



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

February 18, 2009

Mr. Joseph N. Jensen  
Senior Vice President and  
Chief Nuclear Officer  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2 - RELIEF REQUESTS  
(ISIR-23, ISIR-24 AND ISIR-25) FOR INSERVICE PRESSURE TESTING  
PROGRAM (TAC NOS. MD9438 AND MD9439)

Dear Mr. Jensen:

By letter dated August 5, 2008, Agencywide Documents Access and Management System Accession No. ML082270205, Indiana Michigan Power Company (I&M, the licensee) submitted relief requests ISIR-23, ISIR-24, and ISIR-25 pertaining to end-of-interval system pressure testing applicable to the Donald C. Cook Nuclear Plant, Units 1 and 2, for the third 10-year inservice inspection (ISI) interval. The relief pertains to the boundary subject to test pressurization during performance of a system leakage test conducted at or near the end of inspection interval.

In lieu of the Code requirement to conduct the test to extend to all Class 1 pressure-retaining components within the system boundary, the licensee has proposed an alternative to pressurize up to the inboard isolation valve, which would exclude a small segment of the Class 1 pressure boundary from attaining the required test pressure. However, the visual examination during pressurization would include all components within the system boundary. The staff finds that the licensee's proposed alternative provides reasonable assurance of structural integrity and is, therefore, acceptable.

The staff has evaluated the licensee's requests for relief pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii), and concludes in the enclosed safety evaluation that the licensee's compliance to the ISI Code of Record would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, the staff authorizes the ISI program alternative proposed in relief requests ISIR-23, ISIR-24, and ISIR-25 for the third 10-year ISI interval of the Donald C. Cook Nuclear Plant, Units 1 and 2.

J. Jensen

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The reliefs are authorized for the remainder of the third 10-year ISI interval which began on July 1, 1996, and is scheduled to end on February 28, 2010.

Sincerely,



Lois M. James, Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-315 and 50-316

Enclosure:  
Safety Evaluation

cc w/encl: Distribution via ListServ

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION PROGRAM

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-315 AND 50-316

1.0 INTRODUCTION

By letter dated August 5, 2008, Agencywide Documents Access and Management System Accession No. ML082270205, Indiana Michigan Power Company, (I&M, the licensee) submitted relief requests ISIR-23, ISIR-24, and ISIR-25 on end-of-interval system pressure test applicable to Donald C. Cook (D.C. Cook) Nuclear Plant, Units 1 and 2, for the third 10-Year inservice inspection (ISI) interval. The reliefs pertain to the boundary subject to test pressurization during performance of a system leakage test conducted at or near the end of the inspection interval. The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI requires system hydrostatic testing of Class 1 pressure retaining piping and valves once per 10-year interval. The licensee adopted Code Case N-498-1 "Alternative Requirement for 10-year System Hydrostatic Testing for Class 1, 2, and 3 Systems Section XI, Division 1," which allows a system leakage test in lieu of the system hydrostatic test at or near the end of each inspection interval. Subsequently, the U.S. Nuclear Regulatory Commission (NRC) approved a later revision (Code Case N-498-4) of the licensee's proposed Code Case N-498-1 in Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability," Revision 14, which accepts a system leakage test conducted at or near the end of each inspection interval, prior to reactor startup in lieu of the 10-year system hydrostatic test for Class 1 components. However, the Code of Record and Code Case N-498-4 require that the boundary subject to test pressurization during the system leakage test extend to all Class 1 pressure retaining components within the system boundary.

In relief requests ISIR-23, ISIR-24, and ISIR-25, the licensee has proposed an alternative to pressurize up to the inboard isolation valve which would exclude a small segment of the Class 1 piping between the inboard and outboard isolation valves in some systems from attaining the Code required test pressure. Nevertheless, in accordance with the code case, the visual examination during pressurization would include all components within the system boundary.

