



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
OF THE
THIRD TEN-YEAR INSERVICE INSPECTION PROGRAM PLAN
REQUESTS FOR RELIEF RR-1-17 AND RR-2-21
FOR
WISCONSIN ELECTRIC POWER COMPANY
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NUMBERS: 50-266 AND 50-301

1.0 INTRODUCTION

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

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2 and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 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, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the Point Beach Nuclear Plant, Units 1 and 2 third 10-year inservice inspection (ISI) interval is the 1986 Edition. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement.

ENCLOSURE 1

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

By letter dated, March 1, 1996, Wisconsin Electric Power Company proposed alternatives to the ASME Code in Requests for Relief Nos. RR-1-17 and RR-2-21 for Point Beach Nuclear Plant, Units 1 and 2. The licensee provided additional information in its letters dated December 6, 1996, and January 22, 1997.

2.0 EVALUATION

The staff, with technical assistance from its contractor, the Idaho National Engineering Laboratory (INEL), has evaluated the information provided by the licensee in support of its alternatives contained in Requests for Relief Nos. RR-1-17 and RR-2-21 for Point Beach Nuclear Plant, Units 1 and 2. Based on the information submitted, the staff adopts the contractor's conclusions and recommendations presented in the Technical Letter Report (TLR) attached (Enclosure 2).

In the licensee's Request for Relief RR-1-17 the Code requires a volumetric examination of the inner 1/3 of the weld and a surface examination for Category B-F welds for Welds RC-32-MRCL-AIII-03 and RC-32-MRCL-BII-03. The licensee proposed, as an alternative to the surface examination, to perform a remote ultrasonic testing (UT) examination of the welds from the bore using mechanized UT techniques to detect outside diameter (O.D.) surface cracking. The subject welds are located inside the primary reactor shield cavity. Manual surface examination would result in personnel exposure of approximately 640 milli-Rem (mrem) per weld, while the proposed volumetric examination (UT) can be performed using remote UT techniques and equipment resulting in a savings of approximately 1250 mrem for the 10-year interval.

The licensee proposed that it will demonstrate the UT procedures, techniques, and personnel are capable of detecting surface-connected flaws using volumetric techniques that comply with ASME Codes and Standards. The licensee's examination technique will be qualified using calibration standards with O.D. surface-induced cracks as opposed to surface notches.

The staff determined that the proposed alternative volumetric examination will provide an acceptable level of quality and safety. The ultrasonic examination technique, when demonstrated to be capable of detecting O.D. surface-connected cracks, is comparable to the ASME Code surface examination.

For Request for Relief RR-2-21 the Code requires that for Examination Category B-F, Item B5.130, a volumetric and surface examination of Class 1 dissimilar metal butt weld piping, NPS [nominal pipe size] 4 inches or larger, as defined by Figure IWB-2500-8. The subject welds are located inside the primary reactor shield cavity. Manual surface examination would result in personnel exposure of approximately 640 milli-Rem (mrem) per weld, while the proposed

volumetric examination can be performed using remote UT techniques and equipment, resulting in a savings of approximately 2560 mrem for the 10-year interval.

The licensee proposes, as an alternative to the surface examination, to perform a remote UT examination of the welds from the bore using mechanized UT techniques to detect O.D. surface cracking. The licensee will demonstrate that the UT procedures, techniques, and personnel are capable of detecting O.D. surface-connected flaws using volumetric techniques that comply with ASME Codes and Standards. The licensee's examination technique will be qualified using calibration standards with O.D. surface-induced cracks as opposed to surface notches.

The staff determined that the proposed alternative volumetric examination will provide an acceptable level of quality and safety. The ultrasonic examination technique, when demonstrated to be capable of detecting O.D. surface-connected cracks, is comparable to the ASME Code surface examination.

3.0 CONCLUSION

The staff concludes that the proposed alternatives contained in Requests for Relief RR-1-17 and RR-2-21 provide an acceptable level of quality and safety, when the ultrasonic examination technique, is demonstrated to be capable of detecting O.D. surface-connected cracks and that it is comparable to the ASME Code surface examination. Therefore, the licensee's proposed alternative examinations contained in Requests for Relief RR-1-17 and RR-2-21 provide an acceptable level of quality and safety and are authorized pursuant to 10 CFR 50.55a(a)(3)(i).

