July 27, 2001

Mr. J. Sorensen
Site Vice-President
Prairie Island Nuclear Generating Plant
Nuclear Management Company, LLC
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT
NRC INSPECTION REPORT 50-282/01-14(DRS); 50-306/01-14(DRS)

Dear Mr. Sorensen:

On June 29, 2001, the NRC completed a supplemental inspection of your Prairie Island Nuclear Generating Plant. The results of this inspection were discussed on June 29, 2001, with you and other members of your staff. The enclosed report presents the results of that inspection.

The supplemental inspection was an examination of activities conducted under your license as they relate to safety and to compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities, and interviews with personnel. Specifically, this inspection focused on your assessment of the root causes and development of corrective actions for the White inspection finding associated with the cooling water pumps documented in NRC Inspection Report 50-282/00-13; 50-306/00-13.

Based upon the results of this inspection, the inspectors identified a cross-cutting issue associated with your problem identification and resolution efforts for the White inspection finding discussed above. Specifically, the inspectors identified that your staff had not identified all of the root causes for the White finding and therefore had not developed corrective actions for all the root causes. The failure to identify all of the root causes and to develop associated corrective actions was determined to involve a violation of NRC requirements and was characterized as a No Color finding. Because the issue was entered into your corrective action program, the NRC is treating this issue as a Non-Cited Violation in accordance with Section VI.A.1 of the NRC's Enforcement Policy. In addition, the White inspection finding associated with the inoperable cooling water pumps will remain open.

If you deny this violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington DC 20555-0001; and the NRC Resident Inspectors at the Prairie Island Nuclear Generating Plant.

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 by Roy J. Caniano Acting For/

John A. Grobe, Director
Division of Reactor Safety

Docket Nos. 50-282; 50-306
License Nos. DPR-42; DPR-60

Enclosure: Inspection Report 50-282/01-14(DRS);
50-306/01-14(DRS)

cc w/encl: Plant Manager, Prairie Island
R. Anderson, Executive Vice President
and Chief Nuclear Officer
Site Licensing Manager
Nuclear Asset Manager
J. Malcolm, Commissioner, Minnesota
Department of Health
State Liaison Officer, State of Wisconsin
Tribal Council, Prairie Island Indian Community
J. Silberg, Esquire
Shawn, Pittman, Potts, and Trowbridge
A. Neblett, Assistant Attorney General
Office of the Attorney General
S. Bloom, Administrator
Goodhue County Courthouse
Commissioner, Minnesota Department
of Commerce

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-282; 50-306
License Nos:	DPR-42; DPR-60
Report No:	50-282/01-14(DRS); 50-306/01-14(DRS)
Licensee:	Nuclear Management Company, LLC
Facility:	Prairie Island Nuclear Generating Plant, Units 1 and 2
Location:	1717 Wakonade Drive East Welch, MN 55089
Dates:	June 25 through June 29, 2001
Inspectors:	K. O'Brien, Senior Reactor Inspector J. Gavula, Senior Reactor Inspector
Approved by:	John M. Jacobson, Chief Mechanical Engineering Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000282-01-14(DRS); 05000306-01-14(DRS), on 6/25 - 29/2001, Nuclear Management Company, LLC, Prairie Island Nuclear Generating Plant. Supplemental Inspection - Mitigating Systems Cornerstone.

This supplemental inspection was performed by two regional inspectors to assess the licensee's root cause evaluation, extent of condition determination, and corrective actions associated with an NRC-identified issue involving an inoperability of the safeguards cooling water (service water) pumps due to the absence of a qualified source of lubricating water supply to the line shaft bearings. This performance issue was previously characterized as having low to moderate risk significance "White" in NRC letter dated February 20, 2001. The finding was initially documented in NRC Inspection Report 50-282/00-13; 50-306/00-13.

Based upon this supplemental inspection, which was performed in accordance with Inspection Procedure 95001, the inspectors identified several deficiencies in the licensee's root cause evaluation and corrective actions for the White finding. The inspectors identified these deficiencies as a Non-Cited Violation for inadequate corrective actions.

Inspector Identified Findings

Cross-cutting Issues: Problem Identification and Resolution

No Color. The inspectors determined that the licensee's evaluation of the White finding did not identify all of the root causes for the finding and did not propose corrective actions to preclude recurrence. Specifically, the evaluation did not identify root causes associated with inadequate staff and management knowledge of the cooling water pump design and did not identify process and procedure inadequacies which allowed the condition to continue for 25 years. As a result, the licensee did not propose corrective actions for these root causes.

