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A unit of American Electric Power

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Cook Nuclear Plant  
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Bridgman, MI 49106  
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August 23, 2015

AEP-NRC-2015-87  
10 CFR 50.55a

Docket No.: 50-316

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Unit 2  
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 2, 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, with a deviation from ASME Code Case N-666, to a defect in the boric acid makeup system piping. The proposed alternative is provided in the attachment to this letter.

I&M requests approval of the proposed alternative by 0600 Eastern Standard Time, August 24, 2015, to preclude an unnecessary entry into Unit 2 Technical Requirements Manual (TRM), Technical Requirement for Operation (TRO), 8.0.3. On August 21, 2015, at 1600, a leak from a weld was discovered in a boron injection sub-system that is required to be operable by TRM 8.1.1, "Boration System – Operating." Action A was entered for one boron injection system inoperable with a Required Action to restore the subsystem to operable status in 72 hours. When the 72-hour Completion Time expires on August 24, 2015, at 1600, Unit 2 will enter TRO 8.0.3 for associated Actions not met. TRO 8.0.3 requires immediate verification that Unit 2 is not in an unanalyzed condition and that a required safety function is not compromised and, within 12 hours, to obtain Operations Manager approval of the plan to exit TRO 8.0.3 and appropriate compensatory measures. I&M is prepared to enter TRO 8.0.3 for Unit 2, but it would be unnecessary if timely repair could be effected.

A047  
NRR

There are no new or revised commitments identified in this letter. Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Manager, at (269) 466-2649.

Sincerely,



Q. Shane Lies  
Engineering Vice President

HLK/ams

Enclosure

- c: T. A. Beltz, NRC, Washington, D.C.
- A. W. Dietrich, NRC, Washington, D.C.
- J. T. King – MPSC
- MDEQ – RMD/RPS
- NRC Resident Inspector
- C. D. Pederson, NRC, Region III
- A. J. Williamson, AEP Ft. Wayne, w/o enclosure

## **Enclosure to AEP-NRC-2105-87**

### **10 CFR 50.55a Relief Request Number ISIR-4-06**

#### **Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(ii) Hardship or Unusual Difficulty without Compensating Increase in Level of Quality or Safety**

##### **1. Component(s) Affected**

The affected component is socket weld FW-17 attaching a flange fitting to Chemical and Volume Control System Boric Acid Makeup System American Society of Mechanical Engineers (ASME) Code Class III two-inch piping downstream of a flow indication instrument 2-QFI-420 in Donald C. Cook Nuclear Plant Unit 2.

##### **2. Applicable Code Edition and Addenda**

The applicable code edition is the ASME Code Section XI, 2004 edition, no addenda.

##### **3. Applicable Code Requirement**

The applicable code requirement is IWA-4000 of the ASME Code 2004 edition, no addenda. Compliance with this code requirement would necessitate removal of the defect and replacement of the weld.

##### **4. Reason for Request**

During normal plant operation, with Unit 2 at 100 percent power during cycle U2C22, leakage from a through wall defect was discovered at the toe of the flange weld identified in Section 1 above. A relief request is being requested since performing a repair in accordance with the applicable code requirement would result in hardship and unusual difficulty. Additionally, it would not provide a compensating increase in quality and safety compared to the repair as specified in Code Case N-666, with deviation, which is being requested. This defect is located in a section of piping that can only be isolated from the charging system suction header by a single check valve, which is common to both charging pumps. Therefore, normal repair would require re-welding this flange under a non-positive isolation boundary. In addition, after the repair is performed and the system is refilled; there is no means available to vent the piping to remove air from the system. It is unacceptable to introduce air into the charging system suction lines due to concerns for air binding of the high head injection pumps. If a high point vent was to be installed, it would require extensive work to remove surrounding interferences and would potentially increase the risk of foreign material introduction in the charging system, and possibly, the reactor coolant system. Based on the remaining

duration of the Unit 2 current operating cycle, Indiana Michigan Power Company considers it prudent to repair this flaw in an acceptable manner prior to the next refueling outage scheduled for October 2016.

A deviation is requested from the approved Code Case N-666 as it specifically addresses vibration induced failure mechanisms. A walk down of the leak by plant personnel identified a possible cause of the leak as being a lack of fusion of the weld against the flange face, which is not vibration induced. In this case, the cause of failure cannot be definitively determined without forensic analysis. However, Code Case N-666 was selected as it is suitable for socket welds and it allows for repair of an active leak. Per the code case, this overlay restores the structural integrity of the cracked or leaking socket weld. Additionally, the leak was assessed to have developed after several operating cycles with no leakage evident based on a review of maintenance and operating history. Therefore, the weld overlay, as detailed in the sketch in Section 7, will provide an augmented weld that provides adequate structural integrity for the remainder of the current Unit 2 operating cycle until the weld is replaced during the next Unit 2 refueling outage.