Principal Contributor: T. McLellan

Date: April 10, 1997

TECHNICAL LETTER REPORT
ON THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL
PROPOSED ALTERNATIVES RR-1-17 AND RR-2-21
FOR
WISCONSIN ELECTRIC POWER COMPANY
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NUMBERS: 50-266 AND 50-301

1.0 INTRODUCTION

By letter dated March 1, 1996, the licensee, Wisconsin Electric Power Company, submitted proposed alternatives RR-1-17 and RR-2-21 for Point Beach Nuclear Plant, Units 1 and 2. By letter dated January 22, 1997, the licensee submitted information describing a commitment to perform a demonstration of ultrasonic testing instrumentation and procedures for detecting surface connected flaws. A subsequent telephone conference call, on February 11, 1997, was required to confirm that the demonstrated capability was to be on outside diameter (O.D.) surface flaws. The Idaho National Engineering Laboratory (INEL) staff evaluated these proposed alternatives in the following sections.

2.0 EVALUATION

The Code of record for the Point Beach Nuclear Plant, Units 1 and 2, third 10-year inservice inspection intervals, which began in December 1990 and November 1993, respectively, is the 1986 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. The information provided by the licensee in support of the proposed alternatives from Code requirements has been evaluated and the bases for disposition are documented below.

- a) Proposed Alternative RR-1-17, Examination Category B-F,
Item B5.130, Dissimilar Metal Butt Welds in Class 1 Pressure-
Retaining Piping (Unit 1)

Code Requirement: Examination Category B-F, Item B5.130, requires volumetric and surface examination of Class 1 dissimilar metal butt weld piping, NPS 4 inches or larger, as defined by Figure IWB-2500-8.

Licensee's Proposed Alternative Examination: In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed an alternative to performing the Code-required surface examination of the following welds:

<u>Weld ID</u>	<u>Description</u>
RC-32-MRCL-AIII-03	Reactor Vessel Nozzle Pipe Weld
RC-32-MRCL-BIII-03	Reactor Vessel Nozzle Pipe Weld

"No surface exam will be performed from the outside diameter (O.D.) surface. Perform volumetric examination from bore utilizing mechanized UT techniques. The examination technique utilized will examine the required volume for volumetric examination and will be capable of detecting surface indications. The examination process (i.e. equipment and procedures) will be demonstrated capable of detecting O.D. surface connected, circumferentially oriented defects. Appropriate calibration standards will be fabricated and O.D. surface cracks induced for qualification in lieu of machined notches."

Licensee's Basis for Proposing the Alternative (as stated): "To perform surface examination of this weld from the outside diameter surface will result in excessive radiation exposure and exposure of personnel to potentially unsafe conditions. The proposed alternate examination still meets the intent of the examination area in figure IWB-2500-8 of ASME Section XI and will eliminate the radiation exposure and potentially unsafe conditions.

"To perform a surface examination of these welds from the outside diameter of the weld requires removal of a refueling cavity access cover, shielding plug over weld and insulation surrounding the weld. The examination must then be performed by lowering an NDE examiner into the resultant confined space/high radiation area for the duration of the surface exam.

"The radiation exposure associated with this examination is approximately 640 mrem per weld based on past examinations. The dose associated with this process is broken down as follows:

• Remove refueling cavity cover and remove shield plug -	30 mrem
• Remove insulation around weld -	100 mrem
• Perform surface examination -	380 mrem
• Reinstall insulation -	100 mrem
• Replace plug and refueling cavity cover -	30 mrem
TOTAL	640 mrem

"These examination techniques utilized radiation techniques such as exiting the area and utilizing shielding during dwell times of the surface examination, the alternate examination technique would reduce the radiation exposure approximately 1250 mrem (both welds).

"The personnel safety hazards associated with this examination include those hazards associated with confined spaces (poor air quality, etc.), high temperatures with the potential of heat fatigue, and general industrial safety associated with entering, exiting, and working in a confined space where lighting is poor.

"The proposed alternate examination will be performed remotely and will essentially eliminate the radiation exposure and personnel safety concerns. The proposed examination technique will be performed utilizing procedures, techniques, and personnel that comply with ASME Codes and Standards and will be capable of detecting surface indications using volumetric techniques."

Evaluation: For the subject Category B-F welds, Section XI of the ASME Code requires a volumetric examination of the inner 1/3 of the weld and a surface examination.

The subject welds are located inside the primary reactor shield cavity. Manual surface examination would result in personnel exposure of approximately 640 milli-Rem (mrem) per weld, while the proposed volumetric examination (UT) can be performed using remote UT techniques and equipment resulting in a savings of approximately 1250 mrem for the ten-year interval.

The licensee proposes, as an alternative to the surface examination, to perform a remote UT examination of the welds from the bore using mechanized UT techniques to detect O.D. surface cracking. The licensee will demonstrate that the UT procedures,

techniques, and personnel are capable of detecting surface-connected flaws using volumetric techniques that comply with ASME Codes and Standards. The licensee's examination technique will be qualified using calibration standards with O.D. surface-induced cracks as opposed to surface notches.

