lieu of using the requirements of Section IWA-2300 of the 1992 edition and addenda of ASME Code, Section XI, that examination personnel be qualified and certified in accordance with ANSI/ASNT CP-189, the licensee proposes to conduct examinations with personnel qualified and certified to a written practice based on SNT-TC-1A and the 1989 edition of ASME Code, Section XI. This relief is requested for the first inspection interval of the containment ISI program.

The staff recognizes that under the licensee inspection program, examinations are to be conducted by personnel qualified and certified to a written practice based on SNT-TC-1A in accordance with the 1989 edition of ASME Code, Section XI. The staff also realizes that a written practice based on the requirements of CP-189, as amended by the requirements of Section IWA-2300, to implement Sections IWE and IWL duplicates efforts already in place for all other subsections. To develop and to administrate a second program would constitute a burden, particularly in developing a second written practice, tracking of certifications, and duplication of paperwork. In addition, Section IWA-2300 of the 1992 edition, 1992 addenda, states that certification based on SNT-TC-1A are valid until recertification is required. Furthermore, in this request, the licensee indicated that this relief is requested only for the first 10-year containment inspection interval of the Fermi 2 plant containment ISI program.

On the basis discussed above, the staff concludes that developing and implementing two qualification programs for NDE personnel would result in a burden on the licensee. The alternative proposed by the licensee will provide adequate qualifications for personnel performing containment examinations. Therefore, the request for relief is authorized for the first 10-year containment inspection interval of the Fermi 2 plant containment ISI program pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific requirements of the Code would result in hardship without a compensating increase in the level of quality and safety.

### 2.3 Relief Request CISI-003:

#### 2.3.1 Code Requirements:

ASME Code, Section XI, 1992 edition, 1992 addenda, Subsection IWE-2200(g), requires that when paint or coatings are reapplied, the condition of the new paint or coating shall be documented in the preservice examination records.

#### 2.3.2 Specific Relief Requested:

Relief is requested from the requirement to perform a preservice inspection of new paint or coatings.

#### 2.3.3 Licensee's Basis for Relief:

Paint and coatings are not part of the containment pressure boundary under current ASME Code rules because they are not associated with the pressure retaining function of the component (Paragraph NE-2110(b)(5) of ASME Section III). Neither paint nor coatings contribute to the structural integrity or leak-tightness of the containment. Furthermore, the paint and coatings on the containment pressure boundary were not subject to Code rules when they were originally applied and are not subject to ASME Section XI rules for repair or replacement in accordance with IWA-4111(b)(5). The adequacy of applied coatings is verified through Fermi's coating program. Recording the condition of reapplied coatings in the preservice record does not substantiate the containment structural integrity. Should deterioration of the coating in the reapplied area occur, the area will require additional evaluation regardless of the preservice record. Recording the condition of new paint or coating in the preservice records does not increase the level of quality and safety of the containment.

SECY 96-080, response to Comment 3.2 about IWE-2200(g) states, "in the NRC's opinion, this does not mean that a visual examination must be performed with every application of paint or coating. A visual examination of the topcoat to determine the soundness and the condition of the topcoat should be sufficient." This is currently accomplished through Fermi's coating program.

Relief is requested in accordance with 10 CFR 50.55a(a)(3)(i). Coating inspection programs currently provide an adequate level of quality and safety.

#### 2.3.4 Alternative Examination(s):

The paint and coatings in the containment will be examined in accordance with Fermi's coatings program that meets the guidance of NRC Generic Letter (GL) 98-04. If degradation of the coating is identified, additional measures will be applied to determine if the containment pressure boundary is affected. Although repairs to paint or coatings are not subject to the repair/replacement rules of ASME Section XI (Inquiry 97-22), repairs to the primary containment boundary, if required, would be conducted in accordance with ASME Code, Section XI, rules.

#### 2.3.5 Staff Evaluation of CISI-003:

In lieu of meeting the ASME Section XI, 1992 edition, 1992 addenda, Subsection IWE-2200(g), requirements to perform a preservice inspection of new paint or coatings, the licensee proposed to examine the paint and coatings in accordance with Fermi's containment protective coating program. According to the licensee, the coating program requirement for performing examination meets the guidance of NRC GL 98-04. The licensee also committed that repairs to the primary containment boundary, if identified, will be conducted in accordance with ASME Code, Section XI, rules. However, the licensee did not provide details of how the coating program will be performed in its relief request. During a conference telephone conversation conducted on October 27, 1999, the staff raised questions regarding the standards, procedures, or guidelines in this program, and maintenance activities for verifying the coating quality.

