

Prairie Island 1

3Q/2005 Plant Inspection Findings

Initiating Events

Significance:  Jun 30, 2005

Identified By: NRC

Item Type: FIN Finding

FAILURE TO IDENTIFY AND REMOVE/SECURE POTENTIAL TORNADO MISSILE HAZARDS

The inspectors identified a plate of aluminum material unsecured on the south side of the fuel oil transfer house and an unsecured prestaged temporary storage tank in close proximity to the 2M, 2RX, and 2RY transformers. Plant personnel failed to identify these discrepant conditions during the performance of a plant surveillance procedure with the purpose of identifying and removing potential missile hazards from areas where they could damage important plant electrical equipment during adverse weather conditions.

The finding was more than minor because it affected the protection against external factors attribute of the initiating events cornerstone designed to limit the likelihood of events that upset plant stability. The finding was determined to be of very low safety significance since the finding did not contribute to the likelihood of a primary or secondary system loss of coolant accident initiator, nor did it contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available, and the finding did not increase the likelihood of a fire, or internal or external flooding. The inspectors determined that no violation of NRC requirements were associated with this finding.

Inspection Report# : [2005004\(pdf\)](#)

Mitigating Systems

Significance:  Sep 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO MONITOR COOLING WATER PUMP DISCHARGE PIPING WALL THICKNESS

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control." The licensee failed to implement nondestructive examinations on the discharge piping of the safety-related cooling water pumps to verify that the pipe wall had not been reduced below minimum design thickness.

This finding was more than minor because failure to monitor cooling water minimum pipe wall thickness could result in cooling water leakage or pipe rupture due to active corrosion and/or erosion processes present in the cooling water system. The finding was of very low safety significance because the licensee concluded that the piping systems were currently operable based on the absence of through-wall leakage and based upon the surface appearance of internal piping sections photographed during periodic pump discharge valve maintenance.

Inspection Report# : [2005008\(pdf\)](#)

Significance:  Sep 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO MONITOR LOSS OF MAKEUP RESERVE VOLUME AVAILABLE IN INTAKE CANAL

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control." The licensee failed to establish a test program to ensure that the design basis reserve makeup volume of cooling water for the ultimate heat sink contained in the intake canal was maintained. Specifically, the loss of reserve volume available in the intake canal due to accumulation/buildup of sediment was not being tracked or evaluated.

This finding was more than minor because failure to monitor the loss of reserve volume available in the intake canal due to accumulation/buildup of sediment could have resulted in an inadequate cooling water reserve volume to support a plant shutdown and cooldown following a loss of Lock and Dam No. 3. The finding was of very low safety significance because the licensee demonstrated that adequate reserve volume existed in the intake canal to support the 4-hour reserve volume described in the Updated Safety Analysis Report.

Inspection Report# : [2005008\(pdf\)](#)

Significance:  Jul 01, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILED TO UPDATE PRESSURE DROP CALCULATION FOR REPLACEMENT STEAM GENERATORS

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requirements. The licensee failed to recognize an increased pressure drop in the hydraulic characteristics between the new replacement steam generators (RSGs) and associated main steam safety valves. Specifically, Calculation ENG-ME-454, "Pressure Drop Between SG [steam generator] and Safety Valve," Revision 0, was not updated (i.e., revised) to evaluate the affects of the increased pressure drop associated with the RSGs. Once identified, the licensee entered the finding into their corrective action program (CAP) as CAP043077 to revise the affected calculations.

