UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

July 12, 2012

Mr. Mark A. Schimmel
Monticello Nuclear Generating Plant
Northern States Power Company, Minnesota
2807 West County Road 75
Monticello, MN 55362-9637

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT - NRC COMPONENT DESIGN BASES INSPECTION (CDBI) AND TEMPORARY INSTRUCTION 2515/177, "MANAGING GAS ACCUMULATION IN EMERGENCY CORE COOLING, DECAY HEAT REMOVAL, AND CONTAINMENT SPRAY SYSTEMS" INSPECTION REPORT 05000263/2012007(DRS)

Dear Mr. Schimmel:

On May 30, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed a Component Design Bases Inspection (CDBI) and Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," inspection at your Monticello Nuclear Generating Plant. The enclosed report documents the inspection findings, which were discussed on April 20, 2012, and on May 30, 2012, with Mr. T. O'Connor 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 license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, five NRC-identified findings of very low safety significance were identified. The findings involved violations of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as Non-Cited Violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Monticello Nuclear Generating Plant. In addition, 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 III, and the NRC Resident Inspector at the Monticello Nuclear Generating Plant

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 Agency wide 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 No. 50-263
License No. DPR-22

Enclosure: Inspection Report 05000263/2012007
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-263
License No:	DPR-22
Report No:	05000263/2012007(DRS)
Licensee:	Northern States Power Company, Minnesota
Facility:	Monticello Nuclear Generating Plant
Location:	Monticello, MN
Dates:	March 19 through May 30, 2012
Inspectors:	B. Jose, Senior Reactor Engineer, Lead N. Féliz-Adorno, Reactor Engineer, Mechanical J. Gilliam, Reactor Engineer, Electrical M. Jones, Reactor Engineer, Mechanical C. Zoia, Reactor Engineer, Operations G. Skinner, Electrical Contractor H. Campbell, Mechanical Contractor
Approved by:	Ann Marie Stone, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000263/2012007; 03/19/2012 – 05/30/2012; Monticello Nuclear Generating Plant; Component Design Bases Inspection (CDBI) and Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

The inspection was a 3-week onsite baseline inspection that focused on the design of components. The inspection was conducted by regional engineering inspectors and two consultants. Five (Green) findings were identified by the inspectors. All five of these findings were considered Non-Cited Violations (NCVs) of NRC regulations. 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 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, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawing," for the licensee's failure to ensure the bases for sizing of the 250 Vdc safety-related batteries was incorporated into the battery capacity test procedure. Specifically, the licensee did not incorporate the commitment to replace the 250 Vdc batteries when battery capacity drops more than 10 percent of rated capacity from its capacity on the previous test. The licensee verified current operability and entered this issue into their corrective action process as Action Requests 01333346 and 01334083.

  The finding was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of procedure quality, and affected the cornerstone objective to ensure the availability, reliability, and capability of 250 Vdc batteries that are essential for the proper functioning of systems that respond to initiating events to prevent undesirable consequences. The finding screened as having very low safety significance because it did not represent an actual loss of safety function. The inspectors determined there was no cross-cutting aspect associated with this finding because it was not reflective of licensee's current performance due to the age of the issue. [Section 1R21.b.(1)]

- Green. The inspectors identified a finding of very low safety significance(Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to evaluate the operability of safety-related 120 Vac instrument bus loads and 480 Vac non-motor loads under degraded voltage conditions. The inspectors determined several loads and panels did not have the minimum required voltage specified in station procedures, USAR or the manufacturer's specifications. The licensee entered this issue into their corrective action program as Action Requests 01332429, 01334571, and 01334562. The licensee performed testing and analyses, and implemented operating restrictions to obtain reasonable assurance of operability.

The finding was more than minor because it affected the Mitigating Systems Cornerstone attribute of Design Control, and 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 as to whether 480 Vac non-motor loads and equipment supplied by 120 Vac instrument buses had adequate voltage to operate during degraded voltage conditions. The finding was considered to be of very low safety significance (Green) since this was a design deficiency confirmed not to have resulted in a loss of operability or functionality because of licensee's compensatory actions. The inspectors determined the finding had a crosscutting aspect in the area of problem identification and resolution in that the licensee failed to perform a thorough extent of condition review and an assessment of reasonable assurance of operability when similar issues were identified in the 2009 NRC CDBI and a self-assessment performed in 2011. [P.1(c)]. [Section 1R21.b.(2)]

- Green. The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III for the licensee's failure to translate the actual time delay of the degraded voltage relay scheme under all circumstances into the station procedures and Technical Specifications. Specifically, a modification which introduced a five second time delay to the degraded voltage scheme resulted in inconsistencies in Technical Specification Table 3.3.8.1-1 and functionality of the degraded voltage relay scheme when the safety buses are aligned to Transformer 1AR. The licensee entered this issue into their corrective action program as Action Request 01334146, and removed Transformer 1AR from service to match the design with the Technical Specifications.

  The finding was more than minor because it affected the Mitigating Systems Cornerstone attribute of Design Control, and 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 as to whether the degraded voltage scheme would perform as required by Technical Specifications during design basis conditions. The finding was considered to be of very low safety significance (Green) since the total degraded voltage protection scheme time delay of 15 seconds was commensurate with the current accident analysis in the Updated Safety Analysis Report (USAR). The inspectors determined there was no cross-cutting aspect associated with this finding because it was not reflective of licensee's current performance due to the age of the issue. [Section 1R21.b.(3)]

- Green. The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to properly analyze thermal overload relays (TOLs) for Motor Operated Valves (MOVs) and continuous duty motors under degraded voltage conditions. The licensee entered this issue into their corrective action program as Action Requests 01332373, 01332567, and 01334042 and initiated modifications to ensure TOLs would perform as required.

  The finding was more than minor because it affected the Mitigating Systems Cornerstone attribute of Design Control, and 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 as to whether safety-related MOVs and continuous duty motors would continue to operate without tripping during degraded voltage conditions. The finding was considered

to be of very low safety significance (Green) since this was a design deficiency confirmed not to have resulted in a loss of operability or functionality because of licensee's compensatory actions. The inspectors determined there was no cross-cutting aspect associated with this finding because it was not reflective of licensee's current performance due to the age of the issue. [Section 1R21.b.(4)]

- Green. The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to ensure single failure criterion is not violated by the procedure for simultaneously aligning both divisions of 120 Vac uninterruptible instrument power to their alternate, non-battery backed power sources. The licensee entered this issue into their corrective action program as Action Request 01334510 and implemented restrictions to prevent simultaneous alignment of both Divisions 1 and 2 instrument buses to their alternate sources, pending resolution.

  The finding was more than minor because it affected the Mitigating Systems Cornerstone attribute of Procedure Quality, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the uninterruptible instrument power system and the systems supported by it would not be able to perform their required functions during events such as a loss of power or station blackout. The finding was considered to be of very low safety significance (Green) because it did not represent an actual loss of safety function since the licensee had not placed the equipment in this configuration. The inspectors determined there was no cross-cutting aspect associated with this finding because it was not reflective of licensee's current performance due to the age of the issue. [Section 1R21.b.(5)]

B. Licensee-Identified Violations

No violations of significance were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (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 inspectable 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 used information contained in the licensee's PRA and the Monticello's standardized plant analysis risk-model to identify two scenarios to use as the basis for component selection. The scenarios selected were a station blackout (SBO) event and a small break loss-of-cooling-accident (SBLOCA). Based on these scenarios, a number of risk-significant components were selected for the inspection.

The inspectors also used additional component information such as a margin assessment in the selection process. This design margin assessment considered original design reductions caused by design modifications, 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 actions, 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.

The inspectors also identified procedures and modifications for review that were associated with the selected components. In addition, the inspectors selected operating experience issues associated with the selected components.

This inspection constituted 28 samples as defined in Inspection Procedure 71111.21-05.

.3 Component Design

a. Inspection Scope

The inspectors reviewed the Updated Safety Analysis Report (USAR), Technical Specifications (TS), design basis 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 (ASME) Code, Institute of Electrical and Electronics Engineers (IEEE) 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), Regulatory Issue Summaries (RISs), and Information Notices (INs). The review verified the selected components would function as designed when required and support proper operation of the associated systems. The necessary attributes for a component to perform its required function included process medium, energy sources, control systems, operator actions, and heat removal. The attributes to verify 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's corrective action program documents. Field walk downs were conducted for all accessible components to assess material condition and to verify 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 17 components were reviewed:

- Lo-Lo Set Safety Relief Valve (RV-2-71E/H): The inspectors reviewed calculations used for sizing of the safety relief valve (SRV) accumulators and backup alternate nitrogen supply bottles to ensure the valves were capable of functioning under design conditions. The inspectors also reviewed vendor design specifications for the SRV accumulators to verify compliance with the applicable ASME code requirements. In addition, the inspectors reviewed the leak rate testing procedure and recently completed leak rate testing to verify the acceptance criteria were appropriate and data was within the defined criteria. The inspectors reviewed electrical schematic diagrams and control logic diagrams to ensure separation from other trains. Inspectors also reviewed solenoid vendor specification data and 250 Vdc minimum voltage/voltage drop calculations to confirm the valve's solenoid would perform its safety function as designed. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Residual Heat Removal (RHR) Heat Exchanger (E-200B): The inspectors reviewed calculations that determined the flow requirements for the heat exchanger and maximum number of tube circuits that can be plugged while maintaining the ability to remove the design basis cooling load. The inspectors also reviewed the procedural and programmatic aspects of the licensee's program that addresses NRC Generic

Letter 89-13, “Service Water Problems Affecting Safety-Related Equipment,” related to this heat exchanger. The thermal performance test requirements were reviewed to determine if they were consistent with design requirements and industry methodology. Design change history, corrective actions, surveillance results, and trending data were reviewed to assess potential component degradation and impact on design margins. The inspectors performed visual non-intrusive inspections to assess the installation configuration, material condition, and potential vulnerability to hazards. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- RHR Pumps (P-202B/D): The inspectors reviewed the system hydraulic calculations such as, net positive suction head (NPSH) and minimum required flow to ensure the pumps were capable of providing their function and design basis were consistent with the instructions provided by applicable procedures. The inspectors also reviewed vendor specifications and pump curves to confirm these parameters had been correctly translated into calculations, as required. In addition, the inspectors reviewed completed surveillance tests to confirm the acceptance criteria and test results demonstrated the capability of the pump to provide required flow rates. In-service test (IST) results were reviewed to assess potential component degradation and impact on design margins. Design change history, corrective actions, surveillance results, and trending data were reviewed to assess potential component degradation and impact on design margins. The inspectors performed visual non-intrusive inspections to assess the installation configuration, material condition, and potential vulnerability to hazards. The inspectors reviewed motor sizing and pump brake horsepower requirements and vendor ratings for conformance with design basis load conditions. The inspectors also reviewed design calculations to determine the adequacy of voltage at motor terminals during degraded voltage conditions and the adequacy of feeder cable sizing. The motor and feeder cable coordination calculation was reviewed to determine the adequacy of protection and coordination. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Low Pressure Coolant Injection (LPCI) Inboard Valve (MO-2015): The inspectors reviewed calculations such as required thrust and maximum differential pressure to ensure the valve was capable of functioning under design conditions. Local leak rate and IST test results were reviewed to verify acceptance criteria were met and performance degradation would be identified. Design change history, corrective actions, surveillance results, and trending data were reviewed to assess potential component degradation and impact on design margin. The inspectors performed visual non-intrusive inspections to assess the installation configuration, material condition, and potential vulnerability to hazards. The inspectors reviewed minimum voltage/voltage drop calculations to determine the effects of degraded voltage conditions on minimum power and voltage requirements. The inspectors also verified separation from other trains and divisions by reviewing electrical drawings. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Emergency Filtration Train - Emergency Service Water (EFT-ESW) Pump (P-111D): The inspectors reviewed the system hydraulic calculations like NPSH and vortexing to ensure the pump was capable of providing its accident mitigating function and design basis were consistent with the instructions provided by applicable procedures.