In a letter dated November 10, 1999, the licensee provided additional information concerning its coating program. The licensee indicated that the coating on the interior surfaces of the drywell and torus is considered nuclear safety related. Coating application and inspection activities are performed in accordance with the Fermi 2, 10 CFR Part 50, Appendix B, Quality Assurance Program. Appendix A in the Updated Final Safety Analysis Report (UFSAR), "Conformance with Regulatory Guides," describes Fermi's compliance with NRC Regulatory Guide (RG) 1.54 (June 1973), "Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants," and American National Standards Institute (ANSI) Standard N101.4-1972, "Quality Assurance for Protective Coatings Applied to Nuclear Facilities." The following requirements are applicable to the coating applied to the interior surfaces of the drywell and torus:

- The quality assurance requirements of Section 3 of ANSI N 101.4, applicable to the coating manufacturer, are imposed on the coating manufacturer through the procurement process.
- Coating application procedures are developed based on the recommendations provided by the manufacturer for application of the selected coating systems.

- Coating applicators are required to demonstrate their ability to satisfactorily apply the coatings in accordance with the manufacturer's recommendations.
- Quality Control personnel perform inspections to verify conformance to the coating application procedures. Section 6 of ANSI N101.4 is used as a guideline in the establishment of the inspection program.
- Fermi 2 conformance with RG 1.58, Revision 1, "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel," including quality control inspection personnel, is documented in UFSAR Appendix A.
- Documentation demonstrating conformance to the above is maintained.

The condition of the coating is examined on an on-going basis. Selected areas of the drywell are inspected during each refueling outage (approximately every 18 months). The entire containment, including both the drywell and torus, receives a visual inspection every 3-1/3 years per the 10 CFR Part 50, Appendix J Program. These periodic inspections will identify evidence of flaking, blistering, peeling, discoloration, or other signs of coating distress that might be indicative of degradation of the containment structural integrity.

The staff finds that the alternative program, as described by the licensee, will provide an acceptable level of quality and safety for protecting the inside steel surfaces of the Fermi 2 containment. On this basis, the staff concludes that the licensee's alternative for the preservice inspection of new paint or coatings is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

## 2.4 Relief Request CISI-004:

### 2.4.1 Code Requirements:

ASME Code, Section XI, 1992 edition, 1992 addenda, Subarticle IWE-2500(b), requires that when paint or coatings are to be removed, the paint or coatings shall be visually examined in accordance with Table IWE-2500-1 prior to removal.

### 2.4.2 Specific Relief Requested:

Relief is requested from the requirements to perform a visual examination of painted or coated containment components prior to removal of paint or coatings.

### 2.4.3 Licensee's Basis for Relief:

The regulation at 10 CFR 50.55a was amended (61 FR 41303) to require the use of the 1992 edition, 1992 addenda, of ASME Code, Section XI, when performing containment examinations. Paint and coatings are not part of the containment pressure boundary under current Code rules because they are not associated with the pressure retaining function of the component (Paragraph NE-2110(b)(5) of ASME Section III). The interiors of and exposed exteriors of containment are painted to prevent rusting. Neither paint nor coatings contribute to the structural integrity or leak-tightness of the containment. Furthermore, the paint and coatings on the containment pressure boundary were not subject to Code rules when they were originally applied and are not subject to ASME Code, Section XI, rules for repair or replacement

in accordance with IWA-4111(b)(5). Degradation or discoloration of the paint or coating materials on containment would be an indicator of potential degradation of the containment pressure boundary. Additional measures would have to be employed to determine the nature and extent of any degradation, if present. The application of ASME Section XI rules for removal of paint or coatings when unrelated to an ASME Section XI repair or replacement activity, is a burden without a compensating increase in quality or safety.

Relief is requested in accordance with 10 CFR 50.55a(a)(3)(i). A coating inspection program that meets the guidance of NRC GL 98-04 currently provides an adequate level of quality and safety.

#### 2.4.4 Alternative Examination(s):

The paint and coatings in the containment will be examined in accordance with existing plant commitments to the NRC as per the Primary Containment Coating Inspection Program that meets the guidance of NRC GL 98-04. If degradation of the coating is identified, additional measures will be applied to determine if the containment pressure boundary is affected. Examples of these conditions would be cracks or corrosion. If an adverse condition is identified, a visual examination performed by qualified personnel will be used to determine if the containment pressure boundary is affected. Although repairs to paint or coatings are not subject to the repair/replacement rules of ASME Section XI, repairs to the primary containment boundary, if required, would be conducted in accordance with ASME Section XI Code rules.

