January 20, 2006

Mr. David A. Christian
Senior Vice President and
Chief Nuclear Officer
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: KEWAUNEE POWER STATION - NRC PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT NO. 05000305/2005005

Dear Mr. Christian:

On December 16, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed a baseline team inspection at your Kewaunee Power Station. The enclosed report documents the inspection findings, which were discussed on December 16 with Mr. Michael Gaffney and other members of your staff.

The inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems, and compliance with the Commission's rules and regulations and the conditions of your operating license. Within these areas, the inspection involved examination of selected procedures and representative records, observations of activities, and interviews with personnel.

Based on the samples selected for review, the inspectors identified three findings of very low safety significance (Green), two of which were determined to be violations of NRC requirements. However, because the violations were of very low safety significance and because the issues were entered into your corrective action program, the NRC is treating these violations as Non-Cited Violations (NCVs), consistent with Section VI.A of the NRC Enforcement Policy.

If you contest the subject or severity of an NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Kewaunee Power Station facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and any response you provide will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (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/**

Patrick L. Louden, Chief
Projects Branch 5
Division of Reactor Projects

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

Enclosure: Inspection Report 05000305/2005005
w/Attachment: Supplemental Information

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REGION III

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| Docket No: | 50-305 |
| License No: | DPR-43 |
| Report No: | 05000305/2005005 |
| Licensee: | Dominion Energy Kewaunee, Inc. |
| Facility: | Kewaunee Power Station |
| Location: | N490 Highway 42<br>Kewaunee, WI 54216 |
| Dates: | November 28 through December 16, 2005 |
| Inspectors: | M. Kunowski, Project Engineer (Team Leader)<br>P. Higgins, Resident Inspector, Kewaunee<br>J. Jandovitz, Reactor Engineer<br>J. Neurauter, Reactor Engineer |
| Approved by: | P. Louden, Chief<br>Projects Branch 5<br>Division of Reactor Projects |

Enclosure

## SUMMARY OF FINDINGS

IR 05000305/2005005; Dominion Energy Kewaunee, Inc.; on 11/28/2005 - 12/16/2005; Kewaunee Power Station; biennial baseline inspection of the identification and resolution of problems. Two violations were identified in the area of corrective actions.

The inspection was conducted by a regional projects inspector, a resident inspector, and two regional engineering inspectors. Three findings of very low safety significance (Green) were identified during this inspection, two of which were classified as Non-Cited Violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

Identification and Resolution of Problems

The inspectors concluded that the licensee's implementation of its program for identifying, evaluating, and correcting nuclear safety problems was adequate. While the licensee was identifying plant problems at an appropriately low level, the inspectors had observations and one finding that indicated additional attention by plant management was warranted, particularly with the trending of conditions adverse to quality during outages to identify potentially more significant conditions or to effectively correct low-level repetitive conditions. One finding of very low safety significance was identified in this area.

In the area of prioritization and evaluation of issues, program implementation was effective, particularly with the licensee's evaluation of and corrective actions for recurrent problems with certain bistables and for operating experience related to replacement reactor head activities.

In the area of effectiveness of corrective actions, the inspectors identified two findings of very low safety significance, with associated Non-Cited Violations, for the licensee's failure to correct a procedure non-adherence issue identified during its 2004 self-assessment of the corrective action program and to correct leakage from a residual heat removal pump that could significantly increase control room and offsite doses during certain accidents. Leakage from the residual heat removal pumps has been an issue at Kewaunee since 1979.

From interviews conducted during this inspection and a review of corrective action program and employee concerns program documents, the inspectors concluded that workers at Kewaunee felt free to input nuclear safety findings into the corrective action program or the employee concerns program.

### A. Inspector-Identified and Self-Revealed Findings

**Cornerstone: Mitigating Systems**

- Green. The inspectors identified a finding of very low safety significance for the licensee not reviewing corrective action program documents (CAPs) during outages for

potential trends of conditions adverse to quality. As part of the screening process of CAPs, the licensee assigned, as possible, CAPs to various "hot buttons." Hot buttons were searchable categories in the corrective action program computer system that had been established for various problems, such as equipment tagging errors, security door control, and reactivity management. For non-outage times, the licensee assigned a monthly number of hits for each hot button that, if exceeded for 3 months in succession, would result in the generation of a CAP to investigate a possible trend. However, as of December 16, 2005, the licensee did not use hot button action levels during outages when the number of CAPs written was much higher than during non-outage times.

This finding is greater than minor because if left uncorrected would become a more significant safety concern. This finding is not suitable for Significance Determination Process evaluation, but has been reviewed by NRC management and is determined to be a finding of very low safety significance. The cause of the finding is related to the cross-cutting element of problem identification and resolution, because of not identifying potential conditions adverse to quality through trending of CAPs during outages. (Section 4OA2a.(2)(i))

- Green. The inspectors identified a finding of very low safety significance and a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the failure to take corrective action for procedure non-compliance identified during the licensee's 2004 self-assessment of the corrective action program. As a result of the assessment, CAP025194, "Corrective Action Program Procedure and Guidance Document Use," was written and documented that plant workers were not following corrective action program procedures for apparent cause evaluations and root cause evaluations, effectiveness review content, priority and due date assignments, initiator feedback, and documentation of corrective action completion. To correct this problem, corrective action CA018094, "Corrective Action Program Procedure and Guidance Document Use," was written and specified one or 2 weeks of requiring "in-hand" use by the plant staff of the corrective action program administrative procedure. However, completion of this action was delayed several times and on July 25, 2005, CAP025194 and CA018094 were closed with the only documented action taken being a July 18, 2005, meeting of the station human performance steering committee at which the licensee decided not to take action because of the pending transition to the corrective action program documents of the plant's new owner.