In addition, the White inspection finding associated with the inoperable cooling water pumps will remain open.

Report Details

01 Inspection Scope

This supplemental inspection, performed in accordance with NRC Inspection Procedure 95001, assessed the licensee's evaluation of a low to moderate risk finding associated the inoperability of the essential service water pumps. This finding was previously characterized as "White" in NRC letter dated February 20, 2001, which re-analyzed an initial assessment of the finding included in NRC Inspection Report 50-282/00-13; 50-306/00-13. The "White" finding was related to the mitigating systems cornerstone in the reactor safety strategic performance area. The inspectors reviewed the Licensee Event Report and Condition Reports relating to the root cause analysis, extent of condition evaluations, and corrective actions to prevent recurrence associated with this finding.

02 Evaluation of Inspection Requirements

02.1 *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 problem was identified by the NRC during a baseline Safety System Design and Performance Capability Inspection in November 2000, as documented in Inspection Report (IR) 50-282/00-13; 50-306/00-13. Based on the finding from that inspection, the licensee initiated Condition Report (CR) 2000-4776 and, after concluding that the pumps were inoperable, issued Licensee Event Report (LER) 50-282/2000-04.

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

As documented in the LER, the problem originated in 1976 when the site's Operations Committee incorrectly determined that the bearing water supply was not essential to pump operability. This determination contradicted the information in the pump's vendor manual that stated bearing water supply was needed for pump operation. Subsequently, in 1977, the licensee downgraded the bearing water supply for the cooling water pumps to non-safety related in a safety evaluation [10 CFR 50.59] based on the Operations Committee's decision. The pump's operability was eventually affected in 1981 when a design change installed non-safety related filters in the system which resulted in a non-qualified source of bearing water. Additionally, in 1986, a modification moved the bearing water supply source from the safeguards [safety-related] supplied header to the non-safety related filtered water system.

From 1976 through 2000, the licensee had multiple opportunities to identify this problem. In two specific instances, (the Design Basis Document Project in 1991 and the licensee's service water system operational performance inspection in 1994), questions regarding the need for a qualified source of bearing water were asked because of the inconsistency between the bearing water supply classification and the pump design requirements. In both cases, the licensee's resolution relied on the 1977 safety

evaluation and incorrectly agreed that the bearing water was not essential to pump operation.

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

The risk associated with this problem was characterized by the NRC as a "White" finding [an issue with low to moderate increased importance to safety]. The licensee documented that they agreed with this significance determination in Licensee Event Report 50-282/2000-04, Revision 1. Also, the licensee's root cause report stated that this problem was significant because an external event might have required these pumps to operate, and might have disabled the bearing water supply through the failure of the non-qualified PVC [polyvinyl chloride] piping or the loss of power to the well and strainer backwash function.

02.2 *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 performed their root cause investigations using "Event and Causal Factor Charting Method," "Organizational and Programmatic Diagnostic Chart," and "Modified Technique of Operations Review Analysis." Using these methods, the licensee initially identified two root causes and three additional causal factors. After recognizing that their initial root cause evaluation did not address the causes for the multiple instances where prior opportunities had failed to identify this problem, the licensee performed a "Cause Investigation Report" and identified four additional root causes.

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

The inspectors determined that the licensee's root cause reports did not evaluate several critical aspects of this problem. Although the initial report stated that the events/systems that allowed the plant to have this problem needed to be addressed, the evaluation concentrated only on the safety evaluation process. The evaluation did not assess the adequacy of processes or procedures which permitted the incorrect quality classification to continue to exist for 25 years. Specifically, those processes where the specific issue was questioned, but the issue resolution did not reach the appropriate conclusion. The inspectors identified at least three such examples including the design basis document follow-on items, the licensee's self-performed service water system operational performance inspection, and the initial operability evaluation performed during the recent NRC inspection that identified this problem.

The initial root cause report concluded that the safety evaluation process was inadequate in 1976 in that it allowed the Operations Committee to make a determination that changed plant operating requirements prior to performance and approval of a safety evaluation. The inspectors reviewed the related procedure and concluded that the procedure was adequate, but that it had not been followed at the time. On that basis, the inspectors disagreed with the root cause report. This implied that the causes of the failure to follow procedures had not been identified by the licensee's root cause team.

The initial root cause report event and causal factors chart also indicated that a knowledge deficiency contributed to the initial errant conclusions reached by the Operations Committee. However, the licensee did not further evaluate the causes for or current status of the identified knowledge deficiency.