#### 2.4.5 Staff Evaluation of CISI-004:

As discussed in the evaluation of Relief Request CISI-03, the staff finds that the licensee's coating program is adequate for monitoring the condition (including the proper removal) of the old paint and application of new coatings. To perform additional examinations prior to removal of the old paint and to document the condition of the old paint or coatings (in addition to the licensee's program subjected to the quality assurance requirements of 10 CFR Part 50, Appendix B) would result in hardship to the licensee without a compensating increase in the level of quality and safety. On this basis, the staff concludes that the alternative coating program proposed by the licensee is acceptable for authorizing the licensee's proposed alternative to the requirement of Subsection IWE-2500(b) of the Code pursuant to 10 CFR 50.55a(a)(3)(ii).

#### 2.5 Relief Request CISI-005:

By the letter dated November 10, 1999, the licensee withdrew Relief Request CISI-005.

#### 2.6 Relief Request CISI-006:

##### 2.6.1 Code Requirements:

Paragraphs IWE-2420(b) and IWE-2420(c) of the 1992 edition, 1992 addenda of ASME Code, Section XI, requires that when component examination results require evaluation of flaws, evaluation of areas of degradation, or repairs in accordance with Article IWE-3000, and the component is found to be acceptable for continued service, the areas containing such flaws, degradation, or repairs shall be reexamined during the next inspection period listed in the



schedule of the inspection program of Paragraph IWE-2411 or Paragraph IWE-2412, in accordance with Table IWE-2500-1, Examination Category E-C.

2.6.2 Specific Relief Requested:

Relief is requested from the requirement of Paragraphs IWE-2420(b) and IWE-2420(c) to perform successive examination of repairs.

2.6.3 Licensee's Basis for Relief:

The regulation at 10 CFR 50.55a was amended (61 FR 41303) to require the use of the 1992 edition, 1992 addenda, of ASME Code, Section XI, when performing containment examinations. The purpose of a repair is to restore the component to an acceptable condition for continued service in accordance with the acceptance standards of Article IWE-3000. Paragraph IWA-4150 requires the owner to conduct an evaluation of the suitability of the repair including consideration of the cause of failure.

If the repair has restored the component to an acceptable condition, successive examinations are not warranted. If the repair was not suitable, then the repair does not meet code requirements and the component is not acceptable for continued service. Neither Paragraph IWB-2420(b), Paragraph IWC-2420(b), nor Paragraph IWD-2420(b) requires a repair to be subject to successive examination requirements. Furthermore, if the repair area is subject to accelerated degradation, it would still require augmented examination in accordance with Table IWE-2500-1, Examination Category E-C. The successive examination of repairs in accordance with Paragraph IWE-2420(b) and IWE-2420(c) constitutes a burden without a compensating increase in quality or safety.

Repair is not included in Paragraphs IWE-2420(b) and IWE-2420(c) in the 1997 addenda of the Section XI Code.

In their resolution to public comment #3.3, the NRC stated, "The purpose of IWE-2420(b) is to manage components found to be acceptable for continued service (meaning no repair or replacement at this time) as an Examination Category E-C component... If the component had been repaired or replaced, then the more frequent examination would not be needed."

Relief is requested in accordance with 10 CFR 50.55a(a)(3)(ii). Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety.

2.6.4 Alternative Examination(s):

Successive examinations in accordance with Paragraphs IWE-2420(b) and IWE-2420(c) are not required for repairs made in accordance with Article IWA-4000.

2.6.5 Staff Evaluation of CISI-006:

The staff reviewed the licensee's justification that when repairs are complete, IWA-4150 requires licensees to evaluate the suitability of the repair. When a repair is required because of failure of an item, the evaluation shall consider the cause of failure to ensure that the repair is

suitable. Considering that the failure mechanism is identified and corrected as required and the repair receives preservice examinations, as required, the proposed alternative will provide reasonable assurance of structural integrity. In doing this, the requirements of successive examinations are deemed to be unnecessary. Furthermore, IWB-2420(b), IWC-2420(b), and IWD-2420(b) do not require the successive inspection of repairs for ASME Code Class 1, 2, and 3 components as required in IWE-2420(b) for ASME Code Class MC components. On this basis, the NRC staff concludes that the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) in that compliance with the specific code requirements would result in hardship without a compensating increase in the level of quality and safety.

