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INDIANA MICHIGAN POWER

January 4, 2002

AEP:NRC:2550
10 CFR 50.55a

Docket Nos. 50-315
50-316

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop O-P1-17
Washington, DC 30555-0001

Donald C. Cook Nuclear Plant Units 1 and 2
REVISED PROPOSED ALTERNATIVE TO THE REQUIREMENTS
OF SECTION XI OF THE AMERICAN SOCIETY
OF MECHANICAL ENGINEERS CODE
(TAC Nos. MB3551 & MB3552)

Reference Letter from S. A Greenlee, Indiana Michigan Power Company (I&M) to Nuclear Regulatory Commission (NRC) Document Control Desk, "Donald C. Cook Nuclear Plant Units 1 and 2, Proposed Alternatives to the Requirements of Section XI of the American Society of Mechanical Engineers Code," dated December 6, 2001.

Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant, will be conducting inspections of the reactor vessel head penetrations (VHP) during the next Unit 1 and Unit 2 refueling outages. This is to be performed in accordance with Nuclear Regulatory Commission (NRC) Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles." In accordance with 10 CFR 50.55a(a)(2), systems and components of pressurized water cooled nuclear power reactors must meet the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code.

In the referenced letter, I&M proposed an alternative (Relief Request ISI-2001-02) to the ASME Code, Section XI, Paragraph IWA-4120, "Rules and Requirements," and Paragraph IWA 4310, "Repair Program," in the event that VHP flaws requiring repair are detected during the inspections. Specifically, I&M proposed the use of an embedded flaw repair technique for the repair of

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VHP J-groove attachment welds and VHPs. This technique, which reduces the flaw to a code acceptable size and overlays the flaw with weld material, would be used as an alternative to the requirements in ASME Code, Section XI. The ASME requirements preclude welding over or embedding an existing flaw. The proposed alternative was submitted under the provisions of 10 CFR 50.55a(a)(3)(i). Under this provision, licensees may propose alternatives to the requirements of 10 CFR 50.55a if they demonstrate that the proposed alternative would provide an acceptable level of quality and safety.

During a January 2, 2002, telephone conference between I&M and NRC personnel, I&M agreed to revise the proposed alternative to include a provision to perform a future non-destructive examination of embedded flaw repairs that were made to the VHPs or the VHP J-groove weld. The revised proposed alternative, which contains this provision, is provided in the attachment to this letter. Additionally, the description of the proposed alternative has been revised to better reflect the content of the proposed alternative. The requested approval date is January 15, 2002, to support VHP inspections scheduled for the next Unit 2 refueling outage.

This letter contains no new commitments. Should you have any questions, please contact Mr. Gordon P. Arent, Manager of Regulatory Affairs at (616) 697-5553.

Sincerely,

J. E. Pollock
Plant Manager

/bjb

Attachment

c: K. D. Curry, w/o attachments
J. E. Dyer
MDEQ – DW & RPD, w/o attachments
NRC Resident Inspector
R. Whale, w/o attachments

ATTACHMENT TO AEP:NRC:2550

Revised Relief Request ISI-2001-02

PROPOSED ALTERNATIVE FOR FLAW REPAIR

COMPONENT IDENTIFICATION

Code Class:	1
References:	1989 American Society of Mechanical Engineers (ASME) Code, Section III, NB-4622.9
	1989 ASME Code, Section XI, IWA-4120, IWA-4500
Examination Category:	B-E
Item Numbers:	B4.12
Description:	Alternative repair techniques for reactor pressure vessel head penetration (VHP) J-groove attachment welds and VHPs utilizing embedded flaw repair techniques.
Component Numbers:	1-OME-1, Donald C. Cook Nuclear Plant (CNP) Unit 1 Reactor Pressure Vessel (79 penetrations)
	2-OME-1, CNP Unit 2 Reactor Pressure Vessel (78 penetrations)

CODE REQUIREMENT

CNP Units 1 and 2 are in the third ten-year inservice inspection interval using the 1989 Edition of ASME Code, Section XI.

ASME Section XI, IWA-4120, "Rules and Requirements," states:

> (a) "Repairs shall be performed in accordance with the Owner's Design Specification and the original Construction Code of the component or system. Later Editions and Addenda of the Construction Code or of Section III either in their entirety or portions thereof, and Code Cases may be used. If repair welding cannot be performed in accordance with these requirements, the applicable alternative requirements of IWA 4500 and the following may be used:..."

ASME Section XI, IWA-4310, "Repair Program," states:

> "Defects shall be removed or reduced in size in accordance with this Article...."

Neither ASME Code, Section XI, IWA-4120 nor ASME Code, Section XI, IWA-4310 allow welding over or embedding an existing flaw.

