

February 18, 2005

EA 05-021

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

SUBJECT: PRELIMINARY SIGNIFICANCE DETERMINATION FOR A GREATER THAN
GREEN FINDING (NRC INSPECTION REPORT 50-305/2004-09) - KEWAUNEE
CONTAINMENT EQUIPMENT HATCH INTERFERENCE

Dear Mr. Lambert:

The purpose of this letter is to provide you with the Nuclear Regulatory Commission's (NRC's) preliminary significance determination for the performance deficiency which was described in NRC Inspection Report 50-305/2004-09 and 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 which was installed in the containment to facilitate reactor vessel head replacement activities. The preliminary significance determination revealed that this finding appears to have low to moderate safety significance and is being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. The current Enforcement Policy is on NRC's website at <http://www.nrc.gov/what-we-do/regulatory/enforcement/enforce-pol.html>.

The plant entered a refueling outage on October 9, 2004. On October 10, the containment equipment hatch was removed and the rail system was installed on October 11. The rail system consisted of two sections, one installed inside containment and the other exterior to containment. It was intended that the rail system be rapidly removed in the event of a need to close the equipment hatch. The containment equipment hatch closure plan called for the removal of the exterior rail only, whereas, the interior rail system was intended to be left in place inside containment. On October 14, in preparation for lifting the reactor vessel head, an attempt to close the equipment hatch revealed that the interior rail system interfered with and prevented the hatch from being closed. To eliminate the interference, the interior rail system was cut and the hatch was subsequently closed. Resolution of the issue took approximately 8 hours.

As discussed in detail in the enclosure, the significance of the finding was assessed using the NRC Significance Determination Process (SDP). The preliminary safety significance of the inspection finding based on the change in large early release frequency (LERF) considerations is White.

Be advised that this significance assessment is preliminary. The final significance assessment will include consideration of any further information or perspectives you provide that may warrant reconsideration of the methodology or assumptions used during the preliminary significance assessment.

The finding is also an apparent violation of 10 CFR 50, Appendix B, Criterion V, for failure to have procedures in place to effect rapid removal of the interior portion of the rail system to eliminate the interference, and is being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600.

This finding did not present an immediate safety concern because core cooling was available for the entire duration of the event and the interior rail system was modified upon discovery of the interference so that it no longer presented an obstacle to containment equipment hatch closure. The rail system was completely removed from the facility upon completion of the reactor vessel head replacement activities.

Before the NRC finalizes this significance determination, we are providing you an opportunity (1) to present to the NRC your perspectives on the facts and assumptions used by the NRC to arrive at the finding and its significance at a Regulatory Conference; or (2) submit your position on the finding to the NRC in writing.

If you request a Regulatory Conference, it should be held within 30 days of the receipt of this letter and we encourage you to submit supporting documentation at least one week prior to the conference in an effort to make the conference more effective. If a Regulatory Conference is held, it will be open for public observation. If you decide to submit only a written response, such submittal should be sent to the NRC within 30 days of the receipt of this letter.

Please contact Tom Kozak at 630-829-9866 within 10 business days of the date of receipt of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision and you will be advised by separate correspondence of the results of our deliberations on this matter.

Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for the inspection finding at this time. In addition, please be advised that the characterization of the apparent violation described in this letter may change as a result of further NRC review.

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

Sincerely,

/RA/

Mark A. Satorius, Director
Division Of Reactor Projects

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

Enclosure: Significance Determination Process and
Enforcement Review Panel Background Information

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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***See previous concurrence**

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SIGNIFICANCE DETERMINATION PROCESS (SDP) AND
ENFORCEMENT REVIEW PANEL
BACKGROUND INFORMATION

The significance of the finding was assessed using the SDP. Based on the initial results of the NRC Phase 2 SDP assessment, the finding was determined to be of low to moderate safety significance (WHITE). The applicable SDP for evaluation of this issue is the Containment SDP which is Appendix H of Inspection Manual Chapter 0609. The finding was determined to affect the Large Early Release Frequency (LERF) only and not Core Damage Frequency (CDF). Therefore, it was considered to be a "Type B" finding. A performance deficiency existed because an intact containment, meaning containment closure prior to reactor coolant system (RCS) boiling, could not be maintained due to the interference of the rail system.

