August 3, 2007

Mr. Michael Wadley
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 COMPONENT DESIGN BASES INSPECTION (CDBI) REPORT
05000282/2007007(DRS); 05000306/2007007(DRS)

Dear Mr. Wadley:

On June 22, 2007, the U. S. Nuclear Regulatory Commission (NRC) completed a biennial component design bases baseline inspection at your Prairie Island Nuclear Generating Plant, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on June 22, 2007, 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 calculations, design bases documents, procedures, and records; observed activities; and interviewed personnel. Specifically, this inspection focused on the design of components that were risk significant and had low margin.

Based on the results of this inspection, four NRC-identified findings of very low safety significance were identified, all of which involved violations of NRC requirements. However, because these violations were of very low safety significance and because they were entered into your corrective action program, the NRC is treating the issues as Non-Cited Violations (NCVs) in accordance with Section VI.A.1 of the NRC's Enforcement Policy.

If you contest any finding or the subject or severity of any NCV in this report, 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 DC 20555-0001, with copies 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, DC 20555-0001; and the NRC Resident Inspector Office at the Prairie Island facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Ann Marie Stone, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure: Inspection Report 05000282/2007007(DRS); 05000306/2007007(DRS)
w/Attachment: Supplemental Information

cc w/encl: D. Cooper, Senior Vice President and Chief
Nuclear Officer
M. Sellman, President and Chief Executive Officer
Regulatory Affairs Manager
J. Rogoff, Vice President, Counsel and Secretary
Nuclear Asset Manager
State Liaison Officer, Minnesota Department of Health
Tribal Council, Prairie Island Indian Community
Administrator, Goodhue County Courthouse
Commissioner, Minnesota Department
of Commerce
Manager, Environmental Protection Division
Office of the Attorney General of Minnesota

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DATE	07/19/07		08/03/07					

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Inspection Report to Mr. M. Wadley from Ms. A. M. Stone dated August 3, 2007.

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000282/2007007(DRS); 05000306/2007007(DRS)

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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:	05000282/2007007; 05000306/2007007(DRS)
Licensee:	Nuclear Management Company, LLC
Facility:	Prairie Island Nuclear Generating Plant, Units 1 and 2
Location:	Welch, MN 55089
Dates:	May 21 through June 22, 2007
Inspectors:	P. Lougheed, Senior Engineering Inspector, Lead C. Brown, Engineering Inspector J. Jandovitz, Engineering Inspector B. Jose, Engineering Inspector C. Baron, Mechanical Contractor G. Nicely, Electrical Contractor
Approved by:	A.M. Stone, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000282/2007007, 05000306/2007007; 05/21/07 - 06/22/07; Prairie Island Nuclear Generating Plant, Units 1 and 2; Component Design Bases Inspection (CDBI)

The inspection was a 3-week onsite baseline inspection that focused on the design of components that are risk significant and have low design margin. The inspection was conducted by regional engineering inspectors and two consultants. Four findings of very low safety significance were identified, all with associated Non-Cited Violations (NCVs). 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

- Green. Inadequate Modification of Safeguards Screenhouse Ventilation System: The inspectors identified a finding having very low significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, the licensee modified the safeguards screenhouse ventilation system by removing four fans and failed to verify or test the adequacy of the remaining ventilation exhaust fans to cool the safety-related cooling water pumps. Following discovery, the licensee entered the issue into its corrective action program, performed additional tests and calculations and revised the maximum allowable outside air temperature. There was not a cross-cutting aspect to this violation.

  This issue was more than minor because it met the criteria in IMC 0612, Appendix E, “Examples of Minor Issues,” Example 3j for making an issue more than minor. Specifically, without the evaluations and subsequent imposition of a new maximum outside temperature procedure limit, the inspectors had reasonable doubt that the diesel driven cooling water pumps would reliably perform their function under adverse temperature conditions. The issue was of very low safety significance based on a Phase 1 screening in accordance with IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations. (Section 1R21.3.b.1)

- Green. Inadequate Overload Heater Sizing for Safeguards Screenhouse Ventilation Exhaust Fan: The inspectors identified a finding having very low significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, the licensee failed to ensure that the thermal overload heater for the 21 screenhouse safeguards roof exhaust fan had sufficient margin to allow proper operation under adverse conditions. Following discovery, the licensee entered the issue into its corrective action program, took actual running current measurements and performed preliminary calculations to justify operability. There was not a cross-cutting aspect to this violation.

This issue was more than minor in accordance with IMC 0612, Appendix B, "Issue Disposition Screening," because, at the time of discovery, there was reasonable doubt on the operability of fan 21. Specifically, because of the errors in setting and testing the 21 screenhouse safeguards roof exhaust fan thermal overload heater, actual field measurements and further evaluation needed to be performed in order to demonstrate that the overload heater could perform its safety function during a design basis event. The issue was of very low safety significance based on a Phase 1 screening in accordance with IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations." (Section 1R21.3.b.2)

- Green. Non-Conservative Inputs for Motor-Operated Valve (MOV) Calculations: The inspectors identified a finding having very low significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, the licensee used non-conservative inputs or methodologies in calculating terminal voltages or control circuit voltages to safety-related MOV motors that would be required to operate for mitigation of design bases events. Following discovery, the licensee re-did a number of calculations to demonstrate MOV operability, performed an informal bounding analysis to verify that the inputs to the calculations were conservative, and entered the issue into its corrective action program. There was not a cross-cutting aspect to this violation.

  This issue was more than minor because it met the criteria in IMC 0612, Appendix E, "Examples of Minor Issues," Example 3j for making an issue more than minor. Specifically, the use of non-conservative values of motor control center voltages or starting currents to calculate MOV terminal voltages or control circuit voltages to safety-related MOVs, combined with the fact that the electrical voltage analyses had not been updated for a significant period of time to reflect plant modifications, and the omission of the cooling water crossover valve, with its required safety function to close during a design bases event resulted in a condition where there was reasonable doubt on the operability of the components. Both the electrical voltage calculations and mechanical thrust and torque calculations had to be re-evaluated to determine operability of the affected safety-related MOVs. The issue was of very low safety significance based on a Phase 1 screening in accordance with IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations." (Section 1R21.3.b.3)

- Green. Inadequate Voltage at Charging Motor for Diesel Output Breaker Springs: The inspectors identified a finding having very low significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action." Specifically, the licensee failed to identify and correct a condition adverse to quality related to the insufficient available voltage, during normal operating conditions, for the spring charging motor associated with the Unit 1 Train A emergency diesel generator's (EDG) output breaker. The licensee had previously identified an insufficient voltage for this charging motor under adverse circumstances but failed to address normal operating conditions. Following discovery, the licensee verified the breaker closing springs were in the correct position and entered the issue into its corrective action program. There was not a cross-cutting aspect to this violation.

This issue was more than minor in accordance with IMC 0612, Appendix B, “Issue Disposition Screening,” because, if left uncorrected, the issue would become a more significant concern. Specifically, since the spring charging motor was constantly being subjected to a voltage significantly less than required, the motor would eventually degrade to a point where it would not produce sufficient torque to charge the breaker closing springs resulting in stalling of the motor. This would result in the inoperability of the EDG output breaker, which in turn would make the Unit 1 Train A EDG inoperable. The issue was of very low safety significance based on a Phase 1 screening in accordance with IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations. (Section 1R21.3.b.4)

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (CDBI) (71111.21)

.1 Introduction

The objective of the component design bases inspection is to verify that design bases have been correctly implemented for the selected risk significant components and that operating procedures and operator actions are consistent with design and licensing bases. As plants age, their design bases may be difficult to determine and an important design feature may be altered or disabled during a modification. The Probabilistic Risk Assessment (PRA) model assumes the capability of safety systems and components to perform their intended safety function successfully. This inspectible area verifies aspects of the Initiating Events, Mitigating Systems, and Barrier Integrity cornerstones for which there are no indicators to measure performance.

Specific documents reviewed during the inspection are listed in the attachment to the report.

.2 Inspection Sample Selection Process

The inspectors selected risk significant components and operator actions for review using information contained in the licensee's PRA and the Prairie Island Standardized Plant Analysis Risk Model, Revision 3P. In general, the selection was based upon the components and operator actions having a risk achievement worth of greater than 2.0. The operator actions selected for review included actions taken by operators both inside and outside of the control room during postulated accident scenarios.

The inspectors performed a margin assessment and detailed review of the selected risk-significant components to verify that the design bases have been correctly implemented and maintained. This design margin assessment considered original design reductions caused by design modification, or power uprates, or reductions due to degraded material condition. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as performance test results, significant corrective action, repeated maintenance activities, maintenance rule (a)(1) status, components requiring an operability evaluation, NRC resident inspector input of problem areas/equipment, and system health reports. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in depth margins. A summary of the reviews performed and the specific inspection findings identified are included in the following sections of the report.

.3 Component Design

a. Inspection Scope

The inspectors reviewed the Updated Safety Analysis Report (USAR), Technical Specifications (TS), design bases documents, drawings, calculations and other available design basis information, to determine the performance requirements of the selected components. The inspectors used applicable industry standards, such as the American Society of Mechanical Engineers Code, Institute of Electrical and Electronics Engineers Standards and the National Electric Code, to evaluate acceptability of the systems' design. The NRC also evaluated licensee actions, if any, taken in response to NRC issued operating experience, such as Bulletins, Generic Letters (GLs) and Information Notices (INs). The review was to verify that the selected components would function as designed when required and support proper operation of the associated systems. The attributes that were needed for a component to perform its required function included process medium, energy sources, control systems, operator actions, and heat removal. The attributes to verify that the component condition and tested capability was consistent with the design bases and was appropriate may include installed configuration, system operation, detailed design, system testing, equipment and environmental qualification, equipment protection, component inputs and outputs, operating experience, and component degradation.

