UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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July 25, 2012

Mr. Regis T. Repko
Vice President
Duke Energy Carolinas, LLC
McGuire Nuclear Station
MG01VP/12700 Hagers Ferry Road
Huntersville, NC 28078

SUBJECT: MCGUIRE NUCLEAR STATION - NRC COMPONENT DESIGN BASES INSPECTION - INSPECTION REPORT 05000369/2012007 AND 05000370/2012007

Dear Mr. Repko:

On, April 5, 2012, the U. S. Nuclear Regulatory Commission (NRC) completed the onsite portion of an inspection at your McGuire Nuclear Station, Units 1 and 2. The inspection team performed additional in office review activities subsequent to the onsite inspection. The enclosed inspection report documents the inspection results, which were discussed on June 18, 2012, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The team reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two NRC identified findings of very low safety significance (Green), which were determined to involve violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with the NRC Enforcement Policy. If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at McGuire. Further, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at McGuire Nuclear Station.

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 (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Rebecca L. Nease, Chief
Engineering Branch 1
Division of Reactor Safety

Docket No. 50-369, 50-370
License No. NPF-9, NPF-17

Enclosure:
Inspection Report 05000369, 370/2012007
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	05000369, 05000370
License Nos.:	NPF-9, NPF-17
Report No.:	05000369/2012007, 05000370/2012007
Licensee:	Duke Energy Carolinas, LLC
Facility:	McGuire Nuclear Station, Units 1 and 2
Location:	Huntersville, NC 28078
Dates:	March 5, 2012 – April 5, 2012
Inspectors:	S. Walker, Senior Reactor Inspector (Lead) R. Patterson, Reactor Inspector L. Suggs, Reactor Inspector M. Coursey, Reactor Inspector B. Sherbin, Accompanying Personnel A. Della-Greca, Accompanying Personnel K. Hemphill, Trainee
Approved by:	Rebecca Nease, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000369/2012-007, 05000370/2012-007; 03/05/2012 – 04/05/2012; McGuire Nuclear Station, Units 1 and 2; Component Design Bases Inspection.

This inspection was conducted by a team of four Nuclear Regulatory Commission (NRC) inspectors from the Region II office, two NRC contract personnel, and one trainee on a rotational assignment from NRC Headquarters office. Two Green non-cited violations were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using the NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process." Findings for which the Significance Determination Process 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 4.

Cornerstone: Mitigating Systems

- Green. The team identified a non-cited violation of McGuire Unit 1 and 2 Operating License Condition 2.C.4 for the licensee's failure to evaluate potential blockage of the Turbine Driven Auxiliary Feedwater (TDCA) pump lube oil cooler when pump suction is aligned to the circulating water (RC) system. Specifically, during certain fire events causing loss of plant control, the team identified that if the RC system piping was aligned to the suction of the TDCA pump as in accordance with the licensing basis, it could result in blockage of cooling water flow for the TDCA pump lube oil cooler. Immediate actions by the licensee included performing a functional assessment and evaluating potential long term corrective actions. The licensee entered this issue in their corrective action program as PIP M-12-2174.

  The performance deficiency was determined to be more than minor because it was similar to IMC 0612 Appendix E question 3j in that, there was reasonable doubt as to the operability of the auxiliary feedwater system when suction was supplied from RC system. In addition, the finding was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was evaluated using IMC 0609, Attachment 4, Phase 1, and IMC 0609 Appendix F, "Fire Protection Significance Determination Process", Attachment 1, Phase 1 and determined to be of low safety significance because it only affected the ability to reach and maintain cold shutdown. The team determined that no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance. (Section 1R21.2.1)

- Green. The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure adequate tornado missile protection for the emergency diesel generator (EDG) exhaust relief and backdraft dampers as required. Specifically, 12 inches of the upper portion of the EDG Building ventilation system exhaust dampers were exposed and not protected from a tornado-generated missile. The licensee initiated compensatory measures in the form of concrete jersey barriers in front of each exhaust damper opening to provide additional shielding for the unprotected opening. The licensee entered this issue in their corrective action program as PIP M-12-2158.

The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, there was reasonable doubt the EDG ventilation exhaust would remain functional to support EDG operation in the event tornado-induced missiles damaged the exhaust backdraft relief dampers. The team performed a Phase 1 evaluation per Inspection Manual Chapter 0609, Attachment 4 and determined that the finding was potentially risk significant due to a seismic, flooding, or severe weather initiating events (e.g., tornadoes). Consequently, a Phase 3 analysis was performed by a senior reactor analyst, who determined that the risk significance of the issue was very low (i.e., ΔLERF < 1.0E-7). The team determined there was a cross cutting aspect in the area of Problem Identification and Resolution, in that the licensee did not thoroughly evaluate problems with adequate tornado missile protection such that the resolutions address causes and extent of conditions, as necessary. [P.1(c)] (Section 1R21.2.8)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R21 Component Design Bases Inspection (71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and related operator actions for review using information contained in the licensee's probabilistic risk assessment. In general, this included components and operator actions that had a risk achievement worth factor greater than 1.3 or Birnbaum value greater than 1 $X10^{-6}$. The sample included twelve components, including two associated with containment large early release frequency, and seven operating experience (OE) items.

The team performed a margin assessment and a detailed review of the selected risk-significant components to verify that the design bases had been correctly implemented and maintained. This margin assessment considered original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition issues. Equipment reliability issues were also considered in the selection of components for a detailed review. These reliability issues included items related to failed performance test results, significant corrective action, repeated maintenance, maintenance rule status, Regulatory Issue Summary 05-020 (formerly Generic Letter 91-18) conditions, NRC resident inspector input of problem equipment, system health reports, industry OE, and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense-in-depth margins. An overall summary of the reviews performed and the specific inspection findings identified is included in the following sections of the report.

.2 Component Reviews (12 Samples)

.1 Auxiliary Feedwater (CA) Pumps – Motor Driven and Turbine Driven

a. Inspection Scope

The team reviewed the plant Technical Specifications (TS), Updated Final Safety Analyses Report (UFSAR), Design Bases Documents (DBDs), and Piping and Instrumentation Drawings (P&IDs) to establish an overall understanding of the design bases of both the motor driven auxiliary feedwater (MDCA) and turbine driven auxiliary feedwater (TDCA) pumps. Design calculations and site procedures were reviewed to verify that the design bases and design assumptions had been appropriately translated into these documents. The team reviewed various analyses, procedures, and test results associated with operation of the MDCA and TDCA pumps under transient, accident, station blackout, and various Appendix R conditions. The analyses included hydraulic performance, net positive suction head (NPSH), minimum flow, room heat-up during loss of ventilation, and transfer of the suction source. The team also evaluated the pump suction trip setpoint to verify that the pump would not inadvertently trip under transient

conditions. In-service testing (IST) results were reviewed to verify acceptance criteria were met and performance degradation would be identified. In addition, the licensee's responses and actions to Bulletin 88-04, "Potential Safety-Related Pump Loss," and Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment" were reviewed to assess implementation of operating experience related to pump minimum flow requirements, and inspection of service water tie-in to CA piping. For standby shutdown facility (SSF) operation during certain Appendix R events, water from Lake Norman is used as a long term supply for the TDCA pumps. Implementing procedures, system design, and testing of valves were reviewed to ensure sufficient flow would be provided to the pump, and lube oil cooler when the water source is from the lake. Corrective action history was reviewed to ensure problems are identified and corrected in a timely manner.

