May 5, 2005

EA-05-021

Mr. Craig W. Lambert
Site Vice President
Kewaunee Nuclear Power Plant
Nuclear Management Company, LLC
N490 Hwy 42
Kewaunee, WI 54216-9511

SUBJECT: KEWAUNEE NUCLEAR POWER PLANT
FINAL SIGNIFICANCE DETERMINATION FOR A WHITE FINDING AND
NOTICE OF VIOLATION (NRC INSPECTION REPORT 05000305/2004009)

Dear Mr. Lambert:

The purpose of this letter is to provide you with the final results of our significance determination of a finding which was described in Inspection Report 05000305/2004009, issued February 14, 2005, that involved the inability of your staff to rapidly close the containment equipment hatch during cold shutdown conditions due to an interference. The interference was caused by the inadequate design of a rail system that was installed in the containment to facilitate reactor vessel head replacement activities. This finding was assessed using the Significance Determination Process (SDP) and was preliminarily characterized as White (i.e., a finding with low to moderate increased importance to safety, which may require additional NRC inspection).

In our letter dated February 18, 2005, the Nuclear Regulatory Commission (NRC) provided the Nuclear Management Company (NMC) an opportunity to either request a Regulatory Conference to discuss this finding, or to explain your position in a written response. At your request, a Regulatory Conference was scheduled and held on March 17, 2005, to discuss your views on this issue. Supporting documentation for the conference was submitted by you in letters dated March 12 and March 13, 2005. The Regulatory Conference summary, including presentation slides, is available electronically for public inspection in the NRC Public Document Room or from the Publically Available Records (PARS) component of NRC's document system (ADAMS) at accession number ML050620590. The NRC's document system is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

At the Regulatory Conference, you presented an overview of the event, related corrective actions, and the methodology and results of your independent safety assessment of the preliminary White finding, including the risk analysis results that were used in your independent safety assessment. In your presentation, you stated that it was your view that the finding would be more properly characterized as Green (i.e., a finding of very low safety significance). The NRC and NMC staffs held extensive discussions regarding technical issues

related to your analysis. Topics discussed included the probability of closing the containment hatch, if there was a station blackout event, the assumed mission times for the emergency diesel generator (EDG) and the technical support center diesel generator (TSC/DG), the reliability of the TSC/DG, and the exposure time for the finding. Specific topics that affected the final significance determination are discussed in the following paragraphs. Subsequent to the conference, on March 23, 2005, you submitted a written response to certain questions that were asked at the conference. This information was also considered in our final significance determination as described below.

Regarding the probability of closing the containment hatch during a postulated station blackout event, you presented a timeline for closing the hatch, a containment habitability analysis, and a human error probability for the failure to close the hatch. The NRC reviewed your hatch closure timeline and determined that a high degree of uncertainty existed in the time estimates for the decisions and tasks required to close the hatch. In particular, you estimated that the time from the discovery of the interference during the postulated station blackout event to the decision on the method for clearing the hatch interference to be 25.5 minutes, with an additional 40 minutes for the actual clearing of the interference. This and other aspects of the timeline appear to be overly optimistic given that an emergency condition would exist, the hatch interference was not previously known, and there was no existing method or procedure with specific instructions to remove the interference in place prior to discovery of the interference. Additionally, in contrast to the timeline presented, when this interference was identified in the plant, almost 7 hours were required to remove the interference. The containment habitability analysis supported the timeline that you established. However, because of the uncertainty in the timeline, containment habitability is also uncertain for any timeline that would exceed the one that was presented.

The timeline and the results of the containment habitability analysis were used in your calculation of the hatch closure failure probability, which was estimated at 3.7E-1. You stated that your result was based on assuming the decision making for developing the removal method of the hatch interference was a skill-based activity. We determined that the assumption that the activity was skill-based was not justified because the obstruction was not previously known to plant personnel and, in fact, the inner rail system was intended to be designed not to interfere with the equipment hatch door. The discovery of the interference would have occurred only when the closure was necessary, requiring personnel to develop an action plan and execute that plan during emergency conditions. Therefore, the NRC determined that the decision making for developing the removal method of the hatch was a knowledge-based activity.

