U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.:	50-301
License No.:	DPR-27
Report No.:	50-301/96014(DRS)
Licensee:	Wisconsin Electric Power Company 231 West Michigan - P379 Milwaukee, WI 53201
Facility Name:	Point Beach Nuclear Plant - Unit 2
Location:	Two Rivers, WI 54241
Dates:	October 29-31, November 12-15, 18-21, December 2-5, 16-19, 1996, January 8-9, 1997
Inspectors:	M. Holmberg, Reactor Inspector J. Schapker, Reactor Inspector
Approved by:	Wayne Kropp, Chief Engineering Specialists Branch 1 Division of Reactor Safety

Report Details

II. Maintenance

M3 **Maintenance Procedures and Documentation**

M3.1 Unit 2 Steam Generator Replacement (SGRP)

a. Inspection Scope (73753, 73052, 73755)

To evaluate conformance with American Society of Mechanical Engineers (ASME) Code Section V, IX, and XI nondestructive examination (NDE) requirements, the inspectors reviewed:

- Ultrasonic examination (UT) data and flaw sizing analysis associated with indications detected during the preservice examination of the Unit 2 replacement steam generator reactor coolant system (RCS) loop piping welds

- The personnel qualifications and certifications for welders, weld operators and nondestructive testing (radiography, ultrasonic and visual) personnel supporting SGRP.

- Radiographs for the steam generator (SG) A and B reactor coolant loop piping hot and cold leg welds, SG A and B girth welds, and feedwater piping welds.

In addition, inspectors interviewed the UT examiners involved in welding activities on the replacement SG girth and RCS loop welds.

b. Observations and Findings

Based on review of personnel qualifications and certifications for welders, weld operators and NDE (radiography, ultrasonic and visual) personnel supporting SGRP, inspectors concluded that requirements of the ASME Code, Sections V and IX, 1995 Edition, had been met. Additionally, based on review of radiographs for the SG A and B reactor coolant loop piping hot and cold leg welds, SG A and B girth welds, and feedwater piping welds inspectors concluded that ASME Code, Section III, 1986 Edition, Section V, 1995 Edition requirements had been met.

Significant UT indications were detected in the RCS loop welds which required further evaluation for relevance. The licensee reviewed the radiographs, liquid penetrant examinations, welding data, and had contracted an engineering consultant to assess the cause of these indications. The licensee review determined that the indications were due to the ultrasonic beam redirection (an anomaly caused by grain structure at the weld metal interface, which is prevalent for UT examinations in stainless steel welds) and not a flaw or defect in the weld. The engineering evaluation concluded that the weld was suitable for continued service. Additionally, the UT examiners were able to finger dampen the indication

signals on the inner diameter (ID) of the weld. Thus, the inspectors concurred with the licensee conclusions that the weld indications were due to beam redirection. The licensee has scheduled the weld for examination at the next refueling outage for further evaluation.

c. Conclusion

The NDE performed, data reviewed and NDE personnel certifications for these examinations associated with the Unit 2 steam generator replacement met ASME Code requirements. The licensee's decision to employ an independent engineering consultant to review the preservice UT indications demonstrated a conservative action to ensure the indications were not flaws.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Inspector Updated Final Safety Analysis Report (UFSAR) Review

a. Inspection Scope

While performing the inspections discussed in this report, the inspectors reviewed UFSAR sections:

- Section 4.1 - Design Basis
- Section 4.2 - System Design and Operation
- Section 4.3 - System Safety features
- Section 4.4.1 - Reactor Coolant System Inspection
- Section 10.2 - System Design and Operation

b. Observations and Findings

Based on review of these sections the inspectors noted the following:

- Table 4.1-4 - Listed design data for a Model 44 SG that were not applicable to the replacement steam generator (RSG).
- Table 4.1-7 - Listed a design pressure drop of 32.2 psid for the Unit 2 SGs, vice 22.9-37.1 psid for Model Delta 47 RSGs.
- Section 4.2.2 - Discussed fabrication anomalies, design Codes and repair history associated with the original Unit 2 Model 44 SGs and was not applicable to the RSG.

- Table 4.2-1 - Listed materials of construction applicable to the Model 44 SGs, which had changed for the Model Delta 47 RSGs.

- Section 10.2 - A steam flow limiting device in the Unit 2 Model Delta 47 SGs was not discussed as it was for the Unit 1 SGs. SG blowdown line diameter was discussed as a 2 inch line for the Unit 2 SGs, vice a 2.5 inch line for the RSGs.

A licensee regulatory affairs staff member stated that the discrepancies in the UFSAR associated with Unit 2 SGRP would be corrected during the next planned UFSAR update in June of 1997. Inspectors concluded that this would meet 10 CFR 50.71(e) requirements for timeliness of revisions updating the UFSAR.

c. Conclusions

Inspectors identified several areas of the UFSAR which required updating with information related to the Model Delta 47 SGs installed in Unit 2. Inspectors concluded that the Licensing Department's schedule of June 1997 to update the UFSAR with this information would meet 10 CFR 50.71(e) requirements.

