

December 26, 2007

Mr. Michael W. Rencheck
Senior Vice President and
Chief Nuclear Officer
Indiana Michigan Power Company
Nuclear Generation Group
One Cook Place
Bridgman, MI 49106

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2 - GENERIC LETTER 2004-02, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED-WATER REACTORS," EXTENSION REQUEST APPROVAL (TAC NOS. MC4679 AND MD4680)

Dear Mr. Rencheck:

On November 7, 2007, Indiana and Michigan Power Company (I&M) submitted a request to extend the due date of December 31, 2007, stated in Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," for Donald C. Cook Nuclear Plant, Units 1 and 2 (DCCNP-1 and DCCNP-2), to complete corrective actions associated with containment recirculation sump performance.

The Nuclear Regulatory Commission (NRC) staff evaluated the information provided in the request from I&M and has determined that it is acceptable to extend the due date for completion of the specific corrective actions described in the enclosed safety evaluation (SE) according to the revised schedule that is provided therein. The SE also contains the NRC staff's evaluation, which provides the technical basis for the acceptance of the extension request. While the NRC accepts the revised completion dates as reasonable allowance for contingencies regarding completion of remaining activities to address GL 2004-02, the NRC expects I&M to place a high priority on completing remaining actions and updating the licensing basis for DCCNP-1 and DCCNP-2, as soon as possible.

Should I&M elect to begin the DCCNP-1 refueling outage more than 30 days after March 2008, I&M will need to provide the NRC additional justification for the further delay in the completion of the planned outage-related modifications for DCCNP-1 and the other activities specified in the first bullet above.

M. W. Rencheck

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If you have any questions, please feel free to contact me.

Sincerely,

/RA/

Peter S. Tam, Senior Project Manager
Plant Licensing Branch 3-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-315 and 50-316

Enclosure: Staff Evaluation

cc: See next page

M. W. Rencheck

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Docket Nos. 50-315 and 50-316

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EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2

GENERIC LETTER 2004-02 (GENERIC SAFETY ISSUE 191) EXTENSION REQUEST

TAC NOS. MC4679 AND MC4680

In a letter dated December 6, 2007 (Agencywide Document Access and Management System (ADAMS) Accession No. ML073470140), Indiana and Michigan Power Company (I&M) requested an extension to the corrective action due date of December 31, 2007, stated in Nuclear Regulatory Commission (NRC) Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," for Donald C. Cook Nuclear Plant, Units 1 and 2 (DCCNP-1 and DCCNP-2). In its letter, I&M stated that actions have been taken to bring DCCNP-1 and DCCNP-2 into compliance with GL 2004-02, including replacing the sump screens with substantially larger sump strainers during the fall 2006 refueling outage for DCCNP-1 and during the fall 2007 refueling outage for DCCNP-2.

As background, the NRC staff previously approved an extension for certain corrective actions for DCCNP-1. Specifically, the NRC staff's letter to I&M, dated July 28, 2006 (ADAMS Accession No. ML062020768), approved I&M to defer completion of the following actions:

- installation of one or two (to be determined) remote strainers with waterways connecting to the existing recirculation sump;
- creation of additional openings in the overflow wall (to facilitate flow into the annulus area) and modification of associated radiation shields; and
- installation of debris interceptors in the containment annulus and the overflow wall.

In its letter dated December 6, 2007, I&M stated that it had planned to complete all analyses needed to address the issues identified in GL 2004-02 for both units prior to the end of 2007. However, I&M stated that the completion of analyses of the effects of debris downstream of the strainers and analyses of the effects of certain chemical reactions will take longer than originally anticipated. Therefore, I&M requested an extension of the due date for the completion of these analyses and the completion of the subsequent licensing basis changes reflecting final resolution of Generic Safety Issue 191 (GSI-191) concerns. I&M stated that the downstream and chemical effects analyses as well as the licensing basis changes will be completed prior to DCCNP-1 entering Mode 4 at the end of the spring 2008 refueling outage, currently scheduled to begin in March 2008. I&M stated that the proposed completion of these activities prior to the restart of DCCNP-1 would be consistent with the due date that has been previously approved for completing plant modifications at this unit.

