INDIANA MICHIGAN POWER
A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
IndianaMichiganPower.com

February 27, 2017

AEP-NRC-2017-09
10 CFR 50.90

Docket Nos. 50-315
50-316

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

Donald C. Cook Nuclear Plant Unit 1 and Unit 2
Response to Request for Additional Information Regarding the License Amendment Request for the Containment Leakage Rate Testing Program

References:

1. Letter from Q. S. Lies, Indiana Michigan Power Company (I&M), to U. S. Nuclear Regulatory Commission (NRC), "Donald C. Cook Nuclear Plant Unit 1 and Unit 2 License Amendment Request Regarding Containment Leakage Rate Testing Program," dated October 18, 2016, Agencywide Documents Access and Management System Accession No. ML16294A257.

2. E-mail capture from A. W. Dietrich, NRC, to H. L. Kish, I&M, "D.C. Cook Nuclear Plant Units 1 and 2 – RAI regarding LAR to revise TS 5.5.14 (MF8483 and MF8484)," dated January 26, 2017.

This letter provides Indiana Michigan Power Company's (I&M), licensee for Donald C. Cook Nuclear Plant (CNP) Unit 1 and Unit 2, response to the Request for Additional Information (RAI) by the U. S. Nuclear Regulatory Commission (NRC) regarding a license amendment request (LAR) to revise Technical Specification (TS) 5.5.14, Containment Leakage Rate Testing Program.

By Reference 1, I&M submitted a request to amend the TSs to CNP Unit 1 and Unit 2 Renewed Facility Operating License DPR-58 and DPR-74. I&M proposes to change TS 5.5.14, Containment Leakage Rate Testing Program, to clarify the containment leak rate testing pressure criteria. By Reference 2, the NRC transmitted an RAI from the Balance of Plant Branch regarding the LAR submitted by I&M in Reference 1. As part of the response to the RAI, a wording change has been made to TS 5.5.14. The wording change relates to the construction of the sentence and does not alter the No Significant Hazards Consideration.

Enclosure 1 to this letter provides an affirmation statement. Enclosure 2 to this letter provides I&M's response to the NRC's RAI in Reference 2. Enclosures 3 and 4 to this letter provide a revised mark-up of the TS page. Copies of this letter are being transmitted to the Michigan Public Service Commission and Michigan Department of Environmental Quality, in accordance with the requirements of 10 CFR 50.91.

A001
NRR

There are no new regulatory commitments made 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
Site Vice President

DMB/mll

Enclosures:

1. Affirmation
2. Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification 5.5.14, Containment Leakage Rate Testing Program
3. Donald C. Cook Nuclear Plant Unit 1 Technical Specification Page Marked To Show Proposed Changes
4. Donald C. Cook Nuclear Plant Unit 2 Technical Specification Page Marked To Show Proposed Changes

c: R. J. Ancona, MPSC
A. W. Dietrich, NRC, Washington, D.C.
MDEQ – RMD/RPS
NRC Resident Inspector
C. D. Pederson, NRC, Region III
A. J. Williamson, AEP Ft. Wayne, w/o enclosures

Enclosure 1 to AEP-NRC-2017-09

AFFIRMATION

I, Q. Shane Lies, being duly sworn, state that I am the Site Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this request with the U. S. Nuclear Regulatory Commission on behalf of I&M, and that the statements made and the matters set forth herein pertaining to I&M are true and correct to the best of my knowledge, information, and belief.

Indiana Michigan Power Company

Q. Shane Lies
Site Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 27 DAY OF February, 2017

Notary Public

My Commission Expires 4-4-2018

DANIELLE BURGOYNE
Notary Public, State of Michigan
County of Berrien
My Commission Expires 04-04-2018
Acting in the County of Berrien

Enclosure 2 to AEP-NRC-2017-09

Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification 5.5.14, Containment Leakage Rate Testing Program

By letter dated October 18, 2016, (Agencywide Documents Access and Management System Accession No. ML16294A257) (Reference 1), Indiana Michigan Power Company (I&M), the licensee for the Donald C. Cook Nuclear Plant (CNP), Unit 1 and Unit 2, submitted a license amendment request (LAR). The proposed amendment would change Technical Specifications (TS) 5.5.14 for the Containment Leakage Rate Testing Program, to clarify the containment leak rate testing pressure criteria.

