March 23, 2001

EA-01-040

Mr. Mark Reddemann
Site Vice President
Kewaunee and Point Beach Nuclear Plants
Nuclear Management Company, LLC
6610 Nuclear Road
Two Rivers, WI 54241

SUBJECT: KEWAUNEE NUCLEAR POWER PLANT - NRC SUPPLEMENTAL INSPECTION REPORT 50-305/01-05(DRS)

Dear Mr. Reddemann:

On February 27, 2001, the NRC completed a supplemental inspection of your Kewaunee Nuclear Power Plant. The enclosed report presents the results of that inspection, which were discussed on February 27, 2001, with you and other members of your staff.

In January 2000, you reported that the reliability of the siren system intended to alert and notify the public near the Kewaunee facility in the event of an emergency was below 90 percent, representing a reduction in the safety margin characterized by a Yellow Alert and Notification System performance indicator. The reduced safety margin associated with this performance indicator warranted supplemental NRC inspection and assessment of your actions to improve performance under the degraded Emergency Preparedness Cornerstone of operational reactor safety.

On April 5, 2000, and September 21, 2000, supplemental inspections were completed pursuant to NRC Inspection Procedure 95002 and were documented in NRC Inspection Reports Nos. 50-305/00-06(DRS) and 50-305/00-17(DRS), respectively. Those inspections revealed substantive inadequacies in your staff's evaluation of the root causes and extent of the performance problems, and the corrective actions you were implementing to improve performance. In addition, we identified systemic weaknesses in the application of your corrective action program to address this issue. Since we were unable to conclude that the performance issues that resulted in a Yellow siren system performance indicator had been addressed, we issued a Yellow finding that corresponded to the original performance issues and to the corrective action deficiencies we identified that encumbered your staff from effectively evaluating and resolving those issues.

On January 10, 2001, and January 30, 2001, you and members of your staff participated in meetings that were held in the NRC Region III office to discuss the problems associated with your corrective action program and the Yellow siren system performance indicator, respectively. During these meetings, you and your staff described the recently completed root cause evaluations for both areas and your planned corrective actions. You also acknowledged the corrective action issues raised in the two supplemental reports.

This supplemental inspection completed on February 27, 2001, assessed your most recently completed evaluations of the Yellow siren system performance indicator and your corrective action program. The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, the inspectors reviewed your root cause evaluations for the Yellow siren system performance indicator, the weaknesses in your corrective action program, and your planned corrective actions to address these areas.

We found that your recently completed evaluations adequately determined the root causes of your siren system's performance problems and the weaknesses in your corrective action program. The evaluations were systematic and conducted at an appropriate level of depth. In addition, we observed that your corrective actions were appropriately focused at the underlying root causes.

Your staff's early implementation of those corrective actions resulted in improved siren performance and corrective action program effectiveness. The siren system's testing data indicates a notable improvement in system reliability and response. In the corrective action program, we also observed significant progress in correcting the identified deficiencies. You have applied significant resources to improve program procedures and guidelines and have added dedicated personnel to implement the revised corrective action program. Although the NRC and your staff have identified some implementation problems, your staff entered these issues into the corrective action program, and, in many cases, the resolutions were immediate. Recognizing these near term improvements, significant ongoing attention to the corrective action program will be needed to ensure overall program improvements are achieved and sustained.

Since we concluded that your evaluations of the Yellow siren system performance indicator and the associated Yellow corrective action finding were adequate to identify the underlying root causes, and implementation of effective corrective actions has begun, the Yellow finding will no longer be considered in assessing plant performance. The NRC will continue to monitor the implementation of your corrective actions and to assess the status of your siren system and corrective action program through routine baseline inspections.

In accordance with 10 CFR 2.790 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/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

John A. Grobe, Director
Division of Reactor Safety

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

Enclosure: Inspection Report 50-305/01-05(DRS)

cc w/encl: K. Hoops, Manager, Kewaunee Plant
D. Graham, Director, Bureau of Field Operations
Chairman, Wisconsin Public Service Commission
State Liaison Officer

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Sincerely,

/RA/

John A. Grobe, Director
Division of Reactor Safety

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

Enclosure: Inspection Report 50-305/01-05(DRS)

cc w/encl: K. Hoops, Manager, Kewaunee Plant
D. Graham, Director, Bureau of Field Operations
Chairman, Wisconsin Public Service Commission
State Liaison Officer

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-305
License No:	DPR-43
Report No:	50-305/01-05(DRS)
Licensee:	Nuclear Management Company
Facility:	Kewaunee Nuclear Power Plant
Location:	N 490 Highway 42 Kewaunee, WI 54216
Dates:	February 12 through 27, 2001
Inspectors:	Steven K. Orth, Senior Radiation Specialist (Team Leader) Laura Collins, Project Engineer Zachary Dunham, Resident Inspector
Approved by:	Gary L. Shear, Chief Plant Support Branch Division of Reactor Safety

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	Radiation Safety	Safeguards
● Initiating Events ● Mitigating Systems ● Barrier Integrity ● Emergency Preparedness	● Occupational ● Public	● Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW, or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.