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As stated in SECY-06-0078, proposed extensions to permit changes at the next outage of opportunity after December 2007 may be granted if, based on the licensee's request, the staff determines that:

- (1) The licensee has a plant-specific technical/experimental plan with milestones and schedules to address outstanding technical issues with enough margin to account for uncertainties; and
- (2) The licensee identifies mitigative measures to be put in place prior to December 31, 2007, and adequately describes how these mitigative measures will minimize the risk of degraded emergency core cooling system (ECCS) and containment spray system (CSS) functions during the extension period.

SECY-06-0078 also states that for proposed extensions beyond several months, a licensee's request will more likely be accepted if the proposed mitigative measures include temporary physical improvements to the ECCS sump or materials inside containment to better ensure a high level of ECCS sump performance.

In regard to the first criterion for approving an extension, I&M stated that a plant-specific plan exists, with milestones and schedules, to complete the GL 2004-02-required corrective actions and modifications for DCCNP-1 and DCCNP-2 prior to the restart of DCCNP-1 from its spring 2008 refueling outage.

In addition to the corrective actions deferred by the previously approved extension request, the specific actions that I&M stated would be completed prior to DCCNP-1 entering Mode 4 at the end of the spring 2008 refueling outage include the following:

- Downstream effects analyses for ex-vessel components utilizing the methodology detailed in Westinghouse Commercial Atomic Power (WCAP)-16406-P, Revision 1, "Evaluation of Downstream Sump Debris Effects in Support of GSI-191," dated August 2007. I&M stated that initial evaluations using this methodology indicated that several pumps may require a refinement to the debris loading assumptions with respect to the quantity of suspended particulate debris. Therefore, I&M stated that it plans to conduct additional design basis and autoclave testing of cold galvanizing material (organic zinc product), since it would be a significant contributor to component wear based on the existing model. I&M plans to conduct this testing of cold galvanizing material early in 2008, and to update the downstream effects analysis prior to DCCNP-1 entry into Mode 4 at the end of its spring 2008 refueling outage.
- Downstream analysis for in-vessel effects utilizing the methodology detailed in WCAP-16793-NP, Revision 0, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid," dated May 2007. I&M expects to contract with Westinghouse Electric Company, LLC, to perform in-vessel blockage evaluations, and stated that the preparation of the analysis and the licensee's subsequent review and acceptance of the analysis are expected to be completed prior to DCCNP-1 entry into Mode 4 at the end of its spring 2008 refueling outage.
- An analysis of the results of 30-day integrated chemical effects head loss testing that was completed in September 2007. I&M stated that the vendor analysis of the test

results has taken longer to complete than had been anticipated. I&M stated that the delays are due, in part, to the test being a first-of-its-kind experiment, along with the wide variation of head loss data over the duration of the test. The vendor for the test, Alion Science and Technology, expects to complete the final test report during the first quarter of 2008, and the licensee expects to complete its review and acceptance of the test report prior to DCCNP-1 entry into Mode 4 at the end of its spring 2008 refueling outage.

- Completion of the removal of specified labels and other debris sources at DCCNP-1.
- Implementation of GL 2004-02 TS changes for DCCNP-1.
- Licensing basis changes associated with all analyses and with the DCCNP-1 remote strainer installation and related plant modifications.

In regard to the second criterion for approving an extension, I&M described the modifications, mitigating measures, compensatory measures, and/or favorable conditions that are in effect at the plant, minimizing the risk of degraded ECCS and CSS functions during the extension period, including the following:

