ATTACHMENT 1

EGG-SD-7799

TECHNICAL EVALUATION REPORT ON THE SECOND 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN: INDIANA AND MICHIGAN ELECTRIC COMPANY, DONALD C. COOK NUCLEAR PLANT, UNIT 1, DOCKET NUMBER 50-315

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ABSTRACT

This report presents the results of the evaluation of the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval Inservice Inspection (ISI) Program Plan, Change 1, dated December 1985, including the requests for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI requirements which the Licensee has determined to be impractical. The Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI, (b) acceptability of examination sample, (c) exclusion criteria, and (d) compliance with ISI-related commitments identified during the Nuclear Regulatory Commission's (NRC) previous preservice inspection (PSI) and ISI reviews. The requests for relief from the ASME Code requirements which the Licensee has determined to be impractical for the second 10-year inspection interval are evaluated in Section 3 of this report.

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SUMMARY

The Licensee, Indiana and Michigan Electric Company, has prepared the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval Inservice Inspection (ISI) Program Plan to meet the requirements of the 1983 Edition, Summer 1983 Addenda (83S83) of the ASME Code Section XI except that the extent of examination for Code Class 1 and Code Class 2 piping welds has been determined by the 1974 Edition through Summer 1975 Addenda (74S75) as permitted and required by 10 CFR 50.55a(b). The second 10-year interval began July 1, 1986 and ends June 30, 1996.

The information in the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan, Change 1, dated December 1985, was reviewed, including the requests for relief from the ASME Code Section XI requirements which the Licensee has determined to be impractical. As a result of this review, a Request for Additional Information (RAI) was prepared describing the information and/or clarification required from the Licensee in order to complete the review.

Based on the review of the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan, the Licensee's response to the NRC's RAI, and the recommendations for the granting of relief from the ISI examination requirements that have been determined to be impractical, it has been concluded that the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan, Change 1, dated December 1985, is acceptable and in compliance with 10 CFR 50.55a(g)(4).

CONTENTS

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1. INTRODUCTION

Throughout the service life of a water-cooled nuclear power facility, 10 CFR 50.55a(g)(4) (Reference 1) requires that components (including supports) which are classified as American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Class 1, Class 2, and Class 3 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," (Reference 2) to the extent practical within the limitations of design, geometry, and materials of construction of the components. This section of the regulations also requires that inservice examinations of components and system pressure tests conducted during the second 120-month inspection interval shall comply with the requirements in the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months prior to the start of the second 120-month inspection interval, subject to the limitations and modifications listed therein. The components (including supports) may meet requirements set forth in subsequent editions and addenda of this Code which are incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein. The Licensee, Indiana and Michigan Electric Company, has prepared the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval Inservice Inspection (ISI) Program Plan, Change 1 (Reference 3), to meet the requirements of the 1983 Edition, Summer 1983 Addenda (83S83) of the ASME Code Section XI except that the extent of examination for Code Class 1 and Code Class 2 piping welds has been determined by the 1974 Edition through Summer 1975 Addenda (74S75) as permitted and required by 10 CFR 50.55a(b). The second 10-year interval began July 1, 1986 and ends June 30, 1996.

As required by 10 CFR 50.55a(g)(5), if the licensee determines that certain Code examination requirements are impractical and requests relief from them,

the licensee shall submit information and justifications to the Nuclear Regulatory Commission (NRC) to support that determination.

Pursuant to 10 CFR 50.55a(g)(6), the NRC will evaluate the licensee's determinations under 10 CFR 50.55a(g)(5) that Code requirements are impractical. The NRC may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life or 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 on the facility.

The information in the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan, through Change 1, dated December 1985, was reviewed, including the requests for relief from the ASME Code Section XI requirements which the Licensee has determined to be impractical. The review of the ISI Program Plan was performed using the Standard Review Plans of NUREG-0800 (Reference 4), Section 5.2.4, "Reactor Coolant Boundary Inservice Inspections and Testing", and Section 6.6, "Inservice Inspection of Class 2 and 3 Components."

In a letter dated February 2, 1987 (Reference 5), the NRC requested additional information that was required in order to complete the review of the ISI Program Plan. The requested information was provided by the Licensee in submittals dated April 10, 1987 (Reference 6) and June 1, 1987 (Reference 7).

The Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI, (b) acceptability of examination sample, (c) exclusion criteria, and (d) compliance with ISI-related commitments identified during the NRC's previous preservice inspection (PSI) and ISI reviews.