## 2.7 Relief Request CISI-007:

### 2.7.1 Code Requirements:

ASME Code, Section XI, 1992 edition with the 1992 addenda, Table IWE-2500-1, Examination Category E-G, Pressure Retaining Bolting, Item 8.20.

### 2.7.2 Specific Relief Requested:

Relief is requested from ASME Code, Section XI, 1992 edition with the 1992 addenda, Table IWE-2500-1, Examination Category E-G, Pressure Retaining Bolting, Item 8.20. Bolt torque or tension testing is required on bolted connections that have not been disassembled and reassembled during the inspection interval.

### 2.7.3 Licensee's Basis for Relief:

The regulation at 10 CFR 50.55a was amended (61 FR 41303) to require the use of the 1992 edition, 1992 addenda, of Section XI when performing containment examinations. Bolt torque or tension testing is required on bolted connections that have not been disassembled and reassembled during the inspection interval. Determination of the torque or tension value would require that the bolting be untorqued and then retorqued or retensioned. The performance of the Type B leak rate test itself proves that the bolt torque or tension remains adequate to provide a leak rate that is within acceptable limits. The torque or tension value of bolting only becomes an issue if the leak rate is excessive. Once a bolt is torqued or tensioned, it is not subject to dynamic loading that could cause it to experience significant change. Verification of torque or tension values on bolted joints that are proven adequate through Appendix J testing and visual inspection is adequate to demonstrate that design function is met. Torque or tension testing is not required on any other ASME Section XI, Class 1, 2, or 3 bolted connections or their supports as part of the ISI program.

Relief is requested in accordance with 10 CFR 50.55a(a)(3)(ii). Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

#### 2.7.4 Alternative Examination(s):

The following examinations and tests required by Subsection IWE ensure the structural integrity and the leak-tightness of Class MC pressure retaining bolting, and, therefore, no additional alternative examinations are proposed:

- Exposed surfaces of bolted connections shall be visually examined in accordance with requirements of Table IWE-2500-1, Examination Category E-G, Pressure Retaining Bolting, and Item No. E8.10, and
- Bolted connections shall meet the pressure test requirements of Table IWE-2500-1, Examination Category E-P, All Pressure Retaining Components, Item E9.40, and
- A general visual examination of the entire containment once each inspection period shall be conducted in accordance with 10 CFR 50.55a(b)(2)(x)(E).

#### 2.7.5 Staff Evaluation of CISI-007:

ASME Code, Section XI, 1992 edition with the 1992 addenda, Table IWE-2500-1, Examination Category E-G, Pressure Retaining Bolting, Item E8.20 requires bolt torque or tension testing on bolted connections that have not been disassembled and reassembled during the inspection interval. This examination is used to aid in the determination that leak-tight seals exist and that the structural integrity of the subject bolted connections is maintained. The licensee proposes to use the 10 CFR Part 50, Appendix J, Type B test together with visual examinations described in "Alternative Examination(s)" as an alternative to the Code requirement to verify the integrity of penetrations with bolted connections.

The staff finds that bolt torque or tension testing on bolted connections that have not been disassembled and reassembled during the inspection interval would require the bolting be untertorqued and then retorqued or retensioned, whereas the leak testing as required by 10 CFR Part 50, Appendix J would adequately verify the leak-tight integrity of the containment. The staff also finds that compliance with ASME Code requirements will cause a hardship or a usual difficulty because untertorquing and subsequent retorquing bolted connections involve unnecessary radiation exposure and costs to perform the work without a compensating increase in the level of quality and safety. In addition, the staff finds that the alternative approach proposed by the licensee (the test required by 10 CFR Part 50, Appendix J, to verify the leak-tight integrity of bolted connections for containment vessel leak-tight integrity together with visual examinations) will provide reasonable assurance of the containment pressure boundary integrity. On this basis, the staff concludes that the alternative proposed by the licensee is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

#### 2.8 Relief Request CISI-008:

##### 2.8.1 Code Requirements:

ASME Code, Section XI, 1992 edition, 1992 addenda, Subarticle IWE-2500(c)(3), requires 1-foot square grids be used when ultrasonic thickness measurements are performed on augmented surface area examinations. Subarticle IWE-2500(c)(4) requires the minimum wall

thickness within each grid be determined. The number and location of the grids is determined by the Owner.