  This finding is greater than minor because if left uncorrected would become a more significant safety concern. This finding is not suitable for Significance Determination Process evaluation, but has been reviewed by NRC management and is determined to be a finding of very low safety significance. The cause of the finding is related to the cross-cutting element of problem identification and resolution, because of the failure to take corrective action for non-adherence to station procedures. (Section 4OA2c.(2)(i))

- Green. A finding of very low safety significance that was a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified for the licensee's ineffective corrective action to repair a leak on the seal of the "B" residual heat removal (RHR) pump. The leak was identified on November 2, 2005, when the pump was stopped following the performance of a required surveillance. The leak rate exceeded leakage control program limits. A similar leak was identified on

June 16, 2004, for which the licensee replaced the seal in November 2004.

This finding is greater than minor because it was associated with the "RCS (reactor coolant system) equipment and barrier performance" attribute of the barrier integrity cornerstone and does affect the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Although the RCS barrier was affected, the finding did not affect the mitigation capability of the RHR system and did not contribute to the likelihood of a primary or secondary system loss of coolant accident initiator or affect the containment integrity. Therefore, the finding is of very low safety significance. (Section 4OA2c.(2)(ii))

**B. Licensee-Identified Violations**

None.

## REPORT DETAILS

### 4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution

**a. Effectiveness of Problem Identification**

(1) Inspection Scope

The inspectors reviewed items selected from the cornerstones of safety to determine if problems were being properly identified, characterized, and entered into the corrective action program for evaluation and resolution. At Kewaunee, problems entered into the program are documented as CAPs (i.e., condition reports). Included in this review were numerous CAPs, the reports of the 2004 and 2005 Kewaunee self-assessments, Nuclear Oversight (quality assurance) reports, Licensee Event Reports (LERs), other plant documents, and previous NRC inspection reports. The inspectors also conducted plant tours and interviewed plant personnel to identify equipment or process problems that had not been entered into the corrective action program. The previous NRC problem identification and resolution team inspection was conducted at the end of 2003 (Inspection Report (IR) 05000305/2003010).

(2) Assessment

The inspectors concluded that the licensee was generally effective in identifying problems and the threshold of the majority of plant personnel was appropriately low. Both the previous operating company, the Nuclear Management Company, LLC (NMC) and the current owner and operator (as of July 5, 2005), Dominion, emphasized to plant personnel a low threshold for documenting problems in CAPs. The number of CAPs generated in recent years have indicated that this emphasis has been effective:

- in 2001, 4903 CAPs (outage year, including steam generator replacement),
- in 2002, 3867 CAPs (non-outage year),
- in 2003, 5208 CAPs (outage year),
- in 2004, 5367 CAPs (outage year), and
- in 2005, 5773 CAPs (outage year).

The inspectors, however, had several observations, including one finding, that indicated additional effort was warranted in the area of identification of problems. These observations are discussed below.

(i) Trending During Outages

Introduction: The inspectors identified a finding of very low safety significance (Green) for the licensee not reviewing CAPs during outages for potential trends of conditions adverse to quality.

Description: As part of the screening process of CAPs, the licensee assigns, as possible, CAPs to various "hot buttons." Hot buttons are searchable categories in the corrective action program computer system that have been established for various problems, such as equipment tagging errors, security door control, and reactivity management. For non-outage times, the licensee assigned a monthly number of hits for each hot button that, if exceeded for 3 months in succession, would result in the generation of a CAP to investigate a possible trend. However, the licensee does not use hot button action levels during outages. The explanation was that outages were known to result in more CAPs being generated and that developing appropriate action levels for the known increase in CAPs in the various hot button categories would be problematic. The inspectors concluded that timely hot button categorization and analysis during outages could help prevent a significant program, process, or work group problem that was currently showing up as lower level issues or could reduce or eliminate repeat lower level issues.

Analysis: The inspectors determined that the licensee's failure to review CAPs during outages to identify and address potential trends in conditions adverse to quality was a licensee performance deficiency warranting a significance evaluation. The inspectors concluded that the finding was more than minor in accordance with Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," issued September 30, 2005, in that, the finding if left uncorrected would become a more significant safety concern. This finding (FIN 05000305/2005005-01) is not suitable for Significance Determination Process (SDP) evaluation, but has been reviewed by NRC management and is determined to be of very low safety significance (Green).

The inspectors also determined that the finding affected the cross-cutting element of problem identification and resolution, because of not identifying potential conditions adverse to quality through trending of CAPs during outages.

Enforcement: No violation of NRC requirements was identified for this finding. The licensee entered the issue into the corrective action program as CAP030559.

(ii) Additional Observations on Trending and Identification of Problems

- The licensee's 2004 self-assessment of the corrective action program identified that the trend analysis program was adding little value; however, this was not documented in a CAP. The explanation given in the assessment report implied that one was not needed because the recently developed monthly department "roll-up" process (DRUM process) would likely address the problems after several months of run time. Among other items, the DRUM process had the various departments assess department-related CAPs from the past month to identify any trends. The inspectors concluded that a CAP should have been written to ensure that the DRUM process was reviewed after several months to assess if the original issue from the 2004 assessment was addressed. With the imminent change from NMC to Dominion and a forced outage from February 20

to July 2, 2005, the DRUM process was not implemented. A similar Dominion process has since been implemented.

- Trend program concerns were again identified as part of the 2005 self-assessment of the corrective action program. The concerns, identified by an NOS evaluator (Nuclear Oversight–quality assurance) were documented in CAP029587, "The CAP Trending Program Expectations Not Met." Issues documented included not using hot button trends during non-refueling outages; the last published quarterly corrective action program trend report was for the third quarter of 2004, as of the third quarter of 2005; and a backlog of 343 existed for a final corrective action program quality check of completed apparent cause evaluations and conditions evaluations.