An electronic search of available maintenance and corrective action documents, for the past 20 plus years, identified no previous leaks or work on welds associated with 2-QFI-420. Additionally, engineering walk downs identified no evidence of additional through wall leakage indication in the vicinity of this flow indication and other similar locations.

#### **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." This Code Case is referenced in Regulatory Guide 1.147, Revision 17 under Table 1, Acceptable Section XI Code Cases. Use of this code case will seal the leakage and defect as well as restore the structural integrity of the socket weld identified in Section 1 above. The only exception that will be taken is that the failure mechanism is not currently believed to be vibration induced. All other criteria of the Code Case will be met including the following requirements.

- 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 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 and operating condition have not changed for more than 20 years. Since operation history shows no evidence of previous leakage at this location, the weld overlay shall be acceptable for the

remaining fuel cycle until the weld will be removed and examined to support a cause investigation.

- VT-1 visual examination shall be performed using a procedure that meets the requirements of IWA-2210.

Additional information is as follows:

- The through wall defect is on the toe flange side of the weld which most likely propagated from the root of the weld.
- A sketch of the pipe, flange, existing weld and overlay, and an isometric drawing marked to show the flange with the leak are provided in Section 7 of this attachment.
- The flange and pipe material are listed in the following table.

Component	ASME/ASTM	Size/Schedule/Rating	P #
Flange	ASME SA-182 Gr. F304	2 inch, 150#	P-8
Pipe	ASME SA-312 TP-304	2 inch, schedule 40	P-8

Overlay Material and Application Process

System conditions during the weld repair will be ambient temperature of less than 100 degrees and system pressure of nominally 50 pounds per square inch gauge. Wall thickness of the piping has been verified to be greater than the minimum wall thickness and is adequate to perform the repair.

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

The remaining weld passes will use ER308L/E308L as specified in the American Electric Power (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	ER308L or ER309L
SMAW	E308L or ER309L

The seal weld will be examined by VT-1 and a penetrant test (PT) of the seal weld.

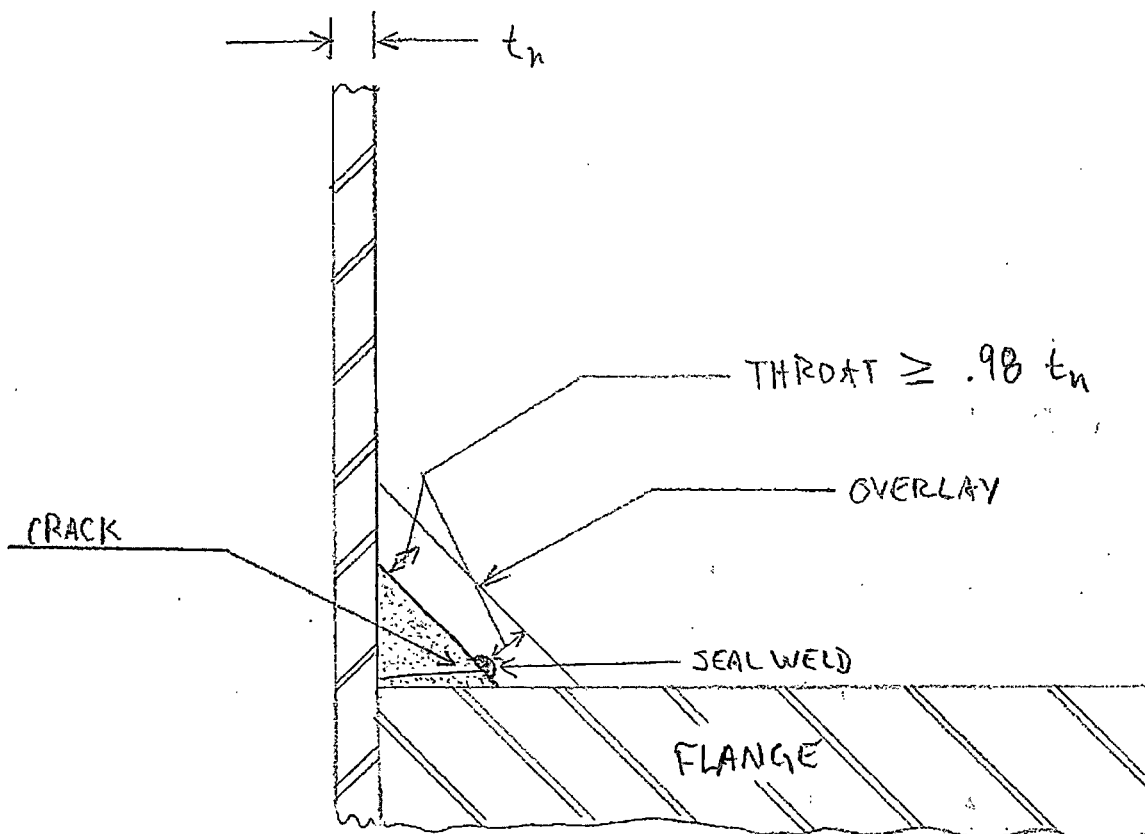
The overlay will be examined by a PT and a VT-1.