SUMMARY OF FINDINGS

IR 05000305-01-05, on 02/12 - 02/27/2001, Nuclear Management Company, Kewaunee Nuclear Power Plant, Unit 1. Supplemental Inspection - Degraded Cornerstone.

Cornerstone: Emergency Preparedness

This supplemental inspection was performed by the NRC to assess the licensee's evaluation associated with a Yellow performance indicator for the Alert and Notification System (ANS) and the associated Yellow finding related to the licensee's corrective action program. During this supplemental inspection, performed in accordance with Inspection Procedure 95002, the inspectors concluded that the licensee performed comprehensive evaluations of the performance problems associated with the ANS and its corrective action program. These evaluations identified primary root causes and contributing causes for both issues. Along with the electronics/hardware problems, the licensee identified the primary root causes for the ANS to be the failure to make changes to the system via a change control process and the failure of the activation procedure to provide for alternate/backup activation methods and to provide clear success criteria. In the case of the corrective action program, the licensee concluded that the primary root causes were plant management's inadequate risk evaluation regarding decisions affecting the corrective action program and the development of a culture in the licensee's organization, which minimized the importance of information from outside organizations. In particular, the licensee focused on low-cost power operation and failed to recognize the value of changes and improvements which had occurred throughout the industry, such as the value and expansion of the corrective action program.

In the case of the Yellow ANS performance indicator, the licensee had completed several significant corrective actions to address the root causes and contributing causes identified in its evaluation. The inspectors found that the corrective actions appeared appropriate to address the underlying root causes and that ANS testing data indicated an improving trend in the NRC performance indicator.

The licensee also performed comprehensive assessments of the emergency preparedness program, quality assurance program, plant operations, and other plant programs to determine the extent of condition (re. the root causes described above). Based on these evaluations, the licensee began to implement significant actions to correct the deficiencies in the corrective action program and other weaknesses identified. Generally, the inspectors observed progress in the licensee's initial implementation of these corrective actions.

Due to the licensee's acceptable performance in assessing the Yellow ANS performance indicator and the associated Yellow finding, the Yellow finding will not be considered in assessing future plant performance.

Report Details

01 Inspection Scope

This supplemental inspection was performed by the NRC in accordance with Inspection Procedure (IP) 95002 to assess the licensee's evaluation of the Yellow performance indicator associated with its Alert and Notification System (ANS) in the Kewaunee County portion of the licensee's emergency planning zone. The NRC also assessed the licensee's evaluation of systemic weaknesses in the licensee's corrective action system, which were identified during the previous NRC supplemental inspection of the ANS. The Yellow performance indicator means that the licensee's sirens did not function as expected during at least 10 percent of the bimonthly test opportunities for the previous 12 months.

In January of 2000, the licensee calculated and reported a Yellow performance indicator for the ANS, which continued to be Yellow through the third quarter of calendar year 2000, and then changed to White in the fourth quarter of calendar year 2000. On April 4 and 5, 2000, and on September 11 - 21, 2000, the NRC performed two supplemental inspections to review the Yellow ANS performance indicator and documented the results in NRC Inspection Reports Nos. 50-305/00-06(DRS) and 50-305/00-17(DRS), respectively. Although the licensee identified the extent of the hardware problems, the NRC concluded that the licensee had not performed an adequate evaluation to identify all root causes and other contributing factors. The NRC also concluded that systemic weaknesses in the licensee's corrective action program contributed to the decline in ANS performance and to the licensee's failure to adequately evaluate these issues. Based on the results of those inspections, the licensee performed an additional evaluation of ANS performance and its corrective action program in the fourth quarter of calendar year 2000.

During this supplemental inspection (February 12 - 27, 2001), the NRC evaluated the licensee's expanded root cause evaluation and corrective actions for ANS performance issues and for the deficiencies in the licensee's corrective action program. Since this supplemental inspection was conducted using the requirements of NRC IP 95002, the following details are organized by the specific inspection requirements of IP 95002 which are noted in italics in the following sections.

02 Evaluation of Inspection Requirements

02.01 Alert and Notification System (ANS) Yellow Performance Indicator

.1 *Problem Identification*

a. Determine that the evaluation identifies who (i.e., licensee, self-revealing, or NRC) and under what conditions the issue was identified.

b. Determine that the evaluation documents, how long the issue existed, and prior opportunities for identification.

c. Determine that the evaluation documents, the plant specific risk consequences (as applicable), and compliance concerns associated with the issue.

The NRC review of the licensee's identification of this issue was performed during the April 4 - 5, 2000, NRC supplemental inspection and was documented in NRC Inspection Report No. 50-305/00-06(DRS).

During 1998 and 1999 routine biweekly siren testing, the licensee observed a series of individual performance problems with the ANS. In August of 1998, the licensee also began to lose confidence in the accuracy of the siren performance feedback system and began deploying staff to verify the accuracy of the biweekly test results. The results of these verifications indicated that the siren feedback system was not always reporting the accurate status of siren operations in the field. During some of these verifications, the licensee found that the feedback system reported successful siren operations when sirens did not fully activate and, conversely, failed to report successful operations when the sirens were fully operational. At the same time, the maintenance staff identified availability issues with replacement parts for the aging system.