During the time that the interference existed, the reactor was in cold shutdown with a high decay heat load and with the RCS vented to the containment atmosphere. This condition represented plant operating state (POS) 2E as designated in the SDP. All emergency core cooling systems and charging systems were available. However, during a portion of the time that the interior rail system was installed, only one of two emergency diesel generators (EDGs) were available. The availability of the plant's mitigation capability (i.e., emergency core cooling system (ECCS) availability, EDG availability) was determined to most closely resemble an in-depth capability. Based on POS 2E and the assessment of an in-depth mitigation capability, the risk significance was determined to be WHITE using the SDP.

A Phase 3 assessment was performed to determine if the Phase 2 result was bounding given that only one EDG was available during the time the interference existed. Only the loss of offsite power initiating event and subsequent station blackout sequence was considered. The plant has a Technical Support Center (TSC) EDG that can provide power to a charging pump to make up reactor vessel inventory in the event of a station blackout. This additional plant-specific equipment was credited in the analysis. The core damage sequence of interest is a loss of offsite power, failure of the available EDG, failure to establish charging powered by the TSC EDG, and the failure to recover offsite power prior to core uncover. A large early release is assumed to occur at core uncover because the RCS is open to containment atmosphere and with the containment equipment hatch unable to be closed, the release is not contained.

Loss of offsite power initiating event frequencies and offsite power nonrecovery probabilities were obtained from NUREG/CR-5496, "Evaluation of Loss of Offsite Power Events at Nuclear Power Plants: 1980 - 1996." The EDG failure probability and the TSC/charging failure probabilities were obtained from the Kewaunee plant-specific probabilistic risk assessment (PRA). The time to core uncover given a station blackout was assumed to be 3 hours. Sensitivity analyses were performed using draft NRC information on loss of offsite power events that are soon to be published as an update to NUREG/CR-5496. Also, sensitivity analyses were performed assuming a time to core uncover of 4 hours. The duration of the condition was 67 hours.

The results of the calculations were a range of core damage frequency due to station blackout of $4.5\text{E-}7$ to $9.3\text{E-}7$. The LERF was assumed to be equivalent to the CDF because the rail system interference would prevent the closure of the equipment hatch prior to the RCS boiling. Once boiling begins in the RCS, the analysis assumed the probability of the failure to close the equipment hatch was 1.0. Therefore the estimated LERF also ranged from $4.5\text{E-}7$ to $9.3\text{E-}7$. This estimate was compared to a base case LERF which represents no performance deficiency. For the base case, a containment closure failure probability of .25 was assumed. The change in LERF due to the performance deficiency then was estimated to be in the range of $3.3\text{E-}7$ to $7.0\text{E-}7$.

The estimate of the probability of failure to close the equipment hatch of 1.0 was made because the interference of the rail system was not known to plant personnel. Since the interference was not known, no procedures existed to remove it and the method of removal was not obvious or simple. Any actions that would be necessary to close the equipment hatch would be severely complicated by a lack of electrical power and plant emergency conditions. Additionally, such actions would be required under the extremely stressful situation of a station blackout.

The licensee provided an analysis of the issue, which was similar in many respects to the Phase 3 analysis performed by the NRC. The major difference was the assumption regarding the likelihood of closing the equipment hatch. The licensee estimated the failure of closing the hatch to be on the order of $6.0\text{E-}2$, while the NRC estimated this probability to be 1.0 for the reasons stated above.

In conclusion, the preliminary safety significance of the inspection finding based on the change in LERF considerations was determined to be of low to moderate safety significance (WHITE). If additional information is provided regarding the likelihood of closing the containment equipment hatch or any other aspect of this analysis, it should be clearly articulated and effectively supported.