The requests for relief are evaluated in Section 3 of this report. Unless otherwise stated, references to the Code refer to the ASME Code, Section XI, 1983 Edition including Addenda through Summer 1983. Specific inservice test (IST) programs for pumps and valves are being evaluated in other reports.

2. EVALUATION OF INSERVICE INSPECTION PROGRAM PLAN

This evaluation consisted of a review of the applicable program documents to determine whether or not they are in compliance with the Code requirements and any license conditions pertinent to ISI activities. This section describes the submittals reviewed and the results of the review.

2.1 Documents Evaluated

Review has been completed on the following information provided by the Licensee:

(a) Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan, through Change 1, dated December 1985;

(b) Letter, dated April 10, 1987, Licensee's response to the NRC's RAI; and

(c) Letter, dated June 1, 1987, information the Licensee committed to in the April 10, 1987 letter.

2.2 Compliance with Code Requirements

2.2.1 Compliance with Applicable Code Editions

The Inservice Inspection Program Plan shall be based on the Code editions defined in 10 CFR 50.55a(g)(4) and 10 CFR 50.55a(b). Based on the starting date of July 1, 1986, the Code applicable to the second interval ISI program is the 1980 Edition with Addenda through Winter 1981. As stated in Section 1 of this report, the Licensee has written the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan, through Change 1, to meet the requirements of the 1983 Edition, Summer 1983 Addenda of the Code except that the extent of examination for Code Class 1 and Code Class 2 piping welds has been determined by the 1974 Edition through Summer 1975 Addenda as permitted and required by 10 CFR 50.55a(b). The use of 83S83 was approved by the NRC in a letter dated January 15, 1986 (Reference 8).

2.2.2 Acceptability of the Examination Sample

Inservice volumetric, surface, and visual examinations shall be performed on ASME Code Class 1, 2, and 3 components and their supports using sampling schedules described in Section XI of the ASME Code and 10 CFR 50.55a(b). Sample size and weld selection have been implemented in accordance with the Code and appear to be correct.

2.2.3 Exclusion Criteria

The criteria used to exclude components from examination shall be consistent with Paragraphs IWB-1220, IWC-1220, IWC-1230, IWD-1220, and 10 CFR 50.55a(b). The exclusion criteria have been applied by the Licensee in accordance with the Code as discussed in the ISI Program Plan and appear to be correct.

2.2.4 Augmented Examination Commitments

The following augmented examinations will be implemented during the second 10-year inspection interval:

(a) The Licensee has committed to volumetrically examine a 7.5% sample of welds in the Containment Spray System.

(b) Examinations for the Reactor Pressure Vessel are in compliance with Regulatory Guide 1.150, "Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examination" (Reference 9).

(c) Augmented examinations per Regulatory Guide 1.14, "Reactor Coolant Pump Flywheel Integrity" (Reference 10).

2.3 Conclusions

Based on the review of the documents listed above, it is concluded that the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval ISI Program Plan, through Change 1, dated December 1985, is acceptable and in compliance with 10 CFR 50.55a(g)(4).

3. EVALUATION OF RELIEF REQUESTS

The requests for relief from the ASME Code requirements which the Licensee has determined to be impractical for the second 10-year inspection interval are evaluated in the following sections.

3.1 Class 1 Components

3.1.1 Reactor Pressure Vessel (No relief requests)

3.1.2 Pressurizer (No relief requests)

3.1.3 Heat Exchangers and Steam Generators (No relief requests)

3.1.4 Piping Pressure Boundary (No relief requests)

3.1.5 Pump Pressure Boundary

3.1.5.1 Request for Relief 1, Examination Categories B-L-1, B-L-2, and B-G-1, Reactor Coolant Pump Casing Weld, Pump Casing Internal Surface, and Pump Flange Surface

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-L-1, Item B12.10 requires a 100% volumetric examination of the pressure retaining pump casing welds as defined by Figure IWB-2500-16.

Section XI, Table IWB-2500-1, Examination Category B-L-2, Item B12.20 requires a 100% visual (VT-3) examination of the internal surfaces of Class 1 pump casings.

Section XI, Table IWB-2500-1, Examination Category B-G-1, Item B6.190 requires a 100% visual (VT-1) examination of the flange surfaces of Class 1 pumps when connection is disassembled. Examination includes 1 inch annular surface of flange surrounding each stud.