- At a CAP screening meeting attended by the inspectors, the screening team did not question why CAP030351 had just been written, on November 30, 2005, for an issue regarding the use of current procedures in training that was first identified on March 29. The licensee wrote CAP030543 to follow-up on the inspectors' observation.

- The resident inspectors, in their daily review of newly written CAPs, have identified instances where more than one potential issue was documented in a CAP. The licensee's policy is "one issue, one CAP." The licensee entered this apparent discrepancy into its corrective action program as CAP030560 for evaluation.

**b. Prioritization and Evaluation of Issues**

(1) Inspection Scope

The inspectors reviewed the licensee's significance classification and evaluation of a sample of CAPs, apparent cause evaluations (ACEs), and root cause evaluations (RCEs). The inspectors' assessment included a review of the following attributes: significance category assigned to a CAP, the adequacy of operability and reportability determinations, the extent of condition evaluations, and the appropriateness of using whatever causal investigation was used. The licensee's prioritization and evaluation of selected operating experience issues regarding reactor vessel head lifting, in Westinghouse technical bulletins, and with Foxboro instruments were also assessed by the inspectors.

The inspectors also attended several CAP daily screening meetings and a corrective action review board meeting where ACEs and RCEs were reviewed by licensee management. At these meetings, the inspectors assessed the licensee's evaluation of issues in CAPs, ACEs, and RCEs.

(2) Assessment

(i) ACEs and RCEs: For the ACEs and RCEs reviewed, no significant problems were identified by the inspectors. The causes identified by the licensee appeared appropriate and the identified corrective actions, if fully implemented, should correct the problems that caused the original issue.

(ii) Operating Experience: For CAPS associated with external operating experience contained in Westinghouse technical bulletins, the inspectors did not identify any significant problems but did have some observations regarding thoroughness of the documentation of evaluation results. The licensee indicated that these observations would be evaluated and appropriate corrective actions would be taken, as necessary.

- For Operating Experience OE002555, "CROSSFLOW Ultrasonic Flow Measurement System Performance Observations," three action items had been assigned to change three procedures. One procedure change had been completed, one procedure deleted with no explanation in the file as to whether another procedure had taken its place; and one change had not yet been made. In addition, the OE evaluation mentioned the need for additional training but no action item was assigned to provide the training.

- For OE002902, "RCP Motor Recommended 1-Year, 5-Year and 10-Year Maintenance," no basis was given for recommendations that would not be followed.

- For OE005168, "Updated Reactivity Surveillance Policy for B-10 Isotopic Concentration," the licensee stated that the recommended actions would be taken, but the frequency of the surveillance was different from that contained in the Bulletin and no basis for the difference was provided.

(iii) Foxboro Instruments: The inspectors reviewed the licensee's evaluation of and subsequent corrective actions for failures of certain Foxboro bistables. The licensee's efforts were in followup to observations made by the resident inspectors (IR 05000305/2005008). The resident inspectors had determined that the licensee did not always address potential operability considerations when bistables associated with safety-related Technical Specification systems were found out-of-tolerance in the non-conservative direction. Also, the resident inspectors identified that because the licensee considered Foxboro instruments in their own Maintenance Rule system, out-of-tolerance bistables were handled through the Maintenance Rule process and components that had out-of-tolerance bistables were not individually evaluated. Lastly, the inspectors had determined that when an out-of-tolerance condition was identified, a thorough extent of condition was not always performed.

During the current inspection, the inspectors reviewed the history of the Foxboro bistable failures contained in the corrective action program, reviewed the results and the trending data of the surveillance procedure of the safety-related Foxboro

instruments for approximately the last 1 ½ years, and discussed these results with station personnel. The inspectors determined through discussions with the Maintenance Rule engineer that Foxboro instrument failures were now evaluated against the plant system affected by the Foxboro instrument as well as the simulated Foxboro system. Unavailability, if any, caused by the Foxboro instrument failure was being logged against the plant system. The results of the monthly surveillance procedures for the last 12-18 months for the safety-related bistables were reviewed with the instrument and control (I&C) engineer. In most cases, the failure of the bistable could be predicted with the trending data. The Foxboro instrument would be recalibrated or replaced prior to the predicted failure. In some cases, the data were not predictable due to large variances, but still within acceptance criteria. The I&C engineer was now engaged with all the Foxboro surveillances conducted and the results and operability determinations resulting from failures of safety-related instruments. In addition, the I&C engineer provided information on the replacement program for the Foxboro instruments which should be completed in 2006. The inspectors determined from this information that the corrective actions taken since the previous inspection adequately addressed the previous concerns of the resident inspectors.

(iv) Reactor Head Drop Analysis: During the fall 2004 refueling outage, Kewaunee installed a new reactor vessel head that weighed less than the original reactor vessel head. The effect of replacement reactor vessel head weight on the original head drop analysis was evaluated by the licensee in its 10 CFR 50.59 analysis. The inspectors considered the original head drop analysis to be bounding and conservative for the lower weight, replacement reactor vessel head. Therefore, a review of the original head drop analysis was not performed by the inspectors.

In later inspections at other licensees where replacement heads weighed more than the original heads, non-conservative assumptions and methodologies and incomplete resolution of load drop analysis results were identified for head drop analyses, as described in NRC Regulatory Issue Summary (RIS) 2005-25, “Clarification of NRC Guidelines for Control of Heavy Loads,” dated October 31, 2005. In addition, RIS 2005-25 also clarified NRC regulatory guidelines for the control of heavy loads to assure the safe handling of heavy loads in areas where a load drop could impact stored spent fuel, fuel in the reactor core, or equipment that may be required to achieve safe shutdown or permit continued decay heat removal.