- The previous sump screens at DCCNP-1 and DCCNP-2, with 1/4-inch openings and a surface area of approximately 85 square feet, have been replaced with new, larger strainers with 1/12-inch openings. The DCCNP-1 replacement strainer surface area is currently 900 ft², and the DCCNP-2 replacement strainer surface area is 1972 ft². (The licensee already has an approved extension to install an additional remote strainer assembly at DCCNP-1 during the spring 2008 refueling outage.) I&M stated that the installation of the replacement strainers provides additional margin both to head loss from debris blockage, and to the effects of downstream wear and blockage due to debris.
- Emergency procedures have been developed to address the potential for sump blockage and pump distress. I&M stated that operators have been trained on indications of sump blockage and pump distress and that new sump level switches have been installed to alert operators of the need to perform sump flow reductions to mitigate any adverse effects that could occur.
- The ex-vessel downstream blockage evaluations conservatively assessed blockage by assuming that the replacement strainer opening size is 1/8 inch.
- Calcium silicate insulation was removed from certain areas in containment.
- DCCNP-1 and DCCNP-2 have very little fiberglass insulation in zones that are vulnerable to destruction from jet impingement due to piping ruptures that could lead to sump recirculation.
- A significant number of qualified and unqualified labels have been removed from containment.
- Modifications were made to penetrations to the recirculation sump, including the sump vents and the crossover pipe to the lower containment sump, to prevent unanalyzed debris bypass.

- Debris interceptors were installed at various locations in containment to serve various functions including (1) preventing water holdup, (2) ensuring the reliability of instrumentation, and (3) preventing the transport of larger pieces of debris to the containment annulus.

I&M further justified its proposed extension for the corrective actions described above by discussing mitigating factors that were originally documented in GL 2004-02, including the following items:

- The probability of the most severe initiating event is extremely low (i.e., large- and intermediate-break loss-of-coolant accidents).
- Small-break loss-of-coolant accidents, which are still low probability events, would not be as severe as larger breaks, and in some cases, sump recirculation would not be required to mitigate these accidents.
- DCCNP-1 and DCCNP-2 do not switch over to sump recirculation until 18 to 20 minutes after an accident, which would allow some types of debris to settle in low-velocity areas in the containment pool.
- DCCNP-1 and DCCNP-2 have implemented interim compensatory measures in response to NRC Bulletin 2003-01 to reduce the potential risk associated with the degradation of the ECCS and containment spray systems in recirculation mode due to post-accident debris.

The NRC staff believes that I&M has a reasonable plan for DCCNP-1 and DCCNP-2 that should result in the completion of final GSI-191 modifications and evaluations that ensure strainer function with adequate margin for uncertainties. Further, the NRC staff has concluded that I&M has put mitigation measures in place at the units to adequately reduce risk for the requested extension period. However, after discussing the extension request by phone with the licensee on December 17, 2007, the NRC staff concluded that linking completion of analyses associated with downstream and chemical effects to the outage schedule for DCCNP-1 is inappropriate. The licensee agreed and proposed revised extensions for completing the downstream and chemical effects analyses. The staff found the licensee's proposed due dates acceptable and expeditious, consistent with the high priority placed on completing corrective actions for GL 2004-02. Therefore, consistent with SECY-06-0078, it is acceptable for I&M to complete the specific corrective actions described above according to the following schedule:

- Completion of the planned outage-related modifications specified above for DCCNP-1 (i.e., the removal of labels and other debris sources from containment), associated TS changes, and plant modification-related licensing basis updates prior to the restart of DCCNP-1 from its upcoming refueling outage that is scheduled to begin in March 2008. (Note that an extension approval already exists for other actions associated with the installation of a remote strainer for DCCNP-1, as described in the July 28, 2006, letter.)
- Completion of analyses for chemical effects and ex-vessel and in-vessel downstream effects and completion of licensing basis changes to reflect the deterministic methodology by the end of May 2008.

While the NRC accepts the revised completion dates above as reasonable allowance for contingencies regarding completion of remaining activities to address GL 2004-02, the NRC expects I&M to place a high priority on completing remaining actions and updating the licensing basis for DCCNP-1 and DCCNP-2, as soon as possible.

Should I&M elect to begin the DCCNP-1 refueling outage more than 30 days after March 2008, I&M will need to provide the NRC additional justification for the further delay in the completion of the planned outage-related modifications for DCCNP-1 and the other activities specified in the first bullet above.

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Dated: December 26, 2007

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