Licensee's Code Relief Request: Relief is requested from performing the Code-required volumetric examination of pump casing weld 1-RCP and from performing the Code-required visual examinations of the internal surfaces of the pump casings and the surfaces of the pump flanges.

Licensee's Proposed Alternative Examination: The Licensee states that, in lieu of the requirements of Section XI for categories B-L-1 and B-L-2, a visual examination (VT-2) will be performed on the external surfaces of one pump during the hydrostatic pressure tests. In addition, a surface examination will be performed on this pump on the accessible external surface of the weld. If a pump has to be disassembled for maintenance, visual examinations will be made of the internal surfaces (VT-3) and the flange surface (VT-1) to satisfy the B-L-2 and B-G-1 Code requirements. The Licensee states that the need for the volumetric examination according to the B-L-1 requirement will be reevaluated at that time.

Licensee's Basis for Requesting Relief: The Licensee states that the substantial radiation exposure that inspection personnel will incur and the substantial costs involved do not justify the possible information that might be gained about the weld and adjacent base metal.

The pump casing is made from ASME SA-351, Grade CF-8M, a cast austenitic stainless steel that has a long history of satisfactory service in handling fluids. The casing was made in two sections to facilitate the casting process, and the two sections are welded together with a matching filler material. The material has good fracture toughness, and unlike ferritic steels, is not subject to fracture prevention criteria.

Volumetric and internal casing visual examination will require complete disassembly of the pump. Disassembly of the pump, storage of the internals, and placement of film for the many

radiographic exposures that will be required, will expose personnel to substantial radiation. From experience at other nuclear plants examining reactor coolant pumps, personnel exposure could be in the range between 35 to 100 man-rem. Flushing or shielding would not be expected to significantly reduce radiation levels. Based on costs incurred by other nuclear plants, this pump examination is estimated to cost about $500,000, which does not include costs associated with unit unavailability should this examination require extending an outage.

The Code-required examination will require disassembly of a pump under adverse conditions where there is a possibility of causing damage to the pump internals. There is no other reason to disassemble any of these pumps other than to perform these examinations. This examination will also require handling the reactor vessel upper internal assembly an additional time, as the upper internals will have to be put back into the reactor vessel to minimize airborne radiation during the pump examination.

Based on the foregoing, and the fact that Code relief was granted for the D.C. Cook reactor coolant pumps for the first interval, as was similarly granted for reactor coolant pumps in other nuclear plants, the Licensee believes that the radiation exposure and costs for this examination do not justify performing the volumetric and visual examinations to meet the requirements of Categories B-L-1, B-L-2, and B-G-1.

Evaluation: The visual examination is to determine whether unanticipated severe degradation of the casing is occurring due to phenomena such as erosion, corrosion, or cracking. However, previous experience during examination of pumps at other plants has not shown any significant degradation of pump casings. The concept of visual examination if the pump is disassembled for maintenance is acceptable. If the pump is disassembled for

maintenance, the Code-required volumetric examination of the pump casing weld should also be performed. The disassembly of the pumps solely for the purpose of inspection is a major effort and, in addition to the possibility of additional wear or damage to the internal surfaces of the pumps, could result in large amounts of radiation exposure to personnel. However, if one of the pumps is disassembled for maintenance, the casing weld, internal surfaces, and flange surface would be examined, in which case relief would not be required for that particular pump.

Conclusions: Based on the above evaluation, it is concluded that compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, it is recommended that: (a) The Licensee's proposal to perform the visual examination of the internal surfaces (VT-3) and the flange surface (VT-1) of the pumps, whenever they are made accessible due to disassembly for maintenance, should be accepted, provided that the Code-required volumetric examination of the pump casing weld is also performed; and (b) Relief should be granted at the end of the interval if one of the subject pumps, for which the visual and volumetric examinations are required, has not been disassembled for maintenance.

3.1.6 Valve Pressure Boundary (No relief requests)

3.1.7 General (No relief requests)

3.2 Class 2 Components

3.2.1 Pressure Vessels (No relief requests)

3.2.2 Piping

3.2.2.1 Request for Relief 2, Examination Category C-F, Item C5.21, Class 2 Pipe-to-Flued Head Welds

Code Requirement: Section XI, Table IWC-2500-1, Examination Category C-F, Item C5.21 requires a 100% surface and volumetric examination of the pressure retaining circumferential welds in Class 2 piping, greater than 1/2 inch nominal wall thickness, as defined by Figure IWC-2500-7.