The inspectors also reviewed the bay water level set point associated with the component. In addition, the inspectors reviewed completed pump surveillances and IST testing to ensure performance degradation would be identified. The inspectors reviewed vendor specifications and pump curves to make sure these parameters had been correctly translated into calculations, as required. Design change history, corrective actions, surveillance results, and trending data were reviewed to assess potential component degradation and impact on design margins. The inspectors performed visual non-intrusive inspections to assess the installation configuration, material condition, and potential vulnerability to hazards. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Control Room Condenser Chiller (E-200B): The inspectors reviewed calculations that determined the flow requirements for the heat exchanger. The inspectors also reviewed the procedural and programmatic aspects of the licensee's program that addresses NRC Generic Letter 89-13 related to this heat exchanger. Inspect and clean procedure requirements and the completed results were reviewed to determine if they were consistent with design requirements. Design change history, corrective actions, and trending data were reviewed to assess potential component degradation and impact on design margins. The inspectors performed visual non-intrusive inspections to assess the installation configuration, material condition, and potential vulnerability to hazards. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Core Spray (CS) Injection Outboard Valve, MO-1752: The inspectors reviewed the USAR, TS, system description documents, and piping and instrumentation diagrams (P and IDs) to identify the safety-related requirements of the CS valve MO-1752 and to ensure the valve was capable of functioning under these design bases conditions. Maximum expected differential pressure calculations, coupled with valve actuator performance requirements were also reviewed to verify design bases and design assumptions were appropriately translated into design calculations and procedures. In-service test surveillance test data, including related system performance calculations, were reviewed to ensure that MO-1752 had been adequately evaluated and tested for its performance requirements. The inspectors undertook review of modifications to the valve, including the evaluation of General Electric Service Information Letters. Further, the inspectors examined system health reports, trend data, maintenance activities, and applicable corrective actions to verify potential degradation issues were being monitored, prevented, and/or corrected. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- CS Pump B-Train Pump, P-208B: The inspectors reviewed applicable portions of the TS, USAR, system description documents and selected drawings to identify the safety-related performance requirements of the Division 2 CS pump. The inspectors reviewed the TS bases and the original p re-operational testing data. The inspectors reviewed hydraulic calculations addressing NPSH when drawing from the torus or Condensate Storage Tank (CST), potential pump run-out scenarios, and pump head/flow accident condition requirements. The licensee's evaluation of IN 97-90, "Use of Non-conservative Acceptance Criteria in Safety-Related Pump Surveillance Tests", and responses to NRC Bulletin 88-04, "Potential Safety-Related Pump Loss"

were reviewed to ensure the potential safety-related issues had been adequately addressed. Surveillance performance data for quarterly and comprehensive tests were reviewed to ensure potential pump degradation was being adequately monitored, and safety-related performance was being satisfied. Further, the test instrumentation and associated calculations used in the IST procedures were evaluated to ensure acceptable performance criteria were adhered to. Finally, selected condition reports and CS system health reports were reviewed to assess the recent and overall health and condition of pump P-208B. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Emergency Diesel Generator (EDG) 12 Air Start System: The inspectors reviewed the TS, USAR, System Descriptions, Design Basis Documents (DBDs) and associated system Piping and Instrument Diagrams (P and IDs) to establish an overall understanding of the function and safety-related performance requirements of the EDG Air Start System. Calculations, including minimum flow requirements to fully open check valves GSA 32-1, and 32-2, and EDG instrument settings for air start pressure alarm switches were reviewed to ensure design requirements were correctly translated into surveillance procedures. Operations procedures and surveillances were reviewed, in addition to recent corrective action reports and EDG system health reports. The inspectors reviewed the original specifications for dual air start storage tanks and related pre-operational start-up test results, in addition to recent examinations of the tanks including wall thickness evaluations to ensure the tanks were being monitored against wear. The inspectors also performed a limited review of EDG 12 air start system from an electrical perspective. The review was limited to verifying the starting and loading logic to determine whether it was consistent with the design bases. In addition, the inspectors performed a walkdown of the installed equipment to determine whether the installed configuration to assess material condition and the presence of hazards. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- CS Pump Discharge Check Valve, CS-09-2: The inspectors reviewed the TS, USAR, CS system description documents, and P and IDs to establish an overall understanding of the design bases and safety requirements of check valve, CS-09-2. The function of this check valve is to fully-open to allow required CS flow to the reactor vessel internal sparger for reactor core cooling. Attendant to this function is the avoidance of water hammer and subsequent potential CS pump inoperability, one feature of which is to prevent voiding upstream of the pump discharge piping. Control room logbook data, and the requirements for such, were reviewed to confirm adequate back pressure, from the Condensate Storage Water pump, was present upstream of CS-09-2. System health reports, corrective action reports and maintenance history were reviewed in order to verify potential degradation was monitored or prevented. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Automatic Depressurization System Valve, RV-2-71D: The inspectors reviewed the TS, USAR, system descriptions documents, and associated system P and IDs to establish an overall understanding of the function and design performance requirements of valve RV-2-71D. Calculations evaluating SRV bellows allowable

leakage, orifice/diameter sizing, and accumulator system leakage were also reviewed. The inspectors reviewed station surveillance test results in addition to off-site laboratory testing reports. Finally, selected condition reports and Pressure Relief system health reports were reviewed to assess the recent and overall health and condition of RV-2-71D. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Number 16 250 Vdc Battery: The inspectors reviewed various electrical calculations associated with the safety-related DC battery to verify the battery was designed to perform its function and pick up the required loads during SBLOCA and SBO events. These calculations included battery sizing, voltage drop, minimum voltage, and short circuit. The calculation review verified methodology, design inputs, assumptions, and results. The inspectors also reviewed TS surveillance requirements and completed surveillances to confirm sufficient capacity existed for the battery to perform its safety function. The battery's performance history including cell voltage, charging, specific gravity, electrolyte level, and temperature correction were also reviewed to ensure acceptance criteria were met and performance degradation would be identified. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Number 16 250 Vdc Battery Charger: The inspectors reviewed calculations relating to sizing and current limit setting to ascertain the adequacy and appropriateness of design assumptions, and to verify that the charger was adequately sized to support the design basis duty cycle requirements of the 250 Vdc safety-related loads and the associated battery under both normal and design basis accident conditions. The inspectors also reviewed a sampling of completed surveillance tests. In addition, periodic preventive maintenance activities and test procedures were reviewed to determine whether maintenance and testing activities for the battery charger were in accordance with vendor's recommendations. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- 125 Vdc Bus D21: The inspectors reviewed various electrical calculations including voltage drop, short circuit, and minimum voltage calculations to verify methodology, design inputs, assumptions, and results. The inspectors reviewed the breaker/fuse coordination for the bus to ensure adequate coordination existed in case of a fault. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- 4.16 kV Bus 16: The inspectors reviewed bus loading calculations to determine whether the 4.16 kV system had sufficient capacity to support its required loads under worst case accident loading and grid voltage conditions. The inspectors reviewed the design of the degraded voltage protection scheme to determine whether it afforded adequate voltage to safety-related devices at all voltage distribution levels. This included review of degraded voltage relay set point calculations and review of the degraded voltage logic scheme. The inspectors reviewed the over current protection scheme for the 4.16 kV buses including drawings and calculations to determine whether loads were adequately protected and were immune from spurious tripping. The inspectors reviewed 125 Vdc system voltage drop calculations to determine whether 4.16 kV bus circuit breakers had

adequate control voltage. The inspectors reviewed the bus transfer schemes to determine whether they were consistent with the design bases and design calculations. The inspectors reviewed maintenance schedules and procedures for the 4.16 kV bus and its associated circuit breakers to determine whether the equipment was being properly maintained. This included reviewing acceptance criteria in procedures for consistency with vendor recommendations and design calculations. The inspectors reviewed the bus transfer scheme, including drawings, calculations and procedures to determine whether it was consistent with the design and licensing bases. The inspectors reviewed corrective action documents and maintenance records to determine whether there were any adverse operating trends. In addition, the inspectors performed a visual inspection of the 4.16kV safety buses to assess material condition and the presence of hazards. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- Transformer 1R: The inspectors reviewed load flow calculations to determine whether the transformer was applied within its specified ratings. The inspectors reviewed maintenance schedules, vendor recommendations, and procedures to determine whether the transformers were being properly maintained. This included reviewing acceptance criteria in procedures for consistency with vendor recommendations and design calculations. The inspectors reviewed protective relaying schemes and calculations to determine whether the transformer was adequately protected and whether it was susceptible to spurious tripping. The inspectors reviewed maintenance and corrective action histories to determine whether there have been any adverse operating trends. In addition, the inspectors performed a walkdown of the installed equipment to determine the installed configuration was consistent with design documents including drawings, and calculations, and to assess the presence of hazards. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

- 480 V Load Center 104: The inspectors reviewed loading calculations to determine whether the 480 V bus had sufficient capacity to support its required loads under worst case accident loading and grid voltage conditions. The inspectors reviewed the design of the degraded voltage protection scheme to determine whether it afforded adequate voltage to safety-related equipment supplied from the 480 V buses. The inspectors reviewed the over current protection scheme for the 480 V buses including drawings and calculations to determine whether loads were adequately protected and were immune from spurious tripping. The inspectors reviewed maintenance schedules and procedures for the 480 V bus and its associated circuit breakers to determine whether the equipment was being properly maintained. This included reviewing acceptance criteria in procedures for consistency with vendor recommendations and design calculations. The inspectors reviewed corrective action documents and maintenance records to determine whether there were any adverse operating trends. In addition, the inspectors performed a visual inspection of the 480 V safety buses to assess material condition and the presence of hazards. Passive long lived portions of this component were verified to be in scope of license renewal and aging effects managed by appropriate programs.

b. Findings

(1) Inadequate Station Battery Capacity Test Procedure

Introduction: A finding of very low safety significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawing," was identified by the inspectors for the licensee's failure to ensure the bases for sizing of the 250 Vdc safety-related batteries was incorporated into the battery capacity test procedure.

Description: The inspectors reviewed the capacity test results for the Number 16 250 V dc battery to ensure adequate capacity was available and to verify testing was performed in accordance with IEEE Standard 450 criteria and TS requirements. The inspectors also reviewed the capacity test procedure to verify the commitments made to the NRC on replacing the batteries were incorporated into the procedures.

The licensee used a lower aging factor than required by IEEE 450 to calculate the size of their 250 Vdc safety-related batteries. The licensee approved the use this lower aging factor because the licensee committed to an accelerated battery replacement criterion. The commitment (NRC Commitment M91186A) states the licensee will replace the batteries when: (1) 85 percent expected service life is reached; (2) Battery capacity drops more than 10 percent of rated capacity from its capacity on the previous test; or (3) Battery capacity tests at or below 90 percent of the manufacturer's rating. To accomplish this, the licensee also committed to conduct the capacity test every refueling outage and stated the test would be done in accordance to IEEE 450. The inspectors noted replacement Criterion 2 was not incorporated into the capacity test procedure.

The inspectors also noted Step 19.f.2 of the capacity Test Procedure 0197-02, "250 V DC Battery Capacity Test," states to terminate the test if any one cell reaches 1 V. This was not in accordance with IEEE 450, which provides specific instructions on how to proceed with the test if any cell reaches 1 V. By ending the performance test prior to reaching the battery minimum terminal voltage, without any additional analysis, the licensee can not accurately compare test results to ensure capacity doesn't drop more than 10 percent.

The licensee subsequently identified the commitment was removed from the procedure in 2006 and the last test conducted before the procedure was revised was in 2005. To verify Criterion 2 of Commitment M91186A has always been met, the licensee reviewed past performances of battery capacity test since 2007 to ensure battery capacity never fell by 10 percent. Because of this review, the inspector concluded there was reasonable assurance of operability for the station 250 V dc station batteries. The licensee entered the issue into their corrective action program (Action Request (AR) 01333346 and AR 1334083)

Analysis: The inspectors determined the licensee's failure to ensure the bases for sizing of the 250 Vdc safety-related batteries was incorporated into the battery capacity test procedure was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of procedure quality, and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the criterion to terminate the battery capacity test was not in accordance with IEEE 450 and the licensee failed to

incorporate criteria for replacing the 250V battery if battery capacity dropped more than 10 percent of rated capacity from its capacity on the previous test. This prevented accurate quantitative measurement of capacity degradation and identification of the need to replace the 250 Vdc batteries.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, Attachment 0609.04, "Phase I - Initial Screening and Characterization of findings," Table 4a for the Mitigating Systems cornerstone. The inspectors answered "yes" to Question 1 because the failure to ensure the bases for sizing of the 250 Vdc safety-related batteries was incorporated into the battery capacity test procedure did not result in a loss of operability or functionality for the station's safety-related batteries. Therefore, the inspectors concluded the finding did not represent an actual loss of safety function, and the issue screened out as having very low safety significance (Green).

The inspectors did not identify a cross-cutting aspect associated with this finding, because the procedure was revised before 2007 and was not representative of current performance.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedure, and Drawing," requires, in part, activities affecting quality shall be prescribed by documented procedures and shall be accomplished in accordance with these procedures. Procedures shall include appropriate quantitative or qualitative acceptance criteria for determining important activities have been satisfactorily accomplished.

Contrary to the above, as of 2007, Procedure 0197-02, "250 V DC Battery Capacity Test," did not include appropriate quantitative or qualitative acceptance criteria for determining important activities have been satisfactorily accomplished. Specifically, the licensee failed to include criteria for replacing the 250V battery if battery capacity dropped more than 10 percent of rated capacity from its capacity on the previous capacity test and the existing criteria to terminate the test before the battery reaches minimum terminal voltage was not in accordance with IEEE 450 Standard. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program (ARs 01334318, 01334083 and, 01334318), this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000263/2012007-01(DRS); Inadequate Station Battery Capacity Test Procedure).