E4 Engineering Staff Knowledge and Performance

E4.1 Unit 2 Steam Generator Replacement (SGRP)

a. Inspection Scope (50001)

Steam Generating Team, Ltd. (SGT), personnel performed replacement of the Unit 2 SGs with Westinghouse Model Delta 47 SGs. The inspectors observed work, reviewed procedures, welder/weld operator personnel certifications and data associated with the following activities:

- SGT welder qualifications and weld mock ups for the SG reactor coolant loop piping.

- SGT personnel performing welding of SG A and SG B RCS hot and cold leg piping.

- SGT personnel establishing pre-heat and performing welding of SG A and SG B girth welds.

- SGT personnel performing welding of the SG B feedwater nozzle to nozzle extension.

- SGT personnel performing final radiography on the SG A hot leg nozzle to safe end and safe end to RCS elbow welds.

- SGT personnel and review and evaluation of radiographs for the SG A and B hot leg and cold leg welds, SG A and B girth welds, and feedwater piping welds.

- Contractor personnel performing preservice examination of the reactor coolant loop piping and feedwater piping.

- Weld data records, radiographs, and nonconformance reports (NCRs) for the replacement steam generator RCS loop piping and girth welds.

Additionally, inspectors reviewed the following work packages:

- 3061-A "Steam Generator "A" Reactor Coolant Pipe Cut and Installation," change 11

- 3061-B "Steam Generator "B" Reactor Coolant Pipe Cut and Installation," change 12

- 3081-A "Steam Generator A, Mainsteam/Feedwater," change 7

- 3081-B "Steam Generator B, Mainsteam/Feedwater," change 8

b. Observations and Findings

All SGT welding procedures used for the SG replacement were supported by procedure qualification records (PQRs) and had been reviewed and accepted for Code compliance by the Authorized Nuclear Inservice Inspector (ANII). Inspectors performed an in-depth review of weld procedure GTNG/8.8-1PB, Revision 1, used for welding the SG A and SG B RCS hot and cold leg loop piping. The inspectors concluded that the procedure met ASME Code, Section IX, 1995 Edition requirements.

On November 13, 1996, inspectors identified that the total shielding gas flow used for the machine gas tungsten arc welding (GTAW) of the SG A and SG B reactor coolant system hot and cold leg RCS piping was set at 400 cubic feet per hour (cfh) on the flood gas cup, with an additional 60-70 cfh set for the center gas cup immediately surrounding the tungsten electrode. Thus, a total shielding gas flow of 460-465 cfh was used for welding, vice 10-400 cfh specified by the weld procedure specification (WPS) GTNG/8.8-1PB, Revision 1. Shielding gas flow is a nonessential variable per QW-256 of Section IX, 1995 Edition of the ASME Code. Thus, the inspectors concluded that the welding procedure qualification remained valid and the increased flow rate had no observed adverse affects on the welding operations. Based on differing explanations by weld operators on how to apply the 10-400 cfh requirement in the WPS, inspectors concluded that this requirement was not being uniformly met. Inspectors' questions prompted the licensee staff to issue revision two, to WPS GTNG/8.8-1PB, which specified an allowed flow rate of 10-400 cfh for both the center and flood cups. The failure to adhere to WPS GTNG/8.8-1PB, Revision 1, constituted a minor violation of Criterion V of 10 CFR 50, Appendix B, and is being treated as a Non-cited violation, consistent with Section IV of the NRC Enforcement Policy (50-301/96014-01(DRS)).

The inspectors verified that weld wire spools (W005/0067 and W005/0130) and argon shielding gas supply bottles (040392M1 and HDA91E237) used in SG A and SG B RCS pipe welds, were traceable to material certifications that complied with

ASME Code, Section III, 1986 Edition; Section IX, 1995 Edition; and WPS requirements.

On November 15, 1996, the inspectors identified a concern with the ASME Code qualification of the GTAW procedure WPS GT-SM/3.3PB, Revision 1, used on the replacement steam generator girth welds. QW-256 of Section IX, 1995 Edition of the ASME Code implemented section QW-409.1 as a supplementary essential variable for GTAW. QW-409.1 of Section IX, 1995 Edition of the ASME code states "An increase in heat input, or an increase in volume of weld metal deposited per unit length of weld, over that qualified." QW-409.1 supplemental essential variables were required to be met to qualify weld procedure, WPS GT-SM/3.3PB, Revision 1, to ASME Code Section IX.