The U. S. Nuclear Regulatory Commission staff in the Balance of Plant Branch (SBPB) of the Office of Nuclear Reactor Regulation is currently reviewing the submittal and has determined that additional information is needed in order to complete the review. The text of the requests for additional information (RAIs) and I&M's responses are provided below.

RAI-SBPB-1

ANSI 56.8-2002 establishes P_a as the calculated peak accident pressure, and limits the Containment Leakage Rate Testing Program pressure to less than or equal to 1.1 P_a. As stated in the license amendment request (LAR), the calculated P_a for CNP is 10.37 pounds per square inch gauge (psig) for Unit 1, and 10.78 psig for Unit 2. I&M has requested to use 12 psig as P_a for the Containment Leakage Rate Testing Program, which is greater than 1.1 times the CNP calculated peak accident pressure for both units. The LAR states that this "will not result in a significantly larger differential pressure to seal components whose characteristics result in improved sealing based on increased pressure." However, a test pressure greater than 1.1 P_a may affect test results in a non-conservative manner.

- *Demonstrate how testing at a pressure of 12 psig, which is greater than 1.1 P_a, is acceptable as an exception to the standard.*

I&M Response to RAI-SBPB-1:

The maximum allowable containment leakage rate from all of containment for either CNP unit can be approximated by a hole in containment of 0.1 inch diameter (0.0079 square inch). For consistency with test conditions, the calculated L_a value will continue to be determined using the test pressure of 12 psig. Although using the test conditions to determine L_a results in a proportional increase in allowable leakage when compared to using analytically derived pressure values calculated peak containment pressure (CPCP), any benefit from the calculated increase in the L_a value would be offset by testing at the higher design pressure of 12 psig. Acceptable containment leakage is maintained by finding and repairing valve seat and disc seat scratches or other very small leaks in Local Leak Rate Testing (LLRT) components. Given any containment boundary leakage pathway (hole, crack, scratch), using a P_a of 12 psig versus a lower LLRT test pressure results in increased leakage. The only way for LLRT results

to be non-conservative using P_a of 12 psig (12 psig vs 10.37 or 10.78 psig) is if the slight increase in P_a results in reducing the area of the leak pathway (further closing of valve disc) on the LLRT component. Maximum test pressures are limited to 1.1 times P_a or 13.2 psig, 11.41 psig and 11.86 psig for the CPCP values listed above. Station LLRT procedures were reviewed for components where potential non-conservative results could be obtained. CNPs LLRT program contains approximately 1,130 components. The components identified as potentially non-conservative in main process lines that penetrate containment are discussed below, and represent both units combined:

- Eight Airlock Door Seals
  Each of the eight airlock door seals has potentially non-conservative leakage during the barrel test. However, the airlock door seals are all tested individually also during the barrel LLRT procedure and on a frequent basis (weekly) to verify their condition.

- Forty-two check valve Containment Isolation Valves
  The low flow LLRT test equipment measures very small areas of imperfect seat contact, versus discs not fully closed. The Measuring and Test Equipment used to perform LLRTs uses small tubing (1/4" and 3/8") to direct flow through rotameters and out to the test volume. Since the total combined containment leakage allowed is approximated by a 0.1 inch diameter hole, it is known that a disc not fully closed will grossly fail LLRT by leaking greater than the LLRT equipment can measure (~55,000 sccm). The test boundary will not pressurize without a closed disc and the desired test pressure is irrelevant.

- Four single wedge Motor-Operated Valve (MOV) gate valves
  LLRT test forces are inconsequential (< 2psi delta between 12 psig and CPCP) versus minimum thrust at closed seat conditions of 4,837 pounds (i.e., the lowest required value of the four valves).

- Six double disc wedge MOVs gate valves
  Increase in the pressure on the discs (LLRT pressure applied between discs) is insignificant versus the forces generated by motor operated valve actuators. Minimum thrust at closed seat conditions of 7,548 pounds (i.e., the lowest required value of the six valves).

- Four globe MOVs where pressure is applied above the seat
  The low flow LLRT rigs will not build up pressure if the disc is located off the seat. If there is a seat or disc imperfection that allows leakage, the larger test pressure will increase leakage results but will not shut the disc further than the actuator already closed the disc.

- Four 0.5" globe Air-Operated Valve (AOV)s where pressure is applied above the seat
  The seat load is 400 pounds. Ignoring the stem area, approximate worst case additional force is area of disc times worst case additional pressure (3.14159)(0.5)(0.5)(13.2-(10.37*1.1)) / 4 = 0.4 pounds. Similar to the discussion above, the low flow LLRT rigs will not build up pressure if the disc is located off seat. If there is a seat or disc imperfection that allows leakage, the larger test pressure will increase the

leakage results but will not shut the disc further than the actuator already closed the disc.