(2) Failure to Analyze Voltage Requirements for Operability of Non-Motor Loads and 120 Vac Instrument Loads

Introduction: The inspectors identified a finding of very low safety-significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to evaluate the operability of safety-related 120 Vac instrument bus loads and 480 Vac non-motor loads under degraded voltage conditions. The inspectors determined several loads and panels did not have the minimum required voltage specified in station procedures, USAR, or the manufacturer's specifications.

Description: The inspectors identified the voltage calculations for safety-related equipment did not address acceptance criteria for operability of non-motor loads such as battery chargers and heating, ventilation and air conditioning equipment. In addition, the inspectors identified some safety-related 120 Vac instrument panels could have voltages

lower than specified in station procedures and the USAR when supplied through their associated 480/120 Vac transformers. These included Panels Y70 and Y80 (normally supplied by battery backed vital inverters) when were aligned to their alternate sources; and Panel Y20, which is normally supplied directly through a 480/120V transformer. Specifically:

- Non-Motor Loads: Calculation CA-93-066 determined the safety-related 480V motor control centers (MCCs) would satisfy their minimum design voltage criterion of 426 V when the upstream 4160 V bus was at its analytical limit. Calculation 06-10 determined terminal voltages for all loads supplied by safety-related 480V MCCs based on minimum voltage of 426V at the MCCs, but only provided acceptance criteria for operability of motors. The inspectors noted the voltage for the Class 1E Battery Chargers was determined to be 420.6V which is lower than the minimum required voltage of 432V per the vendor manual. Similarly, the calculation did not provide acceptance criteria for other safety-related loads including the 480V rated standby gas treatment electric heaters and the emergency filtration train charcoal air filter unit, which also showed voltages below 432V. In response to the inspectors' concerns, the licensee initiated AR 01332429 and performed evaluations of the affected equipment. This included requesting the battery charger vendor to perform low voltage testing on a similar device. The licensee concluded these tests and evaluations demonstrated reasonable assurance of operability of the affected equipment during degraded voltage conditions.

- 120 Vac Instrument Buses: The safety-related 120 Vac electrical system features two inverter supplied instrument busses, Y70 and Y80. These buses may also be supplied by unregulated 480/120 Vac transformers connected to Division I and Division II MCCs, respectively. It also features panel Y20 that is only supplied from the 480V system though either of two 480/120 Vac transformers that are connected to separate divisions. In USAR Section 8.10, "Adequacy of Station Electrical Distribution System Voltages," it stated the AC Load Study program had established the minimum acceptable 120 Vac Instrument AC System Voltages as 108 Vac. Monticello Work Instructions MWI-3-M-2.01, "AC Electrical Load Study," Appendix II, "Acceptance Criteria," stated the 108 Vac system criteria would be present at the 120 Vac bus, per a December 30, 1983, Monticello submittal to the NRC.

  The inspectors requested calculations which demonstrated the 108 Vac criteria would be satisfied when panels Y70 and Y80 were connected to their alternate source through their respective 480/120V transformer and for panel Y20 in its normal alignment. The inspectors also requested data that supported the assumption the voltage drop in circuits fed from 120 Vac panels was negligible. The licensee indicated 120 Vac system calculations were not available, but stated this issue had been previously identified in the 2009 CDBI and was captured in ARs 01209071, 01199936 and 01197202. The inspectors noted these ARs did not include an evaluation for reasonable assurance of operability for components. The condition evaluation performed as Corrective Action No. 2 of AR 01199936 did indicate there were several control panels fed from 120 Vac safety-related panels Y82, Y81, Y80, Y30, and Y20 and each of these panels fed multiple safety-related components with minimum voltage requirements. In order to assure proper operation of these safety-related components, the licensee had made several recommendations including performing a minimum number of calculation(s) that would bound the minimum voltage for all these components and/or install voltage

regulators at the source transformers to correct the effects of degraded voltage. The licensee closed AR 01199936 to long term formal voltage calculation without performing an assessment of reasonable assurance of operability.

The inspectors further noted the 2011 Focused Self Assessment (FSA) conducted in preparation for the CDBI found the extent of condition for the 2009 finding was inadequate because it did not extend beyond the six Solenoid Operated Valves (SOVs) that were evaluated during the CDBI. In response to the FSA issue, the licensee performed additional detailed evaluations of several other SOVs. However, the FSA issue did not address other types of safety-related equipment supplied by the 120 Vac system, and the inspectors' review of the SOV evaluations performed during the 2009 CDBI and the 2011 FSA showed the voltages at several 120 Vac instrument panels would be below the 108 Vac criterion listed in MWI-3-M-2.01 and USAR 8.10, under degraded voltage conditions. Specifically, with voltage at the upstream MCCs at their minimum voltage of 426 Vac, voltage at panels downstream of the Y20 and Y80 panels ranged from 106.16 to 103.53 volts. This non-conformance with the USAR criterion of 108 Vac had not been evaluated for its effect on Class 1E equipment other than SOVs in terms of operability.

In response to the inspectors' concerns, the licensee initiated ARs 01334571 and 01334562. In AR 01334571, the licensee provided a general evaluation of loads supplied by Panel Y20 and concluded that based on previous evaluations of SOVs, concluded there was reasonable assurance of operability pending more extensive analysis. In AR 01334562, the licensee concluded Panels Y70 and Y80 should remain on their regulated inverter sources to ensure adequate voltage for operability of components supplied by these panels, pending formal additional analyses.

Analysis: The inspectors determined the failure to evaluate the operability of safety-related 120 Vac instrument bus loads and 480 Vac non-motor loads when the as-calculated voltages were less than the required voltages under degraded voltage conditions was a performance deficiency. The finding is similar to IMC 0612 Appendix E, Example 3.j, because the issue resulted in a condition where there was a reasonable doubt with respect to operability of safety-related components. Specifically, there was reasonable doubt as to whether non-motor loads and equipment supplied by 120 Vac instrument buses had adequate voltage to operate during degraded voltage conditions. Therefore, the finding was more than minor because it affected the Mitigating Systems cornerstone attribute of Design Control, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, Attachment 0609.04, "Phase I - Initial Screening and Characterization of findings," Table 4a for the Mitigating Systems cornerstone. The inspectors answered "yes" to Question 1 because this was a design deficiency confirmed not to have resulted in a loss of operability or functionality. Therefore, the inspectors concluded the finding screened out as having very low safety significance (Green).

The inspectors determined the finding has a crosscutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, in that, the licensee failed to perform a thorough extent of condition review when similar issues were identified in the 2009 NRC CDBI and a self-assessment performed in 2011 [P.1(c)].

Enforcement: Title 10 CFR 50, Appendix B, Criterion III, "Design Control," requires in part, 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 calculation methods, or by the performance of a suitable testing program.

Contrary to the above, as of March 19, 2012, the licensee's design control measures failed to adequately check the adequacy of the design of the degraded voltage relay protection scheme by analyzing the adequacy of voltages for operability of safety-related loads at all distribution levels. Because this violation was of very low safety significance and because the issue was entered into the licensee's corrective action program as ARs 01332429, 01334571, and 01334562, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000263/2012007-02 (DRS); Failure to Analyze Voltage Requirements for Operability of Non-Motor Loads and 120 Vac Instrument Panels).

(3) Failure to Maintain the Degraded Voltage Function Time Delay Design

Introduction: The inspectors identified a finding of very low safety-significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III for the licensee's failure to translate the actual time delay of the degraded voltage relay scheme under all circumstances into the station procedures and technical specifications.

Description: The Monticello undervoltage protection system consists of first and second level relays, with time delays to limit the duration of inadequate voltage at the terminals of safety-related equipment. The first level relays, designated as Loss of Voltage relays, will separate the safety buses from offsite power if voltage drops below approximately 70 percent for greater than five seconds. The second level relays, designated as Degraded Voltage Relays, are required to separate the safety buses from the affected offsite power if voltage drops below approximately 94 percent for 9 ± 0.2 seconds as indicated in TS Table 3.3.8.1-1, "Loss of Power Instrumentation."

The plant was originally designed to separate the safety buses from the degraded offsite source and transfer directly to the EDGs within the designated 8.8 to 9.2 second specified in TS Table 3.3.8.1-1. Specifically, on a degraded voltage condition, if the Loss of Voltage scheme is not also tripped, the affected safety bus separated from offsite power, and a signal would be generated to close the output breaker for the associated EDG. The EDG breaker would close when the EDG was up to speed and voltage. This degraded voltage scheme performed identically during both accident and non-accident conditions. The time until the affected safety bus is actually loaded onto its EDG depends on when the EDG is ready to load. During time critical accident conditions, the EDG would start on the accident signal; therefore, the EDG would be ready to load fractions of a second following the transfer, (i.e., about 10 seconds after accident initiation). During non-accident conditions, the EDG would receive a start signal at the end of the initial 9.2 seconds time delay and would be ready to load after an additional 10 seconds, (i.e., 19.2 seconds after the initial degraded condition was detected on the safety bus).

In addition, in a letter entitled, "Safety Evaluation and Statement of Staff Positions Relative to the Emergency Power Systems for Operating Reactors," dated June 3, 1977, from NRC to the licensee, staff positions B.1.(d) and B.1.(f) required the degraded voltage scheme to disconnect the safety buses from the offsite power sources, whenever the voltage and time delay relay setpoints are exceeded, and that the surveillance requirements allowable values be listed in Technical Specification.

Positions B.1.(c).(1) also required the time delay, including margin, not exceed the time delay assumed in the FSAR accident analysis. The time delay assumed in the accident analysis for restoration of power to the safety buses when the transfer scheme was implemented was 11 seconds. The inspectors noted the TS and degraded voltage scheme (prior to 1984) were consistent with the staff positions presented in this letter.

However, a modification to include a transfer to Transformer 1AR with an additional time delay of 5 seconds was introduced by Design Change 84Z020 following a 1983 degraded voltage event. The purpose of this 5-second time delay was to verify the offsite standby reserve transformer power source was adequate. In a letter dated September 25, 1984, from Mr. Musolf, Manager – Nuclear Support Services, to the NRC, the station responded to a request for additional information regarding this modification. It states "this sampling of the preferred off-site standby reserve transformer has no effect on the existing time sequence for transfer to the emergency diesel generators." At the time of the modification, the time delay assumed in the accident analysis for restoration of power to the safety buses when the transfer scheme was implemented was 11 seconds. The licensee further stated the transfer to 1AR would take place if the alternate source had adequate voltage and that the absence of adequate voltage would result in transfer to the EDGs. "Adequate voltage" was not defined. This understanding was reiterated in the NRC Safety Evaluation Report dated March 20, 1985, which stated, "Under degraded voltage conditions, however, the safety buses will transfer to RSAT 1AR if it has been determined within five seconds that voltage at this source is adequate. With the absence of adequate voltage at RSAT 1AR the safety buses will be transferred to the EDGs after a total time delay of 10 seconds."

During this inspection, the inspectors noted on a degraded voltage condition, if the Loss of Voltage scheme is not also tripped, the affected safety bus is transferred to an alternate offsite source, supplied through Transformer 1AR, after a maximum time delay of 9.2 seconds. However, if the degraded voltage condition still exists on the safety bus following the transfer, a separate time delay scheme is initiated, with duration of five seconds. If the degraded voltage still exists at the end of this time delay, the affected safety bus is separated from offsite power, and a signal is generated to close the output breaker for the associated EDG. Therefore, this modification did impact when the safety buses would be supplied by the EDGs. Specifically, during time critical accident conditions, the EDG would be ready to load in 10 seconds; however would not be connected to the safety buse until 14.2 seconds after accident initiation. There was no impact under non-accident conditions since the EDGs remain ready to load after about 19.2 seconds after the initial degraded condition was detected on the safety bus.

If the transfer to the offsite source through the Transformer 1AR resolves the degraded voltage condition on the safety buses, a transfer to the EDGs source is not necessary. However, if a degraded voltage condition exists at a later time (while on the Transformer 1AR), the degraded voltage relays will actuate and after the maximum time delay of 9.2 seconds (as indicated in the TS Table 3.3.8.1), a transfer to another source will NOT occur because the separate time delay scheme (5 seconds) as described above needs to actuate before transferring to the EDGs. Therefore, in this scenario, the degraded voltage relays will not fulfill their function as described in TS Table 3.3.8.1-1, that is, the actual transfer to another source would occur after 14.2 seconds, not at a maximum of 9.2 seconds. The inspectors determined station procedures and Technical Specifications permitted aligning the safety buses to the 1AR Transformer, without time restrictions. This alignment has been entered previously, most recently between October 21 and 25, 2011, due to a Transformer 2R feeder cable fault.