Therefore, if an increase in heat input was used in the SG girth weld, over that used to produce the Code qualification weld, the girth weld would not meet ASME Code Section IX requirements as a Code qualified weld. For the girth welding operations WPS GT- SM/3.3PB, Revision 1, allowed the welding to be performed with heat inputs of up to 73.3 kilojoules per inch (kj/in). Inspectors calculated that an average per pass heat input of 55.4 kj/in had been used for making 30 GTAW passes as documented in PQR GT-SM/3.3-Q2, Revision 1, (the PQR for the weld used to Code qualify WPS GT-SM/3.3PB). The licensee staff considered that QW 409.1 requirements had been met based on a single weld pass with a recorded heat input of 114 kj/in documented in PQR GT-SM/3.3-Q2, Revision 1. However, the inspectors concluded that QW-409.1 requirements would not have been met based on the average per pass heat input (55.4 kj/in) used in the qualifying weld (PQR GT-SM/3.3-Q2), which was less than the 73.3 kj/in allowed in the WPS. Therefore, the inspectors considered this weld potentially "unqualified" per the ASME Code requirements and considered this issue an unresolved item (50-301/96014-02(DRS)) pending further NRC staff reviews. Based on discussions with the Office of Nuclear Reactor Regulation and the Office of Nuclear Regulatory Research technical staff and reviews of NDE results (Section M3), the inspectors did not have a concern for the technical adequacy of the girth welds.

The inspectors noted a relatively large number of hold or witness points in work packages associated with SGRP. An SGT quality assurance data base, which tracked hold points in work packages associated with replacement of the Unit 2 SGs, listed a total of 3073 hold points. 532 of these hold points were designated holds for the licensee's Quality Assurance and Engineering staff. 329 witness points were also designated for the licensee's staff. This large number of hold and witness points were indicative of an active licensee staff role in oversight of the SGRP activities performed by SGT. In addition, the inspectors noted that these work packages required SGRP interferences to be marked/tagged with a pre-assigned number and then tracked on a material data sheet, until reinstallation.

On November 20, 1996, the licensee staff identified misalignments between the existing feedwater pipe and feedwater nozzles for SG A (1.5 in) and SG B (2.2 in). This condition was addressed in an engineering change request (ECR) 283. The engineering staff reported that the cause of this misalignment was due to the allowable construction tolerances between the original and replacement SGs and a down-slope (reported as 0.50 in) across the plane of the girth weld. Inspectors

found no installation checks which required the plane of the girth weld to be level. Engineering staff, in consultation with Westinghouse staff, reported that this minor offset from vertical would have no affect on SG level indication or operation. In addition, the licensee identified misalignments between the existing main steam pipe and the main steam outlet for SG A (0.99 in) and SG B (1.56 in). This condition was addressed in ECR 277 and ECR 280. Engineering staff had planned emergent system modifications for the main steam system to install a short pipe segment at the top of each SG main steam outlet to correct for this misalignment and to lower the existing feedwater lines down to the level of the SG nozzle extensions to correct this misalignment. Inspectors' questions concerning the causes of the feedwater and main steam misalignments appeared to prompt the engineering staff to issue condition report CR 96-1462. Based on the ECRs and applicable safety evaluations reviewed, the inspectors concluded that the licensee's corrective actions for these misalignments were acceptable.

The original weld metal in the RCS loop piping to the SG nozzle (for the removed SGs) was not completely removed in preparation for the new narrow groove weld. The inspectors questioned the licensee staff concerning the potential significance of "sensitization" (precipitation of carbides at the grain boundaries of austenitic stainless steel) in the original weld metal caused by deposition of a new weld metal layer in the RCS loop welds, and if the PQR remained valid for this application. The licensee staff stated that they intended to look into this issue. The inspectors considered this issue to be an inspection followup item (50-301/96014-03(DRS)) pending further review by the NRC and the licensee.

The inspectors' review of the weld data records and nonconformance reports (NCR) identified that a welder had performed welding on the SG-B girth weld, without the required ASME Code welder qualifications. The licensee contractor had identified this nonconformance, and documented the problem in NCR-159. Inspectors also interviewed welders and welding foremen concerning the use of this unqualified welder on the SG-B girth weld. The unqualified welder was qualified to the ASME Code for welding with the flux core arc welding (FCAW) process, which was also used for the SG girth welds. However, the welder had performed shielded metal arc welding (SMAW) on the girth weld and was not qualified to the ASME Code for this process. The welder was qualified in the SMAW process per the American Welding Society (AWS) standards. Since the licensee intended for the replacement SG and associated girth welds to meet ASME Code requirements, the welders had to meet ASME Code welder qualifications. Licensee corrective actions that had been taken for this issue included: removing the unqualified welder from the SG girth welding operations, removing the unqualified weld metal, and rewelding the SG B girth weld using ASME Code qualified welders. The licensee also reevaluated the welder's AWS qualification to ASME and reviewed weld data records to assure there were no other unqualified welders used in any of the welds for the SG replacement. The inspectors' review of the NCR-159 and weld documentation determined that the weld applied by the unqualified welder had been removed and replaced by qualified welders. Additionally, the inspectors' reviews of the nondestructive examinations (see section M3), confirmed that the weld quality was not affected by this nonconformance. The inspectors concluded that the licensee's corrective actions that had been taken in response to the use of an unqualified welder were complete and comprehensive. Therefore, this licensee-identified and

