April 28, 2005

Mr. Joseph Solymossy
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, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000282/2005003;
05000306/2005003

Dear Mr. Solymossy:

On March 31, 2005, the U. S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Prairie Island Nuclear Generating Plant, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on April 12, 2005, with you and other members of your staff.

This inspection examined 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. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the inspectors identified two NRC-identified findings of very low significance (Green). Both findings also resulted in a violation of NRC requirements. Because these violations were of very low safety significance and were entered into your corrective action program, the NRC is treating the findings as Non-Cited Violations in accordance with Section VI.A.1 of the NRC's Enforcement Policy.

If you contest the subject or severity of a Non-Cited Violation, 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, D.C. 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, D.C. 20555-0001; and the Resident Inspector Office at the Prairie Island Nuclear Generating Plant.

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Sincerely,

/RA/

David Passehl, Acting Chief
Branch 3
Division of Reactor Projects

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

Enclosure: Inspection Report 05000282/2005003; 05000306/2005003
w/Attachment: Supplemental Information

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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:	05000282/2005003; 05000306/2005003
Licensee:	Nuclear Management Company, LLC
Facility:	Prairie Island Nuclear Generating Plant, Units 1 and 2
Location:	1717 Wakonade Drive East Welch, MN 55089
Dates:	January 1 through March 31, 2005
Inspectors:	J. Adams, Senior Resident Inspector D. Karjala, Resident Inspector B. Winter, Reactor Engineer
Approved by:	D. Passehl, Acting Chief Branch 3 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000282/2005003, 05000306/2005003; 01/01/05 - 03/31/05; Prairie Island Nuclear Generating Plant, Units 1 and 2; Maintenance Effectiveness and Operability Evaluations.

This report covers a 3-month period of baseline resident inspection. The inspection was conducted by the resident inspectors, and an inspector from the Region III office. Two Green findings were identified. 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.

A. Inspector-Identified and Self-Revealed Findings

Cornerstone: Barrier Integrity

- Green. The inspectors identified a finding of very low safety significance for inadequate corrective actions associated with the repetitive failure of Unit 1 and 2 containment fan coil units (CFCUs). Specifically, the licensee failed to identify and correct the root cause of the accelerated erosion of the CFCUs and to implement effective corrective actions in a timely manner to preclude repeat failures of these significant conditions adverse to quality. The finding constituted a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions." The primary cause of this finding was related to the cross-cutting area of Problem Identification and Resolution (corrective actions) because the ineffective implementation of the licensee's corrective action program allowed the root cause of a Unit 1 fan coil unit failure in November 2001, to go unidentified and was not corrected. The licensee's inadequate corrective action has resulted in multiple performance failures of the safety-related containment cooling system and multiple unplanned Technical Specifications (TS) Limiting Condition for Operation (LCO) entries. The licensee has conducted a root cause evaluation, identified long-term corrective actions to prevent future failures, and has implemented short-term corrective actions to reduce the erosion rate until long-term corrective actions are fully implemented.

  The inspectors concluded that the licensee's failure to identify the root cause of the fan coil unit accelerated erosion and implement effective corrective action to preclude recurrence was a performance deficiency that warranted significance evaluation. The inspectors determined the finding to be more than minor because the finding affected the barrier integrity cornerstone objective to provide reasonable assurance that the physical design barriers (the reactor containment) protect the public from radionuclide release from accidents or events. The significance evaluation resulted in a finding of very low safety significance (Green) since the unavailability of the CFCUs did not adversely affect core damage frequency nor did it adversely affect the large early release frequency. (Section 1R12)

- Green. The inspectors identified a finding of very low safety significance for a failure to comply with the required actions of Technical Specifications (TS) Limiting Condition for Operation (LCO) 3.0.3. Specifically, the licensee failed to place Unit 2 in Mode 3 within 7 hours and Mode 4 within 13 hours of entry into TS LCO 3.0.3 after 2 CFCUs, each

from opposite trains, were declared inoperable on February 11, 2005. This finding constituted a Non-Cited Violation of TS LCO 3.0.3. The inspectors determined that the finding impacted the cross-cutting area of Human Performance (organization) because the licensee's management organization failed to carefully assess the situation regarding TS compliance. The licensee's decision to not place Unit 2 in Mode 3 within 7 hours and Mode 4 within 13 hours was based on a conclusion reached in an operability evaluation. That evaluation concluded that the 21 CFCU, one of two CFCUs in Train A, by itself, was sufficient to remove the post-accident containment heat load. The licensee concluded that the 21 CFCU constituted an operable train of containment cooling, declared containment cooling Train A operable, and exited TS LCO 3.0.3. The licensee completed repairs and returned the two CFCUs to operable status on February 12, 2005.

The inspectors concluded that the licensee's failure to place Unit 2 in Mode 3 and Mode 4 as required by TS LCO 3.0.3 was a performance deficiency that warranted significance evaluation. The inspectors determined the finding to be more than minor because the failure to comply with a TS-required shutdown could reasonably be viewed as a precursor to a significant event. The significance evaluation resulted in a finding of very low safety significance (Green) since the unavailability of the CFCUs did not adversely affect core damage frequency nor did it adversely affect the large early release frequency. (Section 1R15)

B. Licensee-Identified Violations

No findings of significance were identified.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at 98 percent power until the unit was shut down for repairs to the generator seal oil system on February 19, 2005. The reactor was restarted on February 26, 2005, and the generator was placed online on March 4, 2005. The unit operated at or near full power for the remainder of the inspection period.

Unit 2 operated at or near full power with the following exceptions. On February 10, 2005, power was reduced to approximately 6.5 percent for nine hours for maintenance on a heater drain tank pump. On March 30, 2005, the unit was shut down for repairs to the 21, 22, and 23 containment fan coil units (CFCU). The unit remained shut down for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather (71111.01)

a. Inspection Scope

On March 30, 2005, the inspectors evaluated the licensee's implementation of their adverse weather abnormal operating procedure for tornados and high winds following inclusion of the plant site and surrounding area in a tornado watch by the National Weather Service. The inspectors observed the actions taken by plant operators and compared them to the actions specified in Abnormal Operating Procedure AB-2, Tornado/Severe Thunderstorm/High Winds, Revision 26.

This inspection comprised one inspection sample.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdowns

a. Inspection Scope

The inspectors performed three inspection samples comprising partial system walkdowns of accessible portions of trains of risk-significant mitigating systems equipment during times when the trains were of increased importance due to the redundant trains or other related equipment being unavailable. In addition, the inspectors reviewed corrective action program action requests (CAPs) associated with

equipment alignment issues to verify that the licensee was identifying issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures.

The inspectors utilized the valve and electric breaker checklists to verify that the components were properly positioned and that support systems were lined up as needed. The inspectors also examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious performance deficiencies. The inspectors reviewed outstanding work orders (WOs) and CAPs associated with the trains to verify that those documents did not reveal issues that could affect train function. The inspectors used the information in the appropriate sections of the Updated Safety Analysis Report (USAR) to determine the functional requirements of the systems.

The inspectors verified the alignment of the following trains:

- 22 turbine-driven auxiliary feedwater pump during the unavailability of the 21 auxiliary feedwater pump on January 19, 2005;
- diesel generator D2 during the unavailability of diesel generator D1 on January 25, 2005; and
- diesel generator D5 during the unavailability of the 122 control room chiller February 28, 2005.

The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings

No findings of significance were identified.

.2 Complete Walkdowns

a. Inspection Scope

During the week of January 16, 2005, the inspectors performed a detailed in-plant walkdown of the alignment and condition of the Unit 1 component cooling water system, a risk significant system that provides cooling to safety-related and risk significant components during normal, off-normal, and accident modes of operation. This inspection effort constituted one complete system alignment inspection sample. In addition, the inspectors reviewed CAPs associated with equipment alignment issues to verify that the licensee was identifying issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures.