**2.8.2 Specific Relief Requested:**

Relief is requested from subarticle IWE-2500(c)(3) and IWE-2500(c)(4) requirements to use 1-foot square grids and utilize ultrasonic measurements to determine the minimum wall thickness within each grid for areas requiring augmented examinations.

**2.8.3 Licensee's Basis for Relief:**

Subarticle IWE-2500(c)(3) and IWE-2500(c)(4) of the 1992 edition, 1992 addenda of ASME Code, Section XI, requires that the minimum thickness within each 1-foot square grid of surface areas requiring augmented examination be marked such that periodic reexamination of that location can be performed. Thickness readings are point of contact readings, requiring numerous readings and extensive time in radiation area to identify the minimum thickness within each grid. Subsequent examinations of minimum thickness points monitor only those points, which may not be the areas most susceptible to accelerated degradation.

Code Case N-605 provides as alternative to the 1-foot square grid area inspections required by IWE-2500(c)(3). Code Case N-605 requires examination at the grid line intersections, the dimensions of which may not exceed 12 inches and may be as small as 2 inches.

For sample areas greater than 100 square feet, Code Case N-605 requires that sufficient points be monitored to ensure at least a 95 percent confidence level that the thickness of the base metal is reduced by no more than 10 percent of the nominal plate thickness, at 95 percent of the grid line intersections.

For all examination areas, should the measurements at a grid-line intersection reveal that the base material has been reduced by more than 10 percent of the nominal plate thickness, Code Case N-605 requires determination of the minimum wall thickness within each adjoining grid. This is similar to the examination requirements of IWE-2500(c)(4) except that Code Case N-605 focuses on areas which exhibit degradation.

The Flow Accelerated Corrosion Program, presently in place at Fermi, has proven that thickness readings taken at grid intersections are effective in monitoring wall thinning of piping.

Based on the above discussion, relief is requested in accordance with 10 CFR 50.55(a)(3)(ii). Taking numerous ultrasonic thickness readings within a grid, which has not exhibited degradation results in hardship and/or unusual difficulty (Increased time and radiation exposure) without a compensating increase in the level of quality and safety.

**2.8.4 Specific Examination(s):**

Code Case N-605 will be used to determine examination requirements for ultrasonic thickness measurements of areas requiring augmented examination.

### 2.8.5 Staff Evaluation of CISI-008:

In lieu of meeting ASME Code, Section XI, 1992 edition through 1992 addenda, Subarticles IWE-2500(c)(3) and (4), which require 1-foot square grids be used when ultrasonic thickness measurements are performed on augmented examination surface areas, and the minimum wall thickness within each grid be determined, the licensee proposed to use Code Case N-605 to determine examination requirements for ultrasonic thickness measurements on areas requiring augmented examination.

Under the application of Code Case N-605 rules (as described in the request), Table 2500-2 requires a minimum 100 locations be monitored for a sample area of 50 square feet. According to the licensee, utilizing Table 2500-2 monitors more locations than that determined by the owner (required by the IWE-2500(c)(3) rule). For sample areas greater than 100 square feet, Table 2500-2 requires: (a) sufficient locations be monitored to ensure at least a 95 percent confidence level that the thickness of the base material is reduced no more than 10 percent of the nominal plate thickness at 95 percent of the grid line intersections, and (b) additional examinations be taken when any measurement reveals that the wall thickness is reduced by more than 10 percent of the nominal plate thickness. For all examination areas, Table 2500-2 requires that the minimum wall thickness within each adjoining grid be determined, if the measurements at a grid line intersection reveal that the base material is reduced by more than 10 percent of the nominal plate thickness.

On the basis discussed above, the staff finds that the alternative proposed by the licensee will provide reasonable assurance of the containment (plate) integrity. Therefore, the request for relief is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative provides an acceptable level of quality and safety.

### 3.0 CONCLUSION

Based on our review of the information provided in the requests for relief (Relief Requests CISI-001 through CISI-008), the staff concludes that for Relief Requests CISI-003 and 008, the licensee's proposed alternative will provide an acceptable level of quality and safety. Therefore, the proposed alternatives are authorized pursuant to 10 CFR 50.55a(a)(3)(i). For Relief Requests CISI-001, 002, 004, 006 and 007, the staff concludes that compliance with the code requirements would result in a burden without a compensating increase in the level of quality and safety, and that licensee's proposed alternatives will provide reasonable assurance of containment pressure integrity. Therefore, these proposed alternatives are authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Principal Contributor: T. Cheng

Date: December 28, 1999