In 1999, the licensee concluded that an upgrade to the ANS electronics and software should be installed at each siren location and started to implement plans to have the upgrade completed in the Fall of 1999. As a result of vendor scheduling and component availability issues, the upgrade was delayed until February of 2000. Following the upgrade and the resolution of start-up issues, the ANS demonstrated an improvement in performance. However, the ANS performance was degraded throughout calendar year 1999 and the first calendar quarter of 2000, i.e., system testing results fell below 90 percent. Therefore, the licensee reported a Yellow performance indicator to the NRC for the system.

On April 4 and 5, 2000, the NRC performed a supplemental inspection to review the Yellow ANS performance indicator and documented the results in NRC Inspection Report No. 50-305/00-06(DRS). Although the licensee identified the primary root cause of the problem, the NRC concluded that the licensee had not performed an adequate evaluation to identify all root causes and other contributing factors. Specifically, the NRC identified the following issues that were not identified by the licensee:

- licensee management oversight of the system was limited,
- quality assurance (QA) oversight of the ANS failed to identify degrading performance,
- annual preventive maintenance was not consistently performed,
- the corrective action program was not consistently used to document ANS problems, and
- maintenance procedures and records were deficient.

During September 11 - 21, 2000, the NRC performed a second supplemental inspection to review the licensee's additional evaluation of the Yellow ANS performance indicator and documented the results in NRC Inspection Report No. 50-305/00-17(DRS). The NRC continued to identify deficiencies with that evaluation. In that evaluation, the licensee continued to identify the symptoms of the performance problems but failed to adequately identify the root causes. Based on the results of that inspection, the NRC identified substantive weaknesses in the licensee's application of its corrective action program to address the ANS performance issue and, therefore, could not conclude that the performance issues were adequately addressed. The NRC issued a Yellow finding that corresponded to the original issues that resulted in the Yellow performance indicator.

.2 *Root Cause and Extent of Condition Evaluation*

a. Determine that the problem was evaluated using a systematic method(s) to identify root cause(s) and contributing cause(s).

The licensee formed a root cause evaluation team consisting of a contractor (industry recognized root cause evaluator) and recently trained members of the licensee's staff. The team performed the root cause using the licensee's draft "Root Cause Evaluation Guideline." The inspectors reviewed the root cause evaluation report (RCE No. 01-004) and discussed the results with members of the root cause team. The team employed the following techniques: records review, personnel interviews, events and causal factors charting, failure mode analysis, and stream analysis. The inspectors concluded that the evaluation was performed in a systematic manner to determine the root causes and contributing causes.

b. Determine that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

In addition to the hardware problems identified during the previous root cause evaluations, the root cause evaluation team identified the following root causes and contributing causes:

Root Causes

- No systematic design change process was utilized to control and verify changes to the system, installation of the system, or testing schedules and requirements.

- The guidance for siren activation did not identify alternate methods to activate the system to ensure the sirens were operable.

- Site leadership did not ensure that root causes or apparent causes were performed because they did not recognize the value of the process.

- Management developed a complacent attitude regarding siren performance due to the acknowledged upcoming system replacement.

Contributing Causes

- The emergency preparedness group has not always taken appropriate, aggressive action to address system operation, focusing in some cases on performance indicator results.

- The QA organization has not adequately reviewed the emergency preparedness processes.

The inspectors concluded that the licensee's analysis was performed to a level of detail commensurate with the significance of the ANS performance problems.

c. Determine that the root cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience.

Based on the licensee's records, the root cause evaluation team developed a performance history for each siren and identified siren problems and testing failures that had significant effects on the overall ANS reliability. In particular, the team evaluated significant test failures that occurred on April 7, 1999; January 5, 2000; and February 16, 2000, and the licensee's response to these events. As a result of this review, the team developed potential causes for the ANS performance decline. The inspectors concluded that the root cause evaluation adequately considered historical performance problems and ANS test failures to determine the root causes.

d. Determine that the root cause evaluation included consideration of potential common cause(s) and extent of condition of the problem.

The root cause evaluation team provided a recommendation for the licensee to evaluate other equipment and processes that could have similar problems. Based on this recommendation, the licensee performed an extent of condition review outside of the ANS root cause evaluation, which evaluated the station's control of offsite equipment and equipment that was maintained by offsite personnel (Kewaunee Assessment Process (KAP) Forms Nos. 00-3211 and 00-3212). In addition, the licensee performed self assessments of its emergency preparedness program (KAP Form No. 00-3539) and QA program (KAP Forms Nos. 00-3742 and 01-1889) that identified areas where these programs did not meet industry standards (i.e., a "Gap" analysis). The assessment teams included both licensee personnel and peers from other 10 CFR Part 50 licensed facilities to ensure that the reviews were independent and objective.