Although the licensee's additional root cause evaluation focused on the causes of the missed opportunities, the identified root causes jumped over the process and procedure elements and concentrated on the cultural aspects of the causes. While this may be appropriate, it was not evident to the inspectors that potential process and procedure inadequacies or weaknesses had been fully considered in order to identify necessary corrective actions.

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

Neither of the licensee's root cause evaluations considered other prior occurrences of the problem. This was specifically evident because one of the findings from the NRC safety system design inspection was a modification done in 1995 wherein a new portion of the cooling water system was assigned an incorrect safety classification. While the causes of the event were almost identical, the modification process as well as the safety evaluation process was involved and therefore additional evaluation may have been warranted.

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 considered potential common causes and extensive extent-of-condition reviews had been conducted and were continuing as of the end of this inspection. The licensee's second root cause report indicated that the problem (the lack of qualifying, validating or verifying information) could be widespread throughout engineering and technical support organizations. Under "Other Corrective Actions" this root cause report specified: Reevaluate other Engineering processes for problems similar to those found in the modification and safety evaluation processes.

02.3 <u>*Corrective Actions*</u>

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.

Based on the above noted deficiencies in the licensee's root cause evaluation, the inspectors could not conclude that appropriate corrective actions were specified. Although the licensee's initial root cause concluded that the Safety Evaluation *process* was deficient, the corrective action was to change the Safety Evaluation *procedure*. Based on the inspectors' reviews, the Safety Evaluation procedure was adequate but the process that allowed the procedure not to be followed was the cause. By simply stating that the Safety Evaluation procedures had been changed since 1976 and were recently upgraded for the new 10 CFR 50.59, the licensee did not address the cause of the problem. In addition, although the root cause evaluations discussed a lack of technical understanding of the equipment, not understanding fundamentals of design, and inadequate initial and refresher training, these short comings were not considered

contributing causes and no specific corrective action were identified in the reports to address these aspects.

The licensee's second root cause report stated that the problem (lack of qualifying, verifying and validating information) could be widespread throughout engineering and initiated reviews of other engineering programs. While this appeared to be an appropriate action to determine the extent of condition in the other programs or processes, there were no corrective actions given to correct and prevent recurrence for the problems found in the modification and safety evaluation processes.

In addition, some of the specified corrective actions to prevent recurrence of the problem were ill-defined and lacked specifics in order to accomplish them. For instance, the corrective action to address the root cause: "Management's constant expectation to maintain the plant's design and licensing basis is not reinforced," was to "Set management expectation to maintain the plant design and licensing basis as a high priority." Although the new Engineering Mission statement begins with "Protect the Prairie Island Nuclear Generating Plant design and licensing basis," none of the information provided to the inspectors delineated specifically how this was to be accomplished.

As another example, the corrective action to address the root cause: "High engineering work load due to inappropriate or non-use of work specialization or having too many non-engineering tasks," was to "Redistribute the work load performed by Engineering in order to transform the organization into one whose primary mission is to protect the plant design and licensing basis." The only information provided to the inspectors to accomplish this was Site Initiative 11, "Transforming Prairie Island Engineering from a reactive to a pro-active organization (AP913)." While this might be the correct approach, the proposed organization structure focused on equipment reliability and did not include anything with regard to protecting the plant's design and licensing basis.

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

The licensee appropriately prioritized the immediate compensatory actions and design change activities necessary to ensure a safety-related source of lubricating water to the cooling water pumps following the NRC's initial identification of the finding. In addition, the inspectors noted that the licensee staff had prioritized additional corrective actions that were necessary as a result of findings developed during the extent of condition reviews.

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

The licensee staff utilized a portion of the computerized corrective action process to track actions assigned as a result of the root cause and other evaluations. The program provided for a centralized tracking and documentation of corrective actions. However, the inspectors could not determine how or if the process was utilized to establish an integrated methodology for ensuring the proper implementation and coordination of efforts. The inspectors noted that several individuals involved in implementation of the

corrective actions had developed their own methods for tracking the status of individual actions.

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

Although many broad and extensive corrective actions had been proposed and were being implemented by the licensee, the inspectors could not determine if these broad corrective actions would result in preventing recurrence of the specific problem. Specifically, the inspectors noted that qualitative and quantitative measures of success had not been developed for determining the effectiveness of the corrective actions to prevent recurrence. During discussions with the inspectors, the licensee staff indicated that some measurement processes had been implemented, such as rating the quality of the safety evaluations. While this appeared appropriate, the inspectors noted that this effort had not been identified as part of the corrective actions for this problem and therefore, the inspectors were unclear if the licensee considered these actions as a measure implemented to prevent the recurrence of this problem.