2.0 REGULATORY REQUIREMENTS

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g), requires that ISI of ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). In accordance with 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph 50.55a(g) may be used, when authorized by the NRC, if the applicant demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would

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ENCLOSURE

result in hardship or unusual difficulty 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 ISI of components and system pressure tests conducted during the first 10-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) 12 months prior to the start of the 120-month interval (or the optional ASME Code cases listed in NRC Regulatory Guide 1.147, through Revision 15, that are incorporated by reference in paragraph (b) of this section), subject to the limitations and modifications listed in paragraph (b) of this section.

The ISI Code of Record for the third 10-year ISI interval of D.C. Cook Nuclear Plant, Units 1 and 2, is the 1989 Edition of the ASME Code, Section XI.

### 3.0 TECHNICAL EVALUATION FOR RELIEF REQUESTS ISIR-23, ISIR-24, AND ISIR-25

#### 3.1 Component Function/Description

This relief request supports examination of all ASME Code Class 1 components in the system pressure boundary between isolation valves identified in Table 1 of relief requests ISIR-23, ISIR-24, and ISIR-25, in the safety injection (SI) system, the residual heat removal (RHR) system, and reactor coolant system (RCS) vents, drains, and instrument lines.

#### 3.2 Code Requirement for Which Relief is Requested

Table IWB-2500-1, Category B-P, Note 2, requires hydrostatic testing of Class 1 pressure retaining piping once per 10-year interval. Code Case N-498-4 approved by the NRC allows performance of a system leakage test in lieu of the 10-year hydrostatic test. Further, Note 2 of Table IWB-2500-1 and Paragraph (a)(2) of Code Case N-498-4 require that the test pressurization boundary extend to all Class 1 components.

Paragraph IWB-5221(a) of the Code states, "The system leakage test shall be conducted at a test pressure not less than the nominal operating pressure associated with 100 percent rated power."

In lieu of performing the 10-year system hydrostatic test, the licensee plans to perform a system leakage test in accordance with ASME Code Case N-498-4, and proposes alternative visual examination of the segment of Class 1 piping between an inboard and an outboard isolation valve including the valves in the system boundary for the RHR system, the SI system, and the RCS.

#### 3.3 Licensee Proposed Alternative

In lieu of the 10-year system hydrostatic test, a system leakage test shall be conducted at or near the end of each inspection interval, prior to reactor startup. The segment of Class 1 piping between an inboard and an outboard isolation valve including the valves in the system boundary for the RHR system, SI system, and RCS vents, drains, fill and instrument lines, will be visually

examined for evidence of past leakage and/or leakage during the system leakage test conducted with the isolation valves in the position required for normal reactor startup.

### 3.4 Licensee Basis for the Alternative

Normal reactor coolant pressure at 100 percent rated power is approximately 2085 pounds per square inch gauge (psig) for D.C. Cook Unit 1, and 2235 psig for Unit 2. The components and piping connected to the RCS, such as vents, drains, and instrument connections, the SI system, and the RHR system for which relief is requested are the portion of piping between an inboard and an outboard isolation valve, including the valves. This segment of piping will not be pressurized to the required test pressures of 2085 psig and 2235 psig for Unit 1 and Unit 2, respectively, during system leakage test as required under ASME Code Case N-498-4. The licensee has stated that compliance with the requirement of the Code or the code case in pressurizing to RCS pressure beyond the inboard isolation valve during performance of a system leakage test would result in hardship without a compensating increase in the level of quality and safety due to the following: Special valve lineup required for the test adds unnecessary challenge to the system configuration. There are no test connections between the isolation valves. Consequently, a system pressure test would require opening the first manual isolation valve to test the second isolation valve.

The affected components are located inside containment. Tests performed inside the radiological-restricted area increase the total exposure to plant personnel while modifying and restoring system lineups, as well as contamination of test equipment. The licensee cites the following additional issues.

- Use of single valve isolation from systems with lower design pressures could result in over-pressurization of these systems and damage to permanent plant equipment.
- Use of single valve isolation is a significant personnel safety hazard.
- There are no test connections for testing the piping between motor-operated valves in the RHR system.