The inspectors conducted in-plant walkdowns using the applicable alignment checklists and plant drawings to verify that system components were properly positioned to support the completion of system safety functions and to verify that the as-found system configuration matched the configuration specified in the system alignment checklist and plant drawings. The inspectors examined the material condition of the components,

such as pumps, motors, valves, instrumentation, controls, and electrical panels. The inspectors observed operating parameters of equipment to verify that there were no obvious performance deficiencies and examined all applicable outstanding design issues, temporary modifications, and operator workarounds. The inspectors verified that tagging clearances were appropriate and attached to the specified equipment where applicable. The inspectors reviewed outstanding WOs and CAPs associated with the trains to determine if any degraded conditions existed that could affect the accomplishment of the system's safety functions. The inspectors referred to the Technical Specifications (TS), USAR, and other design basis documents to determine the functional requirements of the systems and verified those functions could be performed if needed.

The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings

No findings of significance were identified.

1R05 Fire Protection Area Walkdowns (71111.05)

a. Inspection Scope

The inspectors conducted in-office and in-plant reviews of portions of the licensee's Fire Hazards Analysis and Fire Strategies to verify consistency between these documents and the as-found configuration of the installed fire protection equipment and features in the fire protection areas listed below. The inspectors selected fire areas for inspection based on their overall contribution to internal fire risk, as documented in the Individual Plant Examination of External Events (IPEEE); their potential to impact equipment which could initiate a plant transient; or their impact on the plant's ability to respond to a security event. The inspectors assessed the control of transient combustibles and ignition sources, the material and operational condition of fire protection systems and equipment, and the status of fire barriers. The following ten fire areas were inspected by in-plant walkdowns supporting the completion of ten fire protection zone walkdown samples:

- Fire Area 25, D1 diesel generator room, on January 18, 2005;
- Fire Area 31, auxiliary feedwater pump room, on January 18, 2005;
- Fire Area 32, auxiliary feedwater pump room, on January 18, 2005;
- Fire Area 41A, diesel-driven cooling water pump area, on January 19, 2005;
- Fire Area 41B, screenhouse below grade, on January 19, 2005;
- Fire Area 81, bus 15 room, January 18, 2005;
- Fire Area 89, guard house, on January 20, 2005;
- Fire Area 113, D5 day tank room, January 18, 2005;
- Fire Area 115, D5 lubricating oil make-up tank room, January 18, 2005; and
- Fire Area 117, bus 25 room, January 18, 2005.

The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors performed an in-office review of the most recently completed surveillance procedure (SP) for the inspection of plant flooding barriers and the abnormal procedure for flooding. The contents of these documents were compared to the plant flood protection design sections in the USAR and the assumption contained in the IPEEE associated with an external flooding event. This inspection effort completed the annual external flood protection inspection sample.

The inspectors performed an in-plant inspection of flood protection barriers in the Auxiliary Building, Turbine Building, D5/D6 Building, and the Old Screenhouse during the period of March 10 through 16, 2005, comparing the as-found conditions of the flood protection panels against the acceptance criteria in the SP. The inspectors also verified that the actions specified in the abnormal procedure for flooding could be performed in a timely manner (three days) if required, and the necessary hardware and consumable materials were available and still within their shelf life.

The inspectors reviewed several CAP items to verify that minor deficiencies identified during this inspection were entered into the licensee's corrective action program, that problems associated with plant equipment relied upon to prevent or minimize flooding were identified at an appropriate threshold, and that corrective actions commensurate with the significance of the issue were identified and implemented. As part of this inspection, the inspectors reviewed the documents listed in the Attachment.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07A)

a. Inspection Scope

On February 22, 2005, the inspectors performed an in-office review of the results of SP 1424, "Unit 1 Five Year Containment Fan Coil Unit Performance Test." This procedure fulfills a commitment to Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment", which requires a test program to verify the heat transfer capability of safety-related heat exchangers cooled by service water. The CFCUs remove heat from the containment building during normal operations and during post-accident conditions to ensure that containment pressure does not exceed its

design value. The inspectors verified the following items were addressed in the test results:

- Test acceptance criteria and results appropriately considered differences between testing conditions and design conditions;
- Test results were appropriately categorized against preestablished acceptance criteria;
- Frequency of testing is sufficient to detect degradation prior to loss of heat removal capability below design basis values; and
- Test results considered test instrument inaccuracies and differences.

This inspection constituted one inspection sample. The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

On February 28, 2005, the inspectors performed a quarterly review during licensed operator requalification training in the simulator, completing one licensed operator requalification inspection sample. The inspectors observed a crew while in training during an annual requalification examination in the plant's simulator facility. The inspectors compared crew performance to licensee management expectations. The inspectors verified that the crew completed all of the critical tasks for the scenario. For any weaknesses identified, the inspectors observed that the licensee evaluators noted the weaknesses and discussed them in the critique at the end of the session.

The inspectors assessed the licensee's effectiveness in evaluating the requalification program, ensuring that licensed individuals would operate the facility safely and within the conditions of their licenses, and evaluated licensed operator mastery of high-risk operator actions. The inspection activities included, but were not limited to, a review of high-risk activities, emergency plan performance, incorporation of lessons learned, clarity and formality of communications, task prioritization, timeliness of actions, alarm response actions, control board operations, procedural adequacy and implementation, supervisory oversight, group dynamics, interpretations of TS, simulator fidelity, and licensee critique of performance.

The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Repetitive CFCU Failures

a. Inspection Scope

The inspectors reviewed a repetitive maintenance activity to assess maintenance effectiveness, including maintenance rule (10 CFR 50.65) activities, work practices, and common cause issues. The inspectors performed one system/train function oriented maintenance effectiveness sample. The inspectors assessed the licensee's maintenance effectiveness associated with repetitive failures of CFCU H-bends and U-bends.

The inspectors reviewed the licensee's maintenance rule evaluations of equipment failures for maintenance preventable functional failures and equipment unavailability time calculations, comparing the licensee's evaluation conclusions to applicable Maintenance Rule (a)1 performance criteria. Additionally, the inspectors reviewed scoping, goal-setting, performance monitoring, short-term and long-term corrective actions, functional failure definitions, and current equipment performance status.

The inspectors reviewed CAPs for significant equipment failures associated with the CFCUs to ensure that those failures were properly identified, classified, corrected, and that the timeliness of the actions were commensurate with the significance of the identified issues. The documents reviewed by the inspectors are listed in the Attachment.

b. Findings

Introduction

The inspectors investigated the details associated with the repetitive failures of the CFCUs and identified a finding of very low significance that was also determined to be a Non-Cited Violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions. Specifically, the licensee failed to identify and implement effective corrective actions in a timely manner to eliminate the failure mechanism common to all CFCUs on both Units 1 and 2. The licensee's ineffective corrective actions resulted in multiple performance failures of the safety-related containment cooling system and several unplanned TS LCO entries for containment integrity (TS 3.6.1), containment cooling (TS 3.6.5), and two entries into TS LCO 3.0.3 with one resulting in a TS-required shutdown of Unit 2. (See Section 1R15 of this Report.)

Description

Unit 1 and Unit 2 CFCUs have demonstrated a long-standing history of failures due to accelerated erosion. For example, during the period from 1985 to 2001 there were approximately 24 through-wall leaks identified. Since the beginning of 2001, seven additional CFCU failures were identified. Historically, the licensee accepted running the CFCUs to failure. Until recently, the licensee reacted to the failures of the CFCUs by

conducting repairs but never taking the appropriate actions to determine the root cause of the accelerated erosion and eliminating it.