The inspectors also noted the voltage permissive for transfer scheme allows transfer to the Transformer 1AR source if its no-load voltage is ≥63.3 percent of nominal bus voltage, which is not adequate to power safety-related loads. Lastly, the inspectors observed Technical Specification Bases B 3.3.8.1 states, "The LOP [loss of power] instrumentation monitors the 4.16 kV essential buses. Offsite power is the preferred source of power for the 4.16 kV essential buses. If the monitors determine that insufficient power is available, the buses are disconnected from the offsite power sources and connected to the onsite emergency diesel generator (EDG) power sources." This appeared to be inconsistent with the current configuration of the degraded voltage scheme.

Therefore, the inspectors were concerned the modification installed in 1984 resulted in a degraded voltage scheme which was not consistent with the licensing bases and Technical Specification. Specifically, the inspectors were concerned:

- A setpoint of 63.3 percent of nominal bus voltage on Transformer 1AR would not correct the degraded condition on the safety buses and would delay the connection to the EDGs;

- The USAR accident analysis in affect at the time of the modification assumed an 11 second time delay from the accident signal to the restoration of power to the safety buses. In 1991, the accident analysis was revised to assume a 15 seconds delay to the restoration of power to accommodate the possible implementation of an EDG slow start feature. (This feature has not been implemented.) Consequently, from 1984 to 1991, the total degraded voltage time delay of 14.2 seconds as modified was not capable of satisfying the response time assumptions of the accident analysis in the USAR; and

- The degraded voltage relays would not perform their function (disconnecting from the degraded offsite power supplies within 9.2 seconds) if the safety buses were aligned to Transformer 1AR, an allowed condition.

In response to the inspectors' concerns, the licensee prepared Engineering Change (EC)/Evaluation 19992 which asserted the existing scheme was consistent with the Technical Specifications and the current licensing bases. The licensee stated that since the 1AR transformer is normally lined up to a diverse power supply for the purposes of primary source (either the 345 kV system or the 115 kV system depending on whether the 1R or 2R transformer is used as the primary source), it was reasonable to conclude the degradation of the primary source would not affect the 1AR source. Specifically, simultaneous degradation of both sources need not be postulated for purposes of meeting the time delay requirements of Technical Specification 3.3.8.1. However, the inspectors noted the 345kV, 230kV, and 115kV circuits share a common switchyard and the 345kV and 115kV systems are interconnected through Transformer No.10. Section 8.3.3 of the USAR states, "it is highly improbable that all three electrical power sources would be lost simultaneously because each is supplied from a different source in the substation. Nevertheless, *the loss of all auxiliary power is assumed for design purposes [emphasis added]*." The inspectors also noted the current design would allow transfer of power to 1AR transformer even if the voltage at 1AR was at or above 63.3 percent itself – which indicates the design included the simultaneous degradation of both offsite sources.

In EC 19992, the licensee also stated the plant was not required to postulate a degraded voltage condition coincident with an accident, only a loss of voltage condition needed to be postulated coincident with an accident. However, the inspectors noted TS Table 3.3.8.1-1, "Loss of Power Instrumentation," includes requirements for both Loss of Voltage and Degraded Voltage instrumentation. Technical Specification Bases 3.3.8.1 states, "The OPERABILITY of the LOP instrumentation is dependent upon the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.8.1-1." The specific description of the degraded voltage function in the TS bases states,

> "A reduced voltage condition on a 4.16 kV essential bus indicates that, while *offsite power may not be completely lost* [emphasis added] to the respective essential bus, available power may be insufficient for starting large ECCS motors without risking damage to the motors that could disable the ECCS function. Therefore, power supply to the bus is transferred from offsite power to onsite EDG power when the voltage on the bus drops below the 4.16 kV Essential Bus Degraded Voltage Function Allowable Values (degraded voltage with a time delay). This ensures that adequate power will be available to the required equipment."

These statements are consistent with staff position B.1.(c)(1) of the June 3, 1977 letter referenced above. Therefore, the inspectors concluded an accident concurrent with a degraded voltage condition was not excluded by the Monticello design and licensing bases.

In response to the inspectors' concerns, the licensee entered this issue into their corrective action program as AR 1334146 and concluded the time delay associated with transfer or alignment to Transformer 1AR was an unanalyzed condition. On May 8, 2012, the licensee reported this unanalyzed condition to the NRC in Event Notification (EN) 47909, "An Unanalyzed Condition Could Delay Transfer to Emergency Diesel Generators Under Certain Postulated Conditions," as required by 10 CFR 50.72(b)(3)(v)(D). The licensee subsequently removed Transformer 1AR from service to eliminate the unanalyzed condition.

Analysis: The inspectors determined the failure to maintain the degraded voltage function time delay design was contrary to 10 CFR 50, Appendix B, Criterion III, and was a performance deficiency. The finding is similar to IMC 0612 Appendix E, Example 3.j because the issue resulted in a condition where there was a reasonable doubt with respect to operability of safety-related components. Specifically, there was reasonable doubt as to whether the degraded voltage scheme would perform as required by Technical Specifications during design basis conditions. Therefore, the finding was more than minor because it affected the Mitigating Systems cornerstone attribute of Design Control, 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 could be evaluated using the SDP in accordance with IMC 0609, Attachment 0609.04, "Phase I - Initial Screening and Characterization of findings," Table 4a for the Mitigating Systems cornerstone. The inspectors answered "yes" to Question 1 because the current accident analysis assumed the EDGs would provide power to the safety buses within 15 seconds which bounds the maximum transfer time of 14.2 seconds. Therefore, the inspectors concluded the finding did not represent an actual loss of safety function, and the issue screened out as having very low safety significance (Green).

The inspectors determined that no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 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, since the 1984 timeframe, the licensee's design control measures failed to assure that applicable regulatory requirements and the design basis were adequately translated into specifications and procedures. Specifically, the licensee failed to ensure the design basis, i.e. accident analysis with respect to the degraded voltage scheme, was maintained with the installation Design Change 84Z020, in that, the modification introduced an additional 5 second delay to disconnect from offsite sources which was not assumed in the accident analysis. In addition, the requirement to transfer to another source of power after the time delay specified in TS Table 3.3.8.1-1 was not incorporated into the modification. Specifically, as modified, when aligned to Transformer 1AR, the safety buses would not be transferred to another power source within the allowable values due to the addition of a 5-second time delay. Because this violation was of very low safety significance and because the issue was entered into the licensee's corrective action program as AR 01334146, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000263/2012007-03 (DRS); Failure to Maintain the Degraded Voltage Function Time Delay Design).

(4) Failure to Analyze Effect of Degraded Voltage on Proper Operation of Thermal Overload Relays

Introduction: The inspectors identified a finding of very low safety-significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to properly analyze the proper operation of TOL relays for MOVs and continuous duty motors under degraded voltage conditions was a performance deficiency.

Description: The inspectors inquired whether thermal overload (TOL) relays for motors supplied by MCCs would trip if loads were subjected to the voltages and durations afforded by the under voltage protection scheme. Specifically, the inspectors inquired whether continuous duty motors could trip if subjected to low voltage indefinitely afforded by the 94 percent second level relay. In addition, the inspectors inquired whether, if motors failed to start, or stalled under extremely low voltage conditions afforded by the 70 percent first level relays, the increased current due to locked rotor conditions could trip the TOL relays. The inspectors were concerned that if loads necessary to respond to an accident tripped, they would not be available after the safety busses transferred to the EDGs. The inspectors determined the licensee did not have sizing calculations for TOL relays for continuous duty motors and the calculations for motor operated valves (MOVs) did not consider the effects of degraded voltage that could cause motors to stall for a period of time before being transferred to the EDGs. Specifically:

- Continuous Duty Motors: The inspectors reviewed degraded voltage calculations, TOL sizing criteria, and as-built data to assess the vulnerability to tripping under continuous degraded voltage operation or locked rotor conditions for up to 15 seconds, as afforded by the degraded voltage scheme. The data for MCCs 134 and 144 showed if motors were subjected to locked rotor current under degraded/reduced voltage conditions for the duration of the degraded voltage relays' time delay (about 15 seconds), they would trip. In response to the inspectors' concerns, the licensee initiated AR 01332567 and performed preliminary calculations to assess the vulnerability of safety-related 4160 V loads that start at the onset on an accident. The calculations used typical fan and pump acceleration times and nominal TOL tripping times for the subject loads and concluded although the loads would accelerate more slowly, there was adequate margin with the installed TOLs to avoid spurious tripping, thereby providing reasonable assurance of operability, pending formal analysis.

  The inspectors also determined there was little or no margin to prevent tripping of continuous duty motors supplied from MCCs 134 and 144. These MCCs were equipped with Klockner-Moeller type starters that featured adjustable type TOLs that would trip when subjected to current between 105 percent and 120 percent of full load current. In response to the inspectors' concerns, the licensee initiated AR 01332373 to evaluate this condition. The licensee's review concluded, based on margins afforded by actual field test results that 14 safety-related motors could trip under degraded voltage conditions. These included EFT-ESW Pumps C and D. These pumps provide a backup water supply for the control room air conditioning units as well as for the Emergency Core Cooling System (ECCS) room coolers and the ECCS pump motors (both CS pump motors and two of four LPCI pump motors. The licensee initiated Modification 19903 to increase the TOL margins to prevent spurious tripping.

- MOVs: Safety-related MOVs are equipped with TOLs that are not bypassed during automatic operation at the onset of an accident. The inspectors reviewed protection calculations for MO-1752 and MO-2015 and noted the calculations did not assess TOL performance for potential locked rotor conditions during degraded voltage at the onset of an accident and subsequent restarting on the EDGs. In response to the inspectors' concerns, the licensee evaluated the TOLs for automatically operated MOVs and determined adequate margin was available to avoid spurious tripping during the postulated scenario. The licensee initiated AR 01334042 related to this concern.

Analysis: The inspectors determined the failure to properly analyze the proper operation of TOL relays for MOVs and continuous duty motors under degraded voltage conditions was a performance deficiency. The finding is similar to IMC 0612 Appendix E, Example 3.j, because the issue resulted in a condition where there was a reasonable doubt with respect to operability of safety-related components. Specifically, there was reasonable doubt as to whether safety-related motors would continue to operate without tripping during degraded voltage conditions. Therefore, the finding was more than minor because it affected the Mitigating Systems Cornerstone attribute of Design Control, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors evaluated the finding in accordance with IMC 0609, “Significance Determination Process,” Attachment 0609.04, “Phase 1 - Initial Screening and Characterization of Findings,” Table 4a, "Characterization Worksheet for IE [Initiating Events], MS [Mitigating Systems], and BI [Barrier Integrity] Cornerstones." Attachment 0609.04 states if the finding affects multiple reactor cornerstones, the finding should be assigned to the cornerstone that best reflects the dominant risk of the finding. The cornerstone reflecting the dominant risk is the Mitigating Systems cornerstone.

Within the Mitigating Systems cornerstone column of Table 4a, the inspectors answered “Yes” to the screening question “Does the finding represent a loss of system safety function?" The inspectors determined the finding affected the EFT-ESW system, which provides a backup water supply for the control room air conditioning units as well as for the ECCS system room coolers and the ECCS pump motors (both CS pump motors and two of four LPCI pump motors). However, the licensee had performed a draft evaluation which preliminarily concluded there was no ECCS dependency on EFT-ESW. The SRA performed a bounding evaluation assuming there was dependency.

The SRAs evaluated the finding for Monticello using the Standardized Plant Analysis Risk (SPAR) Model Version 8.15. The SPAR model was changed to show the EFT-ESW pumps P-111C and -111D failures to run. Using these changes and evaluating the performance deficiency for a time period of one year, resulted in a negligible delta Core Damage Frequency (ΔCDF). Based on the Phase 3 analysis, the inspectors determined the finding was of very low safety-significance (Green).

The inspectors determined that no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance.

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 calculation methods, or by the performance of a suitable testing program.

Contrary to the above, as of April 20, 2012, the licensee’s design control measures failed to adequately check the adequacy of the design of TOL relays. Specifically, the licensee failed to assess the effects of degraded voltage on the performance of thermal overload protection for safety-related motors. Because this violation was of very low safety significance and because the issue was entered into the licensee’s corrective action program as ARs 01332373, 01332567, and 01334042, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000263/2012007-04 (DRS); Failure to Analyze Effect of Degraded Voltage on Proper Operation of Thermal Overload Relays).

(5) Inadequate Procedures for Alignment of 120 Vac Instrument Buses

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” for the licensee’s failure to ensure single failure criterion is not violated by the procedure for simultaneously aligning both divisions of 120 Vac uninterruptible instrument power to their alternate, non-battery backed power sources. Use of the procedure could result in temporary and prolonged loss of all safety-related uninterruptible instrument power during Loss of Offsite Power and SBO events respectively.

