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November 15, 2017

AEP-NRC-2017-55  
10 CFR 50.54(f)

Docket Nos.: 50-315  
50-316

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
11555 Rockville Pike,  
Rockville, MD 20852

Donald C. Cook Nuclear Plant Units 1 and 2  
Request for Extension of Due Date for Seismic Probabilistic Risk Assessment

References:

1. Letter from E. J. Leeds and M. R. Johnson, U. S. Nuclear Regulatory Commission (NRC), to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012, Agencywide Document Access Management Systems (ADAMS) Accession No. ML12053A340.
2. Letter from F. Vega, NRC, to L. J. Weber, Indiana Michigan Power Company Donald C. Cook Nuclear Plant, Units 1 and 2, - Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (TAC Nos. MF3873 and MF3874)," dated April 21, 2015, ADAMS Accession No. ML15097A196.
3. Letter from W. M. Dean, NRC, to Power Reactor Licensees on the Enclosed List, "Final Determination of Licensee Seismic Probabilistic Risk Assessments under the Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1 'Seismic' of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated October 27, 2015, ADAMS Accession No. ML15194A015.

Indiana Michigan Power Company (I&M) requests an extension of the June 30, 2018, due date for submittal of a Seismic Probabilistic Risk Assessment (SPRA) for the Donald C. Cook Nuclear Plant (CNP). I&M is requesting that the due date be extended to November 6, 2019.

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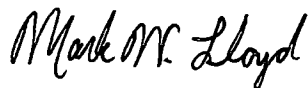
By Reference 1, the Nuclear Regulatory Commission (NRC) requested that licensees reevaluate the seismic hazard at their sites using present-day NRC requirements and guidance. As documented in Reference 2, the reevaluated seismic hazard for CNP exceeds the plant design basis seismic hazard. Consequently, a seismic risk evaluation, including a High Frequency Evaluation, and a Spent Fuel Pool evaluation are required for compliance with Reference 1. By Reference 3, the NRC established a due date of June 30, 2018, for submittal of an SPRA for CNP.

The SPRA commenced in June 2015, and was based on the assumption that the "mirror-image" configuration of Unit 1 and Unit 2 would enable use of a Unit 1 model as representative of Unit 2. However, in October 2017, I&M determined that Unit 2 should be modeled separately to assure realistic SPRA results. I&M has therefore initiated actions to develop a separate Unit 2 model and prepare a Unit 2 SPRA based on that model. However, preparation of a Unit 2 model and SPRA will require significant additional time. I&M has developed a detailed schedule for the associated activities which indicates that the final CNP Unit 1 and Unit 2 SPRAs can be submitted to the NRC by November 6, 2019. I&M is therefore requesting that the SPRA submittal due date be extended to that date. In accordance with Reference 3, the SPRA submittal will include a High Frequency Evaluation.

As detailed in Enclosure 2 to this letter, I&M considers that continued plant operation during the extension period is justified based on considerations that include: consistency with the NRC overall schedule for submittal of all Near-Term Task Force related plant SPRAs, the defense-in-depth provided by compliance with both applicable NRC orders regarding beyond-design-basis events, completion of the NRC endorsed Expedited Seismic Evaluation Process and all actions identified by that process, the inherent nuclear power plant design margins as described in an NRC recognized Electric Power Research Institute report, the comparable ratio of reevaluated hazard to design hazard for CNP and other SPRA plants, and the completion of the evaluation demonstrating the beyond-design-basis seismic robustness of the CNP Spent Fuel Pool.

Enclosure 1 to this letter provides an affirmation. Enclosure 2 provides the detailed extension request including background information and justification for the extension. This letter contains no new or modified Regulatory Commitments. Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Manager, at (269) 466-2649.

Sincerely,



M. W. Lloyd  
Engineering Vice President

JRW/ml

Enclosures:

1. Affirmation
2. Request for Extension of Seismic Probabilistic Risk Assessment  
Submittal Date

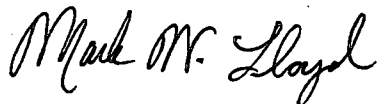
c: R. J. Ancona, MPSC  
MDEQ - RMD/RPS  
NRC Resident Inspector  
C. D. Pederson, NRC, Region III  
J. K. Rankin, NRC Washington, D.C.  
B. A. Titus, NRC, Washington, D.C.  
A. J. Williamson, AEP Ft. Wayne, w/o enclosure

Enclosure 1 to AEP-NRC-2017-55

**AFFIRMATION**

I, Mark W. Lloyd, being duly sworn, state that I am the Engineering Vice President, of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this document 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



Mark W. Lloyd  
Engineering Vice President, Indiana Michigan Power

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 15 DAY OF November, 2017

  
Notary Public

My Commission Expires 04-04-2018

**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-2017-55

### Request for Extension of Seismic Probabilistic Risk Assessment Submittal Date

References for this enclosure are identified on Pages 4 and 5.