On November 11, 2001, the 11 CFCU experienced a through-wall leak. The licensee's corrective action program evaluation of the event determined the cause of the failure to be erosion and identified a corrective action to perform research to determine if a more erosion resistant copper alloy should be used. The research was to be performed as part of a fan coil face replacement modification. However, the fan coil face replacement modification was never funded and the corrective action to research a more erosion resistant material was administratively closed without identification of the root cause of the erosion and without the implementation of any corrective action to prevent recurrence. Researching the material acceptability for the application would likely have led to the discovery of the root cause of the accelerated erosion experienced by the CFCUs.

On November 17, 2004, through-wall leakage was identified on H-bends of the 22 and 23 CFCUs. The licensee entered TS LCO 3.6.1 for an inoperable containment. The licensee restored the containment to an operable status within the required completion time by closing the cooling water containment isolation valves to each affected CFCU. This action made both the 22 and 23 CFCUs inoperable with respect to their containment cooling function. Since the 22 CFCU was part of Train B of the containment cooling system and the 23 CFCU was part of Train A of the containment cooling system, both trains were inoperable and the licensee entered into TS LCO 3.0.3. The repair of the CFCUs could not be completed in the allowed completion time for a unit shutdown and Unit 2 was placed in Mode 3 while repairs were completed. The licensee performed American Society of Mechanical Engineers (ASME) Code repairs of the leaking tubing to restore both containment integrity and the containment cooling functions. Upon the completion of repairs the TS LCOs were exited and Unit 2 was restarted.

The licensee sent the failed H-bends offsite for failure analysis. The failure analysis concluded that the through-wall leaks were due to erosion. The erosion occurred around braze materials that had overflowed from the brazed joints onto the internal surface of the H-bend. The buildup of braze material caused flow disruptions in the H-bends, resulting in grooving and eventually leak formation in the copper base metal.

On January 11, 2005, the 21 CFCU was declared inoperable due to through-wall leakage. The licensee conducted what they believed to be an ASME Code repair of the leak, exited the applicable TS LCO, and assembled a root cause evaluation (RCE) team to identify the cause of the CFCU leaks. On March 30, 2005, the licensee identified that the repairs made to the CFCU were not in compliance with the ASME Code and Unit 2 was shut down for additional repair.

RCE 000193 identified a number of factors that cause erosion, including flow rate, suspended materials in the cooling water, coil design (materials), fabrication irregularities to the inner surface of the tubing that cause localized eddy currents under high flow conditions, and high turbulence areas (H-bends and U-bends) where cooling fluids make sharp directional changes. The RCE team evaluated each condition that could cause accelerated erosion as it applied to the CFCU.

The evaluation of cooling water flow rate through the CFCU identified that they were routinely operated at a flow rate of greater than 900 gallons per minute (gpm). A review of design specification associated with the current CFCUs indicated that they had been designed for a normal flow rate of 450 gpm. The effect of operating the CFCU at the higher flow rate was evaluated by the RCE team and offsite personnel with expertise in heat exchanger design and performance. The CFCUs currently installed in the Unit 1 and 2 containments were constructed of 99.9 percent (pure) copper. Pure copper tubing is typically utilized in systems with a fluid velocity of five to seven feet per second and should typically last about 10 to 15 years. The normal operation of CFCUs at 900 gpm results in a fluid velocity of nine feet per second. The increased fluid velocity reduces the predicted life in half (five to seven years). If the licensee had researched the acceptability of fan coil unit materials instead of administratively closing the corrective action in November 2001, they likely would have identified reduced life expectancy associated with operation of the pure copper coils at flow rates in excess of 900 gpm. This clearly was a missed opportunity to identify and correct the root cause of the CFCU accelerated erosion.

On February 11, 2005, through-wall leaks were once again identified on the 22 and 23 CFCUs. However, during this event the licensee determined through engineering analysis that the 21 CFCU could remove the required post accident heat load with contingency actions in place. This formed the basis for Operability Recommendation (OPR) 000533 which the licensee used to justify that the 21 CFCU comprised an operable train of containment cooling and exited TS LCO 3.0.3 (see Section 1R15.1).

On March 24, 2005, through-wall leaks were once again identified on the 23 CFCU. During this failure the licensee entered TS LCO 3.6.1 for the loss of containment integrity but exited this LCO once containment isolation valves were closed. In contrast to the January 11, 2005, event the licensee did not enter TS 3.6.5 for the loss of one train of containment cooling citing the conclusion reached in OPR 000533 that the 21 CFCU, with other compensatory measure that existed at the time, comprised an operable train of containment cooling.

On March 30, 2005, with Unit 2 in Mode 3 for repair of previous CFCU repairs determined not in compliance with the ASME Code on the 21, 22, and 23 CFCUs, a new active leak on a U-bend of the 21 CFCU was identified. At the time of identification, the 21 CFCU was already declared inoperable and was out-of-service.

Analysis

The inspectors determined that the performance deficiency existed since the licensee failed to meet corrective actions requirements specified in 10 CFR 50, Appendix B, Criterion XVI. Specifically, the licensee failed to identify and correct the root cause of the CFCU accelerated erosion and to implement effective corrective actions in a timely manner to preclude repeat failures.

The inspectors determined the finding to be more than minor in accordance with Inspection Manual Chapter (IMC) 0612, “Power Reactor Inspection Reports,” Appendix B, “Issue Disposition Screening,” issued on June 20, 2003. The finding affected the barrier integrity cornerstone objective to provide reasonable assurance that

the physical design barriers (the reactor containment) protect the public from radionuclide release from an accident or events. The cornerstone objective attribute of Structure, System, or Component (SSC) and Barrier Performance was not maintained. Specifically, degraded barrier performance resulted when through-wall leaks occurred in CFCUs H-bends and U-bends and degraded SSC performance resulted when CFCUs were isolated from their cooling water source preventing the removal of heat from containment. The inspectors determined that the finding impacted the cross-cutting area of Problem Identification and Resolution (corrective actions) because an opportunity to identify the root cause of the accelerated erosion and implement effective corrective actions to preclude recurrence was missed following a November 2001 CFCU failure.

The inspectors completed the significance determination of this finding using IMC 0609, "Significance Determination Process," dated March 12, 2003, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," dated December 1, 2004. The Phase 1 Significance Determination worksheet identified that the finding represented an actual reduction in defense-in-depth for the atmospheric pressure control function of the reactor containment. Therefore, further evaluation in accordance with IMC 609, Appendix H, "Containment Integrity Significance Determination Process," dated May 6, 2004, was required. The Appendix H evaluation resulted in a finding of very low safety significance (Green) since the unavailability of the CFCUs did not adversely affect core damage frequency nor did it adversely affect the large early release frequency.

Enforcement

It is stated, in part, in 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. In the case of a significant condition adverse to quality, the measures shall assure that the cause of the condition is determined and corrective actions taken to preclude repetition.

Contrary to the above, on November 11, 2001, the licensee failed to determine the cause of the accelerated erosion that had resulted in through-wall leakage on the Unit 1 and 2 CFCUs, and failed to implement corrective actions to preclude recurrence. Corrective actions identified by the licensee that would have identified the root cause of the accelerated erosion were administratively closed with no action taken. The failure to implement effective corrective actions to identify and correct the root cause of the accelerated erosion resulted in the subsequent simultaneous failure of the 22 and 23 CFCUs on November 17, 2004; the failure of the 21 CFCU on January 11, 2005; the simultaneous failures of the 22 and 23 CFCUs on February 11, 2005; the failure of the 23 CFCU on March 24, 2005; and the failure of the 21 CFCU on March 30, 2005. Because this finding is of very low safety significance, and has been entered into the licensee's corrective action program with CAPs 039881, 039923, 040615, 040885, 041520, and 041589, this finding is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000282/2005003-01; 05000306/2005003-01).