Description: The Monticello safety-related 120 Vac electrical system features two redundant uninterruptible (UPS) instrument power buses, Y70 and Y80. Each bus is normally supplied by an inverter powered by the battery backed Class 1E 125 Vdc system. Each bus also has an alternate source of power consisting unregulated 480/120 Vac transformer connected to Division I and Division II MCCs respectively. When the instrument buses are aligned to their alternate sources, they are susceptible to an interruption in power if offsite power is lost. In the case of a LOP/LOCA or SBO event, power would not be restored unless off-site or on-site power becomes available. Specifically, during LOP/LOCA power will be interrupted to buses Y70 and Y80 at least for 10 seconds until EDGs become available and during SBO, power to these vital busses could be interrupted up to 4 hours.

Operations Manual Section B.09.13-05, “Instrument AC and Uninterruptible AC Distribution System,” permits simultaneously aligning both UPS buses to their alternate power source for up to 7 days or longer with plant management approval. This procedure had been in place since approximately January 1992. The inspectors were concerned that this allowed alignment will result in failure of redundant safety systems that are dependent on uninterruptible 120 Vac instrument power during events such as LOP/LOCA or SBO. These failures of redundant systems would occur as a consequence of the event, and not as a result of any other random failure, i.e., without considering a single failure.

The licensee was not able to provide an evaluation or other justification for the permitted alignment. The licensee initiated AR 01334510 to address this concern, and implemented restrictions prohibiting alignment of Buses Y70 and Y80 to their alternate sources pending resolution. The licensee also confirmed the simultaneous alignment of both UPS buses to their alternate sources had not occurred in the past.

Analysis: The inspectors determined the failure to perform an adequate evaluation to justify simultaneously aligning both divisions of 120 Vac uninterruptible instrument power to their alternate, non-battery backed power sources was a performance deficiency. The finding was more than minor because it affected the Mitigating Systems cornerstone attribute of Procedure Quality, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the uninterruptible 120 Vac instrument power system and the systems supported by this system would not be capable of performing their required functions during events such as LOP/LOCA or SBO.

The inspectors evaluated the finding in accordance with IMC 0609, “Significance Determination Process,” Attachment 0609.04, “Phase I - Initial Screening and Characterization of Findings,” Table 4a. Within the Mitigating Systems Cornerstone column of Table 4a, the inspectors answered "No" to the screening questions for Items 1-5. The licensee had never used Procedure B.09.13-05 to transfer both instrument buses to their respective offsite sources. Based on this, the inspectors determined the finding was of very low safety significance (Green).

The inspectors determined no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances.

Contrary to the above, since January 1992, the licensee failed to establish that procedures for alignment of uninterruptible 120 Vac instrument power buses were appropriate for the circumstances. Because this violation was of very low safety significance and because the issue was entered into the licensee's corrective action program as AR 01334510, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000263/2012007-05 (DRS); Inadequate Procedures for Alignment of 120 Vac Instrument Buses).

(6) Failure to Analyze Effect of System and Transient Harmonics on Proper Operation of Degraded Voltage Relays

Introduction: The inspectors identified an unresolved item (URI) regarding the degraded voltage relays. Specifically, the effect of system and transient harmonics on proper operation of degraded voltage relays was not analyzed.

Description: The Monticello degraded voltage protection scheme features three ITE Type 27N relays for each 4.16kV safety bus, arranged in a two out of three tripping scheme. BBC Instruction Bulletin 7.4.1.7-7 states, the relay employs a peak voltage detector, and harmonic distortion on the AC waveform can have a noticeable effect on the relay operating point and the measuring instruments used to calibrate the relay. The bulletin also notes that the relay is available with an internal harmonic filter for applications where waveform distortion is a factor. The inspectors noted Calculation 92-220, "Instrument Set-Point Calculation 4.16KV Degraded Voltage," identified the relays as a model not equipped with harmonic filters, but did not address the basis for excluding harmonic distortion as a factor affecting relay accuracy.

The inspectors were concerned that persistent harmonics on the 4.16kV system could cause the relays to fail to actuate at the set point specified in Technical Specifications, and that transient harmonics, caused by switching operations, could cause the relays to spuriously reset during the time delay that occurs during an actual degraded voltage condition concurrent with a design basis accident. Persistent harmonics can be produced by factors external to the nuclear site or by internal phenomena. A typical internal source of harmonics at nuclear power plants is defects in rotating equipment. Persistent harmonics could cause dropout set point shift, and mask an actual degraded voltage condition.

Transient harmonics could cause the relays to spuriously reset during an actual degraded voltage event, thereby delaying the protective function beyond the nominal 10 seconds (9.2 seconds Allowable Value) stipulated in Technical Specifications Table 3.3.8.1-1 and the 15 seconds assumed in the accident analysis. The relay is susceptible to this type of mal-operation because it features an instantaneous voltage sensor that could reset in less than two cycles in the presence of harmonics, thereby reinitiating the relay's internal timer. Operating Experience available to the inspectors from another nuclear station indicated the transient voltages that occur during the operation of medium voltage circuit breakers could cause the relays to spuriously reset during an actual degraded voltage condition. The inspectors were specifically concerned that if a degraded voltage condition occurred concurrently with an accident, the automatic switching operations that occur on the 4.16kV electrical system following the onset of an accident could cause the relay to spuriously reset, thereby delaying the transfer to a reliable source of power beyond the required time.

In response to the inspectors' concerns, the licensee provided information regarding condition monitoring of large motors consisting of periodic measurement and analysis of motor bearing vibration from which various defects that may produce harmonics could be identified. However, the inspectors noted, there was no guidance in design documents that linked the presence of harmonics produced by motors during testing to mal-operation of the degraded voltage scheme. Although the motor vibration data taken by the licensee may be used to predict the presence of harmonics to some extent, the reason or the intent of the tests was not to evaluate or monitor harmonics. Also, the test data was not interpreted to evaluate and document the presence of harmonics. The inspectors further noted during normal bus voltage conditions, i.e., when voltage is above the degraded voltage relay reset set point, harmonics would shift system peak voltage away from the degraded voltage relay operating set point rather than closer to it, and so the presence of harmful harmonics would not self-reveal by spurious actuations. Also, there was no instrumentation or testing that demonstrated transient harmonic would not be presented during switching operations. The licensee has entered this item into their corrective action program as AR 01331618.

This issue is unresolved pending consultation with NRC Headquarters for clarification of equipment qualification requirements of degraded voltage relays to withstand the effects of harmonics. (URI 05000263/2012007-06).

.4 Operating Experience

a. Inspection Scope

The inspectors reviewed seven operating experience issues 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:

- IN 2007-09, "Equipment Operability Under Degraded Voltage Conditions";
- IN 1997-90, "Use of Non-conservative Acceptance Criteria in Safety-Related Pump Surveillance Tests";
- IN 2012-03, "Design Vulnerability in Electric Power System";
- IN 2005-30, "Internal Flooding";
- NRC Bulletin 1988-04, "Potential Safety-Related Pump Loss";
- LER 2011-002, "ESF Actuation due to Failed Power Supply"; and
- OPESS 2012-02, "Technical Specification Interpretation and Operability Determination Smart Sample."

b. Findings

No findings of significance were identified.

.5 Risk-Significant Operator Actions

a. Inspection Scope

The inspectors performed a margin assessment and detailed review of four risk significant, time critical operator actions. 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 some actions in the plant 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:

- Station Blackout - Open Selected Control Room Panel Doors;
- Appendix R - Establish Control at the automatic shutdown system panels;
- Appendix R - Perform Emergency Depressurization; and
- Appendix R - Establish Containment Cooling.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.1 Review of Items Entered Into the Corrective Action Program

a. Inspection Scope

The inspectors reviewed a sample of the selected component problems that were identified by the licensee and entered into the corrective action program. The inspectors reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions related to design issues. In addition, corrective action documents written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action program. The specific corrective action documents that were sampled and reviewed by the inspectors are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

4OA5 Other Activities

(Open) NRC Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01)"

a. Inspection Scope

The inspectors verified the onsite documentation, system hardware, and licensee actions were consistent with the information provided in the licensee's response to NRC GL 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray (CS) Systems." Specifically, the inspectors verified the licensee has implemented or was in the process of implementing the commitments, modifications, and programmatically controlled actions described in the licensee's response to GL 2008-01. The inspection was conducted in accordance with TI 2515/177 and considered the site-specific supplemental information provided by Office of Nuclear Reactor Regulations (NRR) to the inspectors.

The documents reviewed are listed in the Attachment to this report.

b. Inspection Documentation

The selected TI areas of inspection were licensing basis, design, testing, and corrective actions. The documentation of the inspection effort and any resulting observations are as follows:

(1). Licensing Basis: The inspectors reviewed selected portions of licensing basis documents to verify they were consistent with the NRR assessment report and they were processed by the licensee. The inspectors reviewed selected portions of licensing basis documents to verify they were consistent with the NRR assessment report and they were processed by the licensee. The licensing basis verification included the verification of selected portions of TS, TS bases, USAR, and technical requirements manual (TRM). The inspectors also verified applicable documents that described the plant and plant operation, such as calculations, P and IDs, procedures, and corrective action program (CAP) documents, addressed the areas of concern and were changed if needed following plant changes. The inspectors also confirmed the frequency of selected surveillance procedures were at least as frequent as required by TSs. Finally, the inspectors verified the licensee was committed to evaluating and adopting as necessary the applicable changes that will be contained in the Technical Specification Task Force (TSTF) traveler. The inspectors noted the licensee is tracking this commitment as general action request (GAR) 01155334.

(2). Design: The inspectors reviewed selected design documents, performed system walkdowns, and interviewed plant personnel to verify the design and operating characteristics were addressed by the licensee. Specifically:

- The inspectors verified the licensee had identified the applicable gas intrusion mechanisms.

- The inspectors verified the licensee's void acceptance criteria were consistent with NRR's void acceptance criteria. Specifically, the inspectors confirmed the licensee had various industry reports and NRC draft guidelines as reference for performing any operability evaluations and the references were consistent with the latest acceptance criteria of NRR.

- The inspectors selectively reviewed applicable documents, including calculations, engineering evaluations, and vendor technical manuals, with respect to gas accumulation in the subject systems. Specifically, the inspectors verified these documents addressed venting requirements, keep-full systems, aspects where pipes are normally void such as some spray piping inside containment, and void control during system realignments.

- The inspectors conducted a walkdown of selected regions of the HPCI, CS, RHR systems in sufficient detail to assess the licensee's walkdown. The inspectors also verified the information obtained during the licensee's walkdown was consistent with the items identified during the inspector's independent walkdown. The inspectors verified selected portions of the P and IDs accurately described the subject systems and were up-to-date with respect to recent hardware changes. Also, any discrepancies between as built configurations, the isometric drawings, and the P and IDs were documented and entered into the CAP for resolution.

- The inspectors verified the licensee's walkdowns were completed. In addition, the inspectors selectively verified information obtained during the licensee's walkdowns were addressed in procedures, the CAP, and training documents.

(3). Testing: The inspectors reviewed selected surveillance, post-modification test, and post maintenance test procedures, and results to verify the licensee had approved and was using procedures that were adequate to address the issue of gas accumulation and/or intrusion in the subject systems. This review included the verification of procedures used for conducting surveillances and determination and estimation of void volumes to ensure the void criteria was satisfied and will be reasonably ensured to be satisfied until the next scheduled void surveillance. Also, the inspectors reviewed procedures used for fill and vent following operations, which may have introduced voids into the subject systems to verify the procedures addressed testing for such voids and provided processes for their reduction or elimination.

(4). Corrective Actions: The inspectors reviewed selected licensee's assessment reports and CAP documents to assess the effectiveness of the licensee's CAP when addressing the issues associated with GL 2008-01. In addition, the inspectors verified selected corrective actions identified in the licensee's nine-month and supplemental reports were documented. The inspectors also verified commitments were included in the CAP.

c. Findings

No findings of significance were identified. However, the following observations were noted:

- The inspectors noted the licensee generated AR 1286645, "TS 3.5.1 ECCS Operating May Be Non-Conservative", to develop and implement corrective actions to address the lack of analysis that is needed to support the Note in TS 3.5.1, which allows manual realignment of LPCI from shut down cooling (SDC), in Mode 3. The licensee is participating in an ongoing effort with the Boiling Water Reactor Owners Group (BWROG) to perform the analysis that studies the potential for flashing in the Residual Heat Removal System upon realignment. The licensee generated an action request to assess the analysis that will be provided by the BWROG and implement changes based on the report's final conclusions. The licensee revised procedures in the interim to ensure conservative actions are taken, while the condition is being evaluated. The inspectors concluded the TI will remain open to complete a review of the licensee's corrective actions.

- The inspectors reviewed the licensee's current program and process for evaluating voids when they are identified during surveillances and tests. The inspectors concluded the licensee has implemented industry guidance to ensure voids are identified and evaluated so that system operability is not challenged. The licensee's current practices were to estimate the time duration that gas appears to vent from the line, following system restorations, fill and vent, and periodic surveillances, in order to perform engineering evaluations and operability determinations when required.