Licensee's Code Relief Request: Relief is requested from performing the Code-required surface and volumetric examination of pipe-to-flued head weld 01S in the Feedwater System and flued head-to-pipe weld 12F in the Main Steam System.

Licensee's Proposed Alternative Examination: The Licensee states that, in lieu of the requirements of Section XI, the first accessible weld outside each penetration will be examined with the Code-required surface and volumetric examinations. This proposed alternative examination was used in the first 10-year interval.

Licensee's Basis for Requesting Relief: The Licensee states that the subject welds are totally enclosed within a penetration sleeve, and are inaccessible for examination. Since the inaccessible pipe-to-flued head weld thickness is substantially heavier than the proposed alternative weld to be examined and they are exposed to the same environment, the overall level of plant safety will not be reduced by performing the alternative examination.

Evaluation: The Licensee's submittal has been reviewed, including the drawing which shows the examination obstructions. The Code-required surface and volumetric examinations of the subject welds are impractical to perform because these welds are located inside containment penetrations and are completely inaccessible. Because the first accessible weld outside each penetration will receive the Code-required surface and volumetric examinations, sample size is maintained. The subject welds can only be examined by inspecting for evidence of leakage during system hydrostatic tests. Although these containment penetration welds cannot be viewed directly, the Licensee should conduct visual examinations for evidence of leakage in the vicinity of these welds when the hydrostatic pressure tests are performed.

Conclusions: Based on the above evaluation, it is concluded that the Code-required surface and volumetric examinations of the subject welds are impractical to perform and that the proposed alternative examination ensures an acceptable level of inservice structural integrity. Compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, it is recommended that relief be granted as requested provided that visual examinations are performed on the two containment penetration assemblies when leakage and hydrostatic tests are conducted in accordance with IWA-5000.

3.2.2.2 Request for Relief 3, Examination Category C-F, Item C5.21, Class 2 Pipe-to-Flued Head Welds

Code Requirement: Section XI, Table IWC-2500-1, Examination Category C-F, Item C5.21 requires a 100% surface and volumetric examination of the pressure retaining circumferential welds in Class 2 piping, greater than 1/2 inch nominal wall thickness, as defined by Figure IWC-2500-7.

Licensee's Code Relief Request: Relief is requested from performing the Code-required surface and volumetric examinations of pipe-to-flued head weld 10F in the Main Steam System.

Licensee's Proposed Alternative Examination: The Licensee states that, in lieu of the requirements of Section XI, one adjacent weld in one main steam line will be examined with the Code-required surface and volumetric examinations. This proposed alternative examination was used in the first 10-year interval.

Licensee's Basis for Requesting Relief: The Licensee states that the subject weld is inaccessible due to the large pipe whip restraint which surrounds the weld and adjacent area. Volumetric examination by ultrasonics is impractical because the weld cannot be reached for positioning and handling the transducer, and radiography is impractical because the exposure would have to be made through the restraint. Surface examination is impractical because the weld is not readily accessible for application and removal of penetrant or manipulation of magnetic particle equipment. Removal of the pipe whip restraints would require torch cutting 2400 and 2700-lb sections that are supported from above. The service conditions to which an adjacent weld is exposed should be nearly identical to that of the inaccessible weld, and thus the overall level of plant safety will not be reduced by performing the proposed alternative examination.

Evaluation: The Licensee's submittal has been reviewed, including the drawing which shows the examination obstructions. The Code-required surface and volumetric examinations of the subject weld are impractical because this weld (and adjacent area) is surrounded by a large whip restraint and is completely inaccessible. Because an adjacent weld will receive the Code-required surface and volumetric

examinations, sample size is maintained. The subject weld can be examined only by inspecting for evidence of leakage during system hydrostatic tests. Although this containment penetration weld cannot be viewed directly, the Licensee could conduct visual examinations for evidence of leakage in the vicinity of this weld when the hydrostatic pressure tests are performed.

Conclusions: Based on the above evaluation, it is concluded that the Code-required surface and volumetric examinations of the subject weld are impractical and that the proposed alternative examination ensures an acceptable level of inservice structural integrity. Compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, it is recommended that relief be granted as requested provided that visual examinations for evidence of leakage are performed in the vicinity of the covered weld when the Code-required leakage and hydrostatic tests are conducted.