The licensee has identified a number of immediate and interim corrective actions. The licensee immediately performed an ASME Code repair of the leaking tubing to restore both containment integrity and the containment cooling functions. In the interim, the licensee has increased the frequency of containment inspections from quarterly to monthly to visually inspect the CFCUs for leakage (CAPs 040379 and 040535); increase the monitoring of containment sump A pump run times (Prairie Island Nuclear Generating Plant Form 1180 auxiliary building operator logs); imposed restrictions on placing the CFCUs on its chilled water source (Operating Instruction 05-12 and CAP 040906); establish a plan of inspection and/or testing to effectively clarify the condition of all CFCUs (Engineering Work Request 10057); and implement any practical action to reduce cooling water flow through the CFCUs to minimize the erosion rate.

The licensee's RCE 000193 identified three corrective actions to prevent recurrence. Corrective Action (CA) 010285 contains an action to verify and restore the material condition of the Unit 1 and 2 CFCUs. This action is scheduled to be completed no later than the next refueling outage for each unit. New CFCU faces have been ordered for Unit 2 and are scheduled to be installed during refueling outage 2R23. CA 010286 contains an action to limit further erosion on the CFCUs. As stated previously, the licensee has reduced the cooling water flow rate through the CFCUs to the greatest extent practical to minimize the erosion rate. The material specifications for the new coil faces specified a more erosion resistant copper alloy to be used in their construction. CA 010287 contains an action to establish a condition monitoring program to assess the condition of CFCUs relative to the effects of erosion and other potential thinning mechanisms and establish an appropriate frequency of assessment.

.2 Quarterly Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed repetitive maintenance activities to assess maintenance effectiveness, including maintenance rule (10 CFR 50.65) activities, work practices, and common cause issues. The inspectors performed two issue/problem-oriented maintenance effectiveness samples completing a total of two samples. The inspectors assessed the licensee's maintenance effectiveness associated with repetitive problems on the following SSCs:

- 21 residual heat removal pump breaker problems on March 7, 2005; and
- Unit 2 charging pump failures March 23, 2005.

The inspectors reviewed the licensee's maintenance rule evaluations of equipment failures for maintenance preventable functional failures and equipment unavailability time calculations, comparing the licensee's evaluation conclusions to applicable Maintenance Rule (a)1 performance criteria. Additionally, the inspectors reviewed scoping, goal-setting (where applicable), performance monitoring, short-term and long-term corrective actions, functional failure definitions, and current equipment performance status.

The inspectors reviewed CAPs for significant equipment failures associated with electrical equipment problems for risk significant and safety-related mitigating

equipment to ensure that those failures were properly identified, classified, and corrected. The inspectors reviewed other CAPs to assess the licensee's problem identification threshold for degraded conditions, the appropriateness of specified corrective actions, and that the timeliness of the actions were commensurate with the significance of the identified issues. The documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed risk assessments for six maintenance activities associated the following combinations of equipment unavailability completing six risk assessment and emergent work control inspection samples:

- the simultaneous unavailability of the 22 residual heat removal pump, the 22 component cooling water pump, the 23 charging pump, and the 122 instrument air dryer for planned maintenance on January 6, 2005;
- the simultaneous unavailability of the 21 auxiliary feedwater pump and the 21 containment spray pump on January 21, 2005;
- the simultaneous unavailability of bus CT-11, the 21 residual heat removal pump, the 21 component coolant water pump, and the 123 instrument air compressor on February 17, 2005;
- the simultaneous unavailability of volume control tank level loop 1L-112 and the 123 instrument air compressor on February 18, 2005;
- the simultaneous unavailability of D1 diesel generator and the 12 diesel-driven cooling water pump on March 21, 2005; and
- the simultaneous unavailability of 12 diesel-driven cooling water pump, 121 intake bypass gate, 121 control room chiller, and Unit 2, train A of the reactor vessel level indicating system on March 24, 2005.

During these reviews, the inspectors compared the licensee's risk management actions to those actions specified in the licensee's procedures for the assessment and management of risk. The inspectors verified that evaluation, planning, control, and performance of the work were done in a manner to reduce the risk and minimize the duration where practical, and that contingency plans were in place where appropriate. The inspectors used the licensee's daily configuration risk assessment records, observations of shift turnover meetings, observations of daily plant status meetings, and observations of shiftly outage meetings to verify that the equipment configurations had been properly listed, that protected equipment had been identified and was being controlled where appropriate, and that significant aspects of plant risk were communicated to the necessary personnel. The documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance Related to Non-Routine Plant Evolutions and Events (71111.14)

a. Inspection Scope

On March 30, 2005, the inspectors reviewed licensee personnel performance during a shutdown of Unit 2 required by TS due to CFCUs declared inoperable. The review constituted one inspection procedure sample. The inspectors observed the performance of operations personnel in the control room during the unplanned and non-routine evolution. The inspectors compared the actions of plant personnel to the action required by TS and plant procedures. The documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the technical adequacy of eight operability evaluations completing eight operability evaluation inspection samples. The inspectors conducted these inspections by in-office review of associated documents and in-plant observations of affected areas and plant equipment. The inspectors compared degraded or nonconforming conditions of risk-significant structures, systems, or components associated with mitigating systems against the functional requirements described in TS, USAR, and other design basis documents; determined whether compensatory measures, if needed, were implemented; and determined whether the evaluation was consistent with the requirements of 5AWI 3.15.5, “Operability Determinations.” The following operability evaluations were reviewed:

- OPR 000526, that documented the operability of the 21 motor-driven auxiliary feedwater pump with lubricating oil pressure anomalies;
- OPR 000528, that documented the operability of the Unit 2 containment and the containment cooling system with through-wall leaks on the 22 and 23 CFCUs (November 2004 CFCU failures);
- OPR 000529, that documented the operability of diesel generator D2 with 5 time delay relays beyond their qualified life of 10 years;
- CAP 040435 Past (historical) Operability Recommendation for pressurizer power operated relief valve low temperature overpressure protection function;
- OPR 000533, that documented the operability of the Unit 2 containment and the containment cooling system with through-wall leaks on the 22 and 23 CFCUs (February 2005 CFCU failures);

- OPR 000534, that documented the operability of the Unit 2 component cooling water system and the containment with a leak on the 21 reactor coolant pump lower oil cooler outlet flow transmitter;
- OPR 000537, that documented an operability assessment of the Unit 1 turbine stop valve SV-2 failure to close; and
- OPR 000542, that documented the operability of the Unit 2 containment cooling system train B with the 21, 22, and 23 CFCUs determined inoperable due to non-Code repairs.

The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings

Introduction

The inspectors reviewed the actions taken by the licensee to comply with the TS when two CFCUs were declared inoperable on February 11, 2005. The inspectors identified a finding of very low safety significance and a Non-Cited Violation for a failure to comply with the required actions of TS LCO 3.0.3. Specifically, the licensee failed to place Unit 2 in Mode 3 within 7 hours and in Mode 4 within 13 hours of entry into TS LCO 3.0.3. Unit 2 remained at full power throughout this event.