For each of the components selected, the inspectors reviewed the maintenance history, system health reports, operating experience-related information, and licensee corrective action program documents. Field walkdowns were conducted for all accessible components to assess material condition and to verify that the as-built condition was consistent with the design. Other attributes reviewed are included as part of the scope for each individual component.

The following 15 Unit 1 and Unit 2 components were reviewed (15 inspection samples):

1. Component Cooling Water (CC) Surge Tanks (11 and 12): This component was selected based on its overall risk significance. The team also considered the design and operating margin in making the selection. Since the surge tanks were normally connected through an open cross-tie, both tanks were considered as one component.

   The inspectors reviewed plant calculations, drawings, and operating procedures associated with the component cooling water surge tank. The inspectors assessed the tank's volume, capacity, chemistry levels, and setpoints with respect to component cooling water pump suction. The inspectors reviewed the level instrumentation including safety classification, maintenance history, and calibrations. Manual operator actions were reviewed for indications of tank level changes. The inspectors also reviewed the staged operator procedures for isolation of the surge tank vents, and verified that tools were appropriately staged. Non-licensed operators were interviewed regarding how the operators would identify and isolate leaks in the system. The inspectors conducted walkdowns of the tanks to ensure that the installed configuration was consistent with design configurations and that the physical condition of the tanks was appropriate.

2. CC Pump, Unit 1, Train A (11): This component was selected based on its overall risk significance. The team also considered the design, maintenance, and operating margin in making the selection.

   The inspectors reviewed the piping and instrumentation, one-line and schematic diagrams to verify the pump line up, pump capacity, number of pumps required for accident mitigation and the correlation among calculated requirements, test acceptance criteria and test results. Also, the inspectors reviewed mechanical calculations related to pump flow, head, and net positive suction head requirements to ensure the pumps were capable of functioning as required. The team reviewed associated electrical calculations to confirm that the design basis minimum voltage at the motor terminals would be adequate for starting and running the motor under design bases conditions. The protective device settings were reviewed to ensure that adequate margin existed to ensure that spurious operation would not occur for running and starting/accelerating the motor. A review of the cable ampacity was performed to evaluated if adequate margin was available for all operating conditions for the motor. The team assessed the bases for brake horsepower values used as design inputs to the licensee's load flow/electrical distribution system model, and the protective settings were reviewed to assess the adequacy of protection and preclusion of premature tripping under design bases conditions. The manual and automatic actions were reviewed to ensure required flow was available in all conditions. The inspectors reviewed the licensee time validation for isolating flooding sources that could affect the CC pumps. The team performed a visual non-intrusive inspection of the pump and motor to assess the installation configuration, material condition, component degradation, potential vulnerability to hazards and that field configuration was in accordance with design. The inspectors also reviewed the water supply (suction) path, and the possibility of air binding due to loss of the surge tank.

3. CC Motor-Operated Valve on Inlet to the Residual Heat Removal (RHR) Heat Exchanger (MV-32094): This component was selected based on its overall risk significance. The team also considered the design and operating margin in making the selection.

   The inspectors reviewed the piping and instrument, one-line and schematic diagrams, preventive maintenance tasks, corrective maintenance history, problem history, and operating history to ensure the valves were capable of performing their required functions under required conditions. The inspectors reviewed the motor operated valve (MOV) electrical and mechanical calculations including required thrust, weak link, and maximum differential pressure to ensure the valve was capable of functioning under design conditions, to confirm that the design basis minimum voltage at the MOV motor terminals would be adequate for starting and running the MOV under design bases conditions, and to ensure that the design bases calculated voltages at the MOV terminals was consistent with the design inputs used in the MOV thrust and torque calculations. The protective device/thermal overload relay settings were reviewed to ensure that adequate margin existed to ensure that spurious operation would not occur for starting, seating/unseating, and running conditions. The motor control center control circuit voltage drop calculations were reviewed for the MOVs to ensure that adequate voltage would be available to energize the contactor required to energize the MOV under accident conditions. The inspectors reviewed the periodic verification diagnostic test results to verify acceptance criteria were met and performance degradation would be identified. Automatic and manual actions were reviewed to ensure these actions could be performed as required. The inspectors also reviewed the staged operator procedures used to remove the travel stops; verified that tools were appropriately staged and interviewed non-licensed operators regarding operation of the throttle valves. Walkdowns were performed to ensure that the installed configuration ensured appropriate physical condition of the valves and the configuration met design criteria.

4. CC Heat Exchanger Cooling Water Outlet Air Operated Valve (CV-32384): This component was selected based on its overall risk significance. The team also considered the design and operating margin in making the selection.

   The inspectors reviewed the design calculations, preventive maintenance tasks, corrective maintenance history, problem history, and operating history to ensure the valves were capable of performing their required functions under required conditions. Test results were reviewed to verify acceptance criteria were met and performance trended such that degradation would be identified. Walkdowns were performed to ensure that the installed configuration was consistent with design configurations and that the physical condition of the valves was appropriate.

5. RHR Loop B Accumulator Injection MOV (MV-32066): This component was selected based on its overall risk significance. The team also considered the design and operating margin in making the selection.

   The team reviewed motor operated valve calculations, including the flow, pressure drop, and minimum voltage values used to ensure the valve would be capable of opening when required. The team also reviewed selected operating procedures and corrective action documents. The team interviewed both operations and engineering personnel regarding the plant conditions under which these valves would operate and the applicability of motor operated valve pressure locking/thermal binding industry issues to these valves. The team reviewed the system on-line and schematic diagrams. The team reviewed associated electrical calculations to confirm that the design basis minimum voltage at the MOV motor terminals would be adequate for starting and running the MOV under design bases conditions. The team verified that the design bases calculated voltages at the MOV terminals was consistent with the design inputs used in the MOV thrust and torque calculations. The protective device/thermal overload relay settings were reviewed to ensure that adequate margin existed to ensure that spurious operation would not occur for starting, seating/unseating, and running conditions. The motor control center control circuit voltage drop calculations were reviewed for the MOVs to ensure that adequate voltage would be available to energize the contactor required to energize the MOV under accident conditions.

6. <u>Safeguards Screenhouse Roof Exhaust Fans and Dampers (11 and 21)</u>: This component was selected based on its overall risk significance. The team also considered the design, operating and maintenance margin in making the selection.

   The inspectors reviewed the safeguards screenhouse ventilation and temperature calculations, assessing the validity of assumptions; design inputs; results, including fan flow rates; fan blade pitch angle; temperature, pressure, and flow path; room louvers; and two operability recommendations issued to assess the capability of equipment in the safeguards screenhouse rooms to withstand elevated temperatures. Automatic and manual actions, including failure positions, were reviewed to ensure the ventilation would provide adequate cooling to the components at all times. The inspectors reviewed the computer program used in the calculations to ensure the adequacy of this tool for deriving room temperatures. In addition, the inspectors performed walkdowns of the safeguards screenhouse exhaust fans and dampers to assess component degradation, seismic requirements and environmental conditions.

7. <u>Safety Injection (SI) Pump, Unit 1, Train A (11)</u>: This component was selected based on its overall risk significance. The team also considered the design and operating margin in making the selection.

   The inspectors reviewed mechanical calculations and procedures used to establish the throttle valve positions in the system and verify the acceptable minimum pump performance to ensure adequate safety injection flow under the full range of post-accident conditions. The availability of adequate pump NPSH and submergence margin was verified for the injection phase. In addition, the team reviewed the design to verify that the pump would be provided with minimum flow protection and runout flow protection under all operating conditions. The team reviewed the potential for air binding of the pump, based on industry experience. The team also reviewed selected pump performance test results and corrective action documents to verify recent equipment performance. In addition, the team evaluated the electrical power supply to the pump under the most limiting conditions. The team reviewed electrical one-line and schematic diagrams. The team reviewed associated electrical calculations to confirm that the design basis minimum voltage at the motor terminals would be adequate for starting and running the pump motor under design bases conditions. The protective device settings were reviewed to ensure that adequate margin existed to ensure that spurious operation would not occur for running and starting/accelerating the motor. A review of the cable ampacity was performed to evaluate if adequate margin was available for all operating conditions for the motor. The team assessed the bases for brake horsepower values used as design inputs to the licensee’s load flow/electrical distribution system model, and the protective settings were reviewed to assess the adequacy of protection and preclusion of premature tripping under design bases conditions. The team reviewed applicable normal and emergency operating procedures, reviewed the operator response to an overloaded running condition should it occur, and interviewed both engineering and operations personnel to verify the pump operation under various accident scenarios. The team performed a visual non-intrusive inspection of the pump and motor to assess the installation configuration, material condition, and potential vulnerability to hazards.

8. SI Cold Leg Injection Check Valve (SI-9-2): This component was selected based on its overall risk significance. The team also considered the design and operating margin in making the selection.

   The scope of this review included review of safety injection test procedures and results, review of selected corrective actions associated with these valves, and review of design changes implemented on these valves in response to industry experience involving binding of the valve disc. The team also interviewed plant personnel associated with the evaluation and modification of these check valves and reviewed drawing and photographs of the valve internals.

9. Volume Control Tank Level Transmitters (1LT-112, 1LT-141): This component was chosen based on its overall risk significance. The team also considered the design, maintenance, and operating margin.