3.2.3 Pumps (No relief requests)

3.2.4 Valves (No relief requests)

3.2.5 General (No relief requests)

3.3 Class 3 Components (No relief requests)

3.4 Pressure Tests

3.4.1 Class 1 System Pressure Tests

3.4.1.1 Request for Relief P2 (Part 1 of 2), System Hydrostatic Test of Class 1 Piping in the Chemical and Volume Control System

NOTE: See the evaluation of this request for relief in Section 3.4.4.1.

3.4.1.2 Request for Relief P4, System Hydrostatic Test of Class 1 Piping in the Emergency Core Cooling System

Code Requirement: Section XI, Article IWB-5000 requires that, for an operating pressure of 2235 psig, the Class 1 piping be tested at a pressure of 2458 psig.

Licensee's Code Relief Request: Relief is requested from performing the Code-required hydrostatic test of the following Class 1 piping sections in the Emergency Core Cooling System at the required test pressure of 2458 psig:

Valves IMO-51, SI-142L1 - Boron Injection Loop No. 1
Valves IMO-52, SI-142L2 - Boron Injection Loop No. 2
Valves IMO-53, SI-142L3 - Boron Injection Loop No. 3
Valves IMO-54, SI-142L4 - Boron Injection Loop No. 4

Licensee's Proposed Alternative Examination: The Licensee states that the subject sections of piping will be tested at a pressure of 2280 psig. The test will be performed during Mode 3 with the RCS pressure at 2280 psig and temperature greater than or equal to 500°F. The RCS pressure will be used to block check valves SI-142L1 through L4 closed; therefore, maximum pressure will be 2280 psig.

Licensee's Basis for Requesting Relief: The Licensee states that the sections of the piping system upstream of check valves SI-142L1 through L4 cannot be tested at a pressure of 2458 psig without making temporary modifications (blocking the valve disc) to keep the check valves closed. Since the piping sections are part of the primary system, plant personnel will be subjected to substantial radiation exposure and contamination in order to carry out such modifications for the test. The proposed test pressure is higher than the 2235 psig nominal operating pressure in the subject sections of piping, each approximately 44 to 55 feet long.

Evaluation: Because the system's design does not permit pressurizing the sections of piping to the Code-required pressure without extensive temporary valve modifications, the Code test pressure requirement is impractical. The visual inspection of the piping during the pressure test as well as the volumetric examination requirements for selected welds in the system will provide adequate assurance of the continued structural integrity of the piping. The difference in the required test pressure and that proposed by the Licensee does not warrant imposition of the Code requirement.

Conclusions: Based on the above evaluation, it is concluded that the Code requirements are impractical and that the alternative test proposed by the Licensee, in conjunction with the other NDE requirements, will ensure an acceptable level of inservice structural integrity. Compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, it is recommended that relief be granted as requested.

3.4.2 Class 2 System Pressure Tests

3.4.2.1 Request for Relief P1, System Hydrostatic Test of Class 2 Piping in the Emergency Core Cooling System

Code Requirement: Section XI, Article IWC-5000 requires that, for a system design pressure of 2485 psig, the Class 2 piping be tested at a pressure of 2733 psig.

Licensee's Code Relief Request: Relief is requested from performing the Code-required hydrostatic test of the following Class 2 piping sections in the Emergency Core Cooling System at the required test pressure of 2733 psig:

(a) Accumulator No. 1 Discharge Piping - Valves IMO-110, SI-166-1, IRV-115, and SI-168-1;

(b) Accumulator No. 2 Discharge Piping - Valves IMO-120, SI-166-2, IRV-125, and SI-168-2;

(c) Accumulator No. 3 Discharge Piping - Valves IMO-130, SI-166-3, IRV-135, and SI-168-3; and

(d) Accumulator No. 4 Discharge Piping - Valves IMO-140, SI-166-4, IRV-145, and SI-168-4.

Licensee's Proposed Alternative Examination: The Licensee states that the subject sections of piping will be tested at a pressure of 2280 psig. The test will be performed during Mode 3 with the RCS pressure at 2280 psig and temperature greater than or equal to 500°F. The RCS pressure will be used to block the check valves (SI-166-1, -2, -3, and -4) closed, therefore, limiting maximum pressure to 2280 psig.