The team reviewed degraded grid voltage calculation results to determine voltage available at motor terminals and confirm the capability of the pumps to perform their safety function under the most limiting design conditions. The team also reviewed motor/pump performance curves to confirm that the electrical load was correctly included in the voltage analysis. The team reviewed motor feeder ampacity, short circuit capability, and protective relays setting to assess the adequacy of the circuit protection under normal and faulted conditions and to ensure that trip setpoints would not allow the feeder breaker to trip during pump motor highest loading conditions. Additionally, the team reviewed control schematics to verify compliance with system operation requirements and reviewed the environmental qualification report to confirm the capability of the motor to perform its safety function under accident conditions. The electrical separation was also reviewed to ensure that the redundancy of safety divisions was not compromised. The team reviewed motor testing and inspection procedures for on-line and off-line conditions to assure that the testing parameters were adequate and in accordance with industry standards. The review also included recent electrical maintenance and test activities to confirm the readiness of the component to perform its required functions during system demands.

The team reviewed control schematics associated with the TDCA pump to verify compliance with system operation requirements and reviewed the environmental design requirements of the safety-related components to confirm that such components would be capable of performing their intended safety function during calculated worst environmental conditions. The team conducted a walkdown of the TDCA pump and support systems to assess observable material condition of the equipment.

b. Findings

Introduction: The team identified a green non-cited violation (NCV) of McGuire Unit 1 and 2 Operating License Condition 2.C.4 for the licensee's failure to evaluate potential blockage of the TDCA pump lube oil cooler when pump suction is aligned to the circulating water (RC) system. Specifically, during certain fire events causing loss of plant control, the team identified that if the RC system piping was aligned to the suction of the TDCA pump as described in the licensing basis, it could result in blockage of cooling water flow for the TDCA pump lube oil cooler.

Description: Licensee procedure AP/1(2)/A/5500/24, "Loss of Plant Control Due to a Fire or Sabotage," requires plant shutdown using the SSF. The standby shutdown system (SSS), which includes the SSF, provides a means to bring the unit to hot standby and cold shutdown conditions independent from the normal unit systems and equipment. The

TDCA pump is required as part of the SSS to provide a means of achieving hot standby and cold shutdown conditions.

The suction source for the TDCA pump is normally aligned to the preferred source, the auxiliary feedwater storage tank (CAST), which is clean water. In accordance with the licensing basis, during operation of the SSS, per Step 24 of procedure AP/1(2) /A/5500/24, Lake Norman would be aligned as the suction source when the respective unit's CAST level goes below 10 feet. Prior to entering the RC system piping, this water passes through the RC system travelling screens that are constructed from 3/8 inch square mesh. The team evaluated whether the water from Lake Norman could clog the CA components. The team determined there was no impact on CA pump operability regarding the minimum flow recirculation line; however, the team determined the orifices in the TDCA lube oil cooler lines had cross-sectional circular opening of approximately 0.2 inches and lube oil cooler tubes had cross-sectional circular opening of approximately 0.3 inches. The RC system travelling screens had cross-sectional opening of approximately 0.4 inch diagonal (3/8 inch wire mesh, 0.064 inch wire diameter). No other screens or strainers are in the system. Therefore, the team concluded that the potential existed to allow debris large enough to pass through the travelling screens and block the lube oil cooler tubes and orifice.

Analysis: The team determined that failure to analyze the potential clogging of the TDCA pump during SSF related fire events was a performance deficiency. The performance deficiency was determined to be more than minor because it was similar to IMC 0612 Appendix E question 3j, in that as a result of this issue there was reasonable doubt as to the operability of the AFW system when suction was supplied from RC system. In addition, the finding was associated with the design control attribute of the Mitigating Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was evaluated using IMC 0609, Attachment 4, Phase 1, and IMC 0609 Appendix F, "Fire Protection Significance Determination Process," Attachment 1, Phase 1 and determined to be of low safety significance (Green) because it only affected the ability to reach and maintain cold shutdown. The team determined that no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance.

Enforcement: McGuire License Condition 2.C.4 states that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the UFSAR for the facility and as approved in the safety evaluation report dated March 1978 and Supplements 2, 5 and 6 dated March 1979, April 1981, February 1983, respectively, and the safety evaluation dated May 1989. McGuire License Condition 2.C.4 commits to Section III.G., "Fire Protection of Safe Shutdown Capability". In particular, Paragraph 12.L. *Alternative and dedicated shutdown capability,* Item (d): achieve cold shutdown conditions within 72 hours; and (e) maintain cold shutdown conditions thereafter. Contrary to the above, on March 20, 2012, the team identified that since initial approval of the fire protection program (1989), if the RC system piping was aligned to the suction of the TDCA pump, it could result in blockage of cooling water flow for the pump's lube oil cooler which could prohibit the ability of the plant to achieve and maintain cold shutdown conditions. This is a violation of McGuire License Condition 2.C.4. The licensee performed a functional assessment including testing, maintenance, and engineering data to provide the team with reasonable assurance of functionality. Because this violation was determined to be of very low safety significance and has

been entered into the licensee's corrective action program as PIP M-12-2174, it is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000369, 370/2012007-01, Failure to Evaluate Potential Blocking of TDCA Pump Lube Oil Cooler During Certain Fire Events.

.2 CA Suction & Discharge Check Valves (e.g., CA-8, -10, -12, -165, -166, -57, -45, -65, -61, -41, -37)

a. Inspection Scope

The team reviewed the design, corrective action history, and testing of these check valves. It was determined that all of these valves are in the IST program, and are periodically tested to verify performance. The valves are not all of the same design, so it is not possible that a design flaw could affect all of the valves. There are no recurring problems of these valves in the corrective action history. Recent OE on not accounting for back-leakage of check valves during pump IST testing was reviewed to ensure industry problems with back-leakage are identified and investigated.

b. Findings

No findings were identified.