  While the licensee's current practices were in accordance with industry guidance, the licensee generated AR 1327278 for not having location-specific acceptance criteria in accordance with Gas Accumulation Program Procedure EWI12.01.01 and industry recommendations. The licensee had plans to develop and utilize the acceptance criteria as part of the ultrasonic testing (UT) program, which was also being developed, to evaluate voids when they were identified, for their impact on system operability. The inspectors concluded these actions would enhance the gas accumulation program by providing quantitative data to analyze in piping systems when voids are identified.

4OA6 Meeting(s)

.1 Exit Meeting Summary

On May 30, 2012, the inspectors conducted a final exit of the inspection results with Mr. T. O'Connor, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. Several documents reviewed by the inspectors were considered proprietary information and were either returned to the licensee or handled in accordance with NRC policy on proprietary information.

.2 Interim Exit Meeting Summary

On April 20, 2012, the inspectors presented the preliminary inspection results to Mr. T. O'Connor, and other members of the licensee staff.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
T. O'Connor, Site Vice President
J. Grubb, Plant Manager
K. Jepson, Assistant Plant Manager
J. Ohotto, System Engineering Manager
P. Albares, Operations Shift Manager
R. Anderson, System Engineering Supervisor
R. Baumer, Regulatory Affairs Compliance Engineer
J. Kindred, Operations Support Manager
N. Haskell, Engineering Director
P. Anderson, Regulatory Affairs Director
B. Halvorson, Configuration Management Supervisor
P. Kissinger, Regulatory Affairs Manager
C. Fosaaen, Regulatory Affairs
D. Pennington, Mechanical Design Engineer
L. Newberg, Engineering Contractor
R. Siepel, Electrical Design Engineer
E. Watzel, Electrical Design Engineering Supervisor
P. Young, Engineering Supervisor

Nuclear Regulatory Commission
S. Thomas, Senior Resident Inspector
P. Voss, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000263/2012007-06	URI	Failure to Analyze Effect of System and Transient Harmonics on Proper Operation of Degraded Voltage Relays

Opened and Closed

05000263/2012007-01	NCV	Inadequate Station Battery Capacity Test Procedure
05000263/2012007-02	NCV	Failure to Analyze Voltage Requirements for Operability of Non-Motor Loads and 120 Vac Instrument Panels
05000263/2012007-03	NCV	Failure to Maintain the Degraded Voltage Function Time Delay Design
05000263/2012007-04	NCV	Failure to Analyze Effect of Degraded Voltage on proper operation of Thermal Overload Relays
05000263/2012007-05	NCV	Inadequate Procedures for Alignment of 120 Vac Instrument Buses

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply 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.

CALCULATIONS

Number	Description or Title	Revision /Date
94-017	Calculation of Alternate Nitrogen System Operability Leakage Criteria	7
94-066	Determination of RHR HX K Values	8
98-308	RHR HX Uncertainty Determination Method for Proc. 1136	5
01-036	IST Pump and Valve Acceptance Criteria Rounding Evaluation for 4th Ten-Year Code Interval	36
97-113	RHR HX – Performance Analysis	2
97-056	RHR/RHRSW HX – Variation of "U" and "K" with Temperature	2
97-245	Determination of NPSH Available for Low Pressure ECCS Pumps for a DBA LOCA	0
97-025	Low Pressure ECCS NPSH	1
98-168	EPG/SAG Low Pressure ECCS NPSH Calculation	0
94-021	ECCS Equipment Flood Protection	0
90-18	Determination of Acceptance Criteria for RHR Pump Surveillance Testing and Verification of Adequate LPCI Flow Under Four and Two Pump Operation	1/9/91
97-163	Low Pressure ECCS Run Out Flows	6/13/97
89-084	SBO Compressed Air Capacity	3
3494	Intake Structure Minimum Water Level	0
08-024	Monticello Control Room Chiller FSW Flow Calculation	0
90-038	Control Room Space Temperature Evaluation During SBO	3
00-104	Intake Structure Minimum Water Level	0
06-096	EFT Battery Electrolyte Temperature Evaluation	0
06-072	Battery Electrolyte Temperature Evaluation	0
04-047	MNGP 250 Vdc Division II Battery	1
98-005	Environmental Qualification (50.49) of ASCO Solenoid Valves (Normally De- Energized)	10
91-001	125 V DC Fault Current	1
89-084	SBO Compressed Air Capacity	3
90-007	Calculate Required Pressure and Flow Criteria for Core Spray Monthly Surveillance Test	5/29/90
97-163	Low Pressure Emergency Core Cooling System (ECCS) Run Out Flows	0
01-061	Core Spray Testing Pump Flow Measurement Uncertainty	1

CALCULATIONS

Number	Description or Title	Revision /Date
01-111	11/12 Emergency Diesel Generator Air Start	2
97-166	Corrected Containment Overpressure Required for Adequate NPSH for the CS Pumps Under Run-Out	0
01-177	Determination of Containment Overpressure Required for Adequate NPSH for Low Pressure ECCS Pumps Updated for Suction Strainer Debris Loading	1
01-032	Operability Evaluation of Torus Cooling	3
03-089	Section XI In-service Testing IST Test Instrumentation Acceptance Criteria	2
92-035	Core Spray Motor-Operated Valve Functional Analysis	5
93-065	SBO Safe Shutdown Equipment Matrix	2
94-086	Maximum Allowable Leakage Rates and Test Acceptance Criteria for SRV Accumulator Systems D and G	3
96-169	HPCI and RCIC NPSH Evaluation	3A
96-196	Valve Thrust Assessment 8” Anchor Darling Gate Valves MO-1752, -1753, -1754	5/7/99
99-006	Core Spray MOV Performance Analysis	1
99-126	Original Check Valve Program Operational Verification Calculations	0
99-137	Determination of SRV Bellows Allowable Leakage Rate and Orifice/Nozzle Diameter Size	1
01-036	In-service Testing (IST) Pump and Valve Acceptance Criteria Rounding Evaluation for 4th Ten-Year Code Interval	36
05-019	NPSH Requirements for Operating ECCS Pumps from the CST	0A
97-232	HPCI and RCIC NPSH Evaluation	2
12-016	Required Fluid Flow for Dynamic Venting	0
00-124	CST Volume Suction Transfer Levels	7
98-313	Feedwater Modell -1 and 2 (SRP Module M.1) Evaluation for Transient Loading Caused by Opening MO-2068	05/17/04
04-022	Evaluation of Feedwater Module M.1	1
NE-36403-3A	No.12 Standby Diesel Generator Start Circuits 1 and2, Schematic Diagrams	J
03-038	Instrument Set-point Calculation, 4.1 6KV Loss of Voltage	2
06-066	4160V Ground Fault Relay Coordination	0
06-067	Differential Relay Settings for Transformer 1 R, 2R, and IAR	1
06-068	4160V Loss of Voltage Relay Settings	0
06-068	41 60V Bus Loss of Voltage Relay Settings	0
06-093	2R LTC and 1AR LTC Voltage Analysis	0
06-104	480V MCC to Motor Terminal Voltage Drop	3
92-220	Instrument Setpoint Calculation, 4.1 6KV Degraded Voltage	2
92-296	Protection Settings for New LC-104 480 Volt Switchgear Lineup	2
93-066	AC Loads Study, Degraded Voltage Setpoint, 1R XFMR, LOCA Load	6
94-094	MCC Starter Coil Pickup Voltages and Maximum Cable Lengths	0

CALCULATIONS

Number	Description or Title	Revision /Date
96-053	ECCS Starting Evaluation, 2R Transformer at Rerate Conditions	0
97-089	AC Voltage Study, 2R to 1R Transformer Auto Transfer with LOCA Loading	7
97-153	Plant Voltage Study, 1R Transformer at -2.5 percent Tap, Full Plant Load Plus 2 Core Spray Pumps Starting	5
97-219	Effects of Transmission System Performance on Offsite Source Operability	3
98-277	LC-103/104 Settings, Testpoints and Acceptance Criteria for Use in CHAMPS Notebook	5
EC-19597	Evaluation of Available Voltage for SV-2379, SV-2380, and SV-4235	0
EC-19992	Loss of Power Instrumentation Bases Evaluation	0

CORRECTIVE ACTION PROGRAM DOCUMENTS

Number	Description or Title	Date
01202260	14RHR Lower Motor Bearing Oil Sample Showing Abnormal Result	10/12/09
01323059	RHR P-202A and P-202B Reduced Margin	1/31/12
01263686	NRC IN 2010-27 Ventilation System Preventative Maintenance	12/20/10
01178025	Pre-Op Test Work Plan did not Meet In-service Testing Program	4/13/09
01020686	LS-2554 Did Not Start or Stop Pump	3/27/06
01099925	Received Unexpected Alarm Rx Bldg Floor Drain Tank High Level	7/1/07
01081398	Pump P-57A is Misclassified as a Minor Component	3/9/07
01042166	Winding Straps for P-25A Found Broken	7/31/06
01042453	P-25B RB Floor Drain Sump Auto Level Switch Failed	8/1/06
01020803	P-25A Rx Bldg Floor Drain Sump Pump Bearings Going Bad	3/27/06
01080495	P-57A, Rx Bldg Floor Drain Tank Pump Will Not Run	3/5/07
01245486	LS-3059 Hi Level Alarm Switch Has Failed	8/13/10
CAPR 01257298-23	CTP Model – Analysis of 19 Inputs	0
RCE 01257298-01	All 4 APRMs Declared Inoperable, NRC 50.72 Notification Not Made Within Required Time	11/04/10
01334360	Determination of SCAQ not Documented	4/18/12
RCE 1316075	Adverse Trend in Operations When Changing Plant Configurations	2/3/12
ACE 1315669	Mode Switch was in REFUEL but not Locked	12/10/11
ACE 1314953	Rod Worth Minimizer not Blocked as Required	12/13/11
01329567	Past Operability Review not Requested for AR 01327860	3/16/12

CORRECTIVE ACTION PROGRAM DOCUMENTS

Number	Description or Title	Date
01229490	Green Light and Computer Point Changed State for MO-2373	4/27/10
01259879	Mode Change with Inoperable PCIVs	11/22/10
01325353	Evaluate IER L2-12-14 SCRAM Resulting from Design Vulnerability	2/16/12
01324821	Evaluate Events Related to Loss of One Phase in Nuclear Substations	2/16/12
01325199	Degraded Voltage Relay Scheme Wiring Discrepancy	2/16/12
01257298-21	CTP Model Error Caused APRM Deviation > 2 percent	10/16/11
01312822	CTP Model Error Caused APRM Deviation > 2 percent	12/14/11
01257298	All Four APRMs Declared Inoperable	11/5/10
01241925-01	Operating Experience Evaluation NRC IN 2010-11	9/14/10
01286645	TS 3.5.1 ECCS Operating May Be Non-Conservative	5/19/11
01325383	Missing SDC Valve Active Function Action	2/16/12
01327107	New AOP C.4-B.09.06.D to be Developed	2/29/12
01263610	Unexpected Alarms, and Safety System Actuation Caused by a Failure of ES-17-451A	1/19/11
01314953	RWM not Operable During Startup	11/28/11
01315669	Mode Switch not Locked in Position	12/1/11
01252285	TRM Entry for B RBV WRGM	9/30/10
01252285	WRGM B Mid-Range High	10/12/10
1248622- 01	RBV WRGM B Mid-Range High	10/6/10
01257298	All four APRM's Declared Inoperable after 15B HTR Isolation	11/5/10
01259879	Mode 4 to Mode 2 with PCIV's Tagged Open	11/22/10
01229490	Green Light and Computer Point Changed State for MO-2373	4/27/10
01323839	MO-2021 Dual Indication	2/6/12
01324881	Previous ACE for MO-2021 did not Adequately Resolve Issue.	2/13/12
01230724	Potential M0-2020/2021 Logic Issue	5/3/10
01323839	Issues Identified in Corrective Actions 01323839 and 01324881	3/14/12
01327129	LS-2-3-680E OOT Unable to Adjust	2/29/12
01247335	LS-2-3-680E Trip Point not Within as Found Requirement	8/27/10
01301804	LS-2-3-680E, TURB and RFP TRIP: Plan For Future Replacement	8/31/11
01327348	Question: should LS-2-3-680E be in Maintenance Rule Scope?	3/1/12
01327185	SCIV in the SBGT Room were Closed	2/29/12
01327185	SCIV in the SBGT Room were Closed	3/27/12
1305632	Valve EPR-8000K-11 Failed Initial Testing	11/30/11
01327860	B - ATWS Tripped and Will not Reset	3/5/12
01295048	Low Margin DIV2 250 Vdc No.16 Battery	7/18/11
01312667	CDBI-FSA SRV Controls Min Voltage Justification	11/11/11
01305497	2011 CDBI FSA: No.12 Battery Cell Inter-Connector Resistance	9/26/11
01305243	2011 CDBI FSA- Evaluate Changes to Improve Battery Tests	9/23/11