### 3.5 NRC Staff Evaluation

The licensee's Code of Record, 1989 Edition ASME Code, Section XI, Table IWB-2500-1, Category B-P, Item B15.51, requires hydrostatic testing of Class 1 pressure retaining piping once per 10-year interval. The NRC-approved Code Case N-498-4 allows a system leakage test in lieu of the Code-required system hydrostatic test conducted at or near the end of each inspection interval, prior to reactor startup. The system leakage test is required to be performed at a test pressure not less than the nominal operating pressure of the RCS corresponding to 100 percent rated reactor power and shall include all Class 1 components within the RCS boundary.

In relief requests ISIR-23, ISIR-24, and ISIR-25, the licensee proposed an alternative to the boundary subject to test pressurization required under the Code of Record or Code Case N-498-4, for the RCS vents and drains, and the piping segments in SI and RHR systems between an inboard and an outboard isolation valve in the system boundary. The line configuration, as outlined, provides double-isolation of the RCS. Under normal plant operating conditions, the subject pipe segments would see RCS temperature and pressure only if leakage through an inboard isolation valve occurs. As requested in ISIR-23, ISIR-24, and ISIR-25, with the inboard

isolation valve closed during the system leakage test, the segment of piping between an inboard and an outboard isolation valve would not get pressurized to the required test pressure during a system leakage test. In order to perform the ASME Code-required test, it would be necessary to manually open each inboard isolation valve to pressurize the corresponding pipe segment. Pressurization by this method would preclude double valve isolation of the RCS and may cause safety concerns for the personnel performing the examination. Alternatively, the line segments between the isolation valves could be separately pressurized to the required test pressure by a hydrostatic pump, but there are no test connections between the isolation valves to attach a pump.

The basis supporting the acceptability of the licensee's proposal, is that the segments of Class 1 pressure boundary between the inboard and outboard isolation valves in shutdown cooling and SI systems that are not tested to the Code-required test pressure would be pressure-tested at the associated system's operating pressure during the shutdown cooling system inservice test, and the SI system functional test during the refueling outage. Another mitigating factor in accepting the test pressure at system operating pressure in lieu of the Code-required test pressure is based on the fact that there is no known degradation mechanism, such as intergranular stress corrosion cracking, primary water stress-corrosion cracking, or thermal fatigue that is likely to affect the welds in the subject segments.

The subject isolation valves are located inside the containment, and any manual actuation (opening and closing) of these valves would expose plant personnel to undue radiation exposure during modification and restoration of system lineups. The staff concurs with the licensee's finding that compliance with the Code requirement would result in hardship without a compensating increase in the level of quality and safety.

The licensee has proposed an alternative to visually examine (VT-2) for leaks in the isolated portion of the subject segments of piping with the inboard and outboard isolation valves in the normally closed position which would indicate any evidence of past leakage during the operating cycle as well as any active leakage during the system leakage test if the inboard isolation valve leaks. The staff believes that the licensee's proposed alternative will provide reasonable assurance of structural integrity for the RCS vents, drains, and the piping segments in SI and RHR systems between an inboard and an outboard isolation valve including the valves while maintaining personnel radiation exposure to as low as reasonably achievable.

#### 4.0 CONCLUSION

Based on the above review and evaluation, the NRC staff concludes that test pressurization during system leakage tests of the Class 1 pressure retaining components within the system boundary of RCS vents, drains, fill lines, and instrument lines and piping segments in SI and RHR systems between an inboard and an outboard isolation valve including the valves as required under Code Case N-498-4 would result in hardship to the licensee without a compensating increase in the level of quality and safety.

The licensee's proposed alternative in ISIR-23, ISIR-24, and ISIR-25, provides reasonable assurance of structural integrity. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative in ISIR-23, ISIR-24, and ISIR-25 is authorized for the third 10-year ISI interval for the D.C. Cook Nuclear Plant, Units 1 and 2.

All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Prakash Patnaik

Date: February 18, 2009

February 18, 2009

J. Jensen

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The reliefs are authorized for the remainder of the third 10-year ISI interval which began on July 1, 1996, and is scheduled to end on February 28, 2010.

Sincerely,

**/RA/**

Lois M. James, Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-315 and 50-316

Enclosure:  
Safety Evaluation

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