.3 Component Cooling Water (KC) Pumps and Motors (KC 1A1, 1A2, 1B1, 1B2, 2A1, 2A2, 2B1, 2B2)

a. Inspection Scope

The team reviewed the plant TS, UFSAR, DBDs, and P&IDs to establish an overall understanding of the design bases of the KC pumps. The team evaluated the KC pumps to verify that their performance satisfied design basis flow rate requirements during postulated transient and accident conditions. To determine design basis performance requirements and operational limitations, the team reviewed design basis documents including KC system hydraulic calculations, operating instructions and procedures, system drawings, surveillance tests, and modifications. Surveillance test results were reviewed to determine whether established test acceptance criteria were satisfied. The surveillance acceptance criteria were compared to design bases assumptions and requirements to verify adequate margins for allowable pump degradation limits. The NPSH requirements were reviewed to ensure satisfactory pump suction performance during transient and accident conditions. Thermal performance calculations for the heat exchangers in the KC system were reviewed to ensure adequate flow rates were delivered to remove design bases heat loads. In addition, the team walked down the pump rooms, interviewed system and design engineers, reviewed system health reports and reviewed condition reports to assess the current condition of the pumps.

The team reviewed degraded grid voltage calculation results to determine the voltage available at motor terminals and confirm the capability of the pumps to perform their safety function under the most limiting design conditions. The team also reviewed motor/pump performance curves to confirm that the electrical load was correctly included in the voltage analysis. The team reviewed motor feeder ampacity, short circuit capability, and protective relays setting to assess the adequacy of the circuit protection under normal and faulted conditions, and to ensure that trip setpoints would not allow the

feeder breaker to trip during pump motor highest loading conditions. Additionally, the team reviewed control schematics to verify compliance with system operation requirements and reviewed the environmental qualification report to confirm the capability of the motor to perform its safety function under accident conditions. The electrical separation was also reviewed to ensure that the redundancy of safety divisions was not compromised. The team reviewed motor testing and inspection procedures for on-line and off-line conditions to assure that the testing parameters were adequate and in accordance with industry standards. The review also included recent electrical maintenance and test activities to confirm the readiness of the component to perform its required functions during system demands.

b. Findings

No findings were identified.

.4 Auxiliary Building Isolation Motor Operated Valves (KC 50A-1A & 53B-2B)

a. Inspection Scope

The team reviewed the plant TS, UFSAR, DBDs, and P&IDs to establish an overall understanding of the design bases of the KC Auxiliary Building Isolation motor operated valves. Design calculations (i.e., differential pressure and required torque/thrust) and site procedures were reviewed to verify that the design bases and design assumptions had been appropriately translated into these documents. Component walkdowns were conducted to verify that the installed configurations would support their design basis function under accident conditions and had been maintained to be consistent with design assumptions. Operating procedures were reviewed to verify that component operation and alignments were consistent with design and licensing bases assumptions. Test procedures and recent test results were reviewed against design basis documents to verify that acceptance criteria for tested parameters were supported by calculations or other engineering documents and that individual tests and analyses served to validate component operation under accident conditions. Vendor documentation, system health reports, preventive and corrective maintenance history, and corrective action system documents were reviewed in order to verify that potential degradation was monitored or prevented.

The team reviewed load flow and voltage drop calculations to evaluate the capability of the sources of electrical power to supply adequate voltage to the valve motors under worst degraded grid voltage conditions. Control logic diagrams were also reviewed to verify that controls and interlocks were consistent with the design-basis performance requirements and operating procedures. The review also addressed adequacy of control circuit voltage, circuit protection/coordination, thermal overload sizing and application, and electrical separation. Additionally, the team reviewed the environmental qualification report for the valve motor operators to confirm their capability to perform their safety function during design basis scenarios.

b. Findings

No findings were identified.

.5 Pressurizer Safety Relief Valves

a. Inspection Scope

The team reviewed the plant TS, UFSAR, DBDs, and P&IDs to establish an overall understanding of the design bases of the Pressurizer Safety Relief Valves. Design calculations (i.e., accumulation, blowdown and backpressure) and site procedures were reviewed to verify that the design bases and design assumptions had been appropriately translated into these documents. Operating procedures were reviewed to verify that component operation and alignments were consistent with design and licensing bases assumptions. Test procedures and recent test results were reviewed against design basis documents to verify that acceptance criteria for tested parameters were supported by calculations or other engineering documents and that individual tests and analyses served to validate component operation under accident conditions. Vendor documentation, preventive and corrective maintenance history, and corrective action system documents were reviewed in order to verify that potential degradation was monitored or prevented.

b. Findings

No findings were identified.

.6 Hydrogen Igniters

a. Inspection Scope

The team reviewed the plant TS, UFSAR, DBDs and associated system drawings to establish an overall understanding of the design bases of the component. System one-line diagrams and control circuit drawings were reviewed to develop an understanding of system and component architecture. Test procedures and recent testing results were reviewed in order to verify that acceptance criteria for tested parameters were supported by calculations or other engineering documents to ensure that design and licensing bases were met and that individual tests and or analyses validated component operation under accident/event conditions. The team reviewed vendor manuals and construction drawings, to verify that the components' installed configuration would support its design basis function under accident/event conditions and that the equipment was properly protected. Interviews with system engineers and maintenance personnel were conducted to gain a better understanding of the design basis. System health reports, component maintenance history and licensee corrective action program reports were reviewed to verify that potential degradation was monitored or prevented and the component replacement was consistent with in service/equipment qualification life. The system was in maintenance rule 10 CFR 50.65(a)(1) status, so the team reviewed the maintenance rule scoping documents, system get-well plan and proposed, actual and planned corrective actions to ensure that the licensee was properly evaluating the cause of the deficiencies and taking appropriate corrective actions to prevent recurrence.

b. Findings

No findings were identified.

.7 Standby Shutdown Facility (SSF)

a. Inspection Scope

The team reviewed the UFSAR, DBDs, and single-line diagrams to establish an overall understanding of the design bases of the SSF. The team also conducted interviews with plant design and system engineers to evaluate the facility design requirements, functions, and uses and to obtain historical test performance results. In particular, the team evaluated the capability of the facility to support operations in response to an event involving the loss of all alternating current power in either of the two units (station blackout (SBO)), and to bring the affected unit to a hot shutdown condition. The team reviewed single line electrical diagrams, equipment and support components housed within the facility, controls and instrumentation available to the operating staff, circuit breakers alignment, and readiness status of SBO diesel generator. The team also reviewed the diesel loading analysis, control schematics of the circuit breakers required to function during the SBO event, as well as schematic diagrams associated with diesel starting and loading, to verify their compliance with system loading and operation requirements. The team examined maintenance and problem report records as well as the system health reports to confirm that the system components were being monitored and potential degradation was being prevented or readily corrected. Additionally, the team evaluated the health reports associated with the on-site safety-related electrical sources to confirm that the bases for the SBO coping analysis were reasonable. Test procedures and recent test results addressing performance of SBO batteries and the diesel generator were reviewed to verify that test results and acceptance criteria adequately confirmed the capability of the equipment to mitigate the consequences of a SBO event. The team conducted several walkdowns of the facility to assess the observable material condition of the equipment and to confirm that the equipment configuration was in accordance with drawings and design assumptions. The team observed ongoing system tests to evaluate response to a simulated SBO event.

b. Findings

No findings were identified.