Based on the inadequacies in the licensee's initial root cause evaluations of the ANS performance problems, the licensee also reviewed the adequacy of historical root cause evaluations. The licensee's Corrective Actions Review Board (CARB) evaluated selected root cause evaluations and corrective actions to ensure that they would protect against event recurrence. In two cases, the licensee concluded that the root causes were not sufficient to ensure that the corrective actions would prevent

recurrence and additional evaluations were necessary (KAP Form No. 01-0358). In another two cases, the CARB determined that the extent of condition was not sufficiently documented, and KAP Form No. 01-0608 was initiated. Based on the results of these evaluations, the inspectors concluded that the licensee had performed an adequate evaluation of the extent of condition and common causes.

.3 *Corrective Actions*

a. Determine that appropriate corrective action(s) are specified for each root/contributing cause or that there is an evaluation that no actions are necessary.

As discussed in NRC Inspection Report No. 50-305/00-06(DRS), the licensee installed a new electronic feedback system in February 2000 to correct the hardware problems that were identified. In addition, the licensee implemented the following corrective actions to address the root and contributing causes described in Section 02.01.2:

- In coordination with the Kewaunee County Emergency Government staff, the licensee developed a test and activation procedure EPMP-09.03 (Revision G), "Alert and Notification Siren System Testing and Maintenance." The inspectors noted that the revised procedure clearly states the activation sequence, alternate/backup activation methods, and success criteria. The procedure also specifies the controls for making changes to the system or software configuration and provides a threshold for entering performance issues into the licensee's corrective action program for trending and failure analyses.

- On January 24, 2001, the licensee performed a temporary change to procedure NAD 4.3, "Plant Physical Change," to ensure that offsite systems, structures, and components were included in the applicability of the procedure.

- The licensee revised procedures EPMP-09.03 and PMP-44-02 (Revision A), "COM -- Alert and Notification System Annual Preventive Maintenance," to improve the coordination of siren maintenance and records of planned and corrective maintenance.

- The licensee revised procedure EPMP-02.07 (Revision B), "EP Recommendation and Corrective Action Process," to provide clearer direction and thresholds concerning initiation of KAP forms.

Since the licensee's upgrade project and software modifications, the licensee had recorded fully successful ANS activations/tests. Consequently, the ANS performance indicator entered the White band in the fourth quarter of calendar 2000 and was trending toward the Green performance band.

b. Determine that the corrective actions have been prioritized with consideration of the risk significance and regulatory compliance.

The licensee's immediate corrective actions were to install the new electronic feedback system (February 2000), to address immediate concerns relating to the activation of

the new system, and to reschedule the annual maintenance. The licensee's long-term corrective actions described in Section 02.01.3.a were also completed prior to this inspection and the completion of the licensee's most current root cause evaluation. The licensee's remaining corrective actions were to evaluate the adequacy of its QA program and to ensure that the implemented corrected actions fully met the recommendations contained in RCE No. 01-004. The inspectors reviewed these actions and found them to be prioritized in accordance with the licensee's procedures, which were based on the risk significance of the issues.

c. Determine that a schedule has been established for implementing and completing the corrective actions.

The inspectors found that the licensee's corrective actions were scheduled in accordance with its prioritization procedure.

d. Determine that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence.

The licensee's CARB determined that an audit would be performed by the QA staff to assess the effectiveness of the corrective actions. At the time of this inspection, the licensee had not defined the quantitative or qualitative measures of success. The inspectors also noted that the assigned audit was not entered into the licensee's corrective action program to administratively track the review. Licensee management indicated that the audit was planned for the third quarter of calendar year 2001 and that the performance measures would be determined prior to the audit.

.4 *Independent Assessment of Extent of Condition*

The inspectors reviewed the licensee's extent of condition review (Section 02.01.2.d) and compared the licensee's results to the NRC's inspection of the emergency preparedness cornerstone (NRC Inspection Report No. 50-305/00-15(DRS)) and the results of the previous NRC supplemental inspections. Based on this evaluation, the inspectors determined that the licensee had performed an adequate review of the extent of condition.

02.02 Kewaunee Corrective Action Program Weaknesses

.1 *Problem Identification*

a. Determine that the evaluation identifies who (i.e., licensee, self revealing, or NRC) and under what conditions the issue was identified.

The licensee's root cause evaluation of the problems with the corrective action program, the KAP, was completed in January 2001 and documented as RCE No. 01-001. The evaluation provided a history of the identification of issues related to the KAP back to 1993. This history documented that both internal and external organizations, such as QA, Institute of Nuclear Power Operators (INPO), World Association of Nuclear Operators (WANO), Nuclear Safety Review and Audit

Committee (NSRAC), Joint Off-site Review Committee (JOSRC), and the NRC, had identified corrective action program deficiencies. The root cause evaluation was initiated after the JOSRC expressed concern about the effectiveness of the corrective action program in July 2000 and the NRC problem identification and resolution inspection in September 2000 (NRC Inspection Report No. 50-305/00-19(DRP)) concluded that the corrective action program showed significant weaknesses and inconsistencies across all of the procedural elements inspected. The inspectors concluded that the licensee had performed a thorough review in assessing the identification of the corrective action program issues.

b. Determine that the evaluation documents, how long the issue existed, and prior opportunities for identification.

