



Point Beach Nuclear Plant  
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NPL 98-0931

November 2, 1998

Document Control Desk  
US NUCLEAR REGULATORY COMMISSION  
Mail Station P1-137  
Washington, DC 20555

Ladies/Gentleman:

DOCKET 50-301  
ASME SECTION XI RELIEF REQUEST RR-2-24  
POINT BEACH NUCLEAR PLANT UNIT 2

In accordance with 10 CFR 50.55a(a)(3)(i), Wisconsin Electric Power Company requests relief from Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, "Rules for Inservice Examination of Nuclear Power Plant Components," 1986 edition, no addenda.

The requirements for which relief is requested apply to the third inservice inspection interval for Point Beach Nuclear Plant, Unit 2. The third interval for Unit 2 began in December, 1992.

Attached relief request RR-2-24 proposes an alternative to ASME Code Section XI requirement IWA-2232 to use the Performance Demonstration Initiative (PDI) during the Unit 2 reactor pressure vessel examination in the third inservice inspection interval. The Unit 2 reactor pressure vessel inspection is currently to begin in early December 1998.

Sincerely,

A handwritten signature in black ink, appearing to read 'Vito A. Kaminskas', is written over the typed name.

Vito A. Kaminskas  
Manager,  
Regulatory Services & Licensing

Aφ47

Attachments

cc: NRC Resident Inspector  
NRC Project Manager

NRC Regional Administrator

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PDR ADOCK 05000301  
G PDR

ATTACHMENT 1  
RELIEF REQUEST RR-2-24

COMPONENTS

Reactor Vessel welds as listed below:

<u>Component Designation</u>	<u>Component Description</u>
a) RPV-15-683	Upper Shell to Middle Shell
b) RPV-16-683	Middle Shell to Lower Shell
c) RPV-17-683	Lower Shell to Lower Head Ring
d) RPV-18-683	Lower Head Ring to Lower Head
e) RPV-14-683-A	Shell to Flange (Az 0-180)
f) RPV-14-683-B	Shell to Flange (Az 180-360)
g) RPV-2-686-A	Shell to Outlet Nozzle at 28.5 deg
h) RPV-2-686-B	Inlet Nozzle to Shell at 148.5 deg
i) RPV-2-686-C	Shell to Outlet Nozzle at 208.5 deg
j) RPV-2-686-D	Inlet Nozzle to Shell at 328.5 deg
k) RPV-687-01-A	SI Nozzle to Shell at 288.5 deg
l) RPV-687-01-B	SI Nozzle to Shell at 108.5 deg

EXAM AREAS

IWB-2500-1  
IWB-2500-3  
IWB-2500-4  
IWB-2500-7

ISOMETRIC OR COMPONENT DRAWING

ISI-PRI-2101

ASME SECTION XI CATEGORY

B-A - welds (a) through (f) above  
B-D - welds (g) through (l) above

ASME SECTION XI ITEM NUMBER

B1.11 - welds (a) and (b) above  
B1.21 - welds (c) and (d) above  
B1.30 - welds (e) and (f) above  
B3.90 - welds (g) through (l) above

### ASME SECTION XI REQUIREMENT

ASME Section XI 1986 Edition, no addenda, Table IWB-2500-1 requires volumetric examination for these welds. The requirements for volumetric examinations are stated in Article IWA-2232, which states that examinations be conducted in accordance with Article 4 of ASME Code, Section V, as amended by ASME Code, Section XI.

### ALTERNATIVE REQUIREMENT

Examination procedures, equipment and personnel qualified by performance demonstration will be utilized in accordance with the Performance Demonstration Initiative (PDI) program, in combination with ASME Code Section V, Article 4 techniques. The following techniques will be utilized for the proposed welds:

- 1) Welds (a) through (d) above will be examined with PDI techniques only.
- 2) Welds (e) and (f) above will be examined from the seal surface using ASME Code techniques for detection of flaws parallel to the weld plane. Examination for transverse and parallel flaws will be conducted from the vessel inside surface using PDI techniques.
- 3) Welds (g) through (l) above will be examined with PDI techniques from the vessel wall for detection of transverse reflectors. For detection of flaws that are parallel to the weld, examinations will be conducted from the nozzle bore using ASME Code techniques.

As a minimum, all Code requirements of the 1986 Edition, no addenda, of Section XI will be implemented, except where specific differences are identified above. In addition, it is our intention that the proposed alternative examinations satisfy the 10 CFR 50.55a(g)(6)(ii)(A) "Augmented" reactor pressure vessel (RPV) inspection requirements.

Attachment 2 provides a comparison of the proposed PDI technique for Point Beach Nuclear Plant and the standard ASME Code Section V, Article 4, and Regulatory Guide 1.150 procedures.

### REASON FOR PROPOSED ALTERNATE REQUIREMENT

The PDI program was developed by the nuclear industry to manage implementation of the performance demonstration criteria of Appendix VIII, Section XI of the ASME Code, 1992 Edition, 1993 Addenda. Appendix VIII was developed to ensure the effectiveness of the ultrasonic (UT) examinations within the nuclear industry by means of a rigorous, item-specific, performance demonstration. The performance demonstration requires that equipment, procedures and examiners be tested on flawed and notched materials and configurations similar to those found in actual plant conditions. Hence, performance-based UT techniques provide a higher degree of reliability for the detection and characterization of flaws when compared to the conventional amplitude-based UT techniques that is required by current Code of record for Point Beach Nuclear Plant.