.8 Emergency Diesel Generator (EDG) Exhaust Fans (1A1/1B1)

a. Inspection Scope

The team reviewed the UFSAR, system description, vendor manuals, control logic, drawings, maintenance records, surveillances and loading and design calculations to verify that the EDG exhaust ventilation fans could perform their function. Design bases documents were reviewed to verify the EDG exhaust fans could provide emergency ventilation for the diesel generators. Each fan is sized to provide 50% of the ventilation air required for the diesel generator building when the generators are operating, to maintain the diesel generator building temperature to less than or equal to 125°F. The team assessed whether the mechanical load time requirements for the EDG Building Ventilation System (VD) emergency fans met requirements that they shall automatically begin operation when the diesel starts, to support the operation of the diesel. A system walkdown was performed to verify physical condition and configuration control was maintained as designed. The team also reviewed selected operating experience issues dealing with EDG building ventilation to verify that issues at other facilities were being appropriately identified and addressed.

b. Findings

Introduction: The team identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure adequate tornado missile protection for the EDG exhaust relief and backdraft dampers as required. Specifically, 12 inches of the upper portion of the VD system exhaust dampers were exposed and not protected from a tornado-generated missile.

Description: During a walkdown of the VD system, the team observed that 12 inches of the upper portion of the VD system exhaust dampers were potentially exposed and not protected from a tornado generated missile. Similar issues were identified by the licensee in 2008 and 2009, where portions of safety related piping systems in the main steam doghouses & diesel generator buildings were not fully protected against tornado missiles. These issues were captured in the licensee's corrective action program as PIPs M-08-4098 and M-09-2339, respectively. McGuire UFSAR Section 3.5.1.3 stated that all Category 1 structures exposed to probable missiles are designed to withstand their effect. 10CFR50, Appendix A, General Design Criterion 4, further stated, in part, that structures, systems, and components important to safety shall be appropriately protected against dynamic effects, including the effects of missiles that may result from equipment failures and from events and conditions outside the nuclear power unit.

The design basis of the VD System is to control air temperature in the diesel buildings. Each diesel building room was equipped with 4 relief dampers, 4 relief backdraft dampers, and a fixed louver. The relief dampers were located at the diesel room exhaust openings (2 per opening) and open to allow flow from their respective rooms in the diesel building to help prevent the diesel buildings from exceeding 125°F. The relief dampers are normally open and close in the event of a Halon system actuation to aid in extinguishing a fire in the diesel building. The relief backdraft dampers are normally closed and are located adjacent to the relief dampers. They open to allow flow from their respective rooms in the diesel building to help prevent the diesel buildings from exceeding 125°F. The VD exhaust dampers (relief and backdraft) are located approximately 8 feet behind the EDG missile shield wall; however 12 inches of the upper portion of the VD system exhaust dampers were exposed and not protected from a tornado generated missile.

Analysis: The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, there was reasonable doubt the EDG ventilation exhaust would remain functional to support EDG operation in the event tornado-induced missiles damaged the exhaust backdraft relief dampers. The team performed a Phase 1 evaluation per Inspection Manual Chapter 0609, Attachment 4, and determined that the finding was potentially risk significant due to a seismic, flooding, or severe weather initiating events (e.g., tornadoes). Consequently, a Phase 3 analysis was performed by a senior reactor analyst. The dominant sequence was a loss of offsite power caused by the tornado, which generates missiles that impact the EDG dampers and where the licensee fails to transfer electrical power from the opposite and unaffected unit. The analyst determined that the risk significance of the issue was very low, Green (i.e., ΔLERF < 1.0E-7).

The team determined there was a cross cutting aspect in the area of Problem Identification and Resolution [P.1(c)]. Specifically, the licensee did not thoroughly evaluate problems with respect to adequate tornado missile protection such that the resolutions addressed causes and extent of conditions, as necessary. This includes properly classifying, prioritizing, and evaluating for operability and reportability conditions adverse to quality. This also includes, for significant problems, conducting effectiveness reviews of corrective actions to ensure that the problems were resolved.

Enforcement: Appendix B to 10 CFR Part 50, Criterion III, "Design Control," requires, in part, that measures be established to assure that applicable regulatory requirements and the design basis, as defined in Part 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies, are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, on March 22, 2012, the team identified that since initial licensing of Units 1 and 2 (1981 and 1983 respectively), the licensee failed to translate the appropriate tornado missile protection requirements into specifications and drawings that would result in structures adequately protecting EDG exhaust relief and backdraft dampers. The licensee entered this issue into their corrective action program as PIP M-12-2158 and initiated compensatory measures in the form of concrete jersey barriers in front of each exhaust damper opening to provide additional shielding for the unprotected opening. Because this violation was of very low safety significance and the issue was entered into the licensee's corrective action program, as PIP M-12-2158, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000369, 370/2012007-02; Inadequate Tornado Missile Protection for EDG Exhaust Ventilation System.

.9 SSF Fans (#1 & #3)

a. Inspection Scope

The SSF fans provide ventilation for the SSF diesel generator. Each fan is sized to provide adequate ventilation air required for a suitable environment for diesel operation in the SSF diesel building when the generators are operating. The team reviewed the UFSAR, system description, vendor manuals, control logic, drawings, maintenance records, surveillances and loading and design calculations to verify that the SSF ventilation fans could perform their function. A system walkdown was performed to verify physical condition and configuration control was maintained as designed.

b. Findings

No findings were identified.

.10 Pressurizer Pressure-Operated Relief Valves (PORVs)

a. Inspection Scope

The team reviewed applicable portions of the design and licensing documents, including flow diagrams, applicable plant calculations, and drawings to identify the design bases and functional requirements of the pressurizer PORVs. The team also interviewed design and system engineers to evaluate the components design requirements and obtain historical test performance results. In addition, the team reviewed the problem investigation program database to assess identification and resolution of failures or

nonconforming issues. The team reviewed the valve control diagrams to confirm that they conformed to the system functional description and operation requirements contained in the FSAR and DBD. The team also reviewed availability and capability of air supply and electrical power sources to verify that the valves would be able to perform their intended design function when called upon under design basis requirements. Additionally, the team reviewed the environmental qualification report of the PORV solenoid valves and associated limit switches to verify that the components were capable of performing their functions under the most limiting post-accident conditions. The team examined system health reports, records of recent surveillance testing and maintenance activities to confirm the readiness of the components to perform its required functions during system demands. Additionally, the team reviewed station operating and off-normal procedures to verify that design basis requirements had been adequately translated into procedures and instructions. The team did not perform a walkdown and assessment of the material conditions of the PORVs because they are located in a restricted area.

b. Findings

No findings were identified.