   The team reviewed the setpoints and supporting calculations/bases for the transmitters and relays to ensure adequacy. The team reviewed the level transmitters to verify their capability to perform their risk significant function. The team reviewed the calculation of the minimum potential volume control tank level based on the low level setpoint, the charging pump flow, and the time required to transfer the pump suction. The team also reviewed the volume control tank drawings to verify the remaining tank volume and performed a walkdown of the transmitters. The team reviewed modification 88L075 which replaced the level transmitters and relays, as well as various condition reports associated with the transmitters. In addition, the team reviewed the electrical power supply for these instrument loops.

10. 4160V Bus 15, Unit 1, Train A: This component was chosen based on its overall risk significance. The team also considered the design margin which was determined to be low based on the licensee's self-assessment. Finally, review of corrective action documents and maintenance activities indicated that this component likely had a low operating margin. In evaluating this component, the team specifically looked at five breakers on the bus and a transformer which converted the 4160 volts (V) down to 480V in order to assess the bus capability. The breakers were 15-1 (11 SI pump feeder breaker), 15-2 (Unit 1, Train A Emergency Diesel Generator Output Breaker), 15-3 (4 kV feeder breaker to bus 15), 15-5 (11 component cooling pump feeder breaker), and 15-11 (feeder breaker to 480 V bus 111).

    In performing their review, the team scrutinized one-line and schematic diagrams and electrical calculations for both alternating current (AC) and direct current (DC) control. The team reviewed weekly bus surveillances and performed walkdowns, including a visual non-intrusive inspection of observable portions of the safety-related 4160 Vac switchgear to assess the installation configuration, material condition, and potential vulnerability to hazards. Additionally, based upon observations gleaned from review of calculations, the team visually verified that the breaker charging springs were charged.

The team reviewed the adequacy and appropriateness of design assumptions and calculations to determine if the voltages at load terminals, under design bases motor starting and loading conditions, would remain above the minimum acceptable values. The team reviewed the protective device settings and breaker ratings to ensure that selective coordination and protection of connected equipment (cables, loads, and transformers) would be adequate during worst-case calculated short-circuit conditions. The team reviewed the interface and coordination with the transmission system operator for plant voltage requirements and notification setpoints to ensure steady-state voltages will remain above the minimum acceptable values. The team assessed the sizing, loading, protection, and voltage taps for the 4160V/480V stepdown transformer 111M to ensure adequate voltage to 480V Bus 111 and protection. The team verified the minimum voltage requirements of the control components associated with the selected breakers and verified that the breaker opening and closing logic was consistent with design bases descriptions. The team reviewed both the steady-state and transient calculations associated with emergency diesel generator loading to ensure adequate margin existed for design bases events with a loss of offsite power. The team verified that sufficient DC control power was available to the degraded voltage relays and that the degraded voltage relay settings ensured that adequate voltage was maintained at the terminals of the safety loads. The team also reviewed the calibration procedure for the degraded and loss of voltage relays and the latest calibration data sheets, to ensure that the relays were set in accordance with the calculation, and that the calibration procedures were consistent with the assumptions in the calculation. Finally, the team reviewed modification 97EA01, that replaced certain Westinghouse protective devices, following the team's determination that the relays were not in the applicable protection calculations.

11. Load Sequencer Auxiliary Relays: This component was chosen based on its overall risk significance and because it affected selected component, 4160 V Bus 15. The team reviewed the vendor specifications and control logic diagrams associated with relays 27-RY/B15 (Bus 15 degraded voltage relay), 52LR-1X/B15 (Bus 15 load reject relay), and 52P-4X/B15 (Bus 15 load restore relay). The team reviewed the surveillance procedures to verify that the TS surveillance requirements were satisfied. The team also verified that sufficient electrical power was available to the relays.

12. Lockout Relay: This component was chosen based on its overall risk significance and because it affected selected component, 4160V Bus 15. The team reviewed the vendor specifications, control logic diagrams, and surveillances associated with 86/B15 (Bus 15 lockout relay). Through review of control schematic diagrams, the team verified that the emergency diesel generator output breaker would not close if a fault existed on Bus 15. The team reviewed surveillance procedures to verify that TS surveillance requirements were satisfied. The team also verified that the electrical power requirements of the lockout relay were satisfied.

13. 480V Bus 111: This component was chosen based on its overall risk significance. The team also considered the operating and design margin for the component. Additionally, this component was chosen because it was fed from 4160V Bus 15. In evaluating this component, the team specifically looked at two breakers: 111J and 111M.

The team reviewed one-line and schematic diagrams, bus surveillance procedures, 480 V switchgear breaker maintenance procedures, and electrical distribution system load flow, voltage drop, short-circuit, and electrical protection and coordination calculations. The team reviewed the protective device settings and breaker ratings to ensure that selective coordination and protection of connected equipment (cables, loads, and transformers) were adequate during worst-case calculated short-circuit conditions. The team also reviewed the 125V DC control scheme for the 480 V switchgear breaker. The team verified the minimum voltage requirements of the control components associated with the switchgear breaker and verified that the breaker opening and closing logic was consistent with design bases descriptions. The team performed a visual non-intrusive inspection of observable portions of the safety-related 480V AC switchgear to assess the installation configuration, material condition, and potential vulnerability to hazards.

The team used the system EB health and status report, the system description and design bases documents, the USAR, TS, and NRC Information Notices and Generic Letters to provide the acceptance criteria against which the component was evaluated.

14. 480 V Motor Control Center (MCC) 1K1: This component was chosen based on its overall risk significance, because it was fed from the selected 480V Bus, and because selected mechanical components received their power through this MCC.

The team reviewed one-line and schematic diagrams, bus surveillance procedures, 480 V switchgear breaker maintenance procedures, and electrical distribution system load flow, voltage drop, short-circuit, and electrical protection and coordination calculations. The team reviewed the protective device settings and breaker ratings to ensure that selective coordination and protection of connected equipment (cables, loads, and transformers) were adequate during worst-case calculated short-circuit conditions. The team reviewed the control circuit voltage drop calculations to ensure adequate voltage would be available to energize the contactors for the accident initiated MOVs. The team reviewed the MCC bucket inspection and maintenance procedures, and molded case circuit breaker maintenance and test procedures. The team also verified from the degraded voltage calculation that sufficient voltage would be available to both MCC control components as well as the loads supplied by the MCC. The team performed a visual non-intrusive inspection of observable portions of the safety-related 480V AC MCC to assess the installation configuration, material condition, and potential vulnerability to hazards.

15. <u>125V DC panel 281</u>: This component was selected based on its overall risk significance. The team reviewed the 125V DC schematic and elementary diagrams, fuse ratings, and the voltage drop and coordination calculations to confirm that sufficient coordination existed between various interrupting devices and that sufficient power and voltage was available to panel 281 and the equipment supplied by this panel to perform their safety function. The inspectors also reviewed modification 99DC03, “Relocation of 125V DC EQ circuits” as panel 281 was one of panels/circuits relocated by this modification.

b. <u>Findings</u>

1. <u>Inadequate Modification of Safeguards Screenhouse Ventilation System</u>

b1. <u>Introduction</u>: The inspectors identified an NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance (Green). Specifically, the licensee installed a modification to the screenhouse ventilation system which removed four fans in the diesel driven pump and motor driven pump rooms and did not perform calculations or testing for either ventilation flows or room temperatures to verify that the safety-related cooling water pumps would remain operable under all required operating environments. Additionally, the licensee did not consider the effect of one exhaust damper failing open on ventilation flows in the pump rooms. This resulted in establishing a non-conservative maximum outside ambient temperatures required for the diesel driven cooling water pumps and motor driven cooling water pumps to remain operable.

<u>Description</u>: The inspectors reviewed modification 94L482, “Safeguards Screenhouse Exhaust Fan Control Circuit Upgrades,” completed on November 4,1996. The modification removed four room fans in the screenhouse safeguards rooms. The modification referenced calculation ENG-ME-178, “Screenhouse Ventilation Evaluation,” which concluded the air removal volume of the exhaust fans would be sufficient to maintain the temperature of the equipment in the diesel driven cooling water pump rooms and the motor driven cooling water pump room rooms below their design maximum temperature. However, the modification did not address possible reductions in the exhaust fan capabilities due to increased flow resistance and changes in air flow patterns on these component temperatures due to the modification.

Following NRC selection of the component and modification for review, the licensee determined that no post-modification test had been performed, wrote action request (AR) 1093404 and performed an operability review. The operability review evaluations concluded the maximum outside air temperature should be lowered to 102 degrees Fahrenheit (°F) from the previous limit of 106°F. As a result, on May 30, 2007, Procedure C37.8, “Screenhouse Safeguards Equipment Cooling,” was revised to reflect the lower temperature limit. Although the AR stated that additional testing was to be done, no corrective action item had been identified to perform comprehensive air flow tests in the future. Upon identification by the inspectors, the licensee issued the corrective action item.

The inspectors determined that the calculation for the screenhouse ventilation used HEATSINK, a computer program developed to calculate the transient temperature behavior of a room. The HEATSINK users manual noted that this program was not appropriate to use to evaluate the operation of a ventilation system. The inspectors determined that the program assumed equal room temperatures throughout and that, if any ventilation existed, all the air in the room was totally mixed. The inspectors identified that due to the limited number of air inputs and egresses, and their locations, this assumption might not be conservative, and that stagnant areas or hot spots might exist. The inspectors determined that the licensee had not conducted any validation of the HEATSINK calculated temperatures in the screenhouse safeguards rooms. The inspectors also questioned whether the 2500 cubic feet of air per minute (cfm), used by each of the two diesels for combustion air, could be credited for cooling in the diesel driven cooling water pump rooms. Further, the inspectors noted that the calculation assumed a single failure of one of the two exhaust fan, both located in the motor driven cooling water pump room. The inspectors questioned whether this would create different flow patterns in the rooms affecting component temperatures. For these reasons, the inspectors questioned the validity of HEATSINK as an appropriate tool to model the ventilation flow and resulting temperatures in these rooms.