The code of record is ASME/American National Standards Institute B31.1 Power Piping (1967). The piping is inservice inspection Class 3.

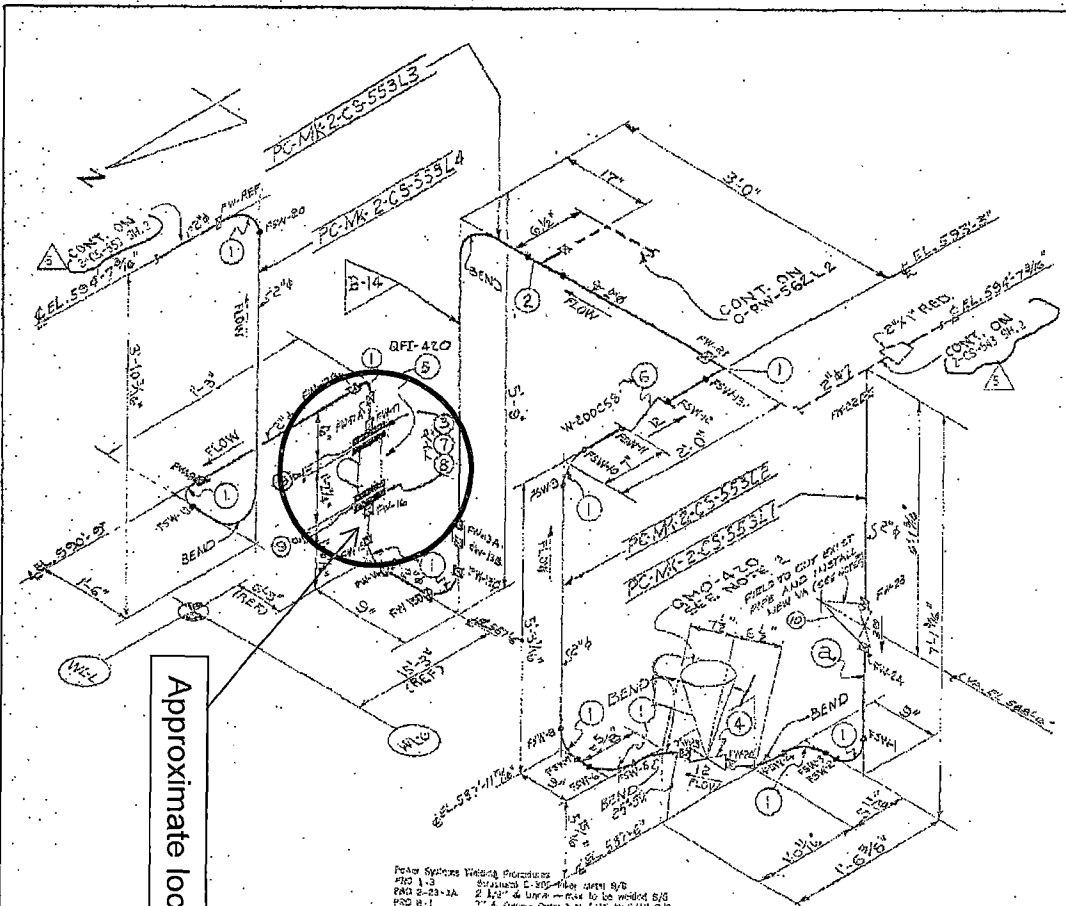
## 6. Duration of Proposed Alternative

The duration of the proposed alternative would be for the remaining fuel cycle until the next Unit 2 refueling outage, scheduled for October 2016. Relief from the ASME code of record is requested only for this specific application and not intended to be applied for any other applications.