The finding was more than minor because the failure to evaluate a change in pressure drop through the RSGs could have caused an adverse effect on the auxiliary feedwater (AFW) pump's flow delivery to the RSGs and could have affected the mitigating systems cornerstone objective. The finding was of very low safety significance because the licensee's analysis showed that adequate design margin remained for the increased pressure drop on the AFW system and did not represent an actual loss of a safety function. (Section 1R21.1b.1)

Inspection Report# : [2005002\(pdf\)](#)

G

Significance: Jul 01, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILED TO USE APPROPRIATE VORTEX METHODOLOGY FOR CST

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requirements. The licensee failed to select an appropriate method for calculating the onset of vortexing at the intake of the AFW suction lines from the condensate storage tank (CST). Specifically, Calculation ENG-ME-293, "Safety Related Tank Usable Volume Evaluation," Revision 3, used a method to determine the minimum height of water above the auxiliary feedwater (AFW) pump's intake to preclude vortex formation that was not appropriate. Once identified, the licensee entered the finding into their corrective action program (CAP) as CAP043276 to revise the affected calculations.

The finding was more than minor because the failure to prevent the formation of vortexing at the intake of the AFW suction lines would result in air entrapment causing pulsating pump flow and/or reduction in pump performance and could have affected the mitigating systems cornerstone objective. The finding was of very low safety significance because the licensee's analysis showed that adequate CST capacity remained for the AFW system and did not represent an actual loss of a safety function. (Section 1R21.1b.2)

Inspection Report# : [2005002\(pdf\)](#)

G

Significance: Jul 01, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILED TO SPECIFY CORRECT MINIMUM PUMP OPERABILITY LIMITS FOR AFW SURVEILLANCE TESTING

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requirements. The licensee failed to correctly specify the minimum pump operability limits to be used in auxiliary feedwater (AFW) surveillance testing. Specifically, Calculation ENG-ME-576, "AFW Pump Minimum Acceptance Criteria - Proto Power Calculation 96-076, Revision B," Revision 0, did not include the bypass cooling flow to the turbine driven auxiliary feedwater pump (TDAFWP) turbine bearings and governor nor include the potential variability in the speed of the TDAFWP. This resulted in an AFW system hydraulic calculation that was non-conservative when determining the minimum acceptance criteria for the TDAFWP full flow test. Once identified, the licensee verified operability and entered the finding into their corrective action program (CAP) as CAP043273 to revise the test's acceptance criteria.

The finding was more than minor because the failure to account for bypass cooling flow and pump speed variation in the surveillance test acceptance criteria would result in over-predicting the AFW pump's performance (i.e., creating design margin capability that would not exist) and could have affected the mitigating systems cornerstone objective. The finding was of very low safety significance because the licensee's analysis showed that adequate design margin existed for the AFW system and did not represent an actual loss of a safety function. (Section 1R21.2b.1)

Inspection Report# : [2005002\(pdf\)](#)

G

Significance: Jul 01, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILED TO VALIDATE HEAT-UP TRANSIENT DESIGN ANALYSIS ASSUMPTION FOR AFW PUMP ROOMS

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requirements. The licensee failed to include the affects of increased initial room temperature and heat load addition due to turbine driven auxiliary feedwater pump (TDAFWP) steam leaks when evaluating the auxiliary feedwater (AFW) pump room's temperature on a loss of ventilation. Specifically, Calculation ENG-ME-182, "AFW Pump Room Ventilation System Design," Revision 0, assumed an initial nominal AFW pump room temperature that was not consistent with actual environmental conditions which resulted in a non-conservative heat-

up transient design analysis. Once identified, the licensee entered the finding into their corrective action program (CAP) as CAP043301 to revise the affected calculations.

The finding was more than minor because the failure to account for a higher initial room temperature and the potential steam leaks would result in a higher room temperature on a loss of ventilation causing equipment degradation due to the higher than anticipated ambient temperature and could have affected the mitigating systems cornerstone objective. The finding was of very low safety significance because the licensee's heat-up transient design analysis showed that adequate design margin remained for the increased temperature on the AFW system and did not represent an actual loss of a safety function. (Section 1R21.2b.2)

Inspection Report# : [2005002\(pdf\)](#)



Significance: Jul 01, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILED TO INCLUDE AFW PUMP HEAT ENERGY TRANSFER IN LUBE OIL COOLER THERMAL PERFORMANCE ANALYSIS

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requirements. The licensee failed to recognize that the calculated design value for cooling water inlet temperature was higher than that assumed by the auxiliary feedwater (AFW) pump's lube oil cooler thermal performance analysis. Specifically, Calculation MECH-0268.4, "Verification of Heat Removal Capability of the American Standard Heat Exchanger, Model 02030-EF," Revision 0, used an assumed value for cooling water inlet temperature that did not include the AFW pump's heat energy transferred to the cooling water when calculating the lube oil cooler's operating temperature. This resulted in the lube oil cooler's thermal performance analysis being non-conservative. Once identified, the licensee entered the finding into their corrective action program (CAP) as CAP043239 to revise the affected calculations.