The inspectors identified that calculation ENG-ME-178 assumed that one of the two exhaust fans would fail (single failure), but that the damper would remain closed. However, the inspectors questioned whether the damper could also fail open on a loss of air creating a bypass condition where part of the suction of the operating exhaust fan now consisted of a portion of outside air from the opening through the failed damper. This would change the ventilation flows and resulting room temperatures. The licensee addressed this issue in AR 1096073 and an associated operability determination. A new HEATSINK calculation was completed which used the results from additional exhaust fan flow testing done on June 15, 2007. This testing allowed the licensee to increase the flow capability of the exhaust fan from 16000 cfm to 19000 cfm. The licensee calculation showed that the maximum air temperature needed to maintain operability of the cooling water pumps remained at 102°F. In order to satisfy the inspectors concerns regarding the validity of the HEATSINK model, the licensee provided temperature data for the previous year; the maximum outside temperature was approximately 97°F. Therefore, the inspectors concluded that, even given the non-conservatisms in the HEATSINK model, that it was likely that the safety-related components in the safeguards screenhouse would continue to operate.

Analysis: The inspectors determined that failure to properly calculate or test the ventilation flow and resulting temperatures following the modification to remove the room fans, and the failure to consider a possible ventilation bypass path was a performance deficiency because the ventilation controlled the temperature of the equipment in the screenhouse safeguards rooms. The inspectors further determined that the issue was within the licensee's ability to foresee and correct, and that it could have been prevented because the licensee had performed several revisions to the screenhouse ventilation calculation and had performed a self-assessment which specifically looked at the screenhouse ventilation system margin and determined that it was sufficiently high to not warrant further review.

The inspectors determined that the performance deficiency did not have actual safety consequences, that it did not impact the NRC’s ability to perform its regulatory function and that there were not any willful aspects to the violation.

The inspectors reviewed the performance deficiency against NRC Inspection Manual Chapter (IMC) 0612 "Power Reactor Inspection Reports" and concluded the performance deficiency fit the more than minor example from Appendix E, "Examples of Minor Issues," example 3j, in that the licensee had to perform two different operability reviews and had to lower the value of the maximum outside temperature required to maintain the cooling water pumps operable. Therefore, this performance deficiency impacted the Mitigating Systems Cornerstone objective of ensuring the operability and reliability of the cooling water pumps.

The inspectors evaluated the finding using IMC 0609, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Appendix A Phase 1 screening. The finding screened as "Green" because the issue was a design and qualification issue and the licensee was, in the end, able to provide objective evidence that the components would be operable and able to perform their safety function during a postulated design bases event.

The inspectors determined there was not a cross-cutting aspect to this finding.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures be established to verify or check the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, from completion of the modification on November 4, 1996 to May 22, 2007, the licensee had not determined the flow capability of the ventilation exhaust fans after removal of four room fans. Specifically, modification 94L482 did not provide calculation or testing to measure the resulting exhaust fan flow to ensure that the safety-related cooling water pumps and associated equipment would remain operable. Also calculation ENG-ME-178 did not consider the effects of a bypass condition that could exist if the opposite fan damper failed open and reduced the heat removal capability from the pump rooms.

The licensee entered the finding into their corrective action program as ARs 1093404 and 1096073. Because this violation was of very low safety significance and was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. (NCV 05000282/2007007-01; 05000306/2007007-01).

b2. Inadequate Overload Heater Sizing for Safeguards Screenhouse Ventilation Exhaust Fan

Introduction: The inspectors identified an NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" having very low safety significance (Green). Specifically, the licensee sized the thermal overload protection for the 21 screenhouse safeguards roof exhaust fan such that there appeared to be insufficient margin at the motor control center (MCC) 1A2 design operating temperature when accounting for operation under degraded voltage conditions or within the motor service factor

Description: During review of the safeguard screenhouse ventilation fans, the inspectors determined that the overload rating for the 21 exhaust fan, when corrected to 130°F, appeared to have minimal margin above the motor name-plate full load ampere (FLA) rating. The inspectors noted that the licensee's procedure as well as the National Electric Code required thermal overloads to be sized to allow for operating within the expected motor service factor as well as operation under degraded voltage conditions. These two conditions required that the thermal overload be sized approximately 25 percent higher than the motor FLA rating.

The inspectors noted that the 11 exhaust fan thermal overload heater rating was 19.3 amps at 104°F; this corresponded to a 16.52 amp rating at 130°F. The inspectors noted that the motor nameplate FLA was 13.5 amps, so that the final thermal overload rating was approximately 22.3 percent above the motor FLAs rating. The inspectors concluded that this value was acceptable, primarily because the next size thermal overload heater would not adequately protect the motor. However, the inspectors noted that the 21 exhaust fan overload heater was rated at 16.1 amps at 104°F; this corresponded to a rating of 13.78 amps at 130°F, while the 21 motor nameplate FLA was 13.7 amps. The inspectors noted that the 0.08 amp (essentially zero) margin did not provide any allowance for operation within the motor service factor rating or during a degraded voltage condition. The inspectors further noted that loss of the exhaust fan due to a thermal overload tripping could result in a loss of ventilation to the cooling water pumps and a subsequent loss of a cooling water pump. Therefore, the inspectors questioned whether the thermal overload for the 21 exhaust fan was adequately sized to perform its safety-related function.

The licensee entered the issue into its corrective action program and took actual running current measurements on fan 21, after ensuring the vane pitch was at maximum. The licensee determined that the highest current, when adjusted for degraded voltage, service factor and 130°F operation, was 10.7 amps. This provided assurance that there was sufficient actual margin to ensure overload operability. The licensee stated that it planned to replace the thermal overload with a larger sized overload.

Analysis: The inspectors identified a performance deficiency for failure to meet 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, the licensee failed to adequately perform thermal overload heater size calculations such that the 21 safeguards ventilation exhaust fan thermal overloads did not sufficiently account for operation under design bases conditions, including operation within the motor service factor, operation degraded voltage conditions and operation at a design temperature of 130°F. The inspectors determined that the issue was within the licensee's ability to foresee and correct, and that it could have been prevented, as the licensee had changed the thermal overloads in 2001.

The inspectors determined that the performance deficiency did not have actual safety consequences, that it did not impact the NRC's ability to perform its regulatory function and that there were not any willful aspects to the violation.

The inspectors reviewed the performance deficiency against NRC IMC 0612 and concluded the performance deficiency fit the more than minor example from Appendix E, example 3j, in that the sizing of the thermal overload resulted in there being a reasonable doubt as to the operability of safeguards screenhouse roof exhaust fan 21. Specifically, prior to the licensee taking actual field measurements during the inspection, the calculated value for the thermal overload to the exhaust fan 21 motor was insufficient to allow for operation under design bases conditions. Failure of the safety-related exhaust fan could impact the ability of the cooling water pumps to perform their function. Therefore, this performance deficiency impacted the Mitigating Systems Cornerstone objective of ensuring the operability and reliability of safety-related equipment.

The inspectors evaluated the finding by performing a IMC 0609, Appendix A, Phase 1 screening. The finding screened as "Green" because the issue was a design and qualification issue and the licensee was, in the end, able to provide objective evidence that the components would be operable and able to perform their safety function during a postulated design bases event.

The inspectors did not identify a cross-cutting aspect to this violation.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that design control measures provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, as of June 22, 2007, the licensee's design control measures failed to verify the adequacy of design for sizing the thermal overload heater for the safeguards screenhouse ventilation exhaust fan 21 motor. Specifically, the installed overload heater did not account for operation within the allowed motor service factor or under degraded voltage conditions.

The licensee captured this issue in their corrective action program as ARs 1098119, 1098193, and 1098350. Because this violation was of very low safety significance and was entered into the licensee's corrective action program, this violation is being treated as an NCV consistent with Section V1.A.1 of the NRC Enforcement Policy. (NCV 05000306/2007007-02)

b3. Non-Conservative Inputs for Motor-Operated Valve Calculations

Introduction: The inspectors identified an NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" having very low safety significance (Green). Specifically, the licensee used non-conservative inputs or methodologies in calculating terminal voltages or control circuit voltages to safety-related motor operated valve (MOVs) motors that were required to operate for mitigation of design bases events.

Description: The inspectors identified that the licensee used non-conservative inputs or methodologies in calculating terminal voltages or control circuit voltages to safety-related MOVs that were required to operate for mitigation of design bases events. Specifically, the inspectors identified non-conservative assumptions which directly affected electrical voltage calculations for terminal voltages or control circuit voltages to safety-related MOVs.

Calculation ENG-EE-147, “Motor Operated Valve Terminal Voltage,” used non-conservative locked-rotor currents and MCC voltages to determine the terminal voltages to safety-related MOVs. The calculated terminal voltages were direct design input into the applicable mechanical MOV thrust and torque calculations. Specifically, the licensee derated the locked-rotor current based on worst case post-accident room temperatures to calculate terminal voltages to the MOVs; derating of the locked rotor current would be non-conservative for MOVs that actuated at the beginning of an event, or for other events, such as station blackout, when the extreme environmental conditions did not exist. The licensee also used steady-state post-event MCC voltages to evaluate the starting terminal voltages for MOVs required to change state for a design basis event. Use of steady-state voltages instead of transient voltage predicted higher terminal voltages than would actually exist. Following inspector identification of these non-conservatisms, the licensee redid calculations and determined that the non-conservative use of locked rotor current values resulted in the MOV terminal voltage being 1.4 percent higher than would actually exist. The licensee determined that the inappropriate use of steady-state voltages resulted in the MOV terminal voltage being 5.6 percent higher than would actually exist, for a reduction in available voltage by as much as 7 percent. This calculation also failed to evaluate the cooling water crossover valve which was required to close for a design bases event. The failure to include this load again resulted in inaccurate prediction of bus and terminal loads.