One of the contributing causes from the initial root cause evaluation was: "Several projects or events provided the opportunity to revisit the need for bearing water supply. The lack of questioning attitude led to the acceptance of the original evaluation." The inspectors determined that it was not that the need, for a qualified bearing water supply source, was not questioned. Instead, the inspectors concluded that it was a continuing acceptance by the licensee staff of historical data, that had an extremely weak basis for initially down grading the bearing water supply, that caused the problem. While the corrective actions to prevent recurrence was to "Improve management practices" through various initiatives, the inspectors noted that there was no specific correlation to ensure that these initiatives would prevent recurrence nor any measures of success developed to determine the effectiveness of these actions.

The failure to identify all of the root causes for the White finding and to develop and implement corrective actions to prevent recurrence was determined to be a violation of 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action. As of the end of the inspection, the licensee had initiated a condition report (CR #2001-5343) to address this issue and the violation was being treated as a Non-Cited Violation, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 50-282/01-14-01; 50-306/01-14-01).

03 Exit Meeting Summary

On June 29, 2001, the inspectors presented the inspection results to Mr. J. Sorensen and other members of the Prairie Island staff. The licensee acknowledged the findings presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. None were identified as proprietary.

KEY POINTS OF CONTACT

Licensee

C. Agan, Consultant
T. Allen, General Superintendent of Engineering
T. Amundson, General Superintendent of Engineering
M. Brossart, Superintendent Mechanical Systems and Program Engineering
M. Klee, Reliability Engineer
R. Peterson, Project Engineer
J. Sorensen, Site Vice President
M. Werner, Plant Manager

NRC

S. Ray, Senior Resident Inspector
S. Reynolds, Deputy Director, Division of Reactor Projects
R. Lanksbury, Branch Chief, Division of Reactor Projects

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed During This Inspection

50-282/01-14-01 50-306/01-14-01	NCV	The failure to identify all of the root causes for and to develop corrective actions to preclude the White finding associated with the inoperable cooling water pumps.

Discussed

50-282/00-13-01 50-306/00-13-01	NOV	Inadequate design control measures, which resulted in a potential failure of the cooling water pumps due to a lack of lubricating water for shaft bearings.

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CR	Condition Report
DRS	Division of Reactor Safety
IR	Inspection Report
LER	Licensee Event Report
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PVC	Polyvinyl Chloride

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 on this list does not imply the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document in this list does not imply NRC acceptance of the document, unless specifically stated in the inspection report.

CONDITION REPORTS GENERATED PRIOR TO THE INSPECTION

Number	Description	Revision/Date
2001-0605	Q-list for Lines of Pipe Does Not Identify Them as Safety Related, but the Component and Specification Sheets do	January 24, 2001
2001-1357	Feedwater Flow Control Valve Solenoid Valves Incorrectly down Graded to Commercial Grade by Safety Evaluation #386	February 8, 2001
2001-2211	Review of Non-Modification Safety Evaluations Revealed Instances of Inappropriate down Grading of Components and Inconsistent Documentation	March 2, 2001
2001-5073	Provide Information to Alleviate Confusion Concerning Use of Quality Assurance Type II Feedwater Regulating Valves as Redundant Quality Assurance Type I Flow Termination Devices	June 18, 2001

CORRECTIVE ACTIONS IMPLEMENTED PRIOR TO THE INSPECTION

Number	Description	Revision/Date
2000-5703	All Safety Evaluations Which Have Downgraded Components Will Be Re-Reviewed	December 1, 2000
2000-5705	Revise Safety Evaluation That Downgraded Cooling Water Pumps Filtered Water Supply	December 1, 2000
2001-0507	Define a Statistically Significant Sampling of All Modifications to Verify Quality Classifications	January 22, 2001
2001-0508	Revise Section Work Instruction O-44 and Technical Specification Requirements as Necessary to Reflect Vertical Cooling Water Pump Bearing Water Requirements	January 22, 2001
2001-0561	Complete the Sampling of All Modifications to Verify Quality Classification Defined in Action 2001-0507	January 23, 2001