CORRECTIVE ACTION PROGRAM DOCUMENTS

Number	Description or Title	Date
01253909	Design Margin Issue: Div II 250Vdc Battery	10/31/10
01280463	16 Battery Test Results WO 00394338-03	4/13/11
01193742	PANEL D21 IS MISSING TWO BOLTS	8/15/09
01308268	Panel D21, Circuit 18, Indicator Light Fixture Loose	10/14/11
00690656	Foreign Material was Found Inside Distribution Panel	5/18/11
01173169	Tech Spec for B Core Spray flow Possibly Non-Conservative	3/16/09
01258369	12 EDG Air Start UT Thickness Measurement	4/01/11
01269497	11 EDG Air Start Tanks T-79D thru T-79F Wall Thickness	5/24/11
01321141	P-208B Affected by Minimum Tech Spec Frequency	1/17/12
01330001	Difficult to Determine Core Spray Flow Requirement from Design Data	3/19/12
01330001	Difficult to Determine Core Spray Flow Requirement from Design Data	3/19/12
01330317	Impact of Diesel Frequency on Core Spray Pump NPSH	3/22/12
01154423	ECCS Pump Suction Void Fraction Assumption Differences	10/08/08
01176796	Post-Fill/Vent voids in ‘A’ Core Spray Piping	04/04/09
01180544	Air Pocket in HPCI Discharge Piping after Fill and Vent	05/01/09
01241925	Potential for Sinspectors Voiding Causing Residual Heat Removal System Inoperability	09/14/10
01259274	GL 2008-01 Operability Guidance	11/18/10
01286645	TS 3.5.1 ECCS Operating May Be Non-Conservative	05/19/11
01295767	NRC Information Notice 2011-14, “Component Cooling Water System Gas Accumulation and other Performance Issues”	02/17/12
01296947	NRC IN 2011-17	09/26/11
01303947	Missed 50.59 Reviews for CAP 01123581 Revisions	09/15/11
01304810	CAP CA and PCR not Aligned for Venting Time Limit	09/21/11
01305218	2011 FSA – Question 212 Identified Issues	09/23/11
01305807	2011 CDBI FSA: TS Bases Needs Updating WRT GL 2008-01	09/28/11
01305811	2011 CDBI FSA: GL 2008-01 Evaluations not in Records	09/28/11
01305816	2011 CDBI FSA: Lack of Technical Basis for Venting Times	09/28/11
01325383	Missing SDC Valve Active Function Action	02/16/12
01325536	GL 2008-01 USAR Update	02/17/12
01325541	Failure to Update RHR Fill and Vent Procedure	02/17/12
01327278	EOC from GL 2008-01 FSA: GL 08-01 Program not Fully Implemented	03/01/12
01327281	EOC from GL 08-01 FSA: Susceptible Areas Inadequately Disp.	03/01/12
01327284	EOC from GL 2008-01 FSA: GE Topical Reports not in Design Basis	03/01/12
01327290	EOC from GL 2008-01 FSA: Vent SR and GL 08-01 Response Not Aligned	03/01/12
01329889	EOC from GL08-01 FSA: Additional Concerns Identified	03/19/12
01636001	Converted Issue No.98001367 Title: Possible Void Formed Behind MO-2068	05/18/98

CORRECTIVE ACTION PROGRAM DOCUMENTS

Number	Description or Title	Date
0767607	Effects on Disch Line With HPCI Suction from Torus When in Stdby Not Addressed	10/22/04
0804885	Tech Spec Statement in B.03.04-05 Directs the Wrong LCO [limiting condition for operation] Action	02/04/05
01325383	Missing SDC Valve Active Function Action	02/16/12
01087966	Station OE Screen Team Review of OE for 04/13/2007	4/16/07
01195865	Minimum Voltage for 2R to 1R Auto Transfer	8/31/09
01196477	CDBI - Evaluation of IN 2007-09 did not Address Issue.	9/3/09
01197202	CDBI – Calculation Quality – Adverse Trend	9/10/09
01199936	Voltage Drop Evaluation for RHR/RHRSW ASCO Solenoid Vlvs	9/28/09
01200170	Pickup Voltage on 480V MCC Contactors Not Periodically Tested	9/29/09
01200487	Apparent Conflict Between Calculations	9/30/09
01200723	Voltage at P-111B Contactor is Less Than 96 Volts	10/2/09
01202633	B4319 Contactor Failed Degraded Voltage Testing	10/15/09
01209071	Enhancement – Consider Volt Drop Calc(s) for 120V Instr AC	12/2/09
01278501	Perform Major Revision to Calculation 94-094	4/1/11
01305514	FSA-CDBI – Extent of Condition Review from CAP 01199936	9/26/11
01324821	OE: Eval Events Related to Loss of 1 Phase in Nuc Substations	2/13/12
01325353	OE –IERL 2-12-14 Scram Resulting from a Design Vulnerability	2/16/12
01329418	NRC RIS 2011-12: Transmission System Voltage Drop	3/15/12
01329620	NRC RIS 2011-12: Degraded Voltage Relay Setpoint Analysis	3/16/12

CORRECTIVE ACTION PROGRAM DOCUMENTS GENERATED AS A RESULT OF THE INSPECTION

Number	Description or Title	Date
01334083	CDBI- Battery Capacity Test Terminated at 1V in 2007	04/17/12
01333758	2012 CDBI: NRC Questions TS Surveillance Requirement	04/13/12
01334318	CDBI- Proc 0197-02 Unclear on TS and NRC Commitment Procedure 0197-02	04/18/12
01333346	CDBI- NRC Commitment M91186A Part 2 Removed from Plant Proc	04/18/12
01330592	CDBI-Editorial Error in Calc 05-019	3/23/12
01330643	CDBI-Calculation Assumption not Clearly Stated.	3/23/12
01333642	CDBI-Incorrect SRV Set Pressure in DBD	4/13/12
01334424	CDBI-Inconsistent Documentation of LLRT Info for LRM	4/19/12
01334219	PCR to Procedure 0255-03-IA-1-2	4/18/12
01330445	CDBI Question 50 P-88D ECCS area Pump D 2009 Testing	3/22/12
01332787	CDBI-MRE Should Have Been Performed for CAP01245486	4/9/12
01332790	CDBI-TR-4926, not Scoped into MR	4/9/12
01330657	CDBI – GL 89-13 NRC Commitment Wording Inconsistent with Test	3/23/12

CORRECTIVE ACTION PROGRAM DOCUMENTS GENERATED AS A RESULT OF THE INSPECTION

Number	Description or Title	Date
01332188	CDBI – Incorrect Reference Value Listed in 0255-11-III-8	4/4/12
01332107	CDBI – Discrepancies Found in CA-95-076	4/3/12
01332258	CDBI – EWI-08.22.01 Minor Discrepancy	4/4/12
01330652	CDBI – CA 84-643 Should Have Been Superseded	3/23/12
01333123	CDBI – Impact of Macrofouling not Ident During 07 CRV HX insp	4/10/12
01333750	CDBI – Bulletin 88-04 Response Documentation is Weak	4/13/12
01330403	Minor Drawing Discrepancy	03/22/12
01331810	Editorial Error on NL-36140-12 and NL-36140-13	04/02/12
01332222	Improvements for GL 08-01 Instrument Line Venting Improvement Opportunity Identified During GL 08-01 Inspection Regarding Instrument Line Venting	04/04/12
01329884	Calc. 90-038 Record Never Turned Over to Records MGMT	3/19/12
01331618	NRC 2012 CDBI Q107 - Harmonics, Degraded Voltage Relays	3/30/12
01332373	2012 CDBI - Motor Thermal Overloads May Trip w Degraded Volt	4/4/12
01332429	CDBI - Incorrect Acceptance Criteria in CA 06-104	4/15/12
01332567	TOL Coordination With Degraded Voltage Relay Time Delay	4/5/12
01333365	Q398 – 12/14 RHR, D SRV Voltage Drop Calc	4/11/20
01334042	OE NRC Green Violation - Fail to Assure TOL on SR Sized	4/16/12
01334146	CDBI - Technical Specification Degraded Voltage Time Value	4/17/12
01334510	CDBI - Response to GL 91-011	4/19/12
01334562	CSBI - Panel Y70andnd Y80 Voltages in Nonconformance with USAR	4/19/12
01334571	CDBI - Instrument Panel Y20 Voltage Nonconformance with USAR	4/19/12
01334264	CDBI - Question 482, MRE Needed for P-25A AR 01020803	4/19/12
01334360	CDBI - Determination of SCAQ not Documented by CAP Screen Inspectors	4/18/12
01331617	CDBI – Typographical Error on B4471 TOL Test Data Sheet	4/17/12
01330403	CDBI 2012: Question 127 Minor Drawing Discrepancy	4/16/12
01330386	CDBI – Editorial Error in 04-047, Div. II 250 Vdc Batt. Calc.	3/23/12
01330112	ATWS TCOA Validation Documentation	4/17/12

DRAWINGS

Number	Description or Title	Revision
NH-36246	P and ID RHR System	80
NH-36248	Core Spray System	80
NH-116629	Hard Pipe Vent System	76

DRAWINGS

Number	Description or Title	Revision
NX-7905-46-17E	12 RHR Containment Spray	76
NF-36298-2	DC Electrical Load Distribution One Line Diagram	82
NX-7905-46	12 RHR LPCI Inboard Isolation, MO-2015	17A
NF-95915-3	Div 1 Lo-Lo SRV Logic	7
NF-95916-3	Div II Lo-Lo SRV Logic	8
26604,(Curve No.)	GE Monticello Core Spray Pump No. 270418, (Bingham Pump Co. Characteristic Curve Sheet)	3/14/69
NH-36246	P and ID Residual Heat Removal System	80
NH-36051	P and ID Diesel Oil System, Sht. 1	77
NH-36248	P and ID Core Spray System	81
NH-36665	P and ID Service Water Make-Up Intake Structure	94
NH-36039	P and ID Condensate and Demineralized Water Storage Systems	86
NH-85509	P and ID Service Condensate System Radwaste Building	80
NX-16984	Gate, Globe and Check Valves, (Anchor Darling Valve Company)	10/29/84
NH-36241-1	Monticello Nuclear Generating Plant Reactor Pressure Relief P and ID	77
NX-13142-74	Condensate, Bechtel Corp., (National Valve and Manufacturing Co., Isometric)	5/23/69
NX-7833-17	Bingham Pump Co. Core Spray Pump No. 270417	3/10/69
NX-7833-37	Plot of Flow Rate vs. Differential Pressure, (Core Spray Flow Element, APED-14-2489-20-2)	7/14/69
NX-9178-14-1	Monticello Nuclear Generating Plant RV-1745andnd RV-1746 Crosby Relief Valves	A
NX-9231-21	MNGP 10”-300No. Swing Check Valve	B
NH-36246	P and ID Residual Heat Removal System	80
NH-36247	P and ID Residual Heat Removal System	81
NH-36248	Core Spray System	81
NH-36249	P and ID (Sinspectors Side) High Pressure Coolant Injection System	78
NH-36250	P and ID (Water Side) High Pressure Coolant Injection System	79
NH-85509	P and ID Service Water to Condensate System Radwaste Building	80
NL-36140-12	Condensate Storage Tank T-1A	76
NQ-211454-1-1	HPCI Keep Fill System	0
NQ-211454-1-2	HPCI Keep Fill System	0
NX-13142-17	Torus Water	76
NX-13142-18	Torus Water	M
NX-13142-20	Torus Water	76
NX-13142-21	Service Condensate	76
NX13142-26	Torus Water Reactor Building	78

DRAWINGS

Number	Description or Title	Revision
NX-13142-28	Condensate	H
NX-13142-31	Torus water – RHR- Core Spray	L
NX-13142-37	Torus Water	76
NX-13142-40	HPCI Torus Water	77
NX-13142-51	Torus Water Core Spray and RHR	77
NX-13142-53	Feed water	77
NX-13142-74	Condensate	1
NX-7833-4	Core Spray System	2
NX-7905-46-1	Elementary Diagram Residual Heat Removal System	78
NX-9881-1	Condensate Storage Tank-Erection Diagram	1
NH-36039	P and ID Condensate and Demineralized Water Storage Systems	86
NE-100346	Div I and Div II 120V Instrument AC Distribution Panel Schedules	M
NE-100346	DIV I and DIV II 120V Instrument AC Distribution Panel Schedules	M
NE-35404-4C	RHR Pump P-220D ACB 152-603 Control	AD
NE-36347-1A	480V MCC Schedules	78
NE-36394-10C	RHR Service Water Pump P-109D ACB No. 152-607	T
NE-36399-5A	1R Transformer SEC ACB 152-202 Control	L
NE-36399-6A	1R Transformer SEC ACB 152-402 Control	H
NE-36399-7A	No. 14 Bus to No. 16 Bus Tie ACB No. 152-408 Control	Q
NE-36399-9B	Essential Bus Transfer Circuits – Div II	B
NE-36403-2A	Standby Diesel Generator ACB 152-602 Control	77
NE-36403-3A	No. 12 Standby Diesel Generator Start Circuits 1 and 2, Schematic Diagrams	J
NE-36404-15A	Schematic Diagram Reactor Auxiliary Systems	76
NE-36404-5A	Core Spray Pump P-208B ACB 152-605 Control	S
NE-36442-2	Generator Lockout Relay and Auto Transfer	82
NE-36771-3	Instrument AC and Uninterruptible AC Panel Schedules Y10, Y20 and Y30	76
NE-36771-3	Instrument AC and Uninterruptible AC Panel Schedules Y10, Y20 and Y30	AK
NE-36858-2	Schematic Meter and Relay Diagram No. 1 AR Reserve Power Transformer	77
NE-36858-5	No. 1AR Reserve Transformer Secondary ACB 152-610 Control	76
NF-36175	Single Line Diagram Station Connections	82
NF-36177	Single Line Meter and Relay Diagram 4160 Volt System Buses No. 13, No. 14, No. 15, and No. 16	80
NF-36298-1	Electrical Load Flow One Line Diagram	99
NF-36397	Schematic – Meter and Relay Diagram 4160V System – Buses No. 11, No. 12, No. 13, No. 14, No. 15, No. 16	Y