During the current inspection, the inspectors reviewed the licensee’s evaluation and corrective actions pertaining to industry operating experience and RIS 2005-25 related to its reactor vessel head drop analysis and control of heavy loads. The evaluation of operating experience had been entered into the licensee’s corrective action program as CAP027482. The licensee’s review identified that its reactor vessel head drop analysis used the same non-conservative method of analysis as the Prairie Island Nuclear Generating Plant (IR 05000282/2005004; 05000306/2005004 (ML052020420) dated July 21, 2005). The inspectors verified that the licensee’s corrective action,

CA019697, included a plan to update the head drop analysis using finite element methods based on a "conservation of energy" methodology. The updated head drop analysis will use a heavier weight, consistent with a head assembly upgrade package. CA019697 indicated that the licensee's goal was to update the head drop analysis prior to the fall 2006 refueling outage. Licensee senior management confirmed this in a discussion with the inspectors.

The inspectors interviewed knowledgeable licensee staff to determine the potential safety significance of the non-conservative methodology used in its current head drop analysis. The licensee's staff indicated that the Kewaunee reactor vessel support design was very similar to that of Prairie Island, and the results from the revised Prairie Island head drop analysis using finite element methods gave reasonable assurance that the current lighter weight Kewaunee head (approximately 140,000 pounds versus 200,000 pounds for Prairie Island) could be safely lifted above the reactor vessel to an elevation necessary to remove and replace the head during refueling operations.

The inspectors observed that current licensee procedures pertaining to removal and replacement of the reactor vessel head did not contain a maximum head lift height restriction. The inspectors noted that licensee procedures may need to be revised to specify a maximum head lift height restriction to be consistent with results from the updated head drop analysis.

The inspectors concluded that industry operating experience and NRC issues identified in RIS 2005-25 related to Kewaunee's reactor vessel head drop analysis and control of heavy loads have been identified by the licensee, entered into its corrective action program, and corrective actions specified and scheduled to resolve concerns and issues related to the current head drop analysis prior to the fall 2006 refueling outage.

**c. Effectiveness of Corrective Actions**

(1) Inspection Scope

The inspectors reviewed selected CAPs and associated corrective actions (CAs) to evaluate the effectiveness of the licensee's corrective actions taken for issues. The inspectors reviewed condition evaluations (CEs), ACEs, and RCEs to determine if corrective actions, commensurate with the significance of the issues, were identified and implemented in a timely manner, including corrective actions to address longstanding or repetitive issues.

The inspectors also verified the continued implementation of a sample of completed corrective actions. The sample that was selected for review was based, in part, on the safety and risk significance of the issues pertaining to the reactor safety strategic performance area. Included in the review by the inspectors were corrective actions taken for licensee self-assessment findings, issues in licensee event reports (LERs), and for Non-Cited Violations (NCVs) discussed in previous NRC inspection reports.

(2) Assessment

For most of the issues reviewed by the inspectors, appropriate and timely corrective actions were taken; however, as discussed below, two findings of very low safety significance involving violations of NRC requirements were identified by the inspectors.

(i) Corrective Action Not Taken

Introduction: The inspectors identified a finding of very low safety significance (Green) for the failure to take corrective action for an issue regarding procedure compliance identified during the licensee's 2004 self-assessment of the corrective action program.

Description: In the 2004 self-assessment of the corrective action program, one of the four CAPs written for identified problems was CAP025194, "Corrective Action Program Procedure and Guidance Document Use," January 27, 2005. This CAP documented that plant workers were not following corrective action program procedures and guidance documents (essentially, NMC procedures and documents) for ACEs and RCEs, effectiveness review content, priority and due date assignments, initiator feedback, and documentation of corrective action completion. To correct this problem, CA018094, "Corrective Action Program Procedure and Guidance Document Use," was written and specified 1 or 2 weeks of requiring "in-hand" use by the plant staff of the corrective action program administrative procedure (General Nuclear Procedure GNP-11.08.01, "Action Request Process") in February-March 2005. However, completion of this action was delayed several times and on July 25, 2005, CAP025194 and CA018094 were closed with the only documented action taken being a July 18, 2005, meeting of the station human performance steering committee. At this meeting, it was decided that the "in-hand" procedure use recommendation would not be implemented because training would be provided to plant staff on standards and expectations of procedure use and adherence when the Dominion fleet corrective action program was implemented at Kewaunee. During the current inspection, licensee representatives stated that the Dominion corrective action program procedure was expected to be implemented in late December 2005 or January 2006.

Although no specific corrective action was taken for this self-assessment problem, the licensee had emphasized corrective action program procedure adherence to the plant staff in periodic plant newsletters and daily alignment meetings ("D-15 meetings"). The inspectors noted that several of the seven issues identified during the 2005 self-assessment of the corrective action program were caused, in part, by plant staff not following correction program procedures and guidance documents.

Analysis: The inspectors determined that the licensee's failure to take corrective action to address plant staff failure to follow the corrective action program administrative procedure was a licensee performance deficiency warranting a significance evaluation. The inspectors concluded that the finding was more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," issued September 30, 2005, in that, the finding if left uncorrected would become a more significant safety concern. This finding is not suitable for SDP evaluation, but has been reviewed by NRC management and is determined to be a finding of very low safety significance (Green).