Number	Description	Revision/Date
2001-2302	Complete Future Need on Safety Evaluation 13, Revision 1. Verify Any Other Documents That Rely on Safety Evaluation 13, Revision 0 Are Appropriately Revised	March 7, 2001
2001-2415	Determine the Extent of past Use of the American Society of Mechanical Engineers Code Drawings to Redefine Safety Related and down Grade Components	March 9, 2001
2001-2416	Review 9 Non-Modification Safety Evaluations That Revised Drawings and Identify Any That Might Have down Graded Components	March 9, 2001
2001-2417	Determine Proper Design Class/Quality Assurance Type for Pipe and Components, Correct Flow Diagrams, and Champs Accordingly	March 9, 2001
2001-2418	Evaluate Actions Taken by Safety Evaluation 218 and Revise Accordingly	March 9, 2001
2001-2800	Statistically Sample Modification Related Safety Evaluations to Determine If Quality Assurance down Grades Were Appropriate	March 22, 2001
2001-2998	Replace Unit 2 Feed Regulating Valve Solenoid Valves with Quality Assurance Type I	March 30, 2001
2001-4695	Redistribute the Work Performed by Engineering in Order to Transform the Organization into One Who's Primary Mission Is to Protect the Plant Design and Licensing Basis	May 30, 2001
2001-4696	Develop, Implement, and Reinforce Standardized Tools for Problem Solving, Decision Making, and Review Methodology	May 30, 2001
2001-4697	Reevaluate Other Engineering Processes for Problems Similar to Those Found in the Modification and Safety Evaluation Processes	May 30, 2001
2001-4528	Ensure Downgrade Project Considers All System Interfaces So Component/Classification Is Consistent Across Interfaces	June 12, 2001
2001-4960	All Systems and Components in Downgrade Project Scope Should Be Reviewed for Safety Class Accuracy and Inconsistencies	June 12, 2001

Number	Description	Revision/Date
2001-4964	Review All Components Classified as American Society of Mechanical Engineers Class 1, 2, or 3 to Ensure All Are Properly Identified from Code Class Drawings	June 12, 2001

CONDITION REPORTS GENERATED DURING THE INSPECTION

Number	Description	Revision/Date
2001-5343	Due to The Expanded Scope/Findings to the Extent of Condition Review, Reassess the Root Cause Performed per CR 20004776	June 27, 2001

PROCEDURES

Number	Description	Revision/Date
SWI-PREP-4	Section Work Instructions, Safety Evaluations	Revision 0 August 28, 1975
3AWI-4.1.1	Administrative Work Instruction, Safety Evaluations	Revision 1 March 25, 1975
5AWI-3.3.2	Safety Evaluation Screenings	Revision 17 September 20, 2000
5AWI-3.3.3	Safety Evaluations	Revision 9 January 18, 2001

MISCELLANEOUS DOCUMENTS

Description	Revision/Date
Root Cause Failure Analysis for Prairie Island Nuclear Plant Licensee Event Report 1-00-04	January 26, 2001
Focused Self-Assessment of the Q-list Program and Equipment Classification for the Prairie Island Nuclear Generating Plant (CR #2001-4528)	Revision 0
Prairie Island Nuclear Plant Cause Investigation Report to Determine Why Several Opportunities Were Missed to Identify the Lube Water to CI (Cooling Water) Pumps down Grade Problems (CR #2001-2596)	June 1, 2001
Focused Self-Assessment Plan to Review the Design and Performance Capability of the Auxiliary Feedwater System	July 1, 2001

Description	Revision/Date
System and Component Downgrade Review Project Plan	June 20, 2001
Prairie Island Nuclear Generating Plant 2001 Site Initiatives, “Building Our Future to 2034”	Revision 2 June 27, 2001
Q List Committee No. 77-9 Minutes	November 9, 1977
Design Change 1976-L-287	March 1, 1979
Prairie Island Nuclear Generating Plant Operating Committee Meeting #315 Minutes	December 2, 1976
Licensee Event Report 1-00-04, Inoperability of Safeguards Cooling Water (Essential Service Water) Pumps Caused by Unqualified Lubricating Water Supply to the Pumps Shaft Bearings	Revision 0 December 1, 2000
Licensee Event Report 1-00-04, Inoperability of Safeguards Cooling Water (Essential Service Water) Pumps Caused by Unqualified Lubricating Water Supply to the Pumps Shaft Bearings	Revision 1 March 22, 2001

SAFETY EVALUATIONS

Number	Description	Revision/Date
13	De-Classify Cooling Water Pumps Lube Flush Water Line	Revision 0 January 3, 1977
13	De-Classify Cooling Water Pumps Lube Flush Water	Revision 1 January 30, 2001