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April 26, 2008

AEP:NRC: 8055-01  
10 CFR 50.55a

Docket Nos.: 50-315  
50-316

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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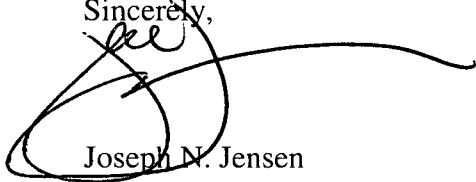
Donald C. Cook Nuclear Plant Unit 1  
PROPOSED ALTERNATIVE TO THE  
AMERICAN SOCIETY OF MECHANICAL ENGINEERS CODE, SECTION XI  
REPAIR REQUIREMENTS

Pursuant to 10 CFR 50.55a(a)(3)(ii), Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant Unit 1, is proposing an alternative to the repair requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. Specifically, I&M is proposing to apply a weld overlay in accordance with ASME Code Case N-666 to a defect in reactor coolant system piping that is not isolable from the reactor vessel. The proposed alternative is provided in the attachment to this letter.

I&M requests approval of the proposed alternative by 0100 Eastern Standard Time, April 27, 2008, to preclude unnecessary delay in returning Unit 1 to operation from its current refueling outage.

There are no new or revised commitments identified in this letter. Should you have any questions, please contact Mr. James M. Petro, Jr., Regulatory Affairs Manager, at (269) 466-2491.

Sincerely,



Joseph N. Jensen  
Site Support Services Vice President

JRW/sla

A047  
NRC

Attachment: 10 CFR 50.55a Relief Request Number ISIR-22, Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(ii), Hardship or Unusual Difficulty without Compensating Increase in Level of Quality and Safety

c: R. Aben – Department of Labor and Economic Growth  
J. L. Caldwell – NRC Region III  
K. D. Curry – AEP Ft. Wayne, w/o attachment  
J. T. King – MPSC, w/o attachment  
MDEQ – WHMD/RPS, w/o attachment  
NRC Resident Inspector  
P.S. Tam – NRC Washington DC

**Attachment to AEP:NRC: 8055-01**

**10 CFR 50.55a Request Number ISIR-22**

**Proposed Alternative**

**In Accordance with 10 CFR 50.55a(a)(3)(ii)**

**Hardship or Unusual Difficulty without Compensating Increase in Level of Quality and Safety**

**1. Component(s) Affected**

The affected component is socket weld OW-1 attaching an elbow fitting to 3/4 inch Reactor Coolant System American Society of Mechanical Engineers (ASME) Code Class I piping upstream of valve 1-NFP-222-V2 in Donald C. Cook Nuclear Plant Unit 1.

**2. Applicable Code Edition and Addenda**

The applicable code edition is the ASME Code, 1989 edition, no addenda.

**3. Applicable Code Requirement**

The applicable code requirement is IWA-4000 of the ASME Code 1989 edition, no addenda. Compliance with this code requirement would necessitate removal of the defect and replacement of the weld.

**4. Reason for Request**

During plant heat up at the end of refueling outage U1C22, leakage from a through wall defect was discovered at the toe of the weld identified in Section 1 above. Based on visual inspection of the failed socket weld, the location of the defect, the configuration of the piping, and the piping material (stainless steel) which precludes primary water stress corrosion cracking, the only credible mechanism for creating the defect is vibratory fatigue. The weld and piping in which the defect is located is not isolable from the reactor vessel. The elevation of the defect is below the elevation of the bottom of the reactor vessel nozzles. Repair of the defect in accordance with the applicable code requirement identified in Section 3 above would require that the reactor vessel be drained to the bottom of the reactor vessel nozzles. Since core cooling cannot be provided in this condition, the concrete missile blocks would have to be removed, the reactor vessel head studs would have to be detensioned, the reactor vessel head removed, the refueling cavity flooded, and the core defueled prior to the repair. Following the repair, the fuel would have to be reloaded, the head reinstalled, the refueling cavity drained, the studs retensioned, and the missile blocks reinstalled. These activities would significantly delay the return of the unit to operation, resulting in hardship and unusual difficulty. The proposed weld

overlay in accordance with Code Case N-666 will seal the defect and provide strength and vibration resistance equal to or better than the construction code quality requirements. Performing a repair in accordance with the applicable code requirement would result in hardship and unusual difficulty and would not provide a compensating increase in quality and safety compared to the repair as specified in the Code Case.