The evaluation documents problems dating back to 1993. Two opportunities to understand the significance of the corrective action process problems were specifically described. The first opportunity was in 1996 when the NRC added the Safety Assessment/Corrective Action focus area to the trial implementation of the Integrated Performance Assessment Process. The root cause evaluation concluded that this should have been a signal to the Kewaunee management and staff of the increasing significance of the corrective action program. The second opportunity to identify the problems was in 1999 when the KAP program manager returned from a Corrective Actions Owners Group conference and initiated KAP Form No. 99-3244, "Kewaunee is ill prepared for the NRC's new risk-based inspection criteria, which takes effect on April 1, 2000." The root cause evaluation concluded that the licensee was aware of the problems with the KAP but underestimated the significance and, as a result, took no effective corrective action to improve the process. The inspectors concluded that the licensee accurately identified prior opportunities for identification of the corrective action program problems.

c. Determine that the evaluation documents, the plant specific risk consequences (as applicable), and compliance concerns associated with the issue.

The evaluation concluded that the station faced moderate risk in the ability to trend low level events prior to them becoming significant events and in the ability to perform quality root cause evaluations. The risk associated with a significant event occurring and not being reported and evaluated in the KAP was determined to be low based on a review of historical significant events. The inspectors considered the risk evaluation to be appropriate for the issues identified. At the time of this inspection, the moderate risk due to lack of trending capability continued to be a vulnerability, because the trending program had not yet been implemented. The licensee recognized this risk and, as a compensatory measure, looked for trends during the daily KAP screening meeting or specifically assigned an action item to look for a trend if the potential for one appeared to exist.

.2 *Root Cause and Extent of Condition Evaluation*

a. Determine that the problem was evaluated using a systematic method(s) to identify root cause(s) and contributing cause(s).

The systematic methods used in the evaluation included failure mode analysis and stream analysis to identify the root and contributing causes. Two root causes were identified. The first root cause was that the leadership at the site performed inadequate risk assessment regarding decisions affecting KAP due to underestimated significance of the corrective action process. The second root cause was a culture developed at Kewaunee that minimized the importance of information from outside the site organization as long as Kewaunee maintained low-cost power production.

b. Determine that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

The root cause evaluation covered why the problem developed, why the site was not aware of the problem, and, if the site was not aware, why was there no response. A separate evaluation, the KAP Improvement Process, was conducted to identify and to correct the actual problems with the process. Together, the root cause and the improvement project were appropriately detailed commensurate with the significance of the problem.

c. Determine that the root cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience.

The root cause evaluation considered prior occurrences of the problem and knowledge of prior operating experience by reviewing QA audits and INPO and WANO reports back to 1993 to find corrective action program problems. Also, the team performed independent review of operating logs and the KAP to see how the problem identification threshold had changed over the last four years. Lastly, extensive interviews with station personnel were conducted to determine the staff's experience using the KAP and the problems that had previously been identified. The inspectors concluded that the licensee had conducted a thorough review to understand and document previous occurrences and prior knowledge of the problems.

d. Determine that the root cause evaluation included consideration of potential common cause(s) and extent of condition of the problem.

The extent of condition of the problems was evaluated in two ways. A self-assessment titled, "Kewaunee Operations Assessment," was performed for every department to identify gaps between Kewaunee programs, processes, and procedures and current industry standards. Also, QA performed a review of audit findings from 1998 - 2000 to determine if there were any additional findings similar to previously identified corrective action program deficiencies that needed to be escalated. The extent of condition identified a large number of gaps in plant processes that needed improvement. These gaps and corrective action plans were tracked in the licensee's business plan and were prioritized with due dates. The inspectors reviewed the analysis and concluded that it was sufficiently comprehensive as an extent of condition review for the root causes identified.

.3 *Corrective Actions*

a. Determine that appropriate corrective action(s) are specified for each root/contributing cause or that there is an evaluation that no actions are necessary.

Corrective actions for the actual process problems identified during the KAP Improvement Process included procedure changes, training, and additional staff that were dedicated to the KAP. The corrective actions to address the root causes included increasing interaction with the licensee's parent corporation (Nuclear Management Company (NMC)) and other industry peers in order to gain additional outside industry experience. Also, dedicated KAP manager and root cause analyst positions were added to the licensee's organization and an escalation process was developed for both JOSRC and QA to bring significant issues to the attention of NMC executive management. These corrective actions appeared to be appropriate to correct both the process problems and the underlying root causes.

Although the licensee's revised corrective action process was only recently implemented, the inspectors reviewed aspects of the implementation of the above corrective actions:

Status of Revisions to Procedures and Program Guides, Changes to the Organizational Structure/Responsibilities

The inspectors reviewed the licensee's procedural and program guide revisions. These procedures had been either recently revised or newly implemented to address the facility's previously failing corrective action program. Procedures reviewed included:

- Nuclear Administrative Directive (NAD) 11.08 (Revision E), "Kewaunee Assessment Process (KAP),"
- General Nuclear Procedure (GNP) 1.08.01 (Revision D), "Instructions for the Kewaunee Assessment Process (KAP),"
- GNP 11.08.07 (Revision A), "Action Prioritization," and
- NAD 01.40 (Revision A), "Self-Assessment Program."