- Two 1" globe AOVs where pressure is applied above the seat
  The seat load is 2,800 pounds. Ignoring the stem area, the approximate worst case additional force is (3.14159)(1)(1)(13.2-(10.37*1.1)) / 4 = 1.4 lbs. Similar to the discussion above, the low flow LLRT rigs will not build up pressure if the disc is located off seat. If there is a seat or disc imperfection that allows leakage, the larger test pressure will increase leakage results but will not shut the disc further than the actuator already closed the disc.

- Two 3" globe AOVs where pressure is applied above seat
  The seat load is 2,200 pounds. Ignoring the stem area, the approximate worst case additional force is (3.14159)(3)(3)(13.2-(10.37*1.1)) / 4 = 12.7 pounds. Similar to the discussion above, the low flow LLRT rigs will not build up pressure if the disc is located off seat. If there is a seat or disc imperfection that allows leakage, the larger test pressure will increase leakage results but will not shut the disc further than the actuator already closed the disc.

- Four 2" globe AOVs where pressure is applied above the seat
  The seat load is 1,500 pounds. Ignoring the stem area, the approximate worst case additional force is (3.14159)(2)(2)(13.2-(10.37*1.1)) / 4 = 5.7 pounds. Similar to the discussion above, the low flow LLRT rigs will not build up pressure if the disc is located off seat. If there is a seat or disc imperfection that allows leakage, the larger test pressure will increase leakage results but will not shut the disc further than the actuator already closed the disc.

- One 1" globe AOV where pressure is applied above the seat
  The seat load is 300 pounds. Ignoring the stem area, the approximate worst case additional force is (3.14159)(1)(1)(13.2-(10.37*1.1)) / 4 = 1.4 pounds. Similar to the discussion above, the low flow LLRT rigs will not build up pressure if the disc is located off seat. If there is a seat or disc imperfection that allows leakage, the larger test pressure will increase leakage results but will not shut the disc further than the actuator already closed the disc.

- Two manual 2.5" globe valves where pressure is applied above the seat
  Ignoring the stem area, the approximate worst case additional force is (3.14159)(2.5)(2.5)(13.2-(10.37*1.1)) / 4 = 8.8 pounds. Seat load for manual valves can be estimated using handwheel size and rim pull force to determine stem torque and then applying a stem factor to determine the stem thrust. However, after seat to disc contact is reached by manual force the additional LLRT force being discussed here should not close the disc further and provide non-conservative LLRT results. Similar to the discussion above, the low flow LLRT rigs will not build up pressure if the disc is located off seat. If there is a seat or disc imperfection that allows leakage, the larger test pressure will increase leakage results but will not shut the disc further.

- Three manual 0.75" globe valves where pressure is applied above the seat
  Ignoring the stem area, approximate worst case additional force is (3.14159)(0.75)(0.75)(13.2-(10.37*1.1)) / 4 = 0.8 pounds. Seat load for manual valves can be estimated using handwheel size and rim pull force to determine the stem torque and then applying a stem factor to determine the stem thrust. However, after seat to disc contact is reached by manual force the additional LLRT force being discussed here should not close the disc further and provide non-conservative LLRT results. Similar to the discussion above, the low flow LLRT rigs will not build up pressure if the disc is located off seat. If there is a seat or disc imperfection that allows leakage, the larger test pressure will increase leakage results but will not shut the disc further.

- One manual 0.75" single wedge gate valve
  Seat load for manual valves can be estimated using handwheel size and rim pull force to determine stem torque and then applying a stem factor to determine the stem thrust. However, the additional approximately 0.8 pounds being applied to the wedge should not move the wedge and provides non-conservative LLRT results.

Additionally, some vent and drain lines (test connections) are potentially non-conservative. These would consist of small globe or needle valves installed with packing facing the upstream side. Packing would be challenged by LLRT pressure and additional force on the seat is a maximum of 1.4 pounds for a 1" globe with smaller valves being even lower. I&M is not currently aware of any in this configuration and it would be unexpected for the containment isolation test valves. Test connection vent and drains that are gate valves will have an additional small force applied to the wedge (1.4 pounds for 1" valve), but this should not move the wedge and provides non-conservative LLRT results. CNP does have some test connection gate valves.