corrected problem associated with an ASME unqualified welder performing a weld on the SG-B girth weld, which is contrary to 10 CFR 50, Appendix B, Criterion V, is being treated as a Non-cited violation (NCV 50-301/96014-04(DRS)), consistent with Section VII.B.1 of the NRC Enforcement Policy.

c. Conclusions

The relatively large number of engineering and quality assurance hold points throughout the SGRP work packages indicated a good preplanned licensee oversight effort. Work packages contained pre-assigned numbers for SGRP interferences, which were tracked until reinstallation and indicated a good preplanned engineering staff effort. However, misalignments of connecting feedwater and mainsteam piping, which required emergent system modifications to correct, indicated that the engineering staff preplanning efforts associated with SG installation alignments were not fully effective.

Inspectors concluded that the welding activities observed associated with the steam generator replacement met the ASME Code requirements, with the following possible exceptions:

- Inspectors were concerned that a GTAW welding process used for the SG girth welds may not have met ASME Code Section IX weld procedure qualification requirements.

- Inspectors were concerned with the potential for metallurgical "sensitization" of the original weld metal, caused by deposition of new weld metal in the reactor coolant system loop welds, and the validity of the ASME Code weld procedure qualification for this application.

- The inspectors concluded that the licensee staff had taken appropriate corrective actions for a welder that performed welding on the SG B girth weld without the required ASME Code welder qualifications.

The inspectors observations of the overall welding processes and controls during the SG replacement were good. The site manager for the SGRP was receptive to the inspectors inquiry and provided necessary contacts and responses in a timely manner.

V. Management Meetings

XI Exit Meeting Summary

At the conclusion of the inspection on November 21, 1996, and January 9, 1997, the inspectors met with licensee representatives identified herein and summarized the scope and findings of the inspection activities. The inspectors questioned licensee personnel as to the potential for proprietary information in the likely inspection report material discussed at the exit. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Wisconsin Electric Power Company (WEPCo)

F. Cayia, Plant Manager
M. Conry, Senior Project Engineer
F. Flentje, Regulatory Administrative Specialist
C. Grey, Operations Manager
D. Johnson, Manager, Steam Generator Replacement
T. Mielke, Senior Engineer
J. Scheweitzer, Site Engineering Manager
T. Quay, Regulatory Services Manager

Steam Generating Team, Ltd (SGT)

M. Cepkauskas, President
E. Gorden, Project Welding Engineer
M. Hendricks, Quality Control Manager

Hartford Steam Boiler Engineering and Insurance Company (HSB)

J. Gault, ANII

U. S. Nuclear Regulatory Commission (NRC)

C. Keller, Resident Inspector
A. McMurtray, Senior Resident Inspector

INSPECTION PROCEDURES USED

IP 50001 Steam Generator Replacement Inspection
IP 73052 Inservice Inspection - Review of Procedures
IP 73753 Inservice Inspection
IP 73755 Inservice Inspection Data Review and Evaluation

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-301/96014-01(DRS)	NCV	Failure to adhere to WPS GTNG/8.8-1PB, Revision 1
50-301/96014-02(DRS)	URI	Girth weld ASME Code qualification
50-301/96014-03(DRS)	IFI	Sensitization of SG loop weld and PQR validity
50-301/96014-04(DRS)	NCV	Unqualified welder

Closed

50-301/96014-01(DRS)	NCV	Failure to adhere to WPS GTNG/8.8-1PB, Revision 1
50-301/96014-04(DRS)	NCV	Unqualified welder

LIST OF ACRONYMS USED

ANII	Authorized Nuclear Inservice Inspector
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
cfh	Cubic feet per hour
ECR	Engineering Change Request
GTAW	Gas Tungsten Arc welding
IFI	Inspection Followup Item
IP	Inspection Procedure
IR	Inspection Report
kj/in	Kilojoules per inch
NCR	Nonconformance report
NDE	Nondestructive examination
PQR	Procedure Qualification Record
RCS	Reactor Coolant System
RSG	Replacement Steam Generator
SG	Steam Generator
SGRP	Steam Generator Replacement
SGT	Steam Generating Team, Ltd
SMAW	Shielded metal arc welding
WPS	Weld Procedure Specification
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic examination
WPS	Weld Procedure Specification