Calculation 12911.6249-E-002, “MCC 120V Control Circuit Voltage Drop Calculation,” used steady-state post-event motor control center voltages to evaluate the control circuit voltage drop for the control circuits for MOVs that were required to change state for a design basis event. The inspector determined that use of steady-state voltages instead of transient voltages would predict higher control circuit voltages than would actually exist. As a result, the control circuit contactor might not have adequate voltage to energize until after the upstream 4.16-kV starting loads had accelerated. Upon identification, the licensee evaluated this potential time delay for the affected MOVs in the accident analyses and determined that all affected MOVs would initiate without impact on the accident analysis.

Electrical calculations ENG-EE-061 “4kV Bus Minimum Voltage,” also failed to evaluate the cooling water crossover valve that was required to close for a design bases event. The failure to include this load again resulted in inaccurate prediction of bus and terminal loads.

Finally, the inspectors noted that the licensee had previously identified that the electrical voltage analyses had not been updated for a significant period of time and did not reflect installed plant modifications. The licensee evaluated each modification as it was performed; however the evaluations were performed against the non-updated analyses and did not address the cumulative effect of previous modifications. The inspector also noted that normal running voltages appeared to be higher than used in the electrical analyses. Based upon the inspectors’ concerns, the licensee performed an informal evaluation that showed that there would still be sufficient voltage to the most limiting component.

The inspectors determined that each of these non-conservatisms resulted in a condition where the inspectors had reasonable doubt on the operability of the affected MOVs and where the licensee needed to redo calculations to show that design margin still existed.

The licensee was in the process of reconstituting its electrical calculations and included the above non-conservatisms as items to be formally addressed in the calculation reconstitution.

Analysis: The inspectors identified a performance deficiency for failure to meet 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, the licensee used non-conservative inputs or methodologies in calculating terminal voltages or control circuit voltages to safety-related MOV motors that would be required to operate for mitigation of design bases events. The inspectors determined that the issue was within the licensee's ability to foresee and correct, and that it could have been prevented, because the plant had identified deficiencies in electrical calculations in 2005 and 2007.

The inspectors determined that the performance deficiency did not have actual safety consequences, that it did not impact the NRC's ability to perform its regulatory function and that there were not any willful aspects to the violation.

The inspectors reviewed the performance deficiency against NRC IMC 0612 and concluded the performance deficiency fit the more than minor example from Appendix E, example 3j, in that the non-conservative assumptions in the calculations led to there being a reasonable doubt as to the operability of the limiting MOV. Specifically, the use of non-conservative values of MCC voltages or starting currents to calculate MOV terminal voltages or control circuit voltages to safety-related MOVs, the failure to update electrical voltage analyses to reflect current plant conditions, and the omission of the cooling water crossover valve resulted in a condition where there was reasonable doubt on the operability of the components. Both the electrical voltage calculations and mechanical thrust and torque calculations had to be re-evaluated to determine operability of the affected safety-related MOVs. Therefore, this performance deficiency impacted the Mitigating Systems Cornerstone objective of ensuring the operability and reliability of safety-related MOVs.

The inspectors evaluated the finding by performing a IMC 0609, Appendix A, Phase 1 screening. The finding screened as "Green" because the issue was a design and qualification issue and the licensee was, in the end, able to provide objective evidence that the components would be operable and able to perform their safety function during a postulated design bases event.

The inspectors did not identify a cross-cutting aspect to this violation. The licensee had not completed the corrective actions associated with the 2005 and 2007 issues.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that design control measures provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, as of June 22, 2007, the licensee's design control measures failed to verify the adequacy of the MOVs that were required to operate for mitigation of design bases events.

The licensee captured this issue in their corrective action program as ARs 1094176, 1093716, 1097092, 1096867, and 1098027. Because this violation was of very low safety significance and was entered into the licensee's corrective action program, this violation is being treated as an NCV consistent with Section V1.A.1 of the NRC Enforcement Policy. (NCV 05000282/2007007-03; 05000306/2007007-03)

b4. Inadequate Voltage at Charging Motor for Diesel Output Breaker Springs

Introduction: The team identified an NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" having very low safety significance (Green). Specifically, the licensee failed to identify and correct a condition adverse to quality related to the insufficient available voltage, during normal operating conditions, for the spring charging motor associated with the Unit 1 Train A emergency diesel generator's (EDG) output breaker. The licensee had previously identified an insufficient voltage for this charging motor under adverse circumstances but failed to address normal operating conditions.

Description: During review of licensee calculation 91-02-11, "Unit 1 Train A Battery Sizing Calculation," the inspectors noted that EDG D1 output breaker charging motor would only have 26 V DC during locked rotor conditions under the maximum battery loading scenario. The inspectors noted that the licensee evaluated operability of the charging motor in operability review 480; however, the operability review only considered an accident situation and concluded that the EDG breaker's ability to close would not be compromised. This was because spring charging occured after the breaker performed its safety function to close and the operability review assumed the springs were charged prior to the accident. The inspectors determined that the licensee had not evaluated the actual voltage seen by the charging motor under normal operating conditions. The inspectors performed an informal calculation and determined that the charging motor could be seeing as little as 46V DC under normal conditions. Following the inspectors' questioning the capability of the motor under normal conditions, the licensee performed an informal analysis which determined that, under normal plant operation, the charging motor would see approximately 51 V DC during locked rotor conditions. Additionally, the inspectors noted that the licensee's analysis used charging motor ratings provided by the breaker manufacturer; these ratings were non-conservative when compared to the motor ratings provided by the motor manufacturer. Specifically, the breaker manufacturer rated the spring charging motor at 0.4 horsepower and 10 Amperes at full load, whereas the motor manufacturer rated the charging motor at 2200 Watts (2.9 horsepower) and 20 Amperes at full load.

The inspectors compared the 51V DC estimated value to the breaker manufacturer's required minimum voltage of 90 V DC, and questioned the ability of the charging motor to continue to perform its safety function of charging the breaker closing springs. The inspectors postulated that continual operation would gradually degrade the motor to a point where it would no longer develop sufficient torque and its ability to perform the safety function would be compromised. The inspectors performed a walkdown to verify that the breaker closing springs were properly energized.

The licensee performed a weekly safeguards bus inspection, SP 1322, to verify that the 4kV safeguards breaker springs were charged. However, the inspectors determined that, prior to April 3, 2007, there could have been a gap of several days following the diesel surveillance which operated the breaker and the surveillance to verify the breaker charging springs were energized. The inspectors noted that on April 3, 2007, a night order was issued to require verification of the breaker springs following testing of the breaker. This was due to a failure of a charging motor on March 15 which was not discovered until April 3, despite the weekly breaker spring surveillance.

Analysis: The inspectors determined that the failure to identify and correct the inadequate voltage to the charging motor for the Unit 1, Train A, EDG output breaker was a performance deficiency because it was a condition adverse to quality which was not identified and corrected as required by 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions." Furthermore, the inspectors determined that it was reasonably within the licensee's ability to have identified this issue in March 2004 when the Unit 1 Train A battery calculation was completed which identified severe voltage issues with the breaker spring charging motor under worst case loading conditions.

The inspectors determined that the finding did not have actual safety consequences, that the finding did not impact the NRC's ability to perform its regulatory function and that there were not any willful aspects to the violation.

The inspectors determined the performance deficiency was more than minor in accordance with IMC 0612, Appendix B, "Issue Disposition Screening, because, if left uncorrected, the issue would become a more significant concern. Specifically, since the spring charging motor was constantly subjected to a voltage significantly lower than required, it would eventually degrade to a point where the motor would not produce sufficient torque to charge the breaker closing springs and the motor would stall. This would result in the inoperability of the EDG output breaker, which in turn would make the Unit 1 Train A EDG inoperable. Therefore, this performance deficiency impacted the Mitigating Systems Cornerstone objective of ensuring the operability and reliability of the Unit 1 Train A EDG.

The inspectors evaluated the finding using IMC 0609, Appendix A. The finding screened as Green under a Phase 1 screening because it was not a design issue, did not represent an actual loss of a system safety function, did not result in exceeding a technical specification allowed outage time, was not an actual loss of non-safety-related equipment and did not affect external event mitigation.

The inspectors determined there was not a cross-cutting aspect to this finding.

Enforcement: Title 10 of CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that the licensee establish measures to ensure that conditions adverse to quality, such as failures; malfunctions; deficiencies; deviations; defective material and equipment; and non-conformances, are promptly identified and corrected, for those systems, structures and components covered under 10 CFR Part 50, Appendix B.

Contrary to the above, from March, 2004, to June, 2007, a condition adverse to quality was not identified by the licensee, and was not corrected. Specifically, in March, 2004, the licensee failed to evaluate the Unit 1, Train A EDG breaker spring charging motor, a component covered under 10 CFR Part 50, Appendix B, under normal operating conditions despite having evidence that under design bases conditions the motor would suffer from significantly adverse voltage conditions. Therefore, the licensee failed to identify the insufficient voltage issue for the breaker spring charging motor during normal operation.