The INEL staff believes that the proposed alternative volumetric examination will provide an acceptable level of quality and safety. The ultrasonic examination technique, when demonstrated to be capable of detecting O.D. surface-connected cracks, is comparable to the ASME Code surface examination. Therefore, we recommend that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

- b) Proposed Alternative RR-2-21, Examination Category B-F,
Item B5.130, Dissimilar Metal Butt Welds in Class 1 Pressure-
Retaining Piping (Unit 2)

Code Requirement: Examination Category B-F, Item B5.130, requires volumetric and surface examination of Class 1 dissimilar metal butt weld piping, NPS 4 inches or larger, as defined by Figure IWB-2500-8.

Licensee's Proposed Alternative Examination: In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed an alternative to performing the Code-required surface examination of the following welds:

<u>Weld ID</u>	<u>Description</u>
RC-32-MRCL-AIII-03	Reactor Vessel Nozzle Pipe Weld
RC-32-MRCL-BIII-03	Reactor Vessel Nozzle Pipe Weld
RC-34-MRCL-AI-01	Reactor Vessel Nozzle Pipe Weld
RC-34-MRCL-BI-01	Reactor Vessel Nozzle Pipe Weld

"No surface exam will be performed from the outside diameter (O.D.) surface. Perform volumetric examination from bore utilizing mechanized UT techniques. The examination technique utilized will examine the required volume for volumetric examination and will be capable of detecting surface indications. The examination process (i.e. equipment and procedures) will be

demonstrated capable of detecting O.D. surface connected, circumferentially oriented defects. Appropriate calibration standards will be fabricated and O.D. surface cracks induced for qualification in lieu of machined notches."

Licensee's Basis for Proposing the Alternative (as stated): "To perform surface examination of this weld from the outside diameter surface will result in excessive radiation exposure and exposure of personnel to potentially unsafe conditions. The proposed alternate examination still meets the intent of the examination area in figure IWB-2500-8 of ASME Section XI and will eliminate the radiation exposure and potentially unsafe conditions.

"To perform a surface examination of these welds from the outside diameter of the weld requires removal of a refueling cavity access cover, shielding plug over weld and insulation surrounding the weld. The examination must then be performed by lowering an NDE examiner into the resultant confined space/high radiation area for the duration of the surface exam.

"The radiation exposure associated with this examination is approximately 640 mrem per weld based on past examinations. The dose associated with this process is broken down as follows:

• Remove refueling cavity cover and	
remove shield plug -	30 mrem
• Remove insulation around weld -	100 mrem
• Perform surface examination -	380 mrem
• Reinstall insulation -	100 mrem
• Replace plug and refueling cavity cover -	30 mrem
TOTAL	640 mrem

"These examination techniques utilized radiation techniques such as exiting the area and utilizing shielding during dwell times of the surface examination, the alternate examination technique would reduce the radiation exposure approximately 1250 mrem.

"The personnel safety hazards associated with this examination include those hazards associated with confined spaces (poor air quality, etc.), high temperatures with the potential of heat fatigue, and general industrial safety associated with entering, exiting, and working in a confined space where lighting is poor.

"The proposed alternate examination will be performed remotely and will essentially eliminate the radiation exposure and personnel safety concerns. The proposed examination technique will be performed utilizing procedures, techniques, and personnel that comply with ASME Codes and Standards and will be capable of detecting surface indications using volumetric techniques."

Evaluation: For the subject Category B-F welds, Section XI of the ASME Code requires a volumetric examination of the inner 1/3 of the weld and a surface examination.

The subject welds are located inside the primary reactor shield cavity. Manual surface examination would result in personnel exposure of approximately 640 milli-Rem (mrem) per weld, while the proposed volumetric examination can be performed using remote UT techniques and equipment, resulting in a savings of approximately 2560 mrem for the ten-year interval.

The licensee proposes, as an alternative to the surface examination, to perform a remote UT examination of the welds from the bore using mechanized UT techniques to detect O.D. surface cracking. The licensee will demonstrate that the UT procedures, techniques, and personnel are capable of detecting O.D. surface-connected flaws using volumetric techniques that comply with ASME Codes and Standards. The licensee's examination technique will be qualified using calibration standards with O.D. surface-induced cracks as opposed to surface notches.

The INEL staff believes that the proposed alternative volumetric examination will provide an acceptable level of quality and safety. The ultrasonic examination technique, when demonstrated to be capable of detecting O.D. surface-connected cracks, is comparable to the ASME Code surface examination. Therefore, we recommend that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3.0 CONCLUSION

The INEL staff evaluated proposed alternatives RR-1-17 for Unit 1 and RR-2-21 for Unit 2. The proposed alternative examinations will provide an acceptable level of quality and safety, therefore, it is recommended that these alternatives be authorized, pursuant to 10 CFR 50.55a(a)(3)(i).