This enclosure provides the details of Indiana Michigan Power Company's (I&M's) request for an extension of the June 30, 2018, due date for submittal of a Donald C. Cook Nuclear Plant (CNP) Seismic Probabilistic Risk Assessment (SPRA), including a High Frequency Evaluation. I&M is requesting that the due date be extended to November 6, 2019.

#### Background

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Reference A which requested, pursuant to 10 CFR 50.54(f), that licensees reevaluate the seismic hazard at their sites using present-day NRC requirements and guidance. The CNP seismic hazard reevaluation for CNP was documented in Reference B. As indicated in Reference B, the reevaluated seismic hazard for CNP exceeds the plant design basis seismic hazard. Therefore, a seismic risk evaluation, High Frequency Evaluation, and Spent Fuel Pool (SFP) evaluation are required for compliance with Reference A.

Reference C documented the NRC Staff's review of the CNP reevaluation, and documented the Staff's conclusion that the reevaluated seismic hazard, once adjusted to account for a layer of beach sand at CNP, was suitable for other actions associated with Reference A. As documented in Reference D, the NRC established a due date of June 30, 2018, for I&M submittal of an SPRA, including a High Frequency Evaluation. In July 2016, I&M informed the NRC Staff that the reevaluated hazard would be adjusted to reflect additional shear wave velocities, in addition to accounting for the layer of beach sand. The Staff agreed with I&M's approach and stated that the changes to the reevaluated seismic hazard would be reviewed in conjunction with the review of the SPRA.

I&M established a project schedule for preparation, internal review, peer review, resolution of findings and observations (F&Os), and submittal of an SPRA, including a High Frequency Evaluation, for CNP by the June 30, 2018, date specified by Reference D. The SPRA commenced in June 2015, and was based on the assumption that the "mirror-image" configuration of Unit 1 and Unit 2 would enable use of a Unit 1 model as representative of Unit 2. I&M initiated a self-assessment in September 2017 to assure readiness for a planned November 2017 peer review of the SPRA. The self-assessment identified components that were the same in each unit but had different fragilities. In such cases the more conservative fragility had been assumed. However that practice affected the correlation groupings in such a manner that other significant seismic risk contributors may be masked. Additionally, some seismic fire and flood scenarios that were initially assumed to be identical between units were found to be different. Consequently, basing the Unit 2 model on Unit 1 may have resulted in a peer review determination that the Unit 2 model was unreviewable. The peer review planned for November 2017 has therefore been cancelled and actions are in progress to conduct a Unit 2 SPRA based on a Unit 2 specific model.

### Requested Extension

I&M requests that the due date for submittal of the CNP SPRA be extended to November 6, 2019. This date is based on a detailed schedule for the critical path activities necessary for that submittal. The major critical path activities include issuance of contracts for engineering support, preparation of fragility inputs, development of the Unit 2 model, quantification of the SPRA, performance of a peer review readiness assessment, performance of the peer review, resolution of peer review F&Os, closure of F&Os, and processing of an NRC submittal documenting the Unit 1 and Unit 2 SPRA.

The schedule also includes a decision point for determining whether the Appendix X process accepted by the staff (Reference E) will be used for closure of peer review F&Os. As part of this determination, consideration will be given to only applying the Appendix X process to findings that affect the technical adequacy, the capability or robustness of the SPRA update process, or the capability category of a technical element. The schedule includes time to implement the Appendix X process in accordance with these determinations.

### Plant Operation During the Requested Extension Period

I&M considers the requested extension to be justified with respect to continued plant operation during the extension period based on the following considerations.