.11 Safety Related Circuit Breakers

a. Inspection Scope

The team reviewed selected portions of the degraded grid voltage study to confirm the capability of selected components to perform their safety functions under accident conditions concurrent with grid voltage at minimum levels. The team also evaluated selected portions of load flow analyses and breaker coordination studies to confirm that selected components were properly protected against overloads and faulted conditions and that breakers were not subject to spurious tripping. Additionally, the team evaluated selected breaker testing records to determine whether scheduled testing activities were consistent with vendor recommendations. Engineering personnel were also interviewed to assess knowledge of operating experience related to low voltage molded-case circuit breakers.

b. Findings

No findings were identified.

.3 Review of Low Margin Operator Actions

a. Inspection Scope

The team performed a margin assessment and detailed review of four risk-significant and time-critical operator actions associated with the selected components. Where possible, margins were determined by the review of the assumed design basis and UFSAR response times. For the selected operator actions, the team performed a walkthrough of associated end path procedures, abnormal operating procedures and other operations procedures with plant operators and engineers to assess operator knowledge level; adequacy of procedures; availability of special equipment when required; and the conditions under which the procedures would be performed. Detailed reviews were also conducted with operations and training department leadership.

Observation and utilization of a simulator training period was used to further understand and assess the procedural rationale and approach toward meeting the design basis and UFSAR response and performance requirements. Operator actions were observed on the plant simulator and during plant walkdowns. Selected operator actions associated with the following events/evolutions were reviewed:

- Operator actions for failure to initiate high pressure recirculation
- Operator actions for failure to cross-tie power from U2 during U1 LOOP
- Operator actions for alignment of SSF during SBO sequence
- Operator actions for starting hydrogen igniters following a LOCA

b. Findings

No findings were identified.

.4 Operating Experience (7 samples)

a. Inspection Scope

The team reviewed seven OE issues for applicability at McGuire Nuclear Station. The team performed an independent review for these issues and where applicable, assessed the licensee's evaluation and dispositioning of each item. The issues that received a detailed review by the team included:

- RIS 2011-12, "Adequacy of Stations Electric Distribution System Voltages, Rev.1"
- IN 2008-02, "Findings Identified During Component Design Basis Inspections"
- IN 98-25, "Loss of Inventory from Safety-Related Closed Loop Cooling Water Systems"
- IN 87-08, "Degraded Motor Leads in Limitorque DC Motor Operators"
- IN 2012-03, "Design Vulnerability in Electric Power System"
- Bulletin 88-04, "Potential Safety-Related Pump Loss"
- GL 89-13, "Service Water System Problems Affecting Safety-Related Equipment"

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On June 18, 2012, the team presented the final inspection results to Mr. Repko and other members of the licensee's staff. Proprietary information that was reviewed during the inspection was returned to the licensee or destroyed in accordance with prescribed controls.

ATTACHMENT: SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:
R. Abbott, Licensing Engineer
K. Ashe, Regulatory Compliance Manager
J. Boyle, Engineering Manager
S. Capps, Station Manager
D. Brewer, Safety Assurance Manager
B. Meyer, Engineering
R. Repko, Site Vice President
T. Sarver, Engineering
S. Snider, Engineering Manager

NRC personnel
J. Zeiler, Senior Resident Inspector, Division of Reactor Projects, McGuire Resident Office
J. Heath, Resident Inspector, Division of Reactor Projects, McGuire Resident Office

Attachment

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000369, 370/2012007-01	NCV	Failure to Evaluate Potential Blocking of TDCA Pump Lube Oil Cooler During Certain Fire Events (Section 1R21.2.1)
05000369, 370/2012007-02	NCV	Inadequate Tornado Missile Protection for EDG Exhaust Ventilation System (Section 1R21.2.8)

List of Documents Reviewed

Technical Specifications and Bases
Updated Final Safety Analyses

Drawings

MCEE-165-02.04, Elementary Diagram Hydrogen Mitigation System, Rev. 0
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MCCD-1703-06.11, One Line Diagram 600VAC Essential Motor Control Center, 1EMXA4, Rev. 14
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MC-1920-09, Electrical Equipment Layout Reactor Building Unit-1 Below El. 778'-10 Cable Tray Hanger Support Steel, Rev. 10
MC-1927-01, Electrical Equipment and Cable Tray layout Reactor Building Ice Condenser Pit Plan, Rev. 10
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MC-1922-01, Electrical Equipment Layout Reactor Building Unit 1 Below EL. 841' +10" Plan, Rev. 16
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MCEE-165-02.03, Elementary Diagram Hydrogen Mitigation System (EHM), Rev. 1
MC-1614-04.00, Flow Diagram of Standby Shutdown Facility HVAC System, Rev. 2
MC-1522-26.85-05, Heating-Ventilation-Air Conditioning Standby Shutdown Facility Controls & Equipment Schedule, Rev. 4
MCEE-120-07.02, Elementary Diagram Diesel Generator Auxiliaries Bldg. Ventilation Fan 1A1 (DSF-1A), Rev. 11
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MCEE-131-03.40, Elementary Diagram Standby Shutdown Facility-VW System SSF-SF-1, Rev. 2
DWG No. MCFD-1554-03.01, Flow Diagram of Chemical and Volume Control System (NV), Rev. 23
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DWG No. MCFD-1573-01.00, Flow Diagram Of Component Cooling System (KC), Rev. 8
DWG No. MCFD-1573-01.01, Flow Diagram Of Component Cooling System (KC), Rev. 10
DWG No. MCFD-2573-01.00, Flow Diagram Of Component Cooling System (KC), Rev. 5
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MCCD-1703-06.00, One Line Diagram, 600 VAC Load Centers 1ELXA and 1ELXC, Rev. 4
MCCD-1703-08.00, One Line Diagram, 600 VAC Load Centers 1SLXA, 1SLXF and 1SLXH, Rev. 8
MCCD-1703-10.00, One Line Diagram, 600 VAC Load Centers 1SLXC and 1SLXD, Rev. 4
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MCEE-111-01.47, Elementary Diagram, 600V Nonessen. Load Center No. 1SLXG, CPT 5B Diesel Generator S. Incoming Breaker, Rev. 6
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MCEE-115-00.35, Elementary Diagram, 4160V Switchgear #1ETB, Potential Circuits (Part #1) Rev. 14
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MCEE-150-00.03, Elementary Diagram, Pressurizer #1 Power Operated Safety Relief Vlv. 1NC34A, Rev. 17
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DCP-1381.05-00-0094, Protective Relay Setting Calculation for Essential Switchgear, Rev. 25
MCC-1205.06-00-0016, AOV Capability Evaluation for 1(2)NC0032, 0034, 0036, Rev. 5
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MCM-1201-05-0258-01, Vendor Manual, AFW Turbine, Rev. D31
MCM 1201.05-388, Vendor Drawing, Lube Oil Cooler Piping, Rev. A
MCS-1154.00-00-0004, Design Basis Specification for the Auxiliary Building Structures, Rev. 7
MCS-1592.CA-00-0001, Design Basis Specification for the CA System, Rev. 27
MCS-1465.00-00-0008, McGuire Design Basis Specification for Fire Protection, Rev. 12
Margin Review Board item number MRB-145 (the margin associated with B train RN to CA autoswap), Update 12/5/2011
10 Year In-Service Testing Program Submittal, 12/22/2004
OEDB Number 02-031647, Evaluation of NRC Information Notice 98-25, Loss of Inventory from Safety-Related Closed Loop Cooling Water Systems, 07/08/98
OEDB Number 02-031647, Evaluation of NRC Information Notice 2002-29, Recent Design Problems in Safety Functions of Pneumatic Systems, 10/23/02
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Procedures