The inspectors also determined that the finding affected the cross-cutting element of problem identification and resolution (corrective action), because of the failure to take corrective action for non-adherence to station procedures.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, and nonconformances are promptly identified and corrected. Contrary to this, as of December 16, 2005, the licensee had not corrected a condition adverse to quality, the failure by plant staff to follow corrective action program procedures that was identified during the 2004 self-assessment of the corrective action program. Because this finding was of very low safety significance (Green) and because it had been entered into the corrective action program (as CAP030538), it is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 05000305/2005005-02).

(ii) Inadequate Corrective Action Taken

Introduction: The inspectors identified a finding of very low safety significance (Green) for the failure to take adequate corrective action for a leaky seal on a residual heat removal (RHR) pump. An NCV had previously been identified for the leaky seal during a mid-2004 NRC inspection.

Description: On June 16, 2004, during a routine quarterly surveillance, the licensee identified that the seal of the 'B' RHR pump was leaking excessively after the pump was stopped. The licensee estimated the leakage was approximately 1 gallon per minute (gpm) or 60 gallons per hour (gph). This was greater than the 6-gph emergency core cooling system leakage allowed by the System Integrity Program (SIP), as referenced by Technical Specification 6.12, and greater than the 12-gph leakage discussed in Chapter 14 of the Updated Safety Analysis Report (USAR) for calculation of control room and offsite doses. The licensee entered a

7-day administrative Limiting Condition for Operation per the SIP and the licensee declared the pump operable but degraded, on the basis that the mechanical seal stopped leaking after the pump was electrically started and stopped in short succession (i.e., “bumped”). The NRC resident inspectors determined that excessive seal leakage had occurred on numerous occasions in the past and previous actions had not been effective in correcting this condition adverse to quality. An NCV (05000305/2004004-01) for failure to correct a condition adverse to quality was identified and was documented in IR 2004004, dated July 29, 2004. The licensee had documented the problem in its corrective action program as CAP021589 and CAP021744. For its corrective action, the licensee replaced the seal in November 2004 during a refueling outage.

During the current inspection, the inspectors reviewed the effectiveness of the corrective action for the 2004 leak and identified that on November 2, 2005, the “B” RHR pump replacement seal leaked when the pump was stopped during a routine quarterly surveillance. As in June 2004, operators stopped the leak by “bumping” the pump. For the subsequent operability evaluation, the licensee estimated that the leakage was less than 1 gpm–the leakage had not been measured before the pump was bumped. The shift manager declared the pump operable, on the basis that the leakage stopped when the pump was “bumped” and that the radiological analysis for the June 2004 leak, which assumed a 60-gph leak rate, determined that there was no significant impact on control room or offsite doses.

In response to questions by the NRC inspectors, the licensee re-estimated the leakage on November 2, 2005, as greater than 6 gph but less than 60 gph, a rate in excess of that allowed by the SIP. The inspectors also noted that the initial operability evaluation for the leak in June 2004 did not address the potential radiological consequences of the RHR system barrier leaking reactor coolant outside containment in excess of SIP and USAR limits. For the operability evaluation for the November 2005 leak, the licensee reviewed the potential impact of the estimated leakage on control room and offsite doses and demonstrated that no dose limits were likely exceeded.

From interviews and a review of corrective action program records and work orders, the inspectors determined that leakage from the RHR pump seals on both trains had occurred numerous times since 1979 following the shutdown of the pumps. Historically, the licensee stopped the leakage by rotating the pump shaft, either electrically or manually, until the leak stopped. This method had been incorporated in Procedure A-MDS-30, “Miscellaneous Drains and Sumps (MDS) Abnormal Operation,” November 22, 2005. Section 4.10, “RHR Pump Pit Sump,” Step 2.a., stated, “IF RHR pump was NOT running, THEN

seal leakage may be stopped by rotating shaft by hand or bumping motor."

Analysis: The inspectors determined that the licensee's failure to take effective corrective actions to address the RHR pump seal leakage was a performance deficiency warranting a significance evaluation. This self-revealed finding was greater than minor because the finding was associated with the "RCS (reactor coolant system) equipment and barrier performance" attribute of the barrier integrity cornerstone and does affect the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events.

The inspectors determined that the finding could not be evaluated using the SDP. Although the inspectors, with the assistance of a Region III Senior Reactor Analyst, determined that the RCS barrier was affected, the Phase 2 worksheets were not applicable because this issue did not affect the mitigation capability of the RHR system. The finding also did not contribute to the likelihood of a primary or secondary system loss of coolant accident initiator or affect the containment integrity. Therefore, this finding was reviewed by a Region III Branch Chief in accordance with IMC 0612, Section 05.04c, who agreed with the inspectors that this finding was of very low safety significance (Green).

The inspectors also determined that the finding affected the cross-cutting element of problem identification and resolution, because of the failure to take effective corrective action to address the RHR pump seal leakage.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. Contrary to this requirement, as of December 16, 2005, actions taken to correct a leaky seal on the "B" RHR pump, a condition adverse to quality, have not been effective. Because this finding was of very low safety significance (Green) and because it had been entered into the corrective action program (as CAP030527, on December 14, 2005), it is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 05000305/2005005-03).

During the review of this issue, the inspectors questioned 1) the basis for a 2 gph limit on RHR train leakage that previously was in the Technical Specifications and was a basis for the current 6 gph limit in the SIP and, 2) whether the licensee had properly transferred all requirements to the SIP and other administratively controlled

documents when the NRC approved (on February 25, 1998) Kewaunee's implementation of Option B of Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," of 10 CFR 50. The licensee could not answer the questions during the inspection and, consequently, the resident inspectors will follow-up as part of their routine inspection activities.

**d. Assessment of Safety-Conscious Work Environment**

(1) Inspection Scope

To determine if plant personnel were reluctant to raise nuclear safety concerns, the inspectors questioned workers in the plant and interviewed the corporate manager (and recent site manager) of the station employee concerns program. The inspectors also reviewed program records to determine if employee concerns had been properly evaluated and corrected, as necessary.