Because the issue was determined to be of very low safety significance, and because, following NRC identification, the licensee subsequently entered the issue into its corrective action system as AR 01098038, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy. (NCV 05000282/2007007-04)

.4 Operating Experience

a. Inspection Scope

The inspectors reviewed eight operating experience issues (8 samples) to ensure that NRC generic concerns had been adequately evaluated and addressed by the licensee. The operating experience issues listed below were reviewed as part of this inspection:

- Bulletin 1988-04: Potential Safety-Related Pump Loss;
- GL 2006-02: Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power;
- IN 1988-23: Potential for Gas Binding of High Pressure Safety Injection Pumps during a Loss-of-Coolant Accident;
- IN 1992-17: NRC Inspectors of Programs Being Developed at Nuclear Plants in Response to Generic Letter 89-10;
- IN 1993-74: High Temperatures Reduce Limitorque Alternating-Current Motor Operator Torque;
- IN 2005-30: Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design;
- IN 2006-21: Operating Experience Regarding Entrainment of Air into Emergency Core Cooling and Containment Spray Systems;
- IN 2006-26: Failure of Magnesium Rotors in Motor Operated Valve Actuators; and
- IN 2006-31: Inadequate Fault Interrupting Rating of Breakers.

b. Findings

No findings of significance were identified.

.5 Modifications

a. Inspection Scope

The inspectors reviewed nine (9) permanent plant modifications related to selected risk significant components to verify that the design bases, licensing bases, and performance capability of the components had not been degraded through modifications. The modifications listed below were reviewed as part of this inspection effort:

84L816	Upgrade Reactor Water Storage Tank Level Indication for Regulatory Guide 1.97;
84L850	CC Surge Tank Relief Valve Removal;
88L075	Replacement of Volume Control Tank Level Transmitters;
89L165	CC Surge Tank Crosstie Line;
90L213	Replace Flow Transmitters with Environmentally Qualified Type FT-626/928;
92L378	Replace Motors on Valves MV 32128 and 32129;
94L482	Screenhouse Safeguards Ventilation Control Circuit Modification;
97EA01	Westinghouse Over-Current Relay Replacement; and
99DC03	Relocation of 125 Volt Direct-Current Environmentally Qualified Circuits.

b. Findings

One finding resulting from review of modification 94L482 is discussed in Section IR21-3.b.1.

.6 Risk Significant Operator Actions

a. Inspection Scope

The inspectors performed a margin assessment and detailed review of six risk significant, time critical operator actions (6 samples). These actions were selected from the licensee's PRA rankings of human action importance based on risk achievement worth values. Where possible, margins were determined by the review of the assumed design basis and USAR response times and performance times documented by job performance measures results. For the selected operator actions, the inspectors performed a detailed review and walk through of associated procedures, including observing the performance of some actions in the station's simulator and in the plant for other actions, with an appropriate plant operator to assess operator knowledge level, adequacy of procedures, and availability of special equipment where required.

The following operator actions were reviewed:

- 0SGTRXXXCDY Operator Fails to Cooldown and Depressurize the Reactor Coolant System for a Steam Generator Tube Rupture Before a Steam Generator Overfill;
- 0AB7FLDISLY Operator Fails to Isolate Auxiliary Building Zone Seven Flooding Source;
- 0AMNVLTRXXY Operator Fails to Perform Manual Voltage Restoration from Opposite Unit;
- 0HRECIRCXXY Operator Fails to Initiate High Head Recirculation for a Medium Loss of Coolant Accident;
- 0HRECIRCSMY Operator Fails to Initiate High Head Recirculation for a Small Loss of Coolant Accident; and
- 0RCPLOCACDY Operator Fails to Cooldown and Depressurize the Reactor Coolant System for an Reactor Coolant Pump Seal Loss of Coolant Accident.

b. Findings

No findings of significance were identified.

4OA6 Meeting(s)

Exit Meeting

The inspectors presented the inspection results to Mr. M. Wadley and other members of licensee management at the conclusion of the inspection on June 22, 2007. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
M. Wadley, Site Vice President
J. Sorensen, Site Operations Director
S. Northard, Component Design Basis Inspection Manager
M. Carlson, Site Engineering Director
E. Weinkam, Licensing Director
P. Huffman, Plant Manager
F. Forrest, Operations Manager
R. Zyduck, Engineering Design Manager
R. Madjerick, Outage Manager
C. Mundt, General Superintendent of Instrumentation and Controls and Electrical Maintenance
S. Meyers, Mechanical Design/ Civil Supervisor
J. Kivi, Regulatory Compliance Engineer
M. Klee, NMC – Regulatory Services

Nuclear Regulatory Commission
A. M. Stone, Chief, Engineering Branch 2
J. Adams, Senior Resident Inspector
D. Karjala, Resident Inspector
E. Sanchez, Intern

LIST OF ITEMS DISCUSSED, OPENED AND CLOSED

Opened and Closed

05000282/2007007-01 05000306/2007007-01	NCV	Inadequate Modification of Safeguards Screenhouse Ventilation System
05000282/2007007-02 05000306/2007007-02	NCV	Inadequate Overload Heater Sizing for Safeguards Screenhouse Ventilation Exhaust Fan
05000282/2007007-03 05000306/2007007-03	NCV	Non-Conservative Inputs for Motor-Operated Valve Calculations
05000282/2007007-04	NCV	Inadequate Voltage at Charging Motor for Diesel Output Breaker Spring

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.

Action Requests Generated As a Result of the Inspection

1093404; Fan Flow Rates Not Revalidated Following System Configuration Changes; dated May 22, 2007

1093627; Jacking Screws Found Engaged on Train A Component Cooling Pump Motors; dated May 22, 2007

1093651; Ty-wrap Found on MV-32078 Train B to Sump to 12 Residual Heat Removal; dated May 23, 2007

1093674; 11 Component Cooling Heat Exchanger Instrument Tubing Bent; dated May 22, 2007

1093716; Non-conservative Input in Calculation END-EE-147 (Locked Rotor Current Derating); dated May 22, 2007

1093767; Safety Injection Pump Performance Testing Instrument Uncertainty; dated May 23, 2007

1093813; Loose Material Found in 12 Diesel-Driven Cooling Water Pump Room; dated May 23, 2007

1093874; Sand Shielding near Containment Spray Pump; dated May 23, 2007

1093917; Leakoff Collection Barrels Unsecured at Component Cooling Pumps; dated May 24, 2007

1094082; 11 Safeguards Battery Discharge Test Results; dated May 25, 2007

1094096; Inservice Testing Basis Not Documented for U2 Residual Heat Removal Heat Exchanger Component Cooling Valves; dated May 25, 2007

1094099; 111M Transformer Tap Settings Not in Passport; dated May 25, 2007

1094121; Technical Manual XH-16-56 Not Updated with New Relay Information; dated May 25, 2007

1094176; Non-conservative Input in Calculation ENG-EE-147 (Use of Steady State Voltage); dated May 25, 2007

1094340; Review of DBD SYS-18-A, Revision 4; dated May 29, 2007

1094366; Safety Injection Pump Current Inconsistencies; dated May 31, 2007

1094529; No Documentation for Low Level Test Referenced in Updated Safety Analysis Report; dated May 30, 2007

1094598; Calculation ENG-ME-278 Needs to be Revised; dated May 31, 2007

1094639; Calibration of Inservice Testing Pressure Gauges for Component Cooling Pumps not Within Percent Allowable; dated May 31, 2007

1094810; Reactor Water Storage Tank and Cavity Level During Safety Injection Pump Testing; dated June 1, 2007

1095002; Containment Back Pressure Assumption in ENG-ME-293, Revision 4; dated June 4, 2007

1095021; Clarification of Residual Heat Removal Flow Value for ENG-ME-293, Revision 4; dated June 4, 2007

1095132; ASME Code Boundary not Properly Shown on Drawing for Surge Tank; dated June 4, 2007

1095343; Require Safeguards Breaker Closing Spring Inspections Following Breaker Closure; dated June 11, 2007

1095448; Inadequate Review of Palo Verde Event; dated June 6, 2007

1095615; Screenhouse Vent (ZR) Backdraft Damper Classification; dated June 7, 2007

1095801; 1C18 Raising Accumulator Level; dated June 7, 2007

1095810; Discrepancies with Protective Relay Settings; dated June 7, 2007

1095827; Incorrect Reference in Procedure C37.8; dated June 8, 2007

1095896; Unclear Basis for Change in Heater Size; dated June 8, 2007

1096073; Screenhouse Ventilation Airflow Short Circuit; dated June 8, 2007

1096223; Potential Engineering Manual Revisions to Address De-Rating Factors; dated June 11, 2007

1096525; Non-Conservative Assumption Used in ENG-ME-178; dated June 19, 2007

1096545; Use of Reference Stroke Times in Simulator for Time Critical Operator Actions; dated June 12, 2007

1096594; Differences Between Emergency Diesel Generator Loading Calculation and Surveillance Testing; dated June 13, 2007

1096759; Procedure SP2155B, Revision 14 Errors; dated June 14, 2007

1096867; Motor Control Center Contactor Voltage May Be Too Low to Pick up Loads During Load Sequencing; dated June 14, 2007

1097092; Possible Start Failure at Degraded Voltage; dated June 15, 2007

1097614; Perform Common Cause Evaluation on Component Design Bases Inspection Issues; dated June 19, 2007

1097724; Basis for Residual Heat Removal Flow Verification in ES-1.2 and 1.3; dated June 19, 2007

1097962; Unidentified Time Critical Operator Action; dated June 20, 2007

1098027; Wrong Locked Rotor Current Used for MV-32144; dated June 20, 2007

1098038; Charging Spring Motor Operation at Reduced Voltage; dated June 20, 2007

1098119; Non-Motor-Operated-Valve Sizing Procedure H6.3 Lacks Guidance; dated June 21, 2007

1098193; Motor Overload Heater for 21 Safeguards Screenhouse Exhaust Fan; dated June 21, 2007

1098350; Error Identified in Table 1 of Calculation ENG-ME-178; dated June 21, 2007