Licensee's Basis for Requesting Relief: The Licensee states that the section of piping upstream of check valves SI-166-1 through 4 cannot be tested at a pressure of 2733 psig without making extensive temporary modifications to keep the valves closed. The modifications would require: (a) disassembly of the valves, (b) welding of temporary blocks (on the downstream side) inside the valve bodies to hold a "jack screw" type arrangement to keep the valve closed, (c) removal of the temporary blocking devices from the valves after testing, and (d) performing necessary nondestructive testing to ensure the integrity of the valve bodies before returning them to service. The piping downstream of these valves is part of the RHR System and carries radioactive fluid during normal operation. Therefore, plant personnel will be subjected to substantial radiation exposure and radioactive contamination in order to carry out any modifications for the test.

Evaluation: The system's design does not permit pressurizing the sections of piping to the Code-required pressure without either extensive temporary valve modifications or overpressurizing the Class 1 sections of connected piping.

Because of this, the test pressure requirement is impractical to attain. The sections of piping will be subjected to a pressure slightly higher than normal operating pressure and at a temperature higher than that required by the Code. The visual inspection of the piping during the pressure test as well as the volumetric examination requirements for selected welds in the system will provide adequate assurance of the continued structural integrity of the piping.

Conclusions: Based on the above evaluation, it is concluded that the Code requirements are impractical and that the alternative test proposed by the Licensee, in conjunction with the other NDE requirements, will ensure an acceptable level of inservice structural integrity. Compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, it is recommended that relief be granted as requested.

3.4.2.2 Request for Relief P2 (Part 2 of 2), System Hydrostatic Test of Class 2 Piping in the Chemical and Volume Control System

NOTE: See the evaluation of this request for relief in Section 3.4.4.1.

3.4.2.3 Request for Relief P3, System Hydrostatic Test of Class 2 Piping in the Chemical and Volume Control System

Code Requirement: Section XI, Article IWC-5000 requires that, for a design pressure of 2485 psig, the Class 2 piping be hydrostatically pressure tested at a pressure of 3106 psig.

Licensee's Code Relief Request: Relief is requested from performing the Code-required hydrostatic pressure test of the

Letdown Lines (Valves QRV-112, QRV-160, QRV-161, and QRV-162) in the Chemical and Volume Control System (Reactor Letdown and Charging) at the required test pressure of 3106 psig.

Licensee's Proposed Alternative Examination: The Licensee states that the subject section of piping will be tested at a pressure of 2280 psig during Mode 3 using RCS pressure. Valves QRV-111 and QRV-112 will be opened with QRV-160, QRV-161, and QRV-162 closed.

Licensee's Basis for Requesting Relief: The Licensee states that the subject section of piping cannot be tested at a pressure of 3106 psig without (a) using a spare one-inch plugged connection in Unit 1 piping located downstream of instrument QTA-160 in the regenerative heat exchanger room, which is considered a high radiation area, and (b) modification, since no test connection exists in Unit 2 piping. This piping carries radioactive fluid during normal operation; therefore, plant personnel will be subject to substantial radiation exposure and contamination in order to modify/add a test connection. As an alternative, extending the test boundary to QCR-301 was considered. This would involve using QPX-301 located on the downstream piping outside the regenerative heat exchanger room as a test connection. This alternative was also rejected because valve QCR-301 and the flange bolted to the inlet flange of safety valve SV-051 are in the 600-lb class which cannot withstand the above test pressure.

Evaluation: The system's design did not include a test connection to allow pressurizing to the Code test pressure or piping and valves rated appropriately to accommodate the required pressure at other isolation points in the system. In order to comply with the Code requirement, the Licensee would have to install a test connection or overpressurize lower rated piping and components. Therefore, the Code requirement is

impractical. The Licensee's proposed alternative test will subject the piping to a pressure slightly higher than normal operating pressure. The required visual inspection of the piping at the test pressure and other required NDE of the welds in the system will provide adequate assurance of the continued structural integrity of the piping.

Conclusions: Based on the above evaluation, it is concluded that the Code requirements are impractical and that the alternative test proposed by the Licensee, in conjunction with the other NDE requirements, will ensure an acceptable level of inservice structural integrity. Compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, it is recommended that relief be granted as requested.

3.4.2.4 Request for Relief P5, System Hydrostatic Test of Class 2 Piping in the Auxiliary Spray to Reactor Coolant System and Pressurizer, and Chemical and Volume Control System

Code Requirement: Section XI, Article IWC-5000 requires that, for a design pressure of 2735 psig, the Class 2 piping be tested at a pressure of 3419 psig.