The finding was more than minor because the failure to account for the AFW pump's heat energy transferred to the cooling water would result in a higher lube oil cooler operating temperature causing increased turbine bearing and governor degradation and could have affected the mitigating systems cornerstone objective. The finding was of very low safety significance because the licensee's analysis showed that adequate design margin remained for the AFW system and did not represent an actual loss of a safety function. (Section 1R21.3b.1)

Inspection Report# : [2005002\(pdf\)](#)



Significance: Jul 01, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILED TO MAINTAIN INSTRUMENTATION TUBING WATER SOLID

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requirements. The licensee failed to maintain the auxiliary feedwater (AFW) instrumentation tubing suction lines in a water solid condition to pressure switch 17704. The pressure switch performed a safety related function to sense low suction pressure and trip the 11 turbine driven auxiliary feedwater pump (TDAFWP) upon a low level condition in the condensate storage tank (CST). Specifically, a void was discovered in the safety related instrumentation tubing which lowered the effective setpoint for the 11 TDAFW pump's low suction pressure trip. Once identified, the licensee entered the finding into their corrective action program (CAP) as CAP043298 to take corrective actions.

The finding was more than minor because the failure to prevent the formation of a void in the TDAFW pump's instrumentation tubing suction lines would result in air entrapment causing erroneous pressure switch performance and could have affected the mitigating systems cornerstone objective. The finding was of very low safety significance because the licensee's analysis showed that adequate design margin remained for the trip setpoint on the AFW system and did not represent an actual loss of a safety function. (Section 1R21.3b.2)

Inspection Report# : [2005002\(pdf\)](#)

Barrier Integrity



Significance: Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

INADEQUATE ULTRASONIC EXAMINATION PROCEDURE FOR THE REACTOR VESSEL FLANGE-TO-SHELL WELD

The inspectors identified a Non-Cited Violation of 10 CFR Part 50.55a(g)(4) associated with the licensee's failure to specify an ultrasonic calibration block with appropriate calibration reflectors, that met the American Society of Mechanical Engineers Code in a procedure that performed examinations of the reactor vessel flange-to-shell welds.

This finding was greater than minor because it affected the barrier integrity cornerstone objective of reactor coolant system equipment and barrier performance, and if left uncorrected could have resulted in allowing unacceptable flaws to remain in-service and the licensee would have relied on an inadequate examination for credit toward completing the required code weld volumetric coverage. The finding was of very low safety significance because this inadequate procedure was identified prior to taking Code credit for this weld examination, and a separate

Code qualified examination was conducted on the affected vessel weld.

Inspection Report# : [2005004\(pdf\)](#)

G

Significance: Mar 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO IMPLEMENT PROMPT AND EFFECTIVE CORRECTIVE ACTIONS FOR REPETITIVE FAILURES OF CONTAINMENT FAN COIL UNITS

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.

Inspection Report# : [2005003\(pdf\)](#)

G

Significance: Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO PROMPTLY IDENTIFY AND CORRECT CONDITIONS ADVERSE TO QUALITY ASSOCIATED WITH MULTIPLE 121 CRAH FAILURES.

