

May 27, 2003

MEMORANDUM TO: Cynthia D. Pederson, Director  
Division of Reactor Safety  
Region III

FROM: Ledyard B. Marsh, Deputy Director **/RA/**  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 -  
RESPONSE TO TIA 2003-01 - APPLICATION OF ASME CODE,  
SECTION XI, IWB-2430 REQUIREMENTS ASSOCIATED WITH  
SCOPE OF VOLUMETRIC WELD INSPECTION EXPANSION (TAC  
NOS. MB7294 AND MB7295)

#### EXECUTIVE SUMMARY

By memorandum dated January 17, 2003, you requested technical assistance from the Office of Nuclear Reactor Regulation (NRR) regarding the application of American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code), Section XI, IWB-2430 requirements associated with the scope of volumetric weld expansion at the Prairie Island Nuclear Generating Plant, Units 1 and 2.

NRR staff has concluded that the sample expansion and additional inspection requirements of ASME Code, Section XI, IWB-2430(a) and (b) apply even when conducting successive examinations per IWB-2420(b).

The detailed NRR staff determination is contained below.

#### INTRODUCTION

In accordance with Nuclear Regulatory Commission (NRC) Inspection Manual, Part 9900, "Technical Guidance," if inspectors identify Code issues that result in disagreement with the licensee, the identified issue should be sent via Task Interface Agreement (TIA) to NRR for guidance and interpretation. NRR Office Instruction COM-106, Revision 1, "Control of Task Interface Agreements," provides guidance on the TIA process.

The NRR staff sent a letter to the Prairie Island licensee dated February 6, 2003, providing the licensee with an opportunity to comment on TIA-2003-01. The licensee commented on the TIA in a letter dated April 4, 2003. The NRR staff has reviewed the licensee's comments.

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BACKGROUND

On November 25, 2002, a Region III inspector identified an unresolved item associated with the licensee's failure to perform a volumetric examination of the Prairie Island Unit 1 steam generator (SG) 12 and Unit 2 SG 21 head-to-tubesheet W-A welds during the 1999 and 2002 refueling outages, respectively.

For Unit 1, the licensee identified a flaw during the 1999 ultrasonic (UT) examination of the SG 11 head-to-tubesheet W-A weld that exceeded ASME Code acceptance standards of Table IWB-3410-1. The licensee accepted the flaw in the SG 11 W-A weld that exceeded the Code-allowable size for continued service based on an analysis derived in WCAP-14166, "Handbook on Flaw Evaluation for Prairie Island Units 1 and 2 Steam Generators and Pressurizer." However, the licensee did not expand the volumetric inspection scope to the SG 12 W-A weld during this refueling outage, as required by paragraph IWB-2430 of ASME Code, Section XI, 1989 edition, no addenda. For the SG 12 W-A weld, the licensee had not completed a UT examination since 1998.

During the extent-of-condition review, the licensee identified that a similar condition also existed for the Unit 2 SG W-A welds. When the licensee examined the SG 22 W-A weld in February 2002, 14 flaws were identified that exceeded the acceptance standards of ASME Code, Table IWB-3410-1. The licensee applied a weld flaw analysis derived in WCAP-14166 to accept these flaws for continued service. However, the licensee did not expand the scope of the inspection to include UT examination of the SG 21 W-A weld during the 2002 outage. The licensee last performed a UT examination of one-third of the SG 21 W-A weld length in 2000 and another one-third of the weld length in 1997. The licensee had performed a full length UT examination of this weld in 1993.

The licensee is in the third ASME Code interval. The licensee was committed to requirements of the ASME Code, Section XI, 1989 edition, no addenda, for these inservice examinations. Specifically, the SG head-to-tubesheet W-A welds were required to be volumetrically examined once per interval in accordance with ASME Code, Table IWB-2500, Category B.2.40.

ASME Code, Section XI, IWB-2430 requires the following:

Examinations performed in accordance with Table IWB-2500-1 that reveal indications exceeding the acceptance standards of Table IWB-3410-1 shall be extended to include additional examinations at this outage. The additional examinations shall include the remaining welds, areas, or parts included in the inspection item listing....

Also, ASME Code, Section XI, IWB-2420(b) requires the following:

If flaw indications or relevant conditions are evaluated in accordance with IWB-3132.4 or IWB-3142.4, respectively, and the component qualifies as acceptable for continued service, the areas containing such flaw indications or relevant conditions shall be reexamined during the next three inspection periods listed in the schedules of inspection programs of IWB 2410.

This requires licensees to implement prompt actions to determine the extent of potential degradation when inservice flaws are identified which exceed ASME Code limits. Therefore, the Region III inspector was concerned that the licensee's decision to not examine the SG 12 W-A weld during the 1999 refueling outage and the SG 21 W-A weld during the 2002 refueling outage could have potentially allowed weld flaws of unacceptable size to remain in service.