Given the large uncertainty in your estimated hatch closure timeline and the NRC determination that the removal of the interference would be a knowledge-based rather than a skill-based activity, the NRC concluded that use of your hatch closure failure probability was not justified. The NRC performed an evaluation of the human error probability (HEP) for removing the interference and closing the hatch using the NRC's Standardized Plant Analysis Risk (SPAR) method. The NRC assumed that no procedures with specific instructions existed for the identification and removal of the interference and that extreme stress would be present. The estimated HEP was 1.0. This estimation assumes that adequate time is available and that the

environment would not prohibit the actions. Due to the uncertainty with your timeline for hatch closure, the NRC does not consider these assumptions to be accurate. However, the effect on the risk estimate would be unchanged since the HEP would also be 1.0 if there was either inadequate time available or if the containment habitability would not support the required actions.

This HEP result is consistent with the NRC's established practice for SDP analyses. Phase 2 analyses allow limited credit for recovery actions if the actions are proceduralized, the staff are trained, enough time is available, and the environment for performing the actions would remain habitable. In Phase 3 of the SDP, the SPAR method explicitly models the effects of various performance shaping factors including the quality of procedures, the environment, and the stress level involved in performing the actions.

For the EDG and TSC/DG mission times, you stated that the 1.6 hours used represented the probability weighted average loss of offsite power recovery time. The NRC calculated the average loss of offsite power recovery time using data from actual loss of offsite power events published in available draft reports, "Evaluation of Loss of Offsite Power Events: 1986 - 2003," and "Station Blackout Risk Evaluation for Nuclear Power Plants," and determined that the mission time used for this assessment should be 5.6 hours. For a sensitivity analysis, the NRC also used 24 hours, which is consistent with the mission time used in the NRC's SPAR models.

In your analysis, you stated that the TSC/DG failure to run probability was based on a Bayesian update of generic data from NUREG/CR-5500 Volume 5, "Emergency Diesel Generator Power System Reliability 1197 - 2003," with plant specific data. We determined that the use of the EDG data for updating the TSC/DG was not appropriate because the EDG reliability study did not include diesel generators used for station blackout conditions similar to the TSC/DG. Therefore, the NRC concluded that the failure to run estimate for the TSC/DG should be based only on the plant-specific data, which resulted in a failure to run estimate of 5.2E-3/hr. Also, you did not include a term for maintenance unavailability of the TSC/DG in your overall failure probability. During the Regulatory Conference you stated that TSC/DG maintenance was typically an online maintenance activity that would not be performed during an outage. The NRC asked if the TSC/DG had ever been unavailable due to maintenance during an outage. In your reply, dated March 23, 2005, you provided information that the TSC/DG had, in a prior outage, been taken out of service for maintenance. Therefore, the NRC determined that maintenance unavailability of the TSC/DG should be considered in the overall failure probability. However, the maintenance unavailability was small compared to the other possible failure modes of the TSC/DG (including human error) and so the result of the analysis remains unchanged with the addition of maintenance unavailability.

The exposure time, or the time that the containment hatch obstruction existed concurrent with an unavailable "A" EDG, used in your analysis was 2.73 days. This did not include a 3.7-hour period of unavailability of the "B" EDG. You indicated that the reason stated for not including this exposure time was that the out of service time was less than the time to core uncovery. Additionally, your analysis included credit for recovery of a failed EDG. The NRC determined that it was appropriate to consider the 3.7-hour period of unavailability of the "B" EDG given that there is no assurance that the return to service of the EDG from the maintenance would always

occur in that time period and because recovery of a failed EDG was explicitly modeled in the analysis. However, similar to the TSC/DG maintenance unavailability, the inclusion of this additional period of exposure time did not significantly influence the result of our analysis.

We reviewed all other aspects of your independent safety assessment of this issue and determined that, with the exception of the specific topics discussed in this letter, your assumptions were reasonable.