(2) Assessment

The inspectors concluded that licensee personnel were willing to raise safety concerns and that nuclear safety issues raised to the employee concerns program were properly evaluated and corrected.

4OA6 Meetings

On December 16, 2005, the team presented the preliminary inspection results to Mr. M. Gaffney and other members of the licensee's staff, who acknowledged the findings. The licensee did not identify any information, provided to or reviewed by the team and likely to be included in the inspection report, as proprietary.

4OA7 Licensee-Identified Violations

None.

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee

L. Armstrong, Director of Engineering
R. Bower, Technical Specialist, Corrective Actions
T. Breene, Manager, Nuclear Licensing
K. Davison, Director, Nuclear Station, Operations and Maintenance
M. Gaffney, Site Vice-President
D. Gauthier, Nuclear Quality Specialist
K. Hoops, Site Director
W. Hunt, Maintenance Manager
R. Nicolai, Organizational Effectiveness Manager
K. Peckham, Nuclear Oversight Manager
K. Peveler, Manager Engineering Programs
D. Sieracki, Dominion Fleet Manager, Employee Concerns Program
T. Taylor, Licensing and Compliance Group
T. Van Valkenburg, Technical Specialist, Corrective Actions
T. Webb, Director of Safety and Licensing

Nuclear Regulatory Commission

S. Burton, Senior Resident Inspector, Kewaunee
P. Louden, Chief, Reactor Projects Branch 5
M. Satorius, Director, Division of Reactor Projects

## ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 05000305/2005005-01 | FIN | No Trending of Adverse Conditions Identified During Outages (Section 4OA2a.(2)(i)) |
| 05000305/2005005-02 | NCV | Failure to Correct Procedure Non-Adherence (Section 4OA2c.(2)(i)) |
| 05000305/2005005-03 | NCV | Failure to Adequately Correct Residual Heat Removal Pump Seal Leakage (Section 4OA2c.(2)(ii)) |

Closed

| | | |
|---|---|---|
| 05000305/2005005-01 | FIN | No Trending of Adverse Conditions Identified During Outages (Section 4OA2a.(2)(i)) |
| 05000305/2005005-02 | NCV | Failure to Correct Procedure Non-Adherence (Section 4OA2c.(2)(i)) |
| 05000305/2005005-03 | NCV | Failure to Adequately Correct Residual Heat Removal Pump Seal Leakage (Section 4OA2c.(2)(ii)) |

Discussed

| | | |
|---|---|---|
| 05000305/2004004-01 | NCV | Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” for the Failure to Correct Historical Residual Heat Removal Pump Mechanical Seal Leakage (Section 4OA2c.(2)(ii)) |

## LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection, including documents prepared by others for the licensee. Inclusion of a document on this list does not imply that NRC inspectors reviewed the entire document, but, rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. In addition, inclusion of a document on this list does not imply NRC acceptance of the document, unless specifically stated in the body of the inspection report.

NMC Internal Correspondence: Charles Tomes to Dave Masarik; Subject: Hudson CAP Regarding Heavy Loads; dated May 19, 2005
GNP 11.08.01; Action Request Process; dated August 30, 2005
GNP 11.08.02; Action Request Process Trending; dated March 27, 2003
RF-02.06; Refueling Procedure: Reactor Vessel Head Lift; Revision F
RF-04.03; Refueling Procedure: Reactor Pressure Vessel Head Installation; Revision G
SP-34-0 99 B Train B RHR Pump and Valve Test – IST
SP–34-091 RHR Hydrostatic Test
Work Order/Procedure # 03-012432 – Overhaul R H R Pump "B"
Byron Jackson Installation and Operations Instructions, Residual Heat Removal Pump
Procedure A–MDS–30; Miscellaneous Drains and Sumps (MDS) Abnormal Operation; dated November 22, 2005
NUREG-0737, Section III.D.1.1, "Integrity Of Systems Outside Containment Likely To Contain Radioactive Material For Pressurized Water Reactors and Boiling Water Reactors"
Operability Recommendation Form OPR–133, "RHR System 34 and Its Impact on the Control Room Exclusion Zone (CREZ);" Revisions 0 and 1
Memo from G. Reiter to R. Nicolai, responding to NRC inspector questions and identifying the Kewaunee containment as "Operable but Degraded," dated December 15, 2005
Kewaunee System Integrity Program and Containment Leak Rate Testing Program; dated January 27, 2003
September 2005 KNPP [Kewaunee Nuclear Power Plant] Corrective Action Program Performance; dated October 20, 2005
October 2005 KNPP Corrective Action Program Performance; dated November 15, 2005
2004 4$^{th}$ Quarter and 2005 1$^{st}$ Quarter Corrective Action Program Trend Report; dated October 18, 2005
SA4784; Corrective Action Program Focused Self-Assessment Report; dated September 13-17, 2004
Focused Self-Assessment Report (CAP029424); Problem Identification and Resolution - Corrective Action Implementation (September 26 - October 7, 2005)
ACE002567; CAPS Not Being Written as Required; dated February 4, 2004
ACE002632; Misposition CAPs Hit Management Threshold for Action; dated April 6, 2004
ACE 003015; DG A Output Breaker Failed to Close; dated June 22, 2005
ACE003010; Dose to Survey the High Integrity Container (HIC) >55 percent of the Estimate; dated June 14, 2005
CA016500; RHR Pump Seal Leakage Evaluation; dated July 6, 2004
CA017909; Additional Evaluation of RHR Seal Leakage Issues Is Needed; dated January 5, 2005
CA018094; Corrective Action Program Procedure and Guidance Document Use; dated January 31, 2005