PROPOSED ALTERNATIVE

Any flaws requiring repair that are identified on reactor VHPs and on the J-groove attachment welds will be embedded with a weld overlay which will prevent further growth of the defects by isolating them from the reactor coolant which might cause them to propagate by primary water stress corrosion cracking (PWSCC).

For an inside diameter (ID) repair, an unacceptable axial flaw will be first excavated (or partially excavated) to a depth no greater than 0.125 inches. The excavation will be performed using an electric discharge machining process to minimize penetration tube distortion. After the excavation is complete, either an ultrasonic test (UT) or eddy current test (ECT) will be performed to ensure the entire flaw length is captured. Then an Alloy 52 weldment will be applied to fill the excavation. Finally, the finished weld will be examined by dye penetrant test (PT), UT, or ECT to ensure acceptability. If an unacceptable ID circumferential flaw is detected, the flaw will either be repaired in accordance with existing code requirements, or will be partially excavated to reduce the flaw to an acceptable size, examined by UT or ECT, overlaid with Alloy 52, and examined by PT, UT, or ECT as described above. The repair will be examined by PT, UT, or ECT during the next inservice inspection period to ensure continued acceptability.

Outside diameter (OD) repairs will be addressed as follows:

1. An unacceptable OD axial or circumferential flaw in a tube below a J-groove attachment weld will be sealed off with Alloy 52 weldment. Excavation or partial excavation of such flaws will not be required, since clearance is not a concern on the outside of a tube.

2. Unacceptable radial OD flaws on the J-groove attachment weld will be sealed off with a 360 degree overlay of Alloy 52 covering the entire weld. No excavation will be required.

3. Unacceptable axial tube flaws extending into the J-groove attachment weld will be sealed with Alloy 52 as in Item 1 above. In addition, the entire J-groove attachment weld will be overlaid with Alloy 52 to embed the axial crack in the seal weld on the VHP penetration.

4. Unacceptable OD circumferential flaws at or above the attachment weld will either be repaired in accordance with existing code requirements, or will be partially excavated to reduce the flaw to an acceptable size, and overlaid with Alloy 52.

5. For all of the above flaw configurations, the finished weld will be examined by PT, UT, or ECT to ensure acceptability.

6. For all of the above flaw configurations, the finished weld will be examined by PT, UT, or ECT during the next inservice inspection period to ensure continued acceptability.

BASIS FOR PROPOSED ALTERNATIVE

Pursuant to 10 CFR 50.55a(a)(3)(i), the alternative is proposed on the basis that it provides an acceptable level of quality and safety.

The embedded flaw repair technique is considered a permanent repair for the following reasons:

1. As long as a PWSCC flaw remains isolated from the primary water (PW) environment, it cannot propagate. Since Alloy 52 weldment is considered highly resistant to PWSCC, a new PWSCC crack cannot initiate and grow through the Alloy 52 overlay to reconnect the PW environment with the embedded flaw. Structural integrity of the affected VHP J-groove attachment weld will be maintained by the remaining unflawed portion of the weld.

2. The residual stresses produced by the embedded flaw technique have been measured and found to be relatively low. This was documented in the attachment to a letter from E. E. Fitzpatrick, Indiana Michigan Power Company (I&M), to the Nuclear Regulatory Commission (NRC) Document Control Desk, "Reactor Vessel Head Penetration Alternate Repair Techniques," letter AEP:NRC:1218A, dated March 12, 1996. The low residual stresses indicate that no new cracks will initiate and grow in the area adjacent to the repair weld.

3. There are no other known mechanisms for significant crack propagation in this region since cyclic fatigue loading is negligible.

4. I&M's position, which is consistent with that given in North Anna Power Station Unit 2 (Docket 50-339), November 16, 2001, relief request, is that the code does not require a successive PT, UT, or ECT examination. However, it is prudent to perform an examination to demonstrate the effectiveness of the repairs. Therefore, an examination of the repair will be performed in the following inservice inspection period to ensure continued repair acceptability.

I&M understands that the NRC has verbally approved a similar alternative for North Anna Power Station Unit 2. The alternative for North Anna Power Station Unit 2 was transmitted and supplemented by Virginia Electric and Power Company letters dated October 18, November 9, and November 16, 2001. Additionally, the NRC previously approved a similar alternative for CNP Units 1 and 2. The approval was documented in an NRC letter dated April 9, 1996. Although the alternative was applied to the VHP tube base metal rather than VHP welds, both alternatives use an embedded flaw repair technique.

CONCLUSION

I&M considers the embedded flaw repair technique to be an alternative to Code requirements that provides an acceptable level of quality and safety, as required by 10 CFR 50.55a(a)(3)(i).