AP/1/A/5500/07, Loss of Electrical Power, Rev. 31
AP/1/A/5500/10, NC System Leakage within the Capacity of Both NV Pumps, Rev. 22
AP/2/A/5500/24, Loss of Plant Control Due to Fire or Sabotage, Rev. 28
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AP/1/A/5500/24, Loss of Plant Control Due to a Fire or Sabotage, Rev, 28
IP/1/B/3050/036, CA Storage Tank Level Calibration, Rev. 0
AP/0/A5500/45, Plant Fire, Rev. 13
EP/1/A/5000/ECA-0.1, Loss of All AC Power Recovery without S/I Required, Rev. 11
IP/0/A/2001/004A, 5 HK Air Circuit Breaker Inspection and Maintenance, Rev. 8
IP/0/A/2001/004B, ABB K-Line 600VAC Air Circuit Breaker Inspection and Maintenance, Rev. 16
IP/0/A/2001/004C, Refurbish ABB/ITE 5 HK Air Circuit Breakers, Rev. 17
IP/0/A/2001/004H, Removal and Installation of Station Circuit Breakers, Rev. 12
IP/0/A/3190/030, Molded Case Circuit Breaker Inspection and Functional Test, Rev. 37
IP/0/B/3061/020, Standby Shutdown Facility Diesel Generator NiCd Battery and Charger Maintenance, Rev. 31
MP/0/B/7300/062, Safe Shutdown Facility Diesel Inspection & Oil Sampling, Rev. 10
MP/0/B/7400/102, Safe Shutdown Facility (SSF) Cummins D/G Preventive maintenance, Rev. 11
NSD-203, Operability/Functionality, Rev. 23
NSD-208, Problem Investigation Program, Rev. 35
NSD-401, Maintenance and Testing of Class QA1 and QA5 AC and DC Molded Case Circuit Breakers, Rev. 4
NSD-505, Response to Reactor Trip, Significant Transient, or Unit Threat Situations, Rev. 8
PT/0/A/4200/002, Safe Shutdown Facility Operability Test, Rev. 57
PT/0/B/4350/035 A, 125/250 Volt SSF Battery Monthly Inspection, Rev. 18
PT/0/B/4350/035 B, 125/250 Volt SSF Battery Quarterly Inspection, Rev. 22
PT/0/B/4350/070, Safe Shutdown Facility Diesel generator 24 VDC Starting Battery Performance Test, Rev. 7
PT/1/A/4151/003A, NC Train A Valve Stroke Timing Using Accumulator Pressure – Shutdown Rev. 30
PT/1/A/4151/003B, NC Train B Valve Stroke Timing Using Accumulator Pressure – Shutdown Rev. 31
PT/1/A/4151/005, NC Valve Stroke Timing Using Air, Rev. 19
RE-3.02, Relaying – 600 and 480 VAC Auxiliary Systems – Equipment Protection Settings, Rev. 4
EDM 210.10.3, Writing the A(1) SSC PIP
PT/1/A/4350/002 B, Diesel Generator 1B Operability Test, Rev. 91
NSD 514, Control of Time Critical Tasks, Rev. 2
AP/1/A/5500/024, Loss of Plant Control due to Fire or Sabotage, Rev. 29
AP/2/A/5500/024, Loss of Plant Control due to Fire or Sabotage, Rev. 28
AP/1/A/5500/07, Loss of Electrical Power, Rev. 31
OP/0/A/6350/008, Enclosure 4.3 (Operation of 6.9KV/13.8KV Breakers), Rev. 65
EP/1/A/5000/ECA-0.0, Loss of All AC Power, Rev. 34
EP/1/A/5000/E-0, Reactor Trip or Safety Injection, Rev. 32
EP/1/A/5000/ES-1.3, Transfer to Cold Leg Recirculation, Rev. 27
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NWS-T-11 NWS Safety Valve Test Procedure for DUKE Energy - McGuire Nuclear Station Crosby Pressurizer Safety Valves, Rev. 4
OP/1/A/6200/001 B, Rev. 49, Chemical and Volume Control System Charging

Completed Procedures

PT/0/A/4600/113, Operator Time Critical Task, Rev. 5, 11/21/02
PT/0/A/4600/113, Operator Time Critical Task, Rev. 8, 10/05/04
PT/0/A/4600/113, Operator Time Critical Task, Rev. 11, 2/09/07
OP-MC-CP-AD:127T: Transfer of Control of Unit 1 SSF, Rev. 15, 7/30/08
OP-MC-CP-AD:126T: Transfer of Control to SSF Room Actions, Rev. 13, 7/04/07
OP-MC-CP-AD:129T: Transfer of Control of Unit 2 SSF, Rev. 15, 6/21/07
OP-MC-CP-AD:087T: Transfer of EMXA-4 To SSF During Loss of All AC, Rev. 13, 7/04/07
NWS Technologies Pressurizer Safety Relief Valve Testing for S/N N56925-00-0001 dated 3/9/2010
NWS Technologies Pressurizer Safety Relief Valve Testing for S/N N56925-00-0003, dated 9/14/2010
NWS Technologies Pressurizer Safety Relief Valve Testing for S/N N56925-00-0009, dated 2/24/2011
NWS Technologies Pressurizer Safety Relief Valve Testing for S/N N56925-00-0001, dated 3/9/2010
PT/1/A/4600/003 D, Rev. 73, Monthly Surveillance Test on Unit 1 NC Pumps Seal Injection Flow Checklist dated 1/12/09
PT/1/A/4600/003 D, Rev. 75, Monthly Surveillance Test on Unit 1 NC Pumps Seal Injection Flow Checklist dated 1/11/10
PT/1/A/4600/003 D, Rev. 77, Monthly Surveillance Test on Unit 1 NC Pumps Seal Injection Flow Checklist dated 1/23/11
PT/2/A/4600/003 D, Rev. 58, Monthly Surveillance Test on Unit 2 NC Pumps Seal Injection Flow Checklist dated 1/25/09
PT/2/A/4600/003 D, Rev. 61, Monthly Surveillance Test on Unit 2 NC Pumps Seal Injection Flow Checklist dated 1/25/10
PT/2/A/4600/003 D, Rev. 62, Monthly Surveillance Test on Unit 2 NC Pumps Seal Injection Flow Checklist dated 1/25/11
PT/!/A/4200/038, Venting of the Unit 1 CA System Suction Piping, 01/21/2012
PT/2/A/4200/043C, Flushing of Unit 2 RN Makeup Lines to CA Pumps (SSF), 03/06/08
PT/2/A/4200/043A, Flushing of Unit 2 RN Makeup Lines to CA Pumps (A-Train), 11/13/10
PT/2/A/4200/043B, Flushing of Unit 2 RN Makeup Lines to CA Pumps (B-Train), 11/19/10
PT/1/A/4252/001, #1 CA Turbine Driven Pump Performance Test, 02/01/12, 12/5/11
PT/1/A/4252/001C, #1 CA Turbine Driven Pump Performance Test Opening 1SA-49 First, 12/30/10
PT/1/A/4252/001B, #1 CA Pump Performance Test, 10/13/10
PT/1/A/4252/001A, #1 CA Pump Performance Test, 10/13/10
PT/1/A/4252/017, CA Check Valve Backseat Verification, 12/19/11
PT/1/A/4252/004A, S/G Injection Check Valve Verification for 1A CA Pump, 03/23/11
PT/2/A/4252/004B, S/G Injection Check Valve Verification for 2B CA Pump, 03/22/11
PT/2/A/4252/004A, S/G Injection Check Valve Verification for 2A CA Pump, 10/02/09