An inspector identified finding of very low safety significance was identified for the licensee's failure to identify and promptly correct conditions adverse to quality associated with the 121 control room air handler. Specifically, the licensee failed to execute a comprehensive and systematic maintenance troubleshooting process as required by plant procedures. 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 because the ineffective troubleshooting resulted in a failure to promptly identify and correct conditions adverse to quality and prevent recurrence of 121 CRAH failures. The licensee's ineffective troubleshooting efforts resulted in multiple performance failures of the safety-related control room ventilation system and several unplanned Technical Specification Limiting Condition for Operation entries. The licensee implemented corrective actions to revise the troubleshooting process to meet industry best practices and developed training on troubleshooting techniques.

The inspectors concluded that the licensee's failure to conduct troubleshooting activities in a comprehensive and systematic manner and was a performance deficiency that warranted significance evaluation. The inspectors determined the finding to be more than minor because degraded and uncorrected conditions associated the 121 control room air handler could become a precursor to a more significant event. Since the finding only represented a degradation of the radiological barrier function provided for the control room, the finding was determined to be of very low safety significance.

Inspection Report# : [2004008\(pdf\)](#)

G

Significance: Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO IDENTIFY THAT IMPORTANT INFORMATION ASSOCIATED WITH LTOP DESIGN BASIS WAS NOT INCLUDED IN OPERABILITY EVALUATION

An inspector identified finding of very low safety significance was identified for the licensee's failure to identify and promptly correct conditions adverse to quality associated with the low temperature overpressure protection function of the pressurizer power operated relief valves. Specifically, the licensee failed to recognize and correct a clear lack of understanding of the design basis for the 15 pressurizer power operated relief valve cycles required to complete the low temperature overpressure protection function for a postulated mass injection event prior to the determination that the function remained operable. 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 because the licensee failed to recognize and correct a clear lack of understanding of the design basis for the 15 pressurizer PORV cycles required to complete the LTOP function for a postulated mass injection event prior to the determination that the function remained operable. The licensee implemented corrective actions that included the identification of LTOP design basis requirements; establishment of

new and more conservative LTOP design basis; and the development, installation, and testing of a recurring temporary modification.

The inspectors determined that a performance deficiency existed with the problem identification and resolution actions taken by the licensee during development and review of the operability recommendation. The finding was more than minor since it could be viewed as a precursor to a more significant event such as a failure of the reactor coolant system barrier integrity and affected the barrier integrity cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide release caused by accidents and events, and was associated cornerstone attributes of reactor coolant system equipment and barrier performance. Since sufficient mitigating capabilities were maintained and no non-compliance with Technical Specifications were identified, the finding was determined to be of very low safety significance.

Inspection Report# : [2004008\(pdf\)](#)

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Physical Protection

[Physical Protection](#) information not publicly available.

Miscellaneous

Significance: N/A Aug 05, 2005

Identified By: NRC

Item Type: FIN Finding

PI&R INSPECTION SUMMARY

The team concluded that the licensee adequately identified, evaluated, and resolved problems within the requirements of the corrective action program (CAP). There were some problems with program implementation, but these problems had been identified by the licensee and actions were underway to resolve them. The team noted a number of observations, including:

The initiation rate of issues entered into the CAP system has been relatively steady for the last two years. About half of the issues being entered were low priority items and were closed rapidly without further evaluation to actions taken, trending, or work orders being issued. This indicated that most issues, even minor ones, were being entered in the CAP.

The quality of apparent cause evaluations and root cause evaluations had improved in the last two years.

Trending of CAP data remained weak with essentially no improvement in the last two years despite the issue being identified by several organizations. Most of the electronic fields on the CAP documents useful for trending such as system, equipment number, process code, failure mode codes, and other predefined categories were not used in approximately 65 percent of the CAP items. The inspectors noted that most of the trends identified by the licensee in the last year had only been identified within the last two weeks through recent emphasis placed on department roll up meetings. There was little evidence that any trends had been identified by electronic sorting of CAP items using the coded fields.

Corrective actions for several issues focused more on detecting inadequacies rather than preventing them. For example, the corrective actions relied on activities like management reviews, operator rounds and score sheets to catch the problems after they occurred, rather than preventing them from occurring in the first place.

Inspection Report# : [2005009\(pdf\)](#)

Last modified : November 30, 2005