Licensee's Code Relief Request: Relief is requested from performing the Code-required hydrostatic pressure test of the Class 2 piping sections described by the following piping boundaries at the required test pressure of 3419 psig:

Valves QRV-51	CS-326
Valves QRV-61	CS-322
Valves QRV-62	

Licensee's Proposed Alternative Examination: The Licensee states that the subject sections of piping will be tested at a pressure of 2800 psig using a "stem block" to keep valve QRV-51 closed.

Licensee's Basis for Requesting Relief: The Licensee states that, in order to perform the pressure test of these sections of piping, valve QRV-51 has to be used as an isolation valve. This 1500-lb class, air-operated control valve is designed to withstand test pressure of 3419 psig in the open position. However, it cannot be used as an isolation valve because it was designed for a differential pressure of 1200 psig.

The valve cannot be kept closed during pressure testing at 3419 psig without extensive, temporary rigging. The modification would require: (a) removal of the air operator and installation of a "strong back" to keep the valve closed during testing, (b) removal of the "strong back" after the testing, and (c) reinstallation of the air operator on the valve and restoring the valve to operable condition before returning to service. The valve is located inside the regenerative heat exchanger room, which is a very high radiation area and plant personnel would be subjected to radiation exposure of five to seven man-rems.

As an alternative, the possibility of using a freeze seal plug downstream of QRV-51 was considered. This would involve extensive working time close to the pressurizer spray valves, which are in a high radiation area. This alternative was rejected because plant personnel would be subject to an even higher radiation exposure of 8.5 man-rems during formation, monitoring, and removal of the freeze seal plug.

Evaluation: The above piping system cannot be tested to ASME Code requirements without modifying the system and/or exposing personnel to large amounts of radiation. The proposed test pressure is higher than the normal operating pressure of 2235 psig in the approximately 30-foot-long section of piping for which Code relief is requested. The proposed test pressure is 25% above the normal operating pressure. Thus, the test provides reasonable assurance of the integrity of the piping.

Conclusions: Based on the above evaluation, it is concluded that the Code requirements are impractical and that the alternative test proposed by the Licensee, in conjunction with the other NDE requirements, will ensure an acceptable level of inservice structural integrity. Compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, it is recommended that relief be granted as requested.

3.4.3 Class 3 System Pressure Tests (No relief requests)

3.4.4 General

3.4.4.1 Request for Relief P2, System Hydrostatic Test of Class 1 and 2 Piping in the Chemical and Volume Control System

Code Requirement: Section XI, Article IWB-5000 requires that, for an operating pressure of 2235 psig, the Class 1 piping be tested at a pressure of 2458 psig.

Section XI, Article IWC-5000 requires that, for a design pressure of 2735 psig, the Class 2 piping be tested at a pressure of 3419 psig.

Licensee's Code Relief Request: Relief is requested from performing the Code-required hydrostatic test of the following Class 1 and 2 piping sections in the Chemical and Volume Control System (Reactor Letdown and Charging) at the Code-required test pressures of 2458 and 3419 psig:

(a) Class 1 piping: Two-inch Auxiliary Spray Piping - Valves QRV-51 and CS-325;

(b) Class 2 piping: Normal Charging Loop 4 Cold Leg - Valves QRV-62, CS-328L4, CS-326, and CS-327;

(c) Class 2 piping: Alternate Charging Line to Loop 1 Cold Leg - Valves QRV-61 and CS-328L1.

Licensee's Proposed Alternative Examination: The Licensee states that the subject sections of piping will be tested at a pressure of 2280 psig at a temperature above 100°F. The test will be performed during Mode 3 with the Reactor Coolant System (RCS) pressure at 2280 psig and temperature greater than or equal to 500°F. The RCS pressure will be used to block the check valves CS-329L1, CS-329L4, and CS-325 closed; therefore, maximum pressure will be 2280 psig.

Licensee's Basis for Requesting Relief: The Licensee states that check valves CS-328L1, CS-328L4, and CS-325 are located on the charging lines to the RCS System. These valves must be disassembled and temporarily modified to block them closed in order to perform the required hydrostatic tests, and plant personnel will be exposed to high radiation and radioactive contamination during the modification. The proposed test pressure is higher than 2235 psig nominal operating pressure in the section of piping between 23 and 115 feet long for which relief is requested.