Wisconsin Electric Power Company has contracted with Southwest Research Institute (SwRI) to perform the third 10-year reactor vessel examination using a combination of the PDI Program qualified techniques and ASME Section V, Article 4 techniques. SwRI's procedures were qualified in accordance with the PDI program covering Supplements 4, "Qualification Requirements for the Clad/Base Metal Interface of Reactor Vessel," and 6, "Qualification Requirements for Reactor Vessel Welds Other than Clad/Base Metal Interface," of ASME Code Section XI, Appendix VIII. Both double- and single-sided approaches were qualified for Supplement 4 applications and for Supplement 6 applications up through 12-inch wall thickness. (Southwest Research Institute's PDI certification is on file at the Electric Power Research Institute Non-Destruction Examination Center in Charlotte, NC.)

Southwest Research Institute's PDI detection procedure utilizes two types of search units (55-degree, multibeam) when scanning can be accomplished from two sides of the weld, and three types of search units (45, 55 and multibeam) when scanning can only be accomplished from one side of the weld. The multibeam search unit is used to examine the inner 25-percent thickness. The 45- and 55-degree shearwave search units are used to examine the outer 75 percent. A 0-degree search unit may also be used to detect laminar reflectors and determine component thickness. (Wisconsin Electric has instructed SwRI to scan from two sides of each weld whenever possible.) Scanning is performed:

(1) Perpendicular to the weld for flaws orientated parallel to the weld; and (2) parallel to the weld for flaws oriented perpendicular (transverse) to the weld. Flaw discrimination methods are independent of signal amplitude. Scanning sensitivities are determined based on the actual material noise.

Analysis and sizing of indications are performed by qualified Level III data analysts using SwRI procedures.

## COMPARISON OF REACTOR PRESSURE VESSEL SHELL WELD EXAMINATION TECHNIQUES

Description (Code Reference)	Standard Section V, XI, Regulatory Guide 1.150 Procedure	SwRI PDI/Appendix VIII Qualified Procedure
Examination Angles (Section V, T-441)	Four transducers required to perform the detection scans 0°, 45°, and 60°, plus a multibeam transducer for clad-to-base metal interface (Regulatory Guide 1.150 requirement) is used.	Two types of search units; a multibeam search unit and 55° search unit are used to perform the double sided detection examinations.  Three types of search units, multibeam, 45° and 55° are used for single-sided detection examinations. The multibeam search units are used to examine the near surface; and the 45° and 55° search units are used to examine the remainder of the wall. These examination angles were successfully qualified under the PDI protocol using the PDI program test blocks.
Instrument Calibrations (Section V, T-431, Section XI, IWA-2232)	Section V requires that instrument screen height and amplitude control linearity be evaluated at least every three months. Section XI requires that these linearity checks be performed before and after the examinations performed during one outage.	SwRI's PDI-qualified procedure does not require that linearity checks be performed on site before and after examinations because amplitude linearity is not relied upon for evaluation of flaws. SwRI does perform instrument linearity checks at least every 6 months as part of the maintenance and instrument certification process.
System Calibrations (Section V, T-432)	Requires that the original system calibration be performed on the Code basic calibration block. It allows the use of different types of reference blocks and electronic simulators to perform system calibration verifications.	One calibration standard is used for the multibeam search unit and another standard is used for the 45° and 55° search units. These standards contain a series of side drilled holes and are used to establish a calibrated time base and initial sensitivity. Periodic sweep calibration checks are made and sensitivity checks are made on the vessel wall.

## COMPARISON OF REACTOR PRESSURE VESSEL SHELL WELD EXAMINATION TECHNIQUES

Description (Code Reference)	Standard Section V, XI, Regulatory Guide 1.150 Procedure	SwRI PDI/Appendix VIII Qualified Procedure
Scanning Sensitivity (Section V, T-424)	Scanning is performed at the reference level sensitivity when electronic distance amplitude correction (DAC) is used for automated examinations.	Initial sensitivity is increased, if necessary, until background noise from the material in the examination area equals a level specified in the qualified procedure. This method of determining scanning sensitivity was successfully qualified under the PDI protocol using the PDI program test blocks.
Recording Level (Section V, T-441)	Section V requires recording and evaluation of 50% DAC. Regulatory Guide 1.150 requires recording and evaluation at 20% DAC for the inner 25% of material thickness.	No amplitude thresholds are used. Data are recorded and evaluated independently of signal amplitude. This evaluation method was successfully qualified under the PDI protocol using the PDI test blocks.
Scan Index, Pulse Repetition Rate (Section V, T-424 and Section XI, IWA-2232)	Section V requires a minimum increment overlap of 10% of the dimension of the piezoelectric element between scans. Section XI requires 50% overlap when not scanning in beam direction. Regulatory Guide 1.150 requires 25% minimum overlap for detection and 0.25" maximum increment for characterization. Section XI also requires a pulse repetition rate sufficient to provide at least 10% overlap of the minimum beam dimension.	Scanning overlap is 10% for the near surface multibeam search units and 40% for the other detection search units, as qualified under the PDI protocol using the PDI test blocks. Pulse repetition rate is set such that data are collected at 0.040 inch increments in the direction of scan.
Flaw Sizing and Evaluation (Section V, T-441 and T-451)	Amplitude based sizing at 50% DAC. Other techniques and methods may be used.	Multibeam tip diffraction techniques are used for through-wall sizing. The length sizing is accomplished using amplitude drop methods. Beam spread calculations are not performed for these techniques.