The inspectors noted that, in general, the revisions to existing procedures and directives and the content of newly implemented procedures were appropriate for addressing many of the previously identified corrective action program deficiencies documented in NRC Inspection Report No. 50-305/00-19(DRP). Such changes included procedural requirements for prioritization of issues and corrective actions, defining the significance level of identified issues, and assignment of due dates commensurate with the assigned priority.

The inspectors did identify some weaknesses in the procedures and an inconsistency between the licensee's practices and procedure NAD 11.08. Specifically, the procedure did not clearly provide authorization for the licensee to determine that an

apparent cause evaluation did not need to be performed for issues rising to the "C" significance level. However, the inspectors observed that the licensee's KAP screening team was applying this discretion. The licensee immediately initiated a KAP form to document the inconsistency and performed a temporary change to the procedure to provide the appropriate level of authority for this discretion.

In addition to reviewing procedural revisions, the inspectors reviewed the facility's organizational changes to implement the revised KAP. In particular, the licensee had formed a screening team, which consisted of upper management representatives, whose responsibilities included reviewing KAP forms on a daily basis, assigning significance levels to KAP forms, and assigning the KAP forms to the appropriate resource manager. Other organizational changes included the addition of departmental liaisons, whose main responsibilities included assisting their assigned departments with the KAP and reviewing KAP forms prior to the screening team's review. The licensee had also planned for the liaisons to develop and track performance indicators of the KAP for their respective departments. Lastly, the licensee had formed a CARB whose major responsibilities included oversight of the KAP and reviewing the adequacies of root cause evaluations.

Effectiveness of the Licensee Management's Communication of the Corrective Actions to the Plant Staff

During this inspection, licensee management conducted general staff overview meetings concerning the identified problems in the emergency preparedness cornerstone and in the KAP and the licensee's planned corrective actions. The inspectors attended these meetings and observed that licensee management communicated to the employees the message discussed with the NRC during the January 10 and 30, 2001, public meetings. The inspectors noted a good level of interaction with the staff, which validated that management's message was being understood. In addition, the inspectors noted that numerous facility wide meetings were conducted during the initial planning stages of the revised KAP and that meetings were conducted just prior to implementation of the revised process. These meetings provided plant staff with the status of the proposed program and solicited feedback and concerns with both the old KAP and with the new proposed process. The inspectors concluded that these meetings were effective in communicating the status of the corrective actions associated with the KAP to the plant staff. Additionally, the KAP administrative staff had provided periodic feedback to plant staff via facility wide distributed e-mails as to concerns and problems identified during the implementation phase of the KAP and how to correct the noted problems.

The licensee also provided training to the staff on root cause evaluations, apparent cause analyses, and overview of the revised KAP. The inspectors reviewed training lesson plans and observed portions of the root cause evaluation overview training, which was provided by a contractor. The inspectors found the training to be consistent with the licensee's revised program and concluded that the scope provided an acceptable level of instruction in the selected areas. However, the inspectors noted that the licensee's program did not provide specific training requirements. The licensee indicated that it had also identified this weakness and was planning to

evaluate each of the new positions in the organization and the new roles within the KAP to determine if training matrices or qualification guides were necessary.

Licensee's Initiation and Completion of KAP Forms

The inspectors reviewed about 20 KAP forms which had been initiated since the licensee's revisions to the KAP were in place. Overall, the inspectors found that the licensee had been properly implementing its process in assigning significance levels, priorities, due dates, and owners. However, the inspectors identified some weaknesses, including the following:

- In one case, a Resource Manager (i.e., department head) determined that an apparent cause evaluation was not warranted for a KAP form, even though the screening team had requested one and had defined specific actions for the evaluation. The KAP administrator indicated that the Resource Manager did not have that authority and that the KAP form would be returned to the department to complete the assigned actions.

- The inspectors questioned the licensee regarding two Significance Level C KAP forms which were written on the same day and that referenced problems with two similar service water system valves. Although the problem with the valves did not appear to be well understood, the inspectors noted that an apparent cause evaluation was not deemed necessary by the screening team. The licensee indicated that a lower level evaluation was performed, but the results were not fully documented in the KAP form. The inspectors observed that the lower level evaluation was not a clear component of the licensee's process and that the failure to fully document the results had the potential to limit the licensee's ability to perform trending or common cause analysis.

The inspectors observed that the licensee had a backlog of about 30 root cause evaluations associated with KAP forms initiated in 1999 through the date of this inspection. The licensee indicated that root cause evaluations for the most risk significant issues had been started, but the inspectors noted that about half of the root cause evaluations had not been assigned owners and were not prioritized or scheduled. The KAP Administrator indicated that these actions were planned to be performed in the near future, once contract support had been fully identified.