Work Order

00442290-01, 1EMXH1, OPS Swap from Normal to Alt. Fdr., 04/20/06
00587785-04, 0EQDBADG Perform Performance Battery Test, 01/21/09
01704523-01, PM 1ETA11 Breaker, 02/13/07
01713997-04, PM ECVA Charger Breaker Functional Test, 06/25/07
01714447-01, PM 1ETB4 Breaker, 01/30/07
01714448-01, PM 1ETB5 Breaker, 01/30/07
01750770-05, PM 2EMXC MCC and Test Breakers, 03/18/08

01762814-01, PM 1ETA4 Breaker, 01/13/09
01762816-01, PM 1ETA5 Breaker, 01/13/09
01837717, NC Train A Valve Stroke Timing Using Accumulator Pressure – Shutdown, 03/16/10
01837718, NC Train B Valve Stroke Timing Using Accumulator Pressure – Shutdown, 03/16/10
01840423-03, 2EMXD MCC, 09/26/2009
01862070-02, 1EMXC-3D/(1EOC20) Test-Replace Bkr w/HFD Type & Pwr Fuses, 03/18/2010
01867358-01, PM 1ETA11 Replace Breaker and Aux. Switches, 09/30/09
01872484-05, NC Valve Stroke Timing Using Air, 03/13/10
01911734-01, PM 1ETB4 Replace Breaker and Aux. Switches, 04/08/10
01911735-01, PM 1ETB5 Replace Breaker and Aux. Switches, 06/24/10
01920056, NC Train A Valve Stroke Timing Using Accumulator Pressure – Shutdown, 09/19/11
01920057, NC Train B Valve Stroke Timing Using Accumulator Pressure – Shutdown, 09/19/11
01938415-01, PM 1ETB11 Breaker, 09/07/10
01956781-05, -06, -07, NC Valve Stroke Timing Using Air, 09/17/11
01957116, Actuation Test PORV M1NC0034, 10/04/11
01957211, Actuation Test PORV M1NC0036, 10/04/11
01957925, Actuation Test PORV M1NC0032, 10/03/11
01974775-01, PT 0EQDBADG SSF D/G Gen Cont Battery, 08/18/11
01991308-01, PM 0ETMBASDSP1, 1Q SSF Battery Inspection, 08/29/11
01996219-01, PM 0ETMBASDSP2, 1Q SSF 125 VDC Battery SDSP2 Inspection, 09/27/11
01999439-01, PT 0ETMBASDSS, 1Q Battery Inspection, 10/24/11
02011136-01, PT 0ETMBASDSS, 1Q Battery Inspection, 01/16/12
02011774-01, PM-0ADDE0005-(1M)-Inspect SSF Diesel, 12/15/11
02013715-01, PT 0ETMBASDSP1, Perform PM on SSF 125 VDC Battery, 12/29/11
02013717-01, PT 0ETMBASDSS, Perform PM on SSF 125 VDC Battery, 12/29/11
02018197-01, PM-0ADDE0005-(1Q)-SSF Diesel Inspection, 01/12/12
02018858-01, PM-0ADDE0005-(3Y)- Inspect SSF Diesel, 02/09/12
02018942-01, PT 0ETMBASDSP1, Perform PM on SSF 125 VDC Battery, 01/27/12
02018944-01, PT 0ETMBASDSS, Perform PM on SSF 125 VDC Battery, 01/27/12
02005469-01, PT 0ETMBASDSP2, 1Q SSF 125 VDC Battery SDSP2 Inspection, 12/21/11
02012145-01, Safe Shutdown Facility Operability Test, 12/16/11
02013716-01, PT 0ETMBASDSP2, Perform PM on SSF 125 VDC Battery, 12/29/11
02017192-01, Safe Shutdown Facility Operability Test, 01/12/12
02018941-01, PT 0EQDBADG, Clean, Check Voltage, 01/27/12
02018943-01, PT 0ETMBASDSP2, Perform PM on SSF 125 VDC Battery, 01/27/12
02022499-01, Safe Shutdown Facility Operability Test, 02/09/12
098055194-06, 1EPBBK1ETA4, PM Replace/Refurbish Breaker, 11/12/02
098525260-05, Replace Breaker 2EMXG-6D, 08/03/02
098638055-01, PM 0EQDBADG, SSF D/G Battery Performance Discharge Test, 06/08/05
098681765-47, PM 1EMXD2A Rx Building Pen Overcurrent, 09/21/05
098698422-01, PM 1SLXG5B Breaker and Relay, 02/15/06
098753897-07, 1VLAH0007 1C VL Unit Tripped, 10/16/05
00-003689-000, 5th Vital Battery Room Roof Leak, dtd 4/24/2000.
01843975-01, Hydrogen Mitigation Igniter Current Verification, Train A, dtd. 02/11/2009
01858896-01, Hydrogen Mitigation Igniter Current Verification, Train A, dtd. 05/11/2009
02000754-01, Hydrogen Mitigation Igniter Current Verification, Train A, dtd. 11/15/2011
02000751-01, Hydrogen Mitigation Igniter Current Verification, Train B, dtd. 11/02/2011
02010539-01, Hydrogen Mitigation Igniter Current Verification, Train B, dtd. 01/26/2012
01784117-03, Hydrogen Mitigation Igniter Glow Plug Test, dtd 10/06/2008
01872977-05, Hydrogen Mitigation Igniter Glow Plug Test, dtd 02/25/2010
01956667-01, Hydrogen Mitigation Igniter Glow Plug Test, dtd 08/18/2011