## **5. Proposed Alternative and Basis for Use**

The proposed alternative is application of a weld overlay in accordance with ASME Code Case N-666, "Weld Overlay of Class 1, 2, and 3 Socket Welded Connections, Section XI, Division 1." Use of this code case will restore the structural integrity of the socket weld identified in Section 1 above by deposition of weld overlay on the outside surface of the pipe and weld. No exceptions will be taken to the requirements of Code Case N-666, including requirements that:

- The structural portion of the overlay and seal layers shall be deposited in accordance with a Shielded Metal Arc or Gas Tungsten Arc Welding Procedure Specification (WPS) qualified in accordance with IWA-4440.
- The review of the design, operating history, and changes to the piping system indicates that the current system configuration has not changed for one or more fuel cycles. If vibration testing performed in accordance with ASME-OMb-S/G-2002, Part 3, shows that the vibration has been reduced to acceptable levels, the weld overlay shall be acceptable for the remaining life of the piping system.
- VT-1 visual examination shall be performed using a procedure that meets the requirements of IWA-2210 and shall be capable of resolving text with lower case characters (e.g., a, c, e, o) not exceeding a height of 0.044 inches (1 mm) at the examination distance. The maximum direct VT-1 distance shall not exceed 2 ft (600 mm).

Additional information is as follows:

- A sketch of the pipe, elbow, existing weld, and overlay, and an isometric drawing marked to show the elbow with the leak are provided in Section 7 of this attachment.
- The elbow and pipe material are shown in the following table.

<b>Component</b>	<b>ASME/ASTM designation</b>	<b>Size/Schedule/Rating</b>	<b>P #</b>
Elbow	ASME SA-182, Gr. F304	3/4 inch, 6000 pounds per square inch	P-8
Pipe	ASME SA-376 Gr. TP304	3/4 inch, Schedule 160	P-8

- The overlay material and application process are described below.

The leak will first be seal welded with 309L filler material. The seal weld will be examined visually (VT-1) prior to performing the weld overlay.

The remaining weld passes will use ER308L/E308L as specified in the AEP weld manual, which is compatible with the stainless base metals. The remaining weld passes may be also completed with ER309L/E309L filler metal as specified in the AEP weld manual as compatible filler material with the stainless base metals used. The possible process and filler/rod combinations are shown in the following table.

Process	Filler/rod
GTAW	ER308 or ER309
SMAW	E308 or E309

- The length of pipe between the elbow and the attachment to the Reactor Coolant System loop is approximately 8 inches, which is not sufficient to install a freeze seal.
- The Reactor Coolant System pressure and temperature will be maintained less than 100 pounds per square inch gauge and less than 170 degrees Fahrenheit during application of the overlay.
- The above noted vibration testing will be performed prior to entry into Mode 1.
- An electronic search of available maintenance and corrective action documents identified no previous leaks or work on welds associated with 1-NFP-222-V2.
- Six other locations on the Reactor Coolant System have been examined for weld discrepancies. These locations were selected because they perform the same function and have similar piping configurations as the weld that is the subject of this request. The inspected welds were found to be defect free and properly sized.
- The seal weld will be examined by VT-1. I&M elected not to perform a penetrant test (PT) of the seal weld because the associated surface preparation would incur significant additional dose and may disturb the seal weld.
- The overlay will be examined by a PT and a VT-1.
- The code of record is ASME/ANSI B31.1 Power Piping (1967).

## 6. Duration of Proposed Alternative

The duration of the proposed alternative would be the remaining service life of the component if the vibration testing shows that the vibration has been reduced to acceptable levels. Otherwise, the duration of the proposed alternative would be until the next Unit 1 outage, scheduled for fall 2009. Relief from the ASME code of record is requested until the NRC approves use of Code Case N-666 in a future revision of the applicable Regulatory Guide.

## 7. Sketch and Drawing