Licensee's Actions to Identify and Evaluate Problems Encountered During Implementation Phase

At the time of this inspection, the licensee had not implemented a formal systematic approach or review of the KAP to identify problems specific to the implementation phase of the KAP. However, the licensee had formed a CARB, which consisted of senior management, to periodically review KAP forms to ensure that proposed corrective actions were adequate to address the identified issues and to review

completed root cause evaluations. Additionally, the inspectors noted that the licensee's change management plan, which prescribed in general the implementation of the revised KAP, stated that the licensee planned to develop and implement, by the end of March 2001, performance indicators to track and evaluate various aspects of the KAP. Interviews of licensee personnel confirmed this commitment to develop and implement the performance indicators. The licensee presented the inspectors with some preliminary trends that indicated progress in the areas of KAP form initiation and timeliness. The inspectors also noted that the KAP administrative department had implemented an informal program to review KAP forms and to provide summary reports to the facility departments on noted problems. These reports generally provided feedback on errors identified in the processing of KAP forms, but also provided information on approaching due dates for evaluations and corrective actions.

The inspectors concluded that the licensee had effectively begun initiation of its planned corrective actions. Although some weaknesses were identified, the inspectors observed a notable measure of progress in the revised structure of the KAP, the dedication of resources to the program, and the staff's use of the program.

b. Determine that the corrective actions have been prioritized with consideration of the risk significance and regulatory compliance.

Most of the corrective actions were properly prioritized with the exception of the lack of trending for conditions adverse to quality. This was identified as a moderate risk to the station in the root cause evaluation, yet a trending program was not yet in place and the due date had been extended to March 2001. A QA audit had recently identified that the trending program had not yet been established but that the corrective action had been closed. The inspectors determined that the trending program improvements had not received the appropriate priority given the risk significance attributed to trending in the root cause evaluation. The licensee recognized that progress in trending to date had been slow and projected that the trending program would be established in March 2001. In the interim, the daily KAP screening committee was evaluating any potential for adverse trends. In addition to trending, the licensee had not yet been able to fill all of the dedicated positions established for the KAP, which appeared to be a crucial corrective action to ensure the success of the new process.

c. Determine that a schedule has been established for implementing and completing the corrective actions.

The inspectors determined that all of the corrective actions were scheduled for completion. However, the corrective actions related to the root cause evaluation, extent of condition evaluation, and the KAP improvements were tracked by different mechanisms. Some were tracked in the station's business plan, some to KAP Form No. 00-3103, and others to the change management plan. The inspectors concluded that the corrective action tracking for all of these issues was not located in one place for easy tracking but was fragmented and difficult to track. However, the inspectors did not identify any overdue corrective actions (with the exception of the tracking/trending of KAP Forms).

d. Determine that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence.

At the time of the inspection, measures of success had not yet been developed but plans to develop appropriate KAP performance measures were in place and tracked by a corrective action item. In addition to the development of performance indicators for the corrective action process, the newly formed CARB reviewed the root cause evaluation and specifically requested that an effectiveness review be conducted. The CARB asked the KAP program manager to develop an approach and plan to perform the effectiveness review and to return to the CARB for approval of the plan. Other measures to review the effectiveness of the corrective actions included a quarterly review of the corrective action program by QA and continued JOSRC oversight.

.4 *Independent Assessment of Extent of Condition*

An independent assessment of the extent of condition was not conducted during this supplemental inspection because the baseline inspection program Problem Identification and Resolution Inspection (NRC IP 71152) conducted in September 2000 and documented in NRC Inspection Report No. 50-305/00-19(DRP) effectively considered the extent of the corrective action program problems. That inspection concluded that significant weakness and inconsistencies existed in all aspects of the program reviewed during the inspection. Based on this assessment, the inspectors concluded that the licensee's evaluations adequately determined the extent of condition.

03 Exit Meeting Summary

On February 27, 2001, the inspectors presented the inspection results to Mr. Reddemann and other members of the Kewaunee staff. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Nuclear Management Company

D. Cole, Manager, Site Assessments
F. Flentje, Point Beach Compliance
J. Gadzala, Licensing
D. Gehrke, Quality Assurance Supervisor
K. Hoops, Plant Manager, Kewaunee Plant
V. Kaminskas, Point Beach Maintenance Manager
B. Koehler, Manager, Quality Programs
R. Nicolai, KAP Process Leader
B. O'Grady, Point Beach Operations Manager
R. Pulec, Assessment Manger
J. Purcell, Self-Assessment Manager
M. Reddemann, Site Vice President
R. Repshas, Manager, Site Services
J. Riste, Licensing Leader
D. Seebart, Process Leader, Emergency Preparedness

U.S. Nuclear Regulatory Commission

J. Caldwell, Deputy Regional Administrator
R. Caniano, Deputy Director, Division of Reactor Safety
Z. Dunham, Kewaunee Resident Inspector
P. Krohn, Point Beach Senior Resident Inspector
R. Lanskbury, Chief, Projects Branch 5
J. Lara, Kewaunee Senior Resident Inspector
S. Orth, Senior Radiation Specialist
R. Powell, Point Beach Resident Inspector
G. Shear, Chief, Plant Support Branch