## 7. Sketch and Drawing



Proposed Overlay



Approximate location of leak

This schematic supersedes drawing 2-CS-553L1A. Solve as much pipe & fittings from fabrication as possible. Retain applications. Test Decoupler, Valve, Weld Documentation, etc. for safety & P&ID Exchange.

Field Symbols Welding Procedures:  
 PWD 1-3 STRAIGHT 1/2" DIA. 1/4" THICK 9/8"  
 PWD 2-23-2A 2 1/2" DIA. 1/4" THICK TO BE WELDED 5/8"  
 PWD 4-1 2" & 3" DIA. 1/4" THICK TO BE WELDED 3/4"  
 PWD 5-1 2" & 3" DIA. 1/4" THICK TO BE WELDED 3/4"  
 PWD 6-1 2" & 3" DIA. 1/4" THICK TO BE WELDED 3/4"

LINE N° 553  
 CHEMICAL & VOLUME CONTROL  
 2" FROM LINE 0-CS-543 TO 6" CS LINE @  
 CENTRIF. CHARGE PUMP 2W"

NO.	DATE	DESCRIPTION	BY	CHKD.
1				
2				
3				
4				
5				

INDIANA MICHIGAN POWER COMPANY  
**DONALD C. COOK**  
 NUCLEAR PLANT  
 BRIDGEWAY MICHIGAN

ITEM NO.	QTY	DESCRIPTION	DR. NO.
1	1	2" 5000' S.W. 30° 21.1	A-182-F904
2	1	2" 5000' S.W. 21.6	A-182-F904
3	2	2" 150' S.W. R.F. FLG.	A-182-F304
SCH. 40 BORE			
4	1	2" SW. CONTROL VALVE	GM0-420
VACTOR OPERATED			
5	1	2" 150' EL. G. FLAM. INDICATOR	GFI-420
6	1	2" 150' S.W. CHECK VALVE	W20K238
7	8	3/8" X 1/2" STUD BOLT	A-182-F65
STEAM HARDWARE			
8	10	3/8" HEAVY HEX NUT	A-182-F68
9	1	2" SANKET FLEXITALIC VALVE	
STYLE CG			
10	1	2" 150' S.W. SW. DIAP. VA.	W200044
FABRICATE MATERIAL			
11	1	2" PIPE	W200044

- NOTE**
- MIN. BEND RADIUS SHALL BE FIVE NOMINAL PIPE DIAMETERS.
  - ITEM (C) CONTROL VALVE TO BE WELDED INTO LINE IN THE FIELD.
  - FW-15, 16, 17, 18 WERE PSW'S ADDED FW-17A, 17B, 17C, 17D, 17E, 17F, 17G, 17H, 17I, 17J, 17K, 17L, 17M, 17N, 17O, 17P, 17Q, 17R, 17S, 17T, 17U, 17V, 17W, 17X, 17Y, 17Z.
  - REMOVE BOWNET ASSEMBLY BEFORE WELDING BODY INTO PIPELINE.
  - FOR HEAT TRACING REQUIREMENTS SEE DRAWING 12-1235

LINE N° 0-CS-553L, SPOOL 1,2,3,4 OF 14

THIS DRAWING HAS BEEN CONVERTED FROM A MANUAL FORMAT TO THE CAD-BASED DRAWING FORMAT AND SUPERSEDES ALL PREVIOUS REVISIONS. REVISED: DRAWING NO. FROM 2-CS-553L.4 TO 2-CS-553 SH.1, CONT. DWG. NO. FROM 0-CS-543L.2 TO 0-CS-543 SH.1, 0-CS-553L.3 TO 2-CS-553 SH.2. ADDED: NOTE #5 PER 2-DCP-342-R3. CEV:JH/dk

REV.	DATE	DESCRIPTION	FIELD
5		FLOW DIAGRAM 12-5523 & 12-5131	REV. 5
FOR SIGNATURE RECORD SEE MICROFILM COPY OF ISG 2-CS-553L.4 REV. 4		2-CS-553 SH.1 REV. 5	

AMERICAN ELECTRIC POWER  
 117 FRENCH CREEK  
 COLUMBUS, OH 43216  
 FILENAME: 2-CS-553 SH.1.DWG  
 (DRAWING NO): 2-CS-553 SH.1 CS-01