The requested due date is within the bounds of the NRC schedule for industry submittal of seismic-related 10 CFR 50.54(f) information. As documented in Reference D, licensees were requested to perform site specific evaluations based on a number of criteria associated with the magnitude of their reevaluated seismic hazard and how it compared to their design basis seismic hazard. SPRAs were required for a subset of plants, including CNP. Within this subset, there is a range of dates by which licensees are to submit their SPRA evaluations. The range of dates begins in March 2017 and continues through December 2019. The order of licensee submittals within this range of dates was not based on safety or seismic risk concerns, i.e., within this submittal date range, plants are not sequenced in order of increasing or decreasing seismic risk. The requested extension will move the CNP SPRA submittal within the existing date range, and not beyond the last date in the range. Therefore, the NRC Staff's basis (stated in Reference F) for continued safe operation during the period in which such evaluations are being performed remains applicable.

Through compliance with Orders EA-12-049 and EA-12-051 (References G and H), CNP has achieved additional defense-in-depth for coping with an extended loss of alternating current electrical power (ELAP) and loss of normal access to the ultimate heat sink (LUHS) due to external events, including those caused by seismic events. The NRC Staff has issued a safety evaluation (Reference I) regarding implementation of the mitigating strategies and reliable SFP instrumentation required by these orders. The NRC Staff concluded that I&M has developed guidance and proposed designs which acceptably address the requirements of these orders. NRC Region III inspection personnel conducted an on-site inspection of the implementation of the strategies and instrumentation. As documented in Reference J, the inspections did not identify any findings or violations of more than minor significance. In conjunction with the completion of Expedited Seismic Evaluation Process (ESEP) related activities as discussed

below, CNP compliance with Orders EA-12-049 and EA-12-051 results in a safety benefit and an enhanced ability to mitigate beyond-design-basis events at CNP during the requested extension period.

As required by Reference A, I&M performed an interim evaluation and took appropriate actions to address the higher seismic hazard (relative to the design basis) prior to completion of the SPRA. I&M implemented the NRC endorsed ESEP to demonstrate adequate seismic margin through a review of plant equipment relied upon to protect reactor core cooling and containment integrity functions following beyond-design-basis seismic events. All actions necessary to meet the ESEP beyond-design-basis seismic criterion for the credited plant equipment have been completed. This provides assurance of core protection and containment integrity following an ESEP beyond-design-basis seismic event concurrent with an ELAP and LUHS. The NRC Staff review (Reference K) of the CNP ESEP concluded that the assessment provided assurance that supported continued plant safety while the longer-term seismic evaluation is completed.

As documented in the CNP ESEP report accepted by the NRC in Reference K, the maximum ratio of the reevaluated Ground Motion Response Spectra (GMRS) when compared to the site's design-basis Safe Shutdown Earthquake was initially determined to be 1.93. When the GMRS is adjusted for the layer of beach sand and new shear wave velocities, this ratio is approximately 2.47. This ratio is of the same order of magnitude as those for other plants that are required to perform an SPRA. CNP and other plants required to perform an SPRA were included in the database of an Electric Power Research Institute (EPRI) report regarding the inherent nuclear power plant seismic design margins. The EPRI report was transmitted to the NRC by a Nuclear Energy Institute (NEI) letter, Reference L. The NEI letter and EPRI report were referenced by the NRC letter (Reference F) documenting reasons for continued operation of nuclear plants while seismic reevaluations are in progress. In the CNP ESEP report, I&M confirmed that the reasons for continued operation cited in the EPRI report and Reference F applied to CNP. These reasons include safety margins in the plants seismic design such that the plants can withstand potential earthquakes exceeding the original design basis. As documented in Reference F, the NRC staff confirmed that the conclusions reached in EPRI study report remain valid and that plants can continue to operate while additional evaluations are conducted.

Additionally, a beyond-design-basis SFP seismic integrity evaluation has confirmed that the pool is seismically adequate and can retain the necessary water inventory in accordance with the Reference A seismic evaluation criteria. The SFP seismic evaluation was based on the GMRS peak spectral acceleration documented in Reference B, adjusted for the layer of beach sand and new shear wave velocities. The NRC Staff reviewed the CNP SFP seismic evaluation and determined it to be acceptable as documented in Reference M. The SFP evaluation provides assurance that the spent fuel will be adequately protected from the reevaluated seismic hazards during the requested extension period.

Finally, a Seismic Mitigating Strategies Assessment (SMSA) will be conducted in parallel, and submitted concurrently, with the SPRA. The SMSA will use the methodology described in Appendix H of NRC-endorsed NEI 12-06 (Reference N) to determine whether modifications are necessary to assure the mitigating strategies developed in accordance with NEI 12-06 can be implemented with respect to the reevaluated hazard.