CA019697; Point Beach CAP063536 - Unable to Meet NUREG-0612 Phase II Requirements for Head Drop Analysis; dated May 23, 2005
CAP021589; RHR Pump B Seal Leakage; dated June 16, 2004
CAP021601; NRC Resident Question on SIP Impact With RHR Pump Seal Leakage; dated June 17, 2004
CAP021744; Rigor of RHR Pump Seal Leakage Evaluation; dated July 2, 2004
CAP024751; Additional evaluation of RHR seal leakage issues is needed; dated December 30, 2004
CAP025177; Limited Knowledge of HU Barriers Seen in Causal Evaluations; dated January 26, 2005
CAP025194; Corrective Action Program Procedure and Guidance Document Use; dated January 27, 2005
CAP025199; Connection Between CAP and Work Management; dated January 27, 2005
CAP025233; CAP/Non-CAP Cross Pollination; dated January 28, 2005
CAP027482; Point Beach CAP063536 - Unable to Meet NUREG-0612 Phase II Requirements for Head Drop Analysis; dated May 20, 2005
CAP029513; “Surveillance” Hot Button Trigger Value Exceeded; dated October 6, 2005
CAP029587; The CAP Trending Program Expectations Not Met; dated October 21, 2005
CAP029618; CARB Fails to Document the Reasons for Rejecting RCE/ACE Evaluations; dated October 13, 2005
CAP029620; PI&R SA, AFA [Problem Identification and Resolution Self-Assessment, Areas for Attention] - Shortfalls in Corrective Action Program Standards; dated October 31, 2005
CAP029728; Overall RCE and ACE Quality Is Inconsistent; dated October 21, 2005
CAP029730; Areas for Improvement: Monitor Age of Maintenance Rule (a)(1) Corrective Actions; dated October 21, 2005
CAP029732; Certain Operability Determinations Did Not Contain Sufficient Information; dated October 21, 2005
CAP029733; Programs Required to Identify and Correct Deficiencies Need Improvement; dated October 21, 2005
CAP029734; RCE Cause Determinations Need to be Improved; dated October 21, 2005
CAP029800; All Site Departments Need to Evaluate Administrative Procedure Adherence; dated October 27, 2005
CAP029885; RHR Pump B Seal Leakage; dated November 2, 2005
CAP029888; Seal leak on B RHR Pump; dated November 2, 2005
CAP030328; RHR Pump Seal Leakage Information Inadequate; dated November 30, 2005
CAP030351; Procedures Communicate Procedure Changes to Ops & Training in Timely Manner; dated November 30, 2005
CAP030487; IPEOPs [Emergency Operating Procedures] May Not Adequately Address the Occurrence of Sump Recirculation Leakage; December 12, 2005
CAP030527; Further Actions on RHR Pump Seal Leakage, dated December 14, 2005
CAP030536; NRC Question Related to Implementation of Approved Amendment 136 (SIP Program); dated December 14, 2005
CAP030538; CA-18094 Closed With No Actions Taken - CAQ Not Addressed; dated December 14, 2005
CAP030543; CAP Screening Process Did Not Question Delay in CAP 30351; dated December 14, 2005
CAP030553; Questions from RCE000689; dated December 15, 2005
CAP030559; Implement Method of Rapid Trending for CAP Issues During Outages; dated December 15, 2005

CAP030560; Establish One Problem - One CAP CAP Process; dated December 15, 2005
CE014427; RHR Pump B Seal Leakage; dated June 18, 2004
CE014437; NRC Resident Question on SIP Impact With RHR Pump Seal Leakage; dated June 22, 2004
CE015294; Limited Knowledge of HU Barriers Seen in Causal Evaluations; dated January 31, 2005
CE015301; Connection Between CAP and Work Management - Assessment; dated January 31, 2005
CE016492; The CAP Trending Program Expectations Not Met; dated October 17, 2005
CE016499; CARB Fails to Document the Reasons for Rejecting RCE/ACE Evaluations; dated October 17, 2005
CE016500; PI&R SA, AFA - Shortfalls in Corrective Action Program Standards; dated October 17, 2005
CE016523; Certain Operability Determinations Did Not Contain Sufficient Information; dated October 25, 2005
CE016524; RCE Cause Determinations Need to be Improved; dated October 25, 2005
CE016525; Programs Required to Identify and Correct Deficiencies Need Improvement; dated October 25, 2005
EFR018881; Effectiveness Review: Provide Trend Information Related to Prior CAPs at the Daily Screening Meeting; dated March 25, 2005
EWR017113; Engineering Work Request, Clarify Licensing Basis for RHR Pump Seal Leakage; dated October 5, 2004
CE015316; CAP/Non-CAP Cross Pollination; dated February 1, 2005
OBD000085; RHR Pump B Seal Leakage; dated June 18, 2004
OE002555; CROSFLOW Ultrasonic Flow Measurement System Performance Observations; dated February 26, 2004
OE002902; RCP Motor Recommended 1-Year, 5-Year and 10-Year Maintenance; dated March 22, 2004
OE005168; Updated Reactivity Surveillance Policy for B10 Isotopic Concentration; dated August 26, 2004
OE006343; Steam Generator Channel Head Bowl Drain Line Leakage; dated November 29, 2004
OE010132; External Operating Experience: Point Beach CAP063450 - Reactor Vessel Head Lift Load Drop Analysis; dated August 1, 2005
OTH005767; Review Evaluation of CE 14427 With Performer; dated October 5, 2004
OTH016702; NRC Resident Question on SIP Impact with RHR Pump Seal Leakage; dated August 12, 2004
OTH017112; Engineering to Monitor RHR Pump B Overhaul for Seal Leakage Evaluation; dated October 5, 2004
PCR020623; Procedure Change Request: Revise Shutdown Safety Assessment and Related Refueling and Operations Procedure; dated August 16, 2005
PCR021359; Procedure Change Request: Revise GNP 11.08.02 to Exclude Hot Buttons During “Outages” Not Just Refueling Outages; dated November 10, 2005
RCE 669 (CAP24453); SP-55-167-5 Not Performed at the Required Frequency Causing Technical Specification 4.0.c Entry; event date December 7, 2004
RCE 000675 (CAP25213); Personnel Inside Radiography Boundaries While Radiography Source Was Exposed; event date January 27, 2005
RCE 674 (CAP025263); TLA-11 Reactor Thermal Power Event High; event date January 31, 2005