Description

On February 11, 2005, plant operators identified multiple through-wall leaks on two of the four Unit 2 CFCUs. Specifically, the licensee identified leaks on the 22 (train B) and 23 (train A) CFCUs. The remaining operable CFCUs were the 21 (train A) and the 24 (train B) CFCUs. The licensee appropriately declared the containment inoperable and closed the associated containment isolation valves for the CFCUs in accordance with TS LCO 3.6.1. Closing the containment isolation valves also rendered the 22 and 23 CFCUs inoperable. TS LCO 3.6.5.c states, in part, that with one containment cooling train inoperable, restore the train to operable status within seven days. Since there are no specified actions for both trains of CFCUs being declared inoperable, the licensee entered TS LCO 3.0.3 at 9:17 a.m. on February 11. The associated action was to place the unit in Mode 3 (Hot Standby) within seven hours; i.e., by 4:17 p.m.

Concurrent with preparations to shut down Unit 2, engineering personnel performed a technical evaluation with the support of a heat exchanger performance vendor, and documented the evaluation in OPR 000533. This evaluation concluded that the 21 CFCU, by itself, was sufficient to remove the post-accident containment heat load under certain environmental and other conditions that existed at the time of this event. The licensee ultimately concluded that the 21 CFCU constituted an operable train of containment cooling, declared train A operable, and exited TS LCO 3.0.3 at 1:38 p.m. on February 11. Late on February 12, the licensee repaired the leaks on both the 22 and 23 CFCUs and exited TS LCO 3.6.5.c.

The inspectors challenged the appropriateness of the licensee's conclusion that the 21 CFCU constituted the operable train A of containment cooling based on review of the

TS. Specifically, TS Surveillance Requirement (SR) 3.0.1 states that "SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during performance of the surveillance or between performances of the Surveillance, shall be failure to meet the LCO."

SR 3.6.5.3 requires the licensee to, "Verify each containment cooling train cooling water flow rate to *each fan coil unit* [emphasis added] is greater than or equal to 900 gpm." Furthermore, SR 3.6.5.2 requires the licensee to, "Operate each containment cooling train *fan coil unit* [emphasis added] on low motor speed for greater than or equal to 15 minutes." Because the licensee had closed the containment isolation valves to 22 and 23 CFCUs to comply with TS LCO 3.6.1 for an inoperable containment after the leaks were initially identified, SR 3.5.6.3, (900 gpm to each fan coil unit) could not be met. Furthermore, the licensee had tagged out the motors for the CFCUs when the containment isolation valves were closed per Abnormal Operating Procedure C35 AOP4, Step 2.4.3.O. Therefore, SR 3.6.5.2 (operate for greater than or equal to 15 minutes) could not be met.

The licensee completed repairs to the 23 CFCU, the first of the two leaking CFCUs, and declared the CFCU operable at 3:09 a.m. on February 12. This was 10 hours 52 minutes after Unit 2 was required to be in Mode 3. The 22 CFCU was repaired and declared operable at 10:40 p.m. on February 12.

Analysis

The inspectors determined that the licensee's failure to maintain a sufficient number of CFCUs capable of meeting TS SRs in order to meet the limiting conditions of operation for the containment cooling function was a performance deficiency warranting significance determination. The inspectors evaluated the finding and determined it to be more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," issued on June 20, 2003. Specifically, the finding was more than minor because the failure to comply with a TS-required shutdown could reasonably be viewed as a precursor to a significant event. This conclusion is further supported by 10 CFR Part 50.36(c)(2) that states "Limiting conditions for operation are the lowest functional capability or performance level of equipment required for safe operation of the facility." The inspectors also determined that the finding impacted the cross-cutting area of Human Performance (organization) because the licensee's management organization failed to carefully assess the situation regarding TS compliance.

The inspectors completed the significance determination of this finding using IMC 0609, "Significance Determination Process," dated March 21, 2003, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," dated December 1, 2004. The Phase 1 Significance Determination worksheet identified that the finding represented an actual reduction in defense-in-depth for the atmospheric pressure control function of the reactor containment. Therefore, further evaluation in accordance with IMC 609, Appendix H, "Containment Integrity Significance Determination Process," dated May 6, 2004, was required. The Appendix H evaluation resulted in a finding of very low safety significance (Green) since the unavailability of the

CFCUs did not affect core damage frequency nor did it affect the large early release frequency.

Enforcement

TS 3.6.1 requires that the containment be operable in Modes 1-4. TS 3.6.1 Action A requires that with an inoperable containment, restore the containment to operable within 1 hour.

TS 3.6.5 requires, in part, that two containment cooling trains be operable. TS 3.6.5 Action C requires that with one containment cooling train inoperable, restore the containment cooling train to operable status within seven days. TS 3.6.5 does not address inoperability of two containment cooling trains.

SR 3.0.1 states that SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during performance of the surveillance or between performances of the Surveillance, shall be failure to meet the LCO.

SR 3.6.5.3 requires the licensee to verify each containment cooling train cooling water flow rate to each fan coil unit is greater than or equal to 900 gpm.

SR 3.6.5.2 requires the licensee to operate each containment cooling train fan coil unit on low motor speed for greater than or equal to 15 minutes.

Because the licensee had closed the containment isolation valves to 22 and 23 CFCUs to comply with TS LCO 3.6.1 for an inoperable containment within one hour after leaks were identified, SR 3.5.6.3 could not be met. Furthermore, because the licensee had tagged out the motors for the CFCUs when the containment isolation valves were closed, SR 3.6.5.2 could not be met. Because the SRs could not be met, TS LCO 3.6.5 could not be met.

TS LCO 3.0.3 states, in part, that when an LCO is not met and the associated actions are not met or an associated action is not provided, then action shall be initiated within 1 hour to place the unit, as applicable, in Mode 3 within 7 hours, Mode 4 within 13 hours, and Mode 5 within 37 hours.

Contrary to the above, at 4:17 p.m. on February 11, 2005, the licensee failed to implement the required action of TS LCO 3.0.3. Specifically, at 9:17 a.m. on February 11, 2005, the licensee identified leakage from both the 22 and 23 CFCUs. The licensee entered TS LCO 3.6.1 for both CFCUs and closed the respective containment isolation valves. The licensee also entered TS LCO 3.6.5 and TS LCO 3.0.3. At 1:38 p.m. on February 11, the licensee exited from TS LCO 3.0.3 without restoring the 22 and 23 CFCUs to operable status and without placing Unit 2 in Mode 3 within 7 hours and Mode 4 within 13 hours of entry into TS LCO 3.0.3. Unit 2 continued to operate in Mode 1 at full power.

Because this finding is of very low safety significance, and has been entered into the licensee's corrective action program with CAP 041681, this finding is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000306/2005003-02).

The through-wall leakage from the 23 CFCU was repaired fully restoring the functional capability of containment cooling system Train A at 3:09 a.m. on February 12, 2005. The 22 CFCU was repaired at 10:40 p.m. on February 12, restoring operability of containment cooling system Train B.

1R16 Operator Workarounds (OWAs) (71111.16)

.1 Operator Workarounds

a. Inspection Scope

The inspectors reviewed selected OWAs to determine if the mitigating system function was affected. Specifically, the inspectors evaluated if the operator's ability to implement abnormal and emergency operating procedures was affected by the workaround. The inspectors considered operator workarounds that have not been evaluated by the licensee and that have been formalized as long-term corrective action for a degraded or non-conforming condition. The inspectors also reviewed OWAs that increased potential for personnel error including OWAs that:

- required operations contrary to past training or require more detailed knowledge of the system than routinely provided;
- required a change from longstanding operational practices;
- required operation of system or component in a manner that is different from similar systems or components;
- created the potential for the compensatory action to be performed on equipment or under conditions for which it is not appropriate;
- impaired access to required indications, increase dependence on oral communications, or require actions under adverse environmental conditions; or
- required the use of equipment and interfaces that had not been designed with consideration of the task being performed.