LIST OF DOCUMENTS REVIEWED

KAP Forms

(WO No.)	(Subject/Title)
99-3008	INPO Shift Manager Professional Development Seminar Trip Report
99-3244	Corrective Action Owners Group Trip Report
99-3443	NEI Self-Assessment of the Self-Assessment Process
00-0728	Self-Assessment to INPO Principles of Effective Self Assessment and Corrective Action Programs
00-1289	Human Performance, Communications, Work Management Trend Analysis is Not Being Performed on KAP Database
00-2354	Siren Performance Decline Root Cause Analysis
00-3048	JOSRC Concern With How Lower-tier PI&R Systems Interface with KAP
00-3103	JOSRC Concern on KAP Process

00-3127	Determine the Scope of Problems Identified in KAPs on the Yellow Siren Indicator
00-3128	Adequancy [sic] of Relay Calibrations Performed by Off-site Organization
00-3190	Untimely Review and Issuance of EPIPs
00-3539	Independent Assessment of the KNPP EP Program
00-3742	KNP Audit Process
00-3883	OQAP Section 11 Trending is Not Proceduralized
00-4062	Inadequate ANS Siren Root Cause Analysis
00-4273	Human Errors in Procedure and Tagout Implementation
00-4313	Evaluate 3rd Qtr Performance of Emergency Response Organization Participation NRC
00-4324	Boron Concentration for Small Break Loss of Coolant Accident
00-4327	Timeliness to Discover Failure of Temperature Sensor
00-4361	SW 1306B is Sticking in the Closed Position
00-4362	SW 1306A is Sticking in the Closed Position
00-4424	During R-18 Source Check Indication Pegged High
00-4435	FW-7B Erratic Operation
00-4438	Missed PMP
01-0160	Backdowns Not Counted Toward Indicator
01-0170	Problems with Implementation of 10CFR50.47(b)(10)
01-0171	Problems with Implementation of 10CFR50.47(b)(12)
01-0172	Problems with Implementation of 10CFR50.47(b)(14)
01-0173	Problems with Implementation of 10CFR50.47(b)(15)
01-0174	Problems with Implementation of 10CFR50.47(b)(16)
01-0175	Problems with Implementation of 10CFR50.54(q)
01-0176	Problems with Implementation of Drill and Exercise Performance PI
01-0197	Problems with Implementation of 10CFR50.47(b)(1) and (2)
01-0198	Problems with Implementation of 10CFR50.47(b)(6)
01-0202	Audit Finding -- Laboratory Procedure Usage
01-0205	Document GAP Analysis of KNPP Maintenance Rule Program
01-0223	Inconsistency in Reactor Coolant Activity Basis
01-0358	CARB Review of KAPs -- Insufficient CAs
01-0488	Source Checks on Free Release Instruments Not Completed Per Procedure
01-0608	CRPAR Fans OOS LER/KAP Extent of Condition Review
01-1761	Determine Better Method for EP Equipment Control
01-1762	Review Vehicles for Capturing and Recording Siren Equipment Failure Modes
01-1889	Strengthen QP Audits for Regulatory Related Systems

(WR No.)

01-1099	Missed Opertunity [sic] to Generate a KAP on Adverse NRC Performance Indicator
01-1100	Missed Opertunity [sic] to Generate a KAP as Required in NRC Performance Indicator Guidelines

Miscellaneous

"Apparent Cause Analysis," Course Notes
Corrective Action Review Board Minutes (December 7, 2000, through February 6, 2001)
"Fundamental Techniques of Root Cause Analysis," Course Notes
"Kewaunee Assessment Process," TS&M Initial, T-TSM-LP 1.01.13, Revision B
"Root Cause Analysis Overview," Course Notes
"Root Cause Evaluation Guideline," dated January 9, 2001

Procedures

EPIP-AD-07 (Revision AM), "Initial Emergency Notifications"
EMP 02.07 (Revision B), "EP Recommendation and Corrective Action Process"
EMP 09.03 (Revision G), "Alert and Notification Siren System Testing and Maintenance"
GNP 11.08.07 (Revision A), "Action Prioritization"
GNP 11.08.01(Revision D), "Instructions for the Kewaunee Assessment Process"
NAD 11.08 (Revision E), "Kewaunee Assessment Process"
PMP 44-02 (Revision A), "COM - Alert and Notification System Annual Preventive Maintenance"

Root Cause Evaluations/Extent of Condition Analyses/Improvement Plans

Assessment K-SA-OPS-01-01, "KNPP Operations Assessment "
KAP Improvement Initiative Change Management Plan
RCE 01-001 Kewaunee Assessment Process Root Cause Evaluation
RCE 01-004 Alert and Notification (Siren) System Performance Decline Root Cause Analysis

LIST OF ACRONYMS USED

ANS	Alert and Notification System
CARB	Corrective Action Review Board
GNP	General Nuclear Procedure
INPO	Institute of Nuclear Power Operators
IP	Inspection Procedure
JSRC	Joint Off-site Review Committee
KAP	Kewaunee Assessment Process
QA	Quality Assurance
NAD	Nuclear Administrative Directive
NMC	Nuclear Management Company
NSRAC	Nuclear Safety Review and Audit Committee
RCE	Root Cause Evaluation
WANO	World Association of Nuclear Operators