01957977-01, Perform Electrical Tests 1A1 D/G Ventilation Fan Motor (DSF-1A), dtd 09/28/2011
01957992-01, Perform Electrical Tests 1B1 D/G Ventilation Fan Motor (DSF-1B), dtd 09/25/2011
01928528-01, PM-1VDAH0003-1B1 D/G Ventilation Fan Motor (DSF-1B), dtd 11/01/2010
01863015-01, PM-1VDAH0008-1A1 D/G Ventilation Fan Motor (DSF-1A), dtd 12/14/2009BCT-2000 Battery Load Test Report for Battery SDSP1, 01/26/09
BCT-2000 Battery Load Test Report for Battery SDSP2, 02/04/09
BCT-2000 Battery Load Test Report for Battery SDSS, 02/02/09

Maintenance Work Orders
PM 2CA-165, Inspect Unit 2 TD AFW Pump Suction from 2A RN Header Check, 09/10/09
PM 2CA-166, Inspect Unit 2 TD AFW Pump Suction from 2B RN Header Check, 03/04/11

Corrective Action Documents Reviewed
G-12-00037, OEDB 60073, Subject: RIS11-12 Revision 1 Adequacy Of Station Electric Distribution System Voltages, 01/10/12
G-12-00296, OEDB 60385 Subject: IER L2-12-14, Automatic Reactor Scram Resulting from a Design Vulnerability in the 4.16kV Bus Undervoltage Protection Scheme.
G-12-00399, OEDB 60500 (IN12-03 Design Vulnerability in Electric Power System).
White paper (informal summary of MNS evaluation of Information Notice 2012-03 as of 4/3/2012).
M-00-00338, SOER 99-1, Loss of Grid, 01/27/00
M-09-02716, MCC-1381.05-00-0094, Calculation Enhancement Needed Based on CDBI Questions, 05/26/09
M-09-02720, MCC-1381.05-00-0094, Calculation Enhancement Needed Based on CDBI Questions, 05/26/09
M-09-02846, MCC-1381.05-00-0-147 Needs to be Updated Using the Worst Case Voltage Determined by the Unit 1 and Unit 2 Voltage Calcs (MCC-1381.05-00-0-258 and MCC-1381.05-00-0-263) to Determine the Maximum Valve Control Circuit Length, 08/02/09
M-09-03113, The NRC Questioned the Basis for the Scope of Breakers Included in the Molded Case Breaker Test Program, 06/16/09
M-10-01026, QA Level of Standby Shutdown Facility and Need for Fire Hazard Analysis, 2/17/10
M-10-04468, Placement of SSF D/G in Maintenance rure A(1) Status, 07/27/10
M-11-01144, Evaluation of ATWS/AMSAC and SSS(SBO) Quality Assurance Program, 02/28/11
M-11-03749, NRC Issuance of Bulletin 2011-01: Mitigating Strategies, 05/11/2011
M-11-05369, MEDB Team to Develop a Self Assessment Plan Aimed at Addressing the OE Issues summarized in the NRC's RIS 2011-12, Rev. 1, 02/12/12
M-11-09295, Potential Concerns with SSF Powered Pressurizer Heater Capacity, 12/09/11M-07-00816, Operator Time Critical Task Verification
PIP M-04-00001, Operability concerns due to gas buildup in the KC systems
PIP M-99-03945, KC Surge Tk level (total A+B) increasing over period of time M-04-03810, Evaluate Enhancements to Gain Margin in Time Critical Action
M-09-02373, Tornado or Seismic induced damage to the Class G portions of CA recirculation piping.
M-09-02339, Some Portions of Safety Related Piping Systems in Doghouse and Diesel Generator Buildings may not be Protected from Tornado Missile. 09/22/09
M-05-00911, 2B ND Pump declared inoperable due to failure of ES AHU RN D/P test, 03/04/05

PIP M-06-04255, Adverse trend associated with increased fouling of plant raw water systems, 09/26/06
PIP M-12-00888, Recent CDBI Violations Due to Inadequate Documentation and / or Test Criteria with respect to IST Closure Testing of CA Pump Discharge Check Valves, 02/26/12
PIP M-09-02216, 2A RN Strainer Fouled (high DP alarm) During high RN Flow Testing per TT Procedure, 04/27/09

Corrective Action Documents Generated As a Result of this Inspection
M-12-01712, DES to consider editorially updating System Description Document for EHM with new glow plug information from Equivalent Change 105225
M-12-01797, Turbine Driven CA Pump Lube Oil Cooler tubing QA classification issue
M-12-02417, During a review of Calculation MCC-1381.05-00-0269 information could not be reconciled with current procedure actions following a degraded grid event
M-12-01733, Develop a formal Design Basis Document for the EHM (Hydrogen Mitigation) System.
M-12-01789, Fleet response to NRC IN 2004-01 is not adequate.
M-12-01802, Documentation of required CA mission time is incorrect in MCC-1223.42-00-0032 and MCS-1505.05-00-0001
M-12-01817, MNS should review and revise calculation MCC-1240.00-00-0008 "Auxiliary Building Temperature Analysis During SSF Operation"
M-12-01818, CDBI Inspector questioned the reference for the KC Technical Specification Bases
M-12-01979, Turbine Driven CA Pump Lube Oil Cooler deficient margin
M-12-02051, A formal supporting calculation for the SSF RN to CA suction flush requirements (flowrate, duration, frequency) could not be located
M-12-02106, EDG VD fan motor loading requirements for Blackout and LOCA are incorrect in UFSAR Table 8-1 and EDG loading calculations
M-12-02132, SSF DBD section 2.2.1.3 contains inappropriate discussion related to internal flooding
M-12-02158, VD exhaust dampers are not fully protected from Design Basis Tornado Missiles
M-12-02174, CDBI inspectors questioned whether the potential existed for blockage of TDCAP cooling water flow to the lube oil cooler, during SSF operation with pump suction aligned to the RC cross-over piping
M-12-02176, Operations JPM Does Not Match What Is In The Procedure
M-12-02180, Apparent discrepancy was identified between UFSAR Table 9-21 and the KC System DBD MCS-1573.KC-00-0001
M-12-02197, OPS Training and OPS need to evaluate the process and frequency for conducting Time Critical JPMs
M-12-02199, NCP Seal Injection From SSF Operator Time Critical Task Marginal
M-12-02395, Develop Training guidance to ensure pip initiate upon task failure
M-12-02399, CDBI Item, MCC-1381.05-00-0269 to be revised to clarify and address discrepancies
M-12-02434, Evaluate motor overload testing or replacement per PM program
M-12-02452, 600 V safety related motors not analyzed to demonstrate functioning after 10 minute degraded voltage
M-12-02453, Molded case breaker test program at McGuire
M-12-02493, Design deliverable documents (EDB and drawings) for the H2 igniter boxes in containment are inconsistent with respect to QA classification
M-12-02458, Operations was unable to provide testing data referenced in letter
M-12-02503, CDBI Item, Technical Bulletin TB-06-2 to be thoroughly reviewed