RCE 682 (CAP025606); Uncontrolled Increase in Steam Generator Level Due to Service Water Flow; event date February 20, 2005
RCE 689 (CAP 027932); High Radiation Area Not Controlled or Posted During Transfer of Filter; event date June 11, 2005
RCE 694; Missed Surveillance on SP-02-138B and SP-55-177; dated August 19, 2005.
LER 2004-004-00; Procedural Deficiency Results in Automatic Containment Ventilation Isolation Being Disabled Contrary to Technical Specifications; dated January 17, 2005
LER 2004–003–01; Control Room Boundary Door Found Ajar – Accident Analysis Assumptions Impacted – Personnel Error; dated February 22, 2005
LER 2005-001–00; Reactor Thermal Power Eight Hour Average Limit Exceeded; dated April 1, 2005
LER 2004–005–00; Safety Injection Accumulator Isolation Valve Position During Heat up Violates Technical Specifications – Procedural Deficiency; dated January 25, 2005
LER 2005-002-00; Auxiliary Feedwater Pumps Assumed to Fail from Postulated Loss of Primary Water Source – Safe Shutdown and Accident Analysis Assumptions Not Assured – Inadequate Design of Pump Protective Equipment; dated April 12, 2005
LER 2005-004-00; Safe Shutdown Potentially Challenged By Unanalyzed Internal Flooding Events and Inadequate Design; dated May 16, 2005
LER 2005-003–00; Inadvertent to Reactor Protection Trip While Shutdown – Caused by Procedure Adherence Deficiencies and Inadequate Shifted Management Oversight; dated April 19, 2005
LER 2005-005-00; Emergency Diesel Generator Exhaust Ductwork Not Adequately Protected from Potential Tornado Winds and Missiles; dated May 23, 2005
LER 2005–008–00; Turbine Driven Auxiliary Feedwater Pump Inoperable Due To Insufficient Net Positive Suction Head; dated June 20, 2005
LER 2005-007–00; Unanalyzed Condition: Design Deficiency – Component Cooling Water System Inoperable Due to Pump “Run Out” Conditions; dated May 27, 2005
LER 2005-006–00; Auxiliary Feedwater Pumps Postulated to Fail Due to Air Ingestion Through Pump Packing; dated May 25, 2005
LER 2005-014-00; Technical Specification LCO Not Entered for Diesel Generators Inoperable While In Refueling Shutdown; dated August 5, 2005
LER 2005–013–00; The Throttle Valves to the Turbine Bearing Oil Coolers for the Turbine Driven AFW Pump Could be Blocked by Debris; dated September 9, 2005
LER 2005–012-00; Residual Heat Removal Pump Run – Out Upon Loss of Instrument Air While Aligned for Sump Recirculation; dated August 10, 2005
LER 2005-011-00; The Settings of a Permissive (P–10) in the Power Range Channels of the Nuclear Instrumentation System was Outside of Plant Technical Specification Requirements; dated August 18, 2005
LER 2005-010-00; Inadequate Engineering Analysis to Support Service Water Pump Operability; dated August 16, 2005
LER 2005–009–00; Firearm Discovered During Security Search Process; dated July 15, 2005

## LIST OF ACRONYMS USED

| | |
|---|---|
| ACE | Apparent Cause Evaluation |
| ADAMS | Agency Wide Access Management System |
| AR | Action Request |
| CA | Corrective Action |
| CAP | Corrective Action Program Document |
| CAQ | Condition Adverse to Quality |
| CARB | Corrective Action Review Board |
| CATPR | Corrective Action to Prevent Recurrence |
| CE | Condition Evaluation |
| CFR | Code of Federal Regulations |
| DRP | Division of Reactor Projects |
| DRS | Division of Reactor Safety |
| DRUM | Department Roll-Up Meeting |
| ECCS | Emergency Core Cooling System |
| FIN | Finding |
| GL | Generic Letter |
| GNP | General Nuclear Procedure |
| gph | Gallons Per Hour |
| gpm | Gallons Per Minute |
| I&C | Instrument and Control |
| IMC | Inspection Manual Chapter |
| IP | Inspection Procedure |
| IR | Inspection Report |
| KPS | Kewaunee Power Station |
| LER | Licensee Event Report |
| NCV | Non-Cited Violation |
| NMC | Nuclear Management Company, LLC |
| NOS | Nuclear Oversight (Quality Assurance) |
| NRC | Nuclear Regulatory Commission |
| OE | Operating Experience |
| OPR | Operability Recommendation (Operability Determination) |
| OTH | Other (Corrective Action Program Document) |
| RCE | Root Cause Evaluation |
| RCS | Reactor Coolant System |
| RHR | Residual Heat Removal |
| RIS | Regulatory Issue Summary |
| SDP | Significance Determination Process |
| SIP | System Integrity Program |
| TS | Technical Specification |
| USAR | Updated Safety Analysis Report |