Evaluation: The system's design does not permit pressurizing the sections of piping to the Code-required pressure without either extensive temporary valve modifications or overpressurizing the Class 1 sections of connected piping. Because of this, the Code-required test pressure is impractical to attain. The sections of piping will be subjected to a pressure slightly higher than normal operating pressure and at a temperature higher than that required by the Code. The visual inspection of the piping during the pressure test, as well as the volumetric examination requirements for selected welds in the systems, will provide adequate assurance of the continued structural integrity of the piping.

Conclusions: Based on the above evaluation, it is concluded that the Code requirements are impractical and that the alternative test proposed by the Licensee, in conjunction with the other NDE requirements, will ensure an acceptable level of inservice structural integrity. Compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, it is recommended that relief be granted as requested.

3.5 General (No relief requests)

4. CONCLUSION

Pursuant to 10 CFR 50.55a(g)(6), it has been determined that certain Section XI required inservice examinations are impractical to perform. In these cases, the Licensee has demonstrated that either the proposed alternatives would provide an acceptable level of quality and safety or that compliance with the requirements would result in hardships or unusual difficulties without a compensating increase in the level of quality and safety.

This technical evaluation report has not identified any practical method by which the existing Donald C. Cook Nuclear Plant, Unit 1, can meet all the specific inservice inspection requirements of Section XI of the ASME Code. Requiring compliance with all the exact Section XI required inspections would require redesign of a significant number of plant systems, sufficient replacement components to be obtained, installation of the new components, and a baseline examination of these components. Even after the redesign efforts, complete compliance with the Section XI examination requirements probably could not be achieved. Therefore, it is concluded that the public interest is not served by imposing certain provisions of Section XI of the ASME Code that have been determined to be impractical. Pursuant to 10 CFR 50.55a(g)(6), relief is allowed from these requirements which are impractical to implement.

The development of new or improved examination techniques will continue to be monitored. As improvements in these areas are achieved, the NRC may require that these techniques be incorporated in the next inspection interval ISI program plan examination requirements.

Based on the review of the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan, Change 1, dated December 1985, the Licensee's responses to the NRC's Request for Additional Information, and the recommendations for granting relief from the ISI examination requirements that have been determined to be impractical, it has been concluded that the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan, Change 1, dated December 1985, is acceptable and in compliance with 10 CFR 50.55a(g)(4).

5. REFERENCES

1. Code of Federal Regulations, Volume 10, Part 50.

2. American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Division 1:

   1983 Edition through Summer 1983 Addenda
   1974 Edition through Summer 1975 Addenda

3. Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan, Change 1, dated December 1985.

4. NUREG-0800, Standard Review Plans, Section 5.2.4, "Reactor Coolant Boundary Inservice Inspection and Testing," and Section 6.6, "Inservice Inspection of Class 2 and 3 Components," July 1981.

5. Letter, February 2, 1987, B.J. Youngblood (NRC) to J.E. Dolan [Indiana and Michigan Electric Company (IMEC)], "Request for Additional Information for Review of the Donald C. Cook Nuclear Plant, Units 1 and 2, Second 10-Year Interval Inservice Inspection Program Plans, Change 1, dated December 1985."

6. Letter, April 10, 1987, M.P. Alexich (IMEC) to H.R. Denton (NRC), "Response to Request for Additional Information on the ISI Second 10-Year Interval Weld Program for the Donald C. Cook Nuclear Plant, Units 1 and 2."

7. Letter, June 1, 1987, M.P. Alexich (IMEC) to T.E. Murley (NRC), "Response to Request for Additional Information on the ISI Second 10-Year Interval Weld Program for the Donald C. Cook Nuclear Plant, Units 1 and 2."

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9. Regulatory Guide 1.150, "Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations," Revision 1, dated February 1983.

10. Regulatory Guide 1.14, "Reactor Coolant Pump Flywheel Integrity," Revision 1, dated August 1975.

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13 ABSTRACT (200 words or less)

This report presents the results of the evaluation of the Donald C. Cook Nuclear Plant, Unit 1, Second 10-Year Interval Inservice Inspection (ISI) Program Plan, Change 1, dated December 1985, including the requests for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI requirements which the Licensee has determined to be impractical. In Section 2 of this report, the ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI, (b) acceptability of the examination sample, (c) exclusion criteria, and (d) compliance with ISI-related commitments identified during the Nuclear Regulatory Commission's (NRC) previous preservice inspection (PSI) and ISI reviews. The requests for relief from the ASME Code requirements which the Licensee has determined to be impractical for the first 10-year inspection interval are evaluated in Section 3 of this report.

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