The inspectors reviewed two OWAs from the licensee's list of OWAs both associated with pressurizer heater control. The Unit 1 and Unit 2 OWA resulted from a different cause but impacted the control room operators in essentially the same way; therefore, the inspectors considered the review as one inspection sample. The Unit 1 OWA resulted from a need for one additional set of back-up heaters to maintain reactor coolant system pressure in the normal operating band due to problems with group C pressurizer heaters. The Unit 2 pressurizer heater control issue was associated with the back-up heaters operating point shift due to misadjustment of the pressurizer spray bypass valve.

The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors performed five assessments of post-maintenance testing completing five post-maintenance test inspection samples. The inspectors selected post-maintenance tests associated with important mitigating and barrier integrity systems to ensure that the testing was performed adequately, demonstrated that the maintenance was successful, and that operability of associated equipment and/or systems was restored. The inspectors conducted this inspection by in-office review of documents and in-plant walkdowns of associated plant equipment. The inspectors observed and assessed the post-maintenance testing activities for the following maintenance activities:

- 21 auxiliary feedwater pump following maintenance on the lubricating oil pump on January 19, 2005;
- diesel generator D1 following preventative maintenance on January 28, 2005;
- Unit 1 main turbine stop valve SV-2 following repairs on March 4, 2005;
- diesel generator D5 following preventative maintenance on March 18, 2005; and
- 12 diesel-driven cooling water pump following preventative maintenance on March 24, 2005.

The inspectors reviewed the appropriate sections of the TS, USAR, and maintenance documents to determine the systems' safety functions and the scope of the maintenance. The inspectors also reviewed the CAPs listed in the Attachment to verify that the licensee was identifying issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures. The documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

Unit 1 Maintenance Outage

a. Inspection Scope

The inspectors observed the licensee's performance during the Unit 1 maintenance outage 1F51 conducted between February 18 and March 4, 2005. These inspection activities represent one outage inspection sample.

This inspection consisted of an in-office and in-plant review of outage activities performed by the licensee. The inspectors conducted in-office reviews of outage related documentation and in-plant observations of the following daily outage activities:

- attended outage management turnover meetings to verify that the current shutdown risk status was accurate, well understood, and adequately communicated;
- performed walkdowns of the main control room to observe the alignment of systems important to shutdown risk;
- observed the operability of reactor coolant system instrumentation and compared channels and trains against one another;
- observe ongoing work activities and foreign material exclusion control; and
- reviewed selected issues that the licensee entered into its corrective action program to verify that identified problems were being entered into the program with the appropriate characterization and significance.

Additionally, the inspectors performed in-plant observations of the following specific activities:

- observed the reactor shutdown from full power to hot shutdown;
- conducted an independent post outage containment close-out inspection;
- observed the reactor start up from the control room; and
- observed generator synchronization to the grid and power ascension.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

During this inspection period, the inspectors completed five inspection samples. SP 1106B completed the quarterly Inservice Testing inspection requirement of a risk-significant pump or valve. SP 2001AA completed the annual requirement to select a reactor coolant system leakage detection surveillance test sample. The inspectors selected the following surveillance testing activities:

- SP 2307, D6 Diesel Generator 6-Month Fast Start Test, on January 3, 2005;
- SP 1219, Monthly 4 Kilovolt Bus 16 Undervoltage Relay Test, on March 8, 2005;
- SP 1106B, 22 Diesel-Driven Cooling Water Pump Monthly, on March 15, 2005;
- SP 1334, D1 Diesel Generator 18-Month 24-Hour Load Test, on March 21, 2005; and
- SP 2001AA, Unit 2 Daily Reactor Coolant System Leakage Test, on March 29, 2005.

During completion of the inspection samples, the inspectors observed in-plant activities and reviewed procedures and associated records to verify that:

- preconditioning does not occur;
- effects of the testing had been adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria were clearly stated, demonstrated operational readiness, and were consistent with the system design basis;
- plant equipment calibration was correct, accurate, properly documented, and the calibration frequency was in accordance with TS, USAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy;
- applicable prerequisites described in the test procedures were satisfied;
- test frequency met TS requirements to demonstrate operability and reliability;
- the tests were performed in accordance with the test procedures and other applicable procedures;
- jumpers and lifted leads were controlled and restored where used;
- test data/results were accurate, complete, and valid;
- test equipment was removed after testing;
- where applicable for in-service testing activities, testing was performed in accordance with the applicable version of Section XI, ASME Code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data have been accurately incorporated in the test procedure;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented in the corrective action program.

The documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors conducted in-plant observations of the physical changes to the equipment and an in-office review of documentation associated with two temporary modifications completing two temporary modification inspection samples. As part of this inspection, the documents in the Attachment were utilized to evaluate the potential for an inspection finding.

The inspectors reviewed the following temporary modifications:

- temporary modification 05T187 associated with a temporary installation of jumpers in breaker cubicles 15-7 and 16-8 to mitigate a potential single failure vulnerability with metering circuits for safety-related buses 15 and 16 on February 7, 2005; and
- temporary modification 05T185 associated with a temporary repair of a steam leak on Unit 1 main steam non-return check valve RS-19-2 on March 10, 2005.

The inspection activities included, but were not limited to, a review of design documents, safety screening documents, and USAR to determine that the temporary modification was consistent with modification documents, drawings, and procedures. The inspectors also reviewed the post-installation test results to confirm that tests were satisfactory and the actual impact of the temporary modification on the permanent system and interfacing systems were adequately verified. The inspectors also reviewed the CAPs listed in the Attachment to verify that the licensee was identifying issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed the licensee perform an emergency preparedness drill on February 9, 2005. This inspection effort completed one emergency planning drill evaluation sample.

The inspectors observed activities in the control room simulator, Technical Support Center, and Emergency Operations Facility and attended the post-drill critique on February 9, 2005. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the drill performance and ensure that the licensee evaluators noted the same weaknesses and deficiencies and entered them into the corrective action program. The inspectors placed emphasis on observations regarding event classification, notifications, protective action recommendations, and site evacuation and accountability activities. The documents reviewed by the inspectors are listed in the Attachment.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's corrective action program at an appropriate threshold, that adequate attention was given to ensure timely corrective actions, and that adverse trends were identified and addressed. Minor issues entered into the licensee's corrective action program as a result of inspector observations are covered by the list of documents included in the Attachment.

b. Findings

No findings of significance were identified.

.2 Problem Identification and Resolution Annual Sample Review - Inadvertent Dilution of the Reactor Coolant System

a. Inspection Scope

During the week ending March 11, 2005, the inspectors selected a corrective action program issue for detailed review completing one problem identification and resolution annual inspection sample. The inspectors selected an issue associated with the inadvertent dilution of the reactor coolant system that was identified and entered into the corrective action program with CAP 039236.

The inspectors conducted a review of the previously referenced CAPs and other related corrective action program documents in order to assess the effectiveness of the licensee's efforts to correct the identified problem. The inspectors placed particular attention on the review of the licensee's corrective actions taken to address the noted deficiencies and the effectiveness of those actions. The inspectors also ensured that the licensee had identified the full extent of the issue, conducted an appropriate evaluation, and that licensee-identified corrective actions were appropriately prioritized.

The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings and Observations

No findings of significance were identified.

.3 Ineffective CFCU Corrective Actions

a. Inspection Scope

The inspectors assessed the licensee's maintenance effectiveness associated with repetitive problems on Unit 1 and Unit 2 CFCUs. During that inspection, the inspectors identified a performance deficiency associated with the cross-cutting area of Problem Identification and Resolution.

