

Prairie Island 2

4Q/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\(pdf\)](#)

Significance:  Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

INADEQUATE CONTROL OF TRANSIENT COMBUSTIBLES

The inspectors identified a Non-Cited Violation of 10 CFR Part 50.48(a)(2)(I) associated with the licensee's storage of transient combustibles in the Unit 2 reactor building without required administrative controls.

The finding was more than minor because it affected the initiating events cornerstone of protection against external factors (fire), and if left uncorrected could have resulted in a greater probability of a fire. Plant personnel failed to identify these transient combustibles during the fire hazard review for work activities and housekeeping tours. The finding was determined to be of very low safety significance because it was in the category of fire prevention and administrative controls.

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

Mitigating Systems

Significance:  Nov 23, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

Configuration Control Event Causes a Loss Fire Suppression to the Relay Room

The carbon dioxide suppression system isolation valve for the relay room had been mis-positioned in the closed position rendering the suppression system non-functional. This finding was related to the Personnel subcategory of the cross-cutting area of Human Performance. Operators failed to open the valve following a maintenance activity. Operators failed to identify that the valve was mis-positioned in the closed position during two subsequent valve position surveillance activities.

Inspection Report# : [2005012\(pdf\)](#)

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\(pdf\)](#)

G

Significance: Sep 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

INADEQUATE DESIGN CONTROL FOR THE 22 COMPONENT COOLING WATER HEAT EXCHANGER DIVIDER PLATE MODIFICATIONS

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." The licensee failed to implement appropriate configuration and design controls associated with modifications made to the number 22 component cooling water (CC) heat exchanger (HX) divider plate. Specifically, the licensee failed to verify input of a key input assumption, apply appropriate acceptance criteria, and update drawings with the replacement divider plate material installed. As corrective actions, the licensee revised related modifications and calculations, and intends to examine CC HX welds during the next internal HX inspection.

This finding was more than minor because the number 22 CC HX divider plate was modified, returned to service, and operated outside design allowable limits due to excessive differential pressure. Sustained operation outside design allowable limits could have resulted in divider plate failure and loss of heat exchanger function. The finding was of very low safety significance because it was a design issue which did not result in loss of function per Generic Letter 91-18.

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

G

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\(pdf\)](#)

G

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\(pdf\)](#)

G

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\(pdf\)](#)

G

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\(pdf\)](#)

G

Significance: Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

NON-CONSERVATIVE METHODOLOGY AND ASSUMPTIONS USED IN DESIGN CALCULATIONS

The inspector identified a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having a very low safety significance involving the licensee's failure to adequately apply design control measures to verify the adequacy of certain design calculations. These calculations provided the basis to ensure the safety injection (SI) system would be capable of injecting water into the reactor vessel to remove decay heat following a postulated reactor vessel closure head (RVCH) drop onto the reactor vessel flange. Specifically, non-conservative assumptions and a non-conservative design methodology were used without justification and the calculations did not include all of the structural components that would be affected by a reactor vessel head drop in the design evaluations that provided the basis for the maximum lift elevation allowed for the reactor vessel head removal and replacement during refueling operations.

This finding was greater than minor because it affected the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events and if left uncorrected, it could become a more significant safety concern, in that the calculational deficiencies resulted in a non-conservative determination of maximum allowable head lift height. The finding was of very low safety significance because the polar crane capacity had considerable margin with respect to the original, lighter weight RVCH, and the issue was appropriately addressed prior to lifting of the heavier replacement RVCH.

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

Barrier Integrity

G

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: Mar 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO MEET TECHNICAL SPECIFICATION 3.0.3 REQUIREMENTS

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.

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

Emergency Preparedness

Significance: TBD Dec 31, 2005

Identified By: NRC

Item Type: AV Apparent Violation

DEGRADED RISK-SIGNIFICANT PLANNING STANDARD

The inspectors identified an apparent violation having preliminarily low to moderate safety significance for a failure to maintain in effect emergency plans that meet the requirements specified in 10 CFR 50.54(q) and risk-significant planning standard 10 CFR 50.47(b)(4). Specifically, the establishment of a non-conservative emergency action level (EAL) classification process, as contained in Prairie Island Emergency Plan Annex A, Condition 19, "Natural Events," would potentially not have resulted in the licensee staff declaring a required Site Area Emergency under certain flooding conditions. This condition was initially identified as the result of a licensee evaluation that concluded transformers associated with each off-site power source to both the Unit 1 and 2 safety-related and non-safety-related 4 kilovolt buses had limiting elevations below 698 feet above mean sea level (MSL). The Updated Safety Analysis Report (USAR), Section 2.4.3.5, "Floods," stated

that the transformers will function when flooded to 698.0 feet above MSL. The entry conditions for the licensee's declaration of a Site Area Emergency at 698 feet above MSL were based on a river water level above which the functionality of site transformers can no longer be relied upon. The licensee initiated a corrective action to correct the USAR but failed to correct references to the 698 feet above MSL for the Site Area Emergency EAL in Prairie Island Emergency Plan Annex A, Condition 19, until this condition was identified by the inspectors. The licensee revised the EAL for a Site Area Emergency to an acceptable value of 695 feet above MSL and conducted a root cause evaluation to determine the causes that prevented timely correction following initial identification.

The inspectors determined the finding to be more than minor since the finding was associated with the procedure quality attribute of the Emergency Preparedness Cornerstone and affected the cornerstone objective of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. The finding significance was assessed using Inspection Manual Chapter (IMC) 0609, Appendix B, Emergency Preparedness SDP Sheet 1, "Failure To Comply," and the examples provided in Section 4.4. The inspectors concluded that the finding was associated with an EAL process that would potentially not have resulted in the licensee staff declaring a Site Area Emergency under certain flooding conditions. The finding was determined preliminarily to be of low to moderate safety significance (White). Additionally, the inspectors concluded that the licensee's failure to implement corrective action to revise the applicable EAL with an acceptable value as a cross-cutting finding associated with problem identification and resolution.

Inspection Report# : [2005011\(pdf\)](#)

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 : March 03, 2006