Overall, even for the components and associated penetrations where increased test pressure could conceptually reduce leakage, the low flow test equipment will not result in non-conservative indicated containment leakage. When all of the approximately 1,130 components in the LLRT program are considered, the total containment leakage estimated by using P_a of 12 psig will be conservative.

CNP TS have always identified P_a as 12 psig. Nothing has changed physically on either unit. Refinements in calculation methodology have resulted in reduced calculated peak containment pressure. All plants use P_a equal to or greater than the highest calculated peak containment pressure based on loss of coolant accident analysis methodology that is biased high with respect to containment pressure by design. LLRT is therefore performed at pressures greater than the containment actual accident pressures by using P_a that is known to be conservative for the actual containment peak pressure.

Lastly a discussion of instrumentation accuracy is warranted to ensure a full understanding. CNP currently only uses the flow makeup method for LLRTs. Pressure accuracy per ANSI/ANS-56.8-2002 is required to be 2% of P_a (0.24 psi at 12 psig). CNP LLRT procedures require this same pressure accuracy. The pressure band of 12.3 -12.8 psig is procedurally provided for LLRTs to avoid going below 12 psig or above 13.2 psig (1.1(12)).

Enclosure 3 to AEP-NRC-2017-09

DONALD C. COOK NUCLEAR PLANT

UNIT 1

TECHNICAL SPECIFICATION PAGE MARKED TO SHOW PROPOSED CHANGES

5.5 Programs and Manuals

5.5.14 Containment Leakage Rate Testing Program

a. A program shall establish the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. This program shall be in accordance with the guidelines contained in NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J," dated July 2012, and Section 4.1, "Limitations and Conditions for NEI TR 94-01, Revision 2," of the NRC Safety Evaluation Report in NEI 94-01, Revision 2-A, dated October 2008.

b. ~~The calculated peak containment internal pressure for the design basis loss of coolant accident, P_a, is 12 psig~~. The containment design pressure is 12 psig. For the containment Leakage Rate Testing Program, P_a is 12.0 psig.

c. The maximum allowable containment leakage rate, L_a, at P_a, shall be 0.25% of containment air weight per day.

d. Leakage rate acceptance criteria are:

1. Containment leakage rate acceptance criterion is 1.0 L_a. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are $\leq$ 0.60 L_a for the Type B and C tests and $\leq$ 0.75 L_a for Type A tests.

2. Air lock testing acceptance criterion is overall air lock leakage rate is $\leq$ 0.05 L_a when tested at $\geq P_a$.

e. The provisions of SR 3.0.3 are applicable to the Containment Leakage Rate Testing Program.

Enclosure 4 to AEP-NRC-2017-09

DONALD C. COOK NUCLEAR PLANT

UNIT 2

TECHNICAL SPECIFICATION PAGE MARKED TO SHOW PROPOSED CHANGES

5.5 Programs and Manuals

5.5.14 Containment Leakage Rate Testing Program

a. A program shall establish the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. This program shall be in accordance with the guidelines contained in NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J," dated July 2012, and Section 4.1, "Limitations and Conditions for NEI TR 94-01, Revision 2," of the NRC Safety Evaluation Report in NEI 94-01, Revision 2-A, dated October 2008.

b. ~~The calculated peak containment internal pressure for the design basis loss of coolant accident, P_a, is 12 psig.~~ The containment design pressure is 12 psig. For the containment Leakage Rate Testing Program, P_a is 12.0 psig.

c. The maximum allowable containment leakage rate, L_a, at P_a, shall be 0.25% of containment air weight per day.

d. Leakage rate acceptance criteria are:

1. Containment leakage rate acceptance criterion is 1.0 L_a. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are $\leq 0.60\ L_a$ for the Type B and C tests and $\leq 0.75\ L_a$ for Type A tests.

2. Air lock testing acceptance criterion is overall air lock leakage rate is $\leq 0.05\ L_a$ when tested at $\geq P_a$.

e. The provisions of SR 3.0.3 are applicable to the Containment Leakage Rate Testing Program.

5.5.15 Battery Monitoring and Maintenance Program

This program provides for battery restoration and maintenance, based on the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," or of the battery manufacturer including the following:

a. Actions to restore battery cells with float voltage < 2.13 V; and

b. Actions to equalize and test battery cells that had been discovered with electrolyte level below the minimum established design limit.