The key documents reviewed by the inspectors associated with this inspection are listed in the Attachment to this inspection report.

b. Findings

The inspectors investigated the details associated with the repetitive failures of the CFCUs and identified a finding of very low significance that was also determined to be a NCV of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions. Specifically, the licensee failed to identify and implement effective corrective actions in a timely manner to eliminate the failure mechanism common to all CFCUs on both Units 1 and 2. The licensee's ineffective corrective actions resulted in multiple performance failures of the safety-related containment cooling system and several unplanned TS LCO entries for containment integrity, containment cooling, and two entries into TS LCO 3.0.3 with one resulting in a TS required shutdown of Unit 2. A detailed evaluation of this finding of very low safety significance can be found in Section 1R12.1 of this report.

4OA3 Event Followup (71153)

a. Inspection Scope

(Closed) Licensee Event Reports (LERs) 05000306/2004-001-00 and 05000306/2004-001-01: Unit 2 Shutdown Required by Technical Specifications Due to Two Trains of Containment Cooling Inoperable

On November 17, 2004, two leaks were identified on the 23 CFCU and one leak was identified on the 22 CFCU. The leaking CFCUs were isolated. Since the leaks affected one of two CFCUs in each of the two trains of containment cooling, both trains of containment cooling were declared inoperable and TS LCO 3.0.3 was entered. The leaks could not be repaired before a plant shutdown was required. The plant was shut down and repair of the leaks was completed on November 18, 2004. Unit 2 returned to power operations on November 19, 2004.

The inspectors reviewed the root cause investigation report, the appropriateness of corrective actions, and compliance with requirements. This LER is closed.

b. Findings

No findings of significance were identified.

4OA4 Cross-Cutting Findings

.1 A finding described in Section 1R12.1 of this report had, as its primary cause, a Problem Identification and Resolution deficiency (corrective action) because the ineffective troubleshooting resulted in a failure to promptly identify the root cause, correct significant conditions adverse to quality, and preclude recurrence of Unit 1 and 2 CFCU failures.

.2 A finding described in Section 1R15 of this report had, as its primary cause, a Human Performance deficiency (organization) because the licensee's management organization failed to carefully assess the situation regarding TS compliance.

4OA6 Meeting(s)

.1 Exit Meeting

The inspectors presented the inspection results to Mr. J. Solymossy and other members of licensee management at the conclusion of the inspection on April 12, 2005. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

L. Clewett, Plant Manager
R. Graham, Director of Site Operations
P. Huffman, Operations Manager
J. Lash, Training Manager
K. Ludwig, Maintenance Manager
J. Maki, Outage and Scheduling Manager
S. McCall, Manager of Engineering Programs
C. Mundt, Engineering Plant and Systems Manager
S. Northard, Business Support Manager
A. Qualantone, Security Manager
G. Salamon, Regulatory Affairs Manager
T. Silverberg, Site Engineering Director
J. Solymossy, Site Vice-President

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000282/2005003-01 05000306/2005003-01	NCV	Failure to Implement Prompt and Effective Corrective Actions for Repetitive Failures of Containment Fan Coil Units
05000306/2005003-02	NCV	Failure to Meet Technical Specification 3.0.3 Requirements
05000306/2004-001-00 05000306/2004-001-01	LER	Unit 2 Shutdown Required by Technical Specifications Due to Two Trains of Containment Cooling Inoperable

Closed

05000282/2005003-01 05000306/2005003-01	NCV	Failure to Implement Prompt and Effective Corrective Actions for Repetitive Failures of Containment Fan Coil Units
05000306/2005003-02	NCV	Failure to Meet Technical Specification 3.0.3 Requirements
05000306/2004-001-00 05000306/2004-001-01	LER	Unit 2 Shutdown Required by Technical Specifications Due to Two Trains of Containment Cooling Inoperable

Discussed

None.

LIST OF DOCUMENTS REVIEWED

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

1R04 Equipment Alignment

22 Turbine-Driven AFW Pump
CAP 037878; VC-33-01 Found in the Local Position

Diesel Generator D5
CAP 036915; 2-EG-41-6 Check Valve in D5 1B Starting Air System Found Installed Backwards

Unit 1 Component Cooling Water Complete Equipment Alignment
CAP 039294; Cooling Water System Cross-Tied to Fire Protection System

1R05 Fire Protection

Plant Safety Procedure F5, Appendix A, Revision 15; Fire Strategies for Fire Areas 25, 31, 32, 41A, 41B, 81, 89, 113, 115, and 117

Plant Safety Procedure F5, Appendix F, Revision 19; Fire Hazard Analysis for Fire Areas 25, 31, 32, 41A, 41B, 81, 89, 113, 115, and 117

IPEEE NSPLMI-96001, Appendix B; Internal Fires Analysis; Revision 2

1R06 Flood Protection Measures (external)

SP 1293; Inspection of Flood Control Measures; Revision 13

AB-4; Flood; Revision 26

1R07 Heat Sink Performance

SP 1424; Unit 1 Five Year Containment Fan Coil Unit Performance Test; Revision 0

1R11 Licensed Operator Requalification Program

Simulator Exercise Guide P9160S-001 ATT SQ-48; Revision 0

1R12 Maintenance Rule Implementation

CFCU Failures
RCE 000193; Fan Coil Unit Cooling Coil Leakage

Maintenance Rule A(1) Action Plan for the Containment Ventilation System

General Condition Report 200186219; U-Bend on the 11 CFCU Was Found to be Leaking

CAP 039881; Possible 23 CFCU Leakage

CAP 039923; Unplanned LCO - 22 CFCU

CAP 040560; 21 Containment Fan Coil Unit Leakage

CAP 040615; Potential Common Mode Failure of CFCUs During a Design Basis Event

CAP 040885; 23 CFCU Leakage

CAP 040942; 21 Containment Sump A Run Time - Repeat Issue

21 Residual Heat Removal Pump Breaker Problems
Maintenance Rule Evaluation 000169; Unplanned LCO Not Met Due to 21 RHR [Residual Heat Removal] Out of Service

Maintenance Rule Evaluation 000189; Failure of Indicating Light Circuit for Breaker 25-7 21 RHR Pump

CAP 030769; Unplanned LCO Not Met Due to 21 RHR Out of Service

CAP 031333; Failure of Indicating Light Circuit for Breaker 25-7 21 RHR Pump

CAP 036800; Negative Trend Concerning Dirty Contacts on Switches

CAP 040380; Trend - Loose Electrical Connections Impacting Plant Conditions

Unit 2 Charging Pump Failures
CAP 028202; 21 Charging Pump Was Started and Flow Did Not Increase

CAP 037133; Failure of 22 Charging Pump Coupling

CAP 037356; 22 Charging Pump Tripped for Unknown Reasons

CAP 040339; 23 Charging Pump Had Large Seal Leak

1R13 Maintenance Risk Assessments and Emergent Work Control

22 RHR Pump, 22 Component Cooling Water Pump, 23 Charging Pump, and 122 Instrument Air Dryer
Unit 2 Configuration Risk Assessment for January 6, 2005

Operator Logs for January 6, 2005

21 AFW Pump and 21 Containment Spray Pump
Unit 2 Configuration Risk Assessment for January 21, 2005

Operator Logs for January 21, 2005

Bus CT-11, 21 RHR Pump, 21 Component Cooling Water Pump, and 123 Instrument Air Compressor
Unit 2 Configuration Risk Assessment for February 17, 2005

Operator Logs for February 17, 2005

Volume Control Tank Level Loop 1L-112 and 123 Instrument Air Compressor
Unit 1 Configuration Risk Assessment for February 18, 2005

Operator Logs for February 18, 2005

WO 0501454; Investigate and Repair Volume Control Tank Auto Make-up Control

Unavailability of EDG D1 and 12 Diesel-Driven Cooling Water Pump
Unit 1 Configuration Risk Assessment for March 21, 2005