After considering the information developed during the inspection, the supporting information you provided prior to the Regulatory Conference, the information you provided at the Regulatory Conference, and your written response to our questions at the Regulatory Conference, the NRC concluded through additional independent risk calculations that the change in the Large Early Release Frequency associated with the inspection finding was still greater than 1E-7 and was appropriately characterized as White (i.e., an issue with low to moderate safety significance which may require additional NRC inspection).

You have 30 calendar days from the date of this letter to appeal the staff's determination of significance for the identified White finding. Such appeals will be considered to have merit only if they meet the criteria given in NRC Inspection Manual 0609, Attachment 2. Appeals to reduce the significance of an inspection finding will be considered as having sufficient merit for review by this appeal process only if the contention falls into one of the following categories: (1) actual (verifiable) plant hardware, procedures, or equipment configurations were not considered by the staff; or (2) the staff's significance determination process was inconsistent with the applicable SDP guidance or lacked justification.

The NRC has also determined that the inadequate design of the rail system that was installed in the containment to facilitate the reactor vessel head replacement activities and the failure to have adequate procedures with specific instructions for rapid removal of the interior rail to allow expeditious hatch closure, is a violation of 10 CFR Part 50, Appendix B, Criterion V, as cited in the enclosed Notice of Violation (Notice). The circumstances surrounding the violation are described in detail in Inspection Report 05000305/2004009. In accordance with the NRC Enforcement Policy, the Notice is considered escalated enforcement action because it is associated with a White finding.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response.

Because plant performance for this issue has been determined to be in the regulatory response band, we will use the NRC Action Matrix to determine the most appropriate NRC response for these events. We will notify you, by separate correspondence, of that determination.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARs) component of the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (The Public Electronic Reading Room).

Sincerely,

/RA by Mark Satorius Acting for/

James L. Caldwell
Regional Administrator

Docket No. 50-305
License No. DPR-43

Enclosure: Notice of Violation

cc w/encl: J. Cowan, Executive Vice President,
Chief Nuclear Officer
Plant Manager
Manager, Regulatory Affairs
J. Rogoff, Vice President, Counsel & Secretary
D. Molzahn, Nuclear Asset Manager,
Wisconsin Public Service Corporation
L. Weyers, Chairman, President and CEO,
Wisconsin Public Service Corporation
D. Zellner, Chairman, Town of Carlton
J. Kitsembel, Public Service Commission of Wisconsin

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D. Zellner, Chairman, Town of Carlton
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***See Previous Concurrence**
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NOTICE OF VIOLATION

Nuclear Management Company
Kewaunee Nuclear Power Plant

Docket No. 50-305
License No. DPR-43
EA-05-021

During an NRC inspection conducted from October 1 through December 31, 2004, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

> Title 10 CFR Part 50, Appendix B, Criterion V, (Instructions, Procedures, and Drawings) requires, in part, that activities affecting quality be prescribed by documented instructions, or procedures of the type appropriate to the circumstances and shall be accomplished in accordance with these instructions, or procedures.
>
> Kewaunee Nuclear Power Plant Procedure CMP-89 A-02, “Containment Building Inner Equipment Door Opening and Closing Instructions,” a procedure affecting quality, required that any equipment which passes through and could obstruct containment hatch closure be designed to allow rapid removal in order to ensure expeditious containment building equipment hatch closure should it become necessary to do so.
>
> Contrary to the above, on October 11, 2004, the licensee installed in the containment an interior steel runway track, equipment which could obstruct the containment hatch closure, which was not designed to allow rapid removal in order to ensure expeditious containment building equipment hatch closure. Specifically, the design of the interior steel runway track obstructed the containment hatch closure and could not be rapidly removed in order to permit an expeditious closure of the containment hatch should it become necessary to do so. In addition, the licensee did not develop or have in place procedures or plans to effect a rapid removal of the interior portion of the steel rail system to eliminate the interference.

This violation is associated with a White Significance Determination Process finding.

Pursuant to the provisions of 10 CFR 2.201, the Nuclear Management Company is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555 with a copy to the Regional Administrator, Region III, and a copy to the NRC Resident Inspector at the Kewaunee Nuclear Power Plant, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation; EA-05-021" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams/html., to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 5th day of May 2005