Conclusion

I&M has performed all previous Near-Term Task Force related actions for CNP in accordance with NRC established schedules. I&M's request for an extension of the SPRA submittal due date is needed to assure adequate time for preparation of an SPRA that includes realistic modeling of both CNP units. Previous I&M and industry actions taken in response to the Near-Term Task Force requirements provide assurance of safety with respect to beyond-design-basis seismic hazards during the extension period. Submittal and NRC acceptance of the SPRA and High Frequency Evaluation are the final activities needed for closure of the 10 CFR 50.54(f) request with respect to seismic hazards for CNP.

References

- A. Letter from E. J. Leeds and M. R. Johnson, Nuclear Regulatory Commissions (NRC), to all power reactor licensees and holders of construction permits in active or deferred status, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012, Agencywide Document Access Management Systems (ADAMS) Accession No. ML12053A340.
- B. Letter from Q. S. Lies, Indiana Michigan Power Company (I&M) to the NRC, "Donald C. Cook Nuclear Plant Units 1 and 2, Seismic Hazard and Screening Report (CEUS Sites), Response to NRC Request for Information, Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 27, 2014, ADAMS Accession No. ML14092A329.
- C. Letter from F. Vega, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 - Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (TAC Nos. MF3873 and MF3874)," dated April 21, 2015, ADAMS Accession No. ML15097A196.
- D. Letter from W. M. Dean, NRC, to Power Reactor Licensees on the Enclosed List, "Final Determination of Licensee Seismic Probabilistic Risk Assessments under the Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1 'Seismic' of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated October 27, 2015, ADAMS Accession No. ML15194A015.
- E. Letter from J. Giitter and M. J. Ross-Lee, NRC, to G. Krueger, Nuclear Energy Institute (NEI), "U.S. Nuclear Regulatory Commission Acceptance on Nuclear Energy Institute Appendix X to Guidance 05-04, 07-12, and 12-13, Close-Out of Facts and Observations (F&Os)," dated May 3, 2017, ADAMS Accession No. ML17079A427



- F. Letter from E. J. Leeds, NRC, to all listed power reactor licensees and holders of construction permits in active or deferred status, "Screening and Prioritization Results Regarding Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Seismic Hazard Re-Evaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated May 9, 2014, ADAMS Accession No. ML14111A147.
- G. Letter from E. J. Leeds and M. R. Johnson, NRC, to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012, ADAMS Accession No. ML12054A736.
- H. Letter from E. J. Leeds and M. R. Johnson, NRC, to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012, ADAMS Accession No. ML12054A682.
- I. Letter from M. Halter, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Safety Evaluation Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Instrumentation Related to Orders EA-12-049 And EA-12-051 (TAC Nos. MF0766, MF0767, MF0761, AND MF0762)," dated November 9, 2015, ADAMS Accession No. ML15264A851.
- J. Letter from A. M. Stone, NRC, to J. P. Gebbie, I&M, "Donald C. Cook Nuclear Power Plant, Units 1 and 2 NRC Temporary Instruction 2515/191, Mitigation Strategies, Spent Fuel Pool Instrumentation and Emergency Preparedness Report 05000315/2016008; 05000316/2016008," dated June 2, 2016, ADAMS Accession No. ML16154A450.
- K. Letter from N. J. Di Francesco, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 - Staff Review of Interim Evaluation Associated with Reevaluated Seismic Hazard Implementing Near-Term Task Force Recommendation 2.1 (TAC Nos. MF5236 and MF5237)," dated August 25, 2015, ADAMS Accession No. ML15232A411.
- L. Letter from A. R. Pietrangelo, NEI, to E. J. Leeds, NRC, "Seismic Risk Evaluations for Plants in the Central and Eastern United States," dated March 12, 2014, ADAMS Accession No. ML14083A596.
- M. Letter from F. Vega, NRC to J. P. Gebbie, "Donald C. Cook Nuclear Plant, Units 1 and 2 - Staff Review of Spent Fuel Pool Evaluation Associated with Reevaluated Seismic Hazard Implementing Near-Term Task Force Recommendation 2.1 (CAC Nos. MF3873 and MF3874)," dated November 9, 2016, ADAMS Accession No. ML16308A086.
- N. NEI report NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 4, dated September 2016, ADAMS Accession No. ML16354B421.