The licensee was performing successive examinations beginning in 1994 for SG 11 and 1989 for SG 22 after identification of subsurface flaws which exceeded acceptable sizes, as identified in Table IWB-3410-1. The licensee believed that these subsurface flaw indications, which exceeded the ASME Code acceptance criteria, were likely fabrication-related weld defects (e.g., slag, inclusions, or weld porosity), as opposed to service-induced. However, the licensee's manual UT examination methods were not sufficient to confirm the flaw locations or to determine changes in flaw size (e.g., flaws indications sometimes got smaller in subsequent examinations). Therefore, the licensee considered each flaw identified in the SG W-A welds that exceeded ASME Code acceptance criteria during these examinations a "new" flaw.

The licensee verbally discussed with the Region III inspector its decision to not apply the ASME Code, Section XI, IWB-2430 requirements to expand the scope of weld examinations for the SG W-A welds. The licensee applied a successive examination schedule (discussed in ASME Code, Section XI, IWB-2420) to the SG 11 and SG 22 W-A welds. The licensee then excluded application of IWB-2430 requirements to expand the extent of weld examinations to SG 12 and SG 21 W-A welds because SG 11 and SG 22 W-A welds were in a successive examination schedule, which began in 1994 and 1989, respectively. The licensee interpreted the ASME Code, Section XI, IWB-2430 statement, "...examinations performed in accordance with Table IWB-2500-1...", to allow excluding expansion of weld examinations for "new" weld flaws identified during successive examinations performed under ASME Code, Section XI, IWB-2420.

The Region III inspector requested the licensee to provide a technical basis to support its application of the ASME Code requirements. At the conclusion of the Region III inspection, the licensee did not have a documented technical basis, nor an NRC-endorsed code case (CC) to support its potentially nonconservative application of the ASME Code requirements.

### RISK SIGNIFICANCE

Region III performed a risk-significance evaluation of the licensee's interpretation of the ASME Code requirements. Region III's risk-significance evaluation would most likely result in a finding of low safety significance because there is a lack of industry-observed, service-induced flaws for these types of welds.

### REQUESTED ACTION

Region III requested the following action:

Recognizing that the licensee has not followed an NRC endorsed Code Case, nor provided a technical basis for their interpretation of Section XI, IWB-2430 requirements, is the licensee's interpretation and application of Code requirements correct in this case? If the licensee[s] application of Code requirements is determined to be correct, what is the technical basis for not

expanding the scope of weld examinations when "new" flaws are identified which exceed Code acceptance limits?

#### NRR STAFF CODE INTERPRETATION

In the view of NRR's Piping Integrity & Nondestructive Examination (NDE) Section of the Materials & Chemical Engineering Branch (EMCB) in the Division of Engineering, the sample expansion and additional inspection requirements of ASME Code, Section XI, IWB-2430(a) and (b) apply even when conducting successive examinations per IWB-2420(b). The purpose of successive examinations is to ensure that assumptions made in the analyses which allow leaving a flaw in service remain valid. However, if new flaws are found while conducting the successive exams, then those flaws must be appropriately dispositioned because (1) they may or may not be related to the original flaw left in service, and (2) the provisions of IWB-2430(a) and (b) must be followed.

CC-N-586, "Alternative Additional Examination Requirements for Class 1, 2, and 3 Piping, Components, and Component Supports, Section XI, Division I," provides alternate requirements to IWB-2430(a), which, based on the licensee's determination that these "new" flaws were fabrication-related indications, may not have required additional exams. Although the NRC staff has not approved the use of CC-N-586 via Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability ASME Section XI, Division I," the NRR staff would likely have approved its use, with conditions, had the licensee proposed to use it.

EMCB notes that Region III's TIA 2003-10 does not indicate what the inspection results were for SG 12 and SG 21 for the 1998 and 2000 refueling outages, respectively. However, if those exam results are "clean," then from a practical viewpoint, it is possible for the licensee to have determined that sample expansion or additional exams were not required if CC-N-586 was invoked.

Because the licensee called these flaws "new flaws," a technical noncompliance with implementation of the ASME Code requirement occurred, but the safety significance is low. Had the licensee characterized these "new" flaws as "old" flaws, but in a different (but justifiably similar) location based on new NDE methods or characterization uncertainties, or implemented CC-N-586, it is possible that the licensee could have justified not expanding the sample and thus, the noncompliance could have been avoided.

Docket Nos. 50-282 and 50-306

cc: W. Lanning, Region I  
C. Casto, Region II  
D. Chamberlain, Region IV

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