Unavailability of 12 Diesel-Driven Cooling Water Pump, 121 Intake Bypass Gate, 121 Control Room Chiller
Unit 2 Configuration Risk Assessment for March 24, 2005

1R14 Non-Routine Evolutions

Operating Procedure 2C1.3; Unit 2 Shutdown; Revision 53

Operating Procedure 2C1.4; Unit 2 Power Operation; Revision 35

1R15 Operability Evaluations

1 Motor-Driven AFW Pump
OPR 000526; Low Oil Pressure on 21 Motor-Driven AFW Pump

Equipment/System Troubleshooting Investigation; Low Lube Oil Pressure on 21 Motor-Driven AFW Pump

Unit 2 CFCUs and Containment
OPR 000528; Containment Fan Coil Unit Cooling Coils (H-Bends and U-Bends); Revision 0, 1, and 2

RCE 000193; 21 Fan Coil Unit Unplanned LCO Due to Cooling Water Leak

Apparent Cause Evaluation 008886; Possible 23 CFCU Leakage

Diesel Generator D2
OPR 000529; Five D1 Agastat Relays Appear to be Beyond Qualified Life of 10 Years; Revision 0

Past (Historical) Operability Recommendation for Pressurizer Power Operated Relief Valve Low Temperature Overpressure Protection Function
CAP 040435; Additional Action Related to CAP 039539

CAP 039539; Westinghouse Analysis Reveals Higher Required Number of Power Operated Relief Valve Strokes for Low Temperature Overpressure Protection

Repetitive Failure of CFCUs
Abnormal Operating Procedure C35 AOP4; Cooling Water Leakage in Containment; Revision 12

OPR 000533; 21 Containment Sump A Run Time - Repeat Issue

Unit 2 Component Cooling Water and Containment
OPR 000534; Component Cooling Water Leak; Revision 0 and 1

Turbine Stop Valve
OPR 000537; SV-2 Not Develop the Required 50 Pounds Per Square Inch Drop When Closed Per SP 1054

CAP 041183; SV-2 Not Develop the Required 50 Pounds Per Square Inch Drop When Closed Per SP 1054

Non-Code Repairs to CFCUs
OPR 000542; Train B Containment Cooling Operability with 22 CFCU Isolated

Letter dated March 7, 2005, from E. Mercier to S. Thomas; Containment Integrity Analysis with Half CFCU Capacity

Letter dated February 11, 2005, from E. Mercier to S. Thomas; Preliminary Nuclear Analysis Department Analysis Results for Main Steamline Break and Loss of Coolant Accident with Reduced CFCU Heat Removal

1R16 OWAs

Prairie Island Operator Workarounds List; Updated March 1, 2005

CAP 036710; Received Annunciator 47512-0608 When Pressurizer Master Controller is Placed in Automatic

CAP 040114; Inoperable Pressurizer Group C Heaters Not Repaired During 1R23 Causing an OWA

1R19 Post-Maintenance Testing

21 AFW Pump
SP 2100; 21 Motor-Driven AFW Pump Monthly Test; Revision 64

CAP 040637; Part Found Not Installed on 21 AFW

Diesel Generator D1
D1 18-Month Preventative Maintenance Voluntary Limiting Condition for Operation Plan; January 23 through 27, 2005

SP 1295; D1 Diesel Generator 6-Month Fast Start Test; Revision 35

SP 1334; D1 Diesel Generator 18-Month 24-Hour Load Test; Revision 7

CAP 040754; D1 Locked Out During Post-Maintenance Operability Test

CAP 040816; WO 046367 Installed a Different Size Orifice Without Proper Documentation

Unit 1 Stop Valve SV-2
SP 1054; Turbine Stop, Governor, Reheat Stop and Reheat Intercept Valve Exercise; Revision 31

Diesel Generator D5
SP 2295; D5 Diesel Generator 6-Month Fast Start Test; Revision 28

SP 2334; D5 Diesel Generator 18-Month 24-Hour Load Test; Revision 9

CAP 040754; D1 Locked Out During Post-Maintenance Operability Testing

12 Diesel-Driven Cooling Water Pump
SP 1106A; Cooling Water Pump Monthly Test; Revision 64

1R20 Refueling and Other Outage Activities

SP 1750; Post Outage Containment Close-Out Inspection, Part C; Revision 27

1R22 Surveillance Testing

SP 2307
SP 2307; D6 Diesel Generator 6-Month Fast Start Test; Revision 22

CAP 040401; D6 Diesel Room Vent System Trouble Alarm During D6 Engine Run

SP 1219
SP 1219; Monthly 4 Kilovolt Bus 16 Undervoltage Relay Test; Revision 29

SP 1106B
SP1106B; 22 Diesel-Driven Cooling Water Pump Monthly; Revision 62

CAP 041334; Desired Cooling Water Flow Rate Not Achieved During 22 Diesel-Driven Cooling Water Pump Monthly SP

SP 1334
SP 1334; D1 Diesel Generator 18-Month 24-Hour Load Test; Revision 7

CAP 041454; Documentation of D5 18-Month Boroscope Results of WO 0400818

SP 2001AA
SP 2001AA; Unit 2 Daily Reactor Coolant System Leakage Test: Revision 42

CAP 040369; Boric Acid Leaks Found During SP 1544

1R23 Temporary Modifications

Temporary Modification 05T187
Temporary Modification 05T187- Installation of Jumpers in Breaker Cubicles 15-7 and 16-8

CAP 040896; 5AWI 6.5.0 Has Several Traps to Make Human Performance Errors

Temporary Modification 05T185
Modification 05T185; Furmanite Repair RS-19-2; March 2, 2005

CAP 040403; RS-19-2 Has a Leak Under the Insulation

WO 0500826; Furmanite 12 Steam Generator Main Steam Outlet Stop Check Valve

WO 0500827; Repair 12 Steam Generator Main Steam Outlet Stop Check Valve

1EP6 Drill Evaluation

Prairie Island Nuclear Generating Plant Emergency Plan Drill; February 9, 2005; Revision 2

4OA2 Identification and Resolution of Problems

Annual Sample
CAP 033250; Make Up Flow to the Volume Control Tank and Reactor Coolant System

CAP 039236; SP 1366/SP 2366 Will Cause an Inadvertent Dilution of the Reactor Coolant System

CAP 039599; Inadvertent Dilution of Unit 1 Reactor Coolant System Boron

Apparent Cause Evaluation 008854; Inadvertent Boration of Unit 2 Reactor Coolant System

4OA3 Event Followup

LER 05000306/2004-001-00 and 05000306/2004-001-01; Unit 2 Shutdown Required by Technical Specifications Due to Two Trains of Containment Cooling Inoperable

RCE 000193, Fan Coil Unit Cooling Leakage; February 15, 2005

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ASME	American Society of Mechanical Engineers
CA	Corrective Action
CAP	Corrective Action Program/Corrective Action Program Action Request
CFR	Code of Federal Regulations
CFCU	Containment Fan Coil Unit
DRP	Division of Reactor Projects
gpm	gallons per minute
IMC	Inspection Manual Chapter
IPEEE	Individual Plant Examination of External Events
IR	Inspection Report
LCO	Limiting Condition for Operation
LER	Licensee Event Report
NCV	Non-Cited Violation
NMC	Nuclear Management Corporation, LLC
NRC	U.S. Nuclear Regulatory Commission
OPR	Operability Recommendation
OWA	Operator Workaround
PARS	Publicly Available Records
RCE	Root Cause Evaluation
RHR	Residual Heat Removal
SSC	Structure, System, or Component
SDP	Significance Determination Process
SP	Surveillance Procedure
SR	Surveillance Requirement
TS	Technical Specifications
USAR	Updated Safety Analysis Report
WO	Work Order