Action Requests Reviewed During the Inspection

ACE008888; Divergence Between Volume Control Tank Level Channels is Up to 4 Percent; dated December 9, 2004

585250; New Calculation Issued for 11 Battery Identified Issues; March 11, 2004

860897; Diesel Generator Load Calculations Do Not Justify Using Nameplate Values; dated June 24, 2005

879970; Review Operator Actions Against Maximum Room Temperatures; dated August 25, 2005

4129496; Update Electrical Analyses; dated September 29, 2005

892474; Update and Complete ETAP Model; dated September 29, 2005

892489; Verification of ETAP Model; dated September 29, 2005

892490; Setup ETAP Database for Degraded Voltage and Load Flow; dated September 29, 2005

892492; Update Calculations E-415-EA-003 and ENG-EE-061; dated September 29, 2005

892515; Setup ETAP Database for Electrical Fault Studies; dated September 29, 2005

1001811; Exceeded Design Pressure on Spent Resin Tank; dated October 25, 2005

1002823; Bus 15 Load Sequencer Error Codes During Troubleshooting; dated November 3, 2005

1003534; NRC Information Notice 05-30 – Internal Flooding Events; dated November 14, 2005

1021302; Safety Injection System Components with Incorrect Quality Level; dated March 30, 2006

1029151; Relay Cards Have Errors; dated May 10, 2006

1049042; Evaluation of Impacts from Emergency Diesel Generator Frequency Variation; dated September 6, 2006

1050327; Short Circuit Analyses Performed at Non-Standard Cable Temperatures; dated September 14, 2006

1074252; Evaluation of Magnesium Rotors In Response to NRC IN 2006-26; dated January 26, 2007

1075705; Conduct Formal Benchmarking of ETAP; dated February 5, 2007

1075864; Evaluation of Inadequate Fault Interrupting Rating of Breakers In Response to NRC IN 2006-31; dated February 6, 2007

1082624; CV-31384 Travel Stop Hole on Valve Body is Stripped; dated March 16, 2007

1085806; Unit 1 12 Safety Injection Pump Breaker Inoperable; dated April 3, 2007

1086205; ENG-ME-206, Revision 4 and Transfer to Recirculation Actions; dated April 5, 2007

1086222; Time to Stop Residual Heat Removal Pump at 8 Percent Reactor Water Storage Tank Level; dated April 5, 2007

1087971; Electrical Analyses Have Not Been Maintained Up to Date; dated April 16, 2007

1089144; MV-32094 Was Found Set Below Minimum Thrust to Close; dated April 23, 2007

1090396; Inadequate Emergency Diesel Generator Surveillance Test Procedures; dated May 1, 2007

1090934; Update to Air Operated Valve Probabilistic Risk Assessment Risk Rankings; dated May 3, 2007

1093126; Errors in Safety Injection Pump Performance Testing Acceptance Criteria; dated May 17, 2007

1093265; Incorrect Acceptance Criteria Used in Calculation ENG-ME-178; dated May 18, 2007

1093329; Time Critical Operator Actions Required in Potentially Hot Environments; dated May 18, 2007

1093335; Travel Stop on CV-31384 Was Found Inserted in Yoke by 3.5 Inches; dated May 19, 2007

1093523; ENG-ME-541, Revision 0 – Instrument Uncertainty Consideration; dated May 21, 2007

Alarm Response Procedures

C47020 Location 47020-0103; 11 Component Cooling Surge Tank Lo/Lo Level; Revision 36

C47020 Location 47020-0203; 11 Component Cooling Surge Tank Hi/Lo Level; Revision 35

Calculations

09-0910-74; Electrical Coordination Study Volume 1; Revision 2

105209-2.2-001; Cooling Water Pump Area Loss of Ventilation; Revision 1

12911.6249-E-002; Motor Control Center Control Voltage Drop Calculation; Revision 1

12911.6249-E-003; Evaluation of Unacceptable Motor Control Center Breakers for Calculation

12911.6249-E-002; Revision 1

12911-6259-001; Cable Sizing and Voltage Drop Calculation for Panels 171, 181, 271 and 281; Revision 1

91-02-11; Battery 11 Calculation; Revision 0

95X003; Degraded Voltage Setpoints; Revision 0

C20.3; Electrical Power System Security Analysis; Revision 13

E-385-EA-2; 480 Volt Feeder Sizing; Revision 0

E-385-EA-9; Relay Settings and Coordination; Revision 2

E-385-EA-21; 480 Volt Coordination; Revision 1

E-415-EA-3; Degraded Voltage Relay Dropout; Revision 1

E-415-EA-4; 4 Kilovolt Fault Study; Revision 1

E-415-EA-12; Grid Voltage at Degraded Voltage Relay Maximum Tolerance; Revision 0

ENG-CS-011; Weak Line Analysis for Calculated Thrust to Failure on Listed Powell Valves; Revision 1

ENG-EE-017; Safeguards Pump/Motor (4 Kilovolt) Data Package; Revision 0

ENG-EE-018; Diesel Generator Sequence Loading for an Safety Injection Event Concurrent with Loss of Off-site Power for D1, D2, D5, D6; Revision 4

ENG-EE-021; Diesel Generator Steady-State Loading for an Safety Injection Event Concurrent with Loss of Offsite Power for D1, D2, D5, D6; Revision 2

ENG-EE-061; Unit 1 4 Kilovolt Bus Minimum Voltage; Revision 0

ENG-EE-141; Direct Current (DC) Coordination Calculation for Panels 171, 181, 271 and 281; Revision 1

ENG-EE-147; Motor Operated Valve Terminal Voltage (includes Addendum 1); Revision 0

ENG-EE-149; Coordination Between Safety Injection Pump and Emergency Diesel Generator D1/D2 Relay Overcurrent Protection; Revision 0

ENG-ME-005; Analysis of Available Net Positive Suction Head to the Residual Heat Removal Pumps from the Containment Sump; Revision 5

ENG-ME-046; Thrust and Torque Calculation; Revision 4

ENG-ME-178; Screenhouse Ventilation Evaluation (includes Addenda 0, 1, 2, and D); Revision 0

ENG-ME-206; Residual Heat Removal Pump Switchover to Long Term Recirculation Time Determinations; Revision 4

ENG-ME-285; Liquid Volume at Zero Level in the 11 and 21 Volume Control Tanks Available for Suction; Revision 0

ENG-ME-293; Tank Usable Volume Evaluation; Revision 4

ENG-ME-334; Section XI Valve Limiting Stroke Time Basis; Revision 5

ENG-ME-448; Auxiliary Building Flooding Analysis; Revision 1

ENG-ME-541; Component Cooling Hydraulic Model Proto-Power Calculation 02-002; Revision A

ENG-ME-545; Reactor Water Storage Tank Volume Calculation; Revision 1

ENG-ME-546; Westinghouse Calculation Note CN-SEE-02-90, Residual Heat Removal and Safety Injection Flow Rates for Loss of Coolant Accident Release and Containment Analysis; Revision 0

ENG-ME-559; Safety Injection Pump Interaction During Small Break Loss of Coolant Accident; Revision 0

ENG-ME-657; Sump B Strainer Head Loss Determinations; Revision 2

SPC-EA-006; 4160 Volt Safeguards Degraded Bus Voltage Setpoint; Revision 1

SPC-EA-007; 4160 Volt Safeguards Bus Undervoltage and Loss of Voltage Setpoints; Revision 1

SPC-EP-041; Unit 1 Wide Range Reactor Coolant System Pressure Control Room Indication 1P-709 Uncertainty; Revision 0

SPC-EP-051; Unit 1 Residual Heat Removal Flow Control Room Indication Loop 1F-626 Uncertainty; Revision 0

SPC-EP-051A; Unit 1 Residual Heat Removal Flow Control Room Indication Loop 1F-626-dP; Revision 2

SPC-EP-051B; Unit 1 Residual Heat Removal Flow Control Room Indication Loop 1F-626 Rack and Indicator Uncertainty; Revision 0

SPC-EP-075; Unit 1 RCS Pressure Emergency Operating Procedure Setpoint; Revision 0

SPC-EP-093; Unit 1 Flow Parameter Emergency Operating Procedure Setpoint; Revision 0

SPC-RH-003; Total Discharge Head Uncertainty and Flow Uncertainty for 11 Residual Heat Removal Loop A Outlet Flow; Revision 0

Calibration Cards

1LT-141; Calibration and Checkout Card; October 12, 1993

1LT-112; Calibration and Checkout Card; May 24, 1994

Drawings

M-6340; Surge Tank (Pioneer); Revision 3

NE-40006-48; Unit 1 Train A Safety Injection Pump Breaker Control Schematic; Revision AG

NE-40006-49; Emergency Diesel Generator D1 Output Breaker Control Schematics; Revision PV
NE-40006-51; Uni1 Train A Residual Heat Removal Pump Breaker Control Schematic; Revision QU

NE-40006-52; Unit 1 Train A Component Cooling Pump Breaker Control Schematic; Revision NR

NE-40006-56; Unit 1 Train A Containment Spray Pump Breaker Control Schematic; Revision LP

NE-40006-81; Control Schematic for Emergency Diesel Generator D1 Lockout Relay; Revision XC

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NF-40008-62; Control Circuit MV-32066; Revision BT

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NF-40018-3; 230 Volt AC Circuit Diagram Distribution Panels 134/135/119; Revision P

NF-40022-1; Circuit Diagram – 4 Kilovolt and 480 Volt Safeguard Busses Unit 1; Revision G

NF-40026; 480 Volt Motor Control Center 1A, 1AA, 1AB Circuit Diagram; Revision X

NF-40036; 480 Volt Circuit Diagram Motor Control Center 1K, 1KA; Revision J

NF-40321-1; Interlock Logic Diagram Component Cooling System – Unit 1; Revision L

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NL-173001-1; Containment Sump B Elevation View; Revision A

Sketch; One Line Diagram; datedJanuary 20, 2003

X-HIAW-1-7; Flow Diagram – Unit 1 Reactor Coolant System; Revision 76

X-HIAW-1-31; Flow Diagram – Residual Heat Removal System; Revision 76

X-HIAW-1-39; Flow Diagram – Chemical and Volume Control System; Revision 76

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X-HIAW-1-45; Flow Diagram – Unit 1 Safety Injection System; Revision AD

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X-HIAW-106-81; Reactor Safety Injection & Containment Spray Piping Unit 1; Revision C

X-HIAW-106-88; Reactor Safety Injection & Containment Spray Piping Unit 1; Revision A

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X-HIAW-1001-3; Flow Diagram – Unit 2 Reactor Coolant System; Revision 76

X-HIAW-1001-8; Flow Diagram – Residual Heat Removal System; Revision P

Modifications or Design Changes

84L816; Reactor Water Storage Tank Level Instrumentation Upgrade for Compliance with Regulatory Guide 1.97; Revision 0

84L850; Component Cooling Surge Tank Relief Valve Removal and Replacement with Spool Pieced; December 20, 1984

88L067; Safety Injection Pump Performance Curve; dated December 31, 1991

88L075; Replacement of Volume Control Tank Level Transmitters; dated July 31, 1995

89L165; Unit 1 to Unit 2 Component Cooling Surge Tank Crosstie Line; dated December 12, 1989

90L213; Replace Flow Transmitters 1FT-626, 2FT-626, 1FT-928, and 2FT-928; dated April 26, 1993

92L378; Replace 5 Foot-pound Motors on MV-32128 and MV-32129 with 10 Foot-pound Motors; dated August 25, 1992

94L482; Safeguards Screenhouse Fan Deletion; dated October 25, 1995

97EA01; Westinghouse Overcurrent Relay Replacement; Revision 0

99DC03; Relocation of 125 Volt DC Environmentally Qualified Circuits; Revision 1

DC499; Install Manual Dampers and Back Draft Dampers on Air Intake Housing; dated June 20, 1974

EC8032; Equivalency Evaluation – Velan Safety Injection Swing Check Valve Cotter Pin to Machined Pin Change; dated August 28, 2006

EC9591; Equivalency Evaluation – Valve Position Travel Stop Cotter Key; Revision 0

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480; Unit 1 Train A Emergency Diesel Generator Output Breaker 15-2 Due to Spring Charging Motor and Anti-Pump Relay Operating Below Their Design Voltage; Revision 0

1093404-01; Screenhouse Temperatures Due to Removal of Fans; Revision 0

1093716-01; Motor Operated Valve Population of Generic Letter 96-05 Motor Operated Valves; Revision 0

1096073-01; Screenhouse Ventilation Issues Due to Exhaust Damper Failed Open; Revision 0

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1E-1; Loss of Reactor or Secondary Coolant; Revision 21

1E-2; Faulted Steam Generator Isolation; Revision 7

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1ES-1.3; Transfer to Recirculation With One Safeguard Train Out of Service; Revision 15

2.16.3; Transmission Operating Guide; Revision 2

2C37.10; D5/D6 Diesel Generator Building Heating, Ventilation and Air Conditioning; Revision 4

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AP115B; Component Cooling System Quarterly Test Train B; Revision 14

C18.1; Engineered Safeguards Equipment Support Systems; Revision 19

C31.1 AOP1; Fire Protection Line Break; Revision 0

C35 AOP5; Cooling Water Leakage Outside of Containment; Revision 6

C37.8; Screenhouse Safeguard Equipment Cooling; Revision 9

C37.9 AOP1; Loss of Control Room Cooling; Revision 12

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EM 1.2.3; Development of Design Calculations; Revision 11

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EM 3.3.1.5; Medium and Low Voltage Power Cable Sizing Criteria; Revision 0

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EM 3.3.2.11; Short Circuit Calculations; Revision 0

FG-E-CAL-01; Fleet Guidance on Calculations; Revision 02

FP-E-CAL-01; Calculations; Revision 01

FP-OP-OL-01; Operability Determinations; Revision 2

H1; Quality List Classification Criteria; Revision 13

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H5; Motor Operated Valve Program; Revision 10

H6.1; Motor Operated Valve Thermal Overload Heater Sizing for General Electric Motor Control Centers; Revision 4

H6.3; General Electric Thermal Overload Heater Sizing for Non-Motor Operated Valve Motors; Revision 3

H36; Plant Flooding; Revision 1

ICPM 1-017; 11 Component Cooling Surge Tank Level Control Calibration; Revision 4

ICPM 1-036; Functional Check of the Unit 1 Screenhouse Safeguards Equipment Temperature Control Loop; Revision 4

IECA-0.0; Unit 1 Loss of All Safeguards AC Power; Revision 17

PE 0015-01C; 4.16 Kilovolt Bus 15 Cubicle 1 Bus 15 Source to 11 Safety Injection Pump Relay Calibration; Revision 0

PE 0015-02C; 4.16 Kilovolt Bus 15 Cubicle 2 Bus 15 Source From D1 Diesel Generator Relay Calibration; Revision 0

PE 0015-03C; 4.16 Kilovolt Bus 15 Cubicle 3 Bus 15 Source from Bus 1RY Relay Calibration; Revision 1

PE 0015-05C; 4.16 Kilovolt Bus 15 Cubicle 5 Bus 15 Source to 11 Component Cooling Pump Relay Calibration; Revision 0

PE 0015-11C; 4.16 Kilovolt Bus 15 Cubicle 11 Bus 15 Feed to 111M Transformer Relay Calibration; Revision 0

PE 007; 5HK250/350 Breaker Testing, Maintenance and Repair – Minor; Revision 4

PE 008; 5HK250/350 Breaker Testing, Maintenance and Repair – Major; Revision 5

PE 4801; 480 Volt ABB K-600S/K-800S Manually Operated Breaker Maintenance and Calibration; Revision 2

PE 4804; 480 Volt ABB K-1600/K-1600S/K-2000/K-2000S Electrically Operated Breaker Maintenance and Calibration; Revision 3

PE 4821; 480 Volt Bus Inspection and Breaker Rolls; Revision 2

PE MCC-G7; Motor Control Center Electrical Preventive Maintenance for General Electric 7700 Line Motor Control Centers; Revision 22

PM 4910; Thermographic Inspection of Prairie Island Components; Revision 2

TP 1617B; 480 Volt Breaker 111M Functional Test; Revision 3

TP 1637; Winter Plant Operations; Revision 38

<u>Surveillances</u>

121-071 Test Data; Summary of 11 Safety Injection Pump Inservice Testing Results; January 21, 2001 – February 2, 2007

MV-32075 Test Data; Summary of MV-32075 Stroke Time Results; 1997-2006

MV-32077 Test Data; Summary of MV-32077 Stroke Time Results; 1997-2006

MV-32084 Test Data; Summary of MV-32084 Stroke Time Results; dated February 22, 2001 – February 22, 2007

SP1083; Unit 1 Integrated Safety Injection Test with a Simulated Loss of Offsite Power; Revision 31

SP 1088A; Train A Safety Injection Quarterly Test; Revision 10

SP 1089A; Train A Residual Heat Removal Pump and Suction Valve from Reactor Water Storage Tank Quarterly Test; Revision 11

SP 1092A; Safety Injection Check Valve Test (Head Off) Part A: High Head Safety Injection Flow Path Verification; Revision 24

SP 1098; 11 Battery Refueling Outage Discharge Test; Revision 25

SP 1137; Recirculation Mode Valve Functional Test; Revision 28

SP 1155A; Component Cooling System Quarterly Test Train A; Revision 14

SP 1216; 4 Kilovolt Bus 15 Undervoltage Relay Calibration; Revision 13

SP 1218; Monthly 4 Kilovolt Bus 15 Undervoltage Relay Test; Revision 32

SP 1322; Safeguards Buses Weekly Inspection-Operating; Revision 20

SP 2088A; Train A Safety Injection Quarterly Test; Revision 10

SP 2088B; Train B Safety Injection Quarterly Test; Revision 10

Evaluations and Screenings Pursuant to 10 CFR 50.59

294; Safety Evaluation – High Head Safety Injection Performance Evaluation; dated February 21, 1991

2727; Screening for EC 9591, “Addition of a Nut to Travel Stop on CV-31384”; Revision 0

Work Orders

324007; Perform Underwater Visual Inspection of the Reactor Water Storage Tank Interior; dated February 27, 1992

107579; Residual Heat Removal Heat Exchanger Component Cooling Inlet D70 Inspection (Post Maintenance Test); dated June 5, 2003

9800086; 11 Safeguards Screenhouse Roof Exhaust Fan Breaker Preventive Maintenance; dated February 22, 2000

9910992; Breaker Electrical 5-Yr Preventive Maintenance for Screenhouse Exhaust Fan 21; dated January 9, 2001

LIST OF ACRONYMS USED

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
AR	Action Request
CC	Component Cooling
CFM	Cubic Feet per Minute
CFR	Code of Federal Regulations
DC	Direct Current
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
GL	Generic Letter
IMC	Inspection Manual Chapter
IN	Information Notice
IR	Inspection Report
MCC	Motor Control Center
MOV	Motor Operated Valve
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
PARS	Publicly Available Records
PRA	Probabilistic Risk Assessment
RHR	Residual Heat Removal
SDP	Significance Determination Process
SI	Safety Injection
TS	Technical Specifications
USAR	Updated Safety Analysis Report
V	Volts
°F	degrees Fahrenheit