DRAWINGS

Number	Description or Title	Revision
NF-46104	Connection Diagram Reactor and Containment Cooling Isolation Bench Board C-03	77
NX-7828-50-3	Connection Diagram Panel 9-3	80
NX-7833-21-4A	Core Spray System	77
NX-8292-12-4	Elementary Diagram HPCI System	79

MISCELLANEOUS

Number	Description or Title	Date or Revision
11-MN1-03	ECT Report of RHR HX E-200B	3/25/11
SRI 90-025	Acceptability of CS and RHR Minimum Flow Lines	8/29/90
SRI 89-003	Justification for Continued Operation with RHR and CS Minimum Flow Less Than Vendor Recommendations	2/15/89
NMC69-MN1-09	V-EAC-14A/B EFT Chillers – Eddy Current Test	4/9/07
B.5.13	Maintenance Rule Basis Document – Annunciators	10/21/97
B.7.1	Maintenance Rule Basis Document – LRW	6/28/99
B.3.4	Maintenance Rule Basis Document – RHR	1/9/08
Response to Question 273	Explanations of CAPR 01257298-23 and Related Corrective Actions from RCE 01257298-01.	0
NEEDS Assessments for 01257298	Training Needs Related to RCE 01257298-01. Includes Reporting Issues and Knowledge Issues for CTP Calculations.	0
SOMS Logs	Control Room Operator Logs	Various
EC 19545	Monticello Degraded Voltage Scheme Susceptibility to Loss of Phase Condition Evaluation (Byron OE 38219)	0
MT-LOR-11B-003L	Core Thermal Power Calculation	0
Question 472	Explain CAP Severities for AR1315669 and AR1314953	4/17/12
Question 35	Requested Information Related to Current Impediments to Operations	3/20/12
Question 33	Requested Information Related to the Hard Pipe Vent.	3/20/12
MT-OPS-CDB-001S	Small Break LOCA Scenario	4/13/12
LARs 163 - 167	Various License Amendment Requests and Responses	Various
M-8107L-044	PRIMARY CONTAINMENT ILT Lesson Plan	18
M-8107L-002	High Pressure Coolant Injection System ILT Lesson Plan	23
TS Bases	Technical Specification Bases	Various
QF-1128	OWI-03.07 Fig. 5.4, App. R TCOA Simulator Validation	1
QF-1128	OWI-03.07 Fig. 5.1, SBO TCOA Simulator Validations	1
QF-1114	TYPE 2 - OPERATIONAL DECISION MAKING ISSUE EVALUATION	4

MISCELLANEOUS

Number	Description or Title	Date or Revision
WR 00060081	REPLACE LS-2-3-680E	8/27/10
ECR 0000006204	INSTALL ATWS CHANNEL BYPASS SWITCHES	3/26/12
LER 2011-010	RWM Bypassed During Startup	1/26/12
LER 2011-002	ESF Actuation Due to Failed Power Supply	2/17/11
EC 19085	Evaluate of Available Voltage for Lo-Lo Set SRVs E, G, and H in Response to 2011 CDBI-FSA Question	02/10/12
NX-16647	Battery Installation and Operating Instructions	2005
IST Test Data	Core Spray Pumps, P-208A and P-208B, (Quarterly Pump and Valve Tests)	7/6/09 – 4/1/12
DBD B.03.01	Design Bases Document for Core Spray System	3
DBD-B.03.03	Design Bases Document for Reactor Pressure Relief System	2
DBD T.18	Design Bases Document for Station Blackout Topic	4
2030	Control Room Log, (PI-14-48B)	83
GE SIL 375	Power Supply for Discharge Line Fill Systems on BWR/4,5,6 ECCS and RCIC Systems	April, 1982
PREOP No. A-11	Monticello Atomic Power Station Unit No. 1 Preoperational Test Procedure No. A-11	8/24/70
MPS-0200	Core Spray Flow Element Specification No. 21A1275	9/26/85 (4/19/68)
B.03.01-05	Core Spray Cooling System, System Operation, (Ops Man)	31
NUREG/CR-6031	Cavitation Guide for Control Valves	4/93
IN 97-90	Use of Non-conservative Acceptance Criteria in Safety-Related Pump Surveillance Tests	12/30/97
GL 95-07	Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves	8/17/95
NSP letter to NRC	180 Day Response to Generic Letter 95-07	2/12/96
FP-PE-MOV-03	Motor Operated Valve Program Design Methodology	2
NRC Bulletin No. 88-04	Potential Safety-Related Pump Loss	5/5/88
NSP letter to NRC	IE Bulletin 88-04 Response	7/8/88
Letter, Sulzer Bingham to NSP	RHR, Core Spray and RCIC Pumps Minimum Flow	11/8/88
Letter, NSP to NRC, IE Bulletin 88-04	NRC Bulletin 88-04 Final Response	12/13/88
NSP to NRC, IE Bulletin 88-04	NRC Bulletin 88-04 Response	6/17/94
NL-36126-1	RO-1744 Restricting Orifice Data Sheet, (RO-1743, -1744, Core Spray Min Flow Line, Data)	A

MISCELLANEOUS

Number	Description or Title	Date or Revision
Specification No. 5828-M-8	Specification for Standby Diesel Generators for the Monticello Nuclear Generating Plant, Unit 1	Rev. 1
Letter, Inter-Office Memo, Bechtel	Testing of Standby Diesel Generators, (Original start-up test data of the Monticello EDGs)	10/3/69
Letter, Sulzer to NSP	NPSH of Sulzer Bingham Pumps S/N 270417/418 Core Spray Pumps, F-97-10626	6/18/97
L-MT-11-077	Supplement to License Request: Revise Core Spray Pump Flow Rate in Specification 3.5.1, ECCS – Operating,"	12/22/11
Letter, NRC to MNGP	Monticello Nuclear Generating Plant – Issuance of Amendment Re: Minimum Core Spray Flow Rate	1/11/12
N/A	180 Day Response to GL 95-07; Pressure Locking and Thermal Binding of Safety Relater Power Operated Gate Valves	2/12/97
L-MT-09-079	Monticello Nuclear Generating Plant Nine-Month Supplemental (Post-Outage) Response to Generic Letter 2008-01	08/14/09
L-MT-07-044	Response to Request for Additional Information for the License Amendment Request: Revision to the Allowable Values and Surveillance Intervals for the Low Pressure Coolant Injection Loop Select Logic Time Delay Relays	06/05/07
SCR-05-0295	NMC Standard 10 CFR 50.59 Screening Form, Residual Heat Removal System- System Operation	00
SCR-11-0289	Revision to C.3 Shutdown Procedure	0
L-MT-11-076	2011 Report of Changes and Errors in ECCS Evaluation Models	12/22/11
OWI-02.02	Monticello Station Log-Night Shift	10/22/11
CD Letter	Test Below Low-Line Operation	4/5/12
NRC GL 91-11	Resolution of Generic Issues 48 and 49	7/18/91
NRC Letter	Amendment 31 to Facility Operating License No. DPR-122	11/27/84
NRC Letter	Monticello Operating Event of August 1, 1983: Degraded Voltage Relay Trip and Unexpected Loss of Offsite Power	9/8/83
NRC Letter	Revised Safety Evaluation for Amendment No. 31	3/20/85
NSP Letter	Revised Response to Generic Letter 91-11	2/6/92
NSP Letter	Response to Request for Additional Information	9/25/84
NSP Letter	Re-Analysis of Adequacy Of Station Electrical Distribution System Voltages	12/30/83
NSP Letter	Request for Amendment to Operating License No. DPR-122	7/27/84
NSP Letter	Additional Information Related to Modification to Degraded Voltage Protection Logic and Diesel Generator Start Logic	10/25/84
NSP Letter	Revised Response to Generic Letter 91-11	2/6/92
NX-16951	Single Phase Undervoltage Relays, Brown Boveri, Inc	0
NX-17494	1R Reserve Transformer Instruction Manual	0
NX-8974-17	Technical Manual, Magne-Blast Circuit Breaker	7

MODIFICATIONS

Number	Description or Title	Date or Revision
83m100	Limitorque Operator Replacements for Environmental Qualification	10/21/83
90Z040	ECCS Keep Fill; Core Spray and RHR Vents	6/25/90
EC 16693	Implement Proc. 8382, Vent Valve Installation for Core Spray Discharge Line	000
EC 13078	GL 2008-01 Generic Vent Line Modification	0
EC 14179	Implement Proc. 8382, Vent Valve Installation for HPCI Discharge Line	001
EC 811	HPCI Discharge Void Elimination	1
EC 19666	Generic Letter 2008-01 Project	0
84Z020	Degraded voltage Transfer Scheme Upgrade	3/20/84

OPERABILITY EVALUATIONS

Number	Description or Title	Date
OPR 1325199-1	Monticello not Designed to Detect All Single Open Phase Conditions	0
OPR 1323839-1	MO-2021 dual indication	1
EqDE-34-0687	Monticello Nuclear Plant Core Spray System Operability Report	8/3/87
SRI No. 89-003	Justification for Continued Operation with RHR and Core Spray Minimum Flow Less than Vendor Recommendations	8/7/89
SRI No. 90-025	Acceptability of Core Spray and RHR Minimum Flow Lines	8/30/90
SRI No. 90-031	Clarification of EDG Starting Requirements	8/7/01
OPR. 1173169	Core Spray System Bypass Leakage Above Tech Spec Value	3/21/09
Sulzer FEAR E-068-02692	Core Spray (CS) and Residual Heat Removal Pumps-Operability Assessment, (pump vendor evaluation).	4/13/12
OPR 1199936-1	SV-1995 and SV-1728 Terminal Voltage	10/2/09
OPR 1279021-1	Bus 13-16 High Voltage	4/13/11
OPR 1325199-1	Single Open Phase conditions	2/22/12
OPR 1199936-1	SV-1995 and SV-1728 Terminal Voltage	10/2/09
OPR 1279021-1	Bus 13-16 High Voltage	4/13/11
OPR 1325199-1	Single Open Phase Conditions	2/22/12

PROCEDURES

Number	Description or Title	Revision
MWI-3-M-2.04	DC Calculations	10
0197-02	16 250 V DC Battery Capacity Test	19
MWI-3-M-2.06	FUSE/BREAKER COORDINATION STUDY AND ELECTRICAL COORDINATION	9
0193-02	NO. 16 250 Vdc BATTERY OPERABILITY CHECK (DIVISION II)	26
NUC-03.21	Review of Reactor Heat Balance Changes	0
FP-PA-ARP-01	CAP Action Request Process	33
OWI-03.07	Time Critical Operator Actions	2
8153	Powering Div, II 250Vdc chargers from No.13 D/G, Security Diesel or Portable Generator	5
C.4-B.09.02.A	Station Blackout	38
FP-OP-CTC-01	Time Critical Operator Actions	3
8900	Operation of RCIC Without Electric Power	2
B.9.9-01	250 Vdc System Description	1
B.9.9-05	250 Vdc System Operation	13
C.4-B.09.13.G	Loss of Y-89	14
8900	Operation of RCIC Without Electric Power	2
B.09.13-05	Instrument AC and Uninterruptible AC Distribution Operation	24
B.09.13-01	Instrument AC and Uninterruptible AC Distribution Description	5
C.5-3504	Primary Containment Vent and Purge	5
C.5-3505	Venting Primary Containment	12
C.5.1-1200	Primary Containment Control	14
B.04.01-05	Primary Containment System Operation	26
B.08.04.03-01	Alternate Nitrogen System Description	3
C.4-B.09.06.D	Non-Essential 4.16KV Bus Abnormal Phase Voltage	0
FP-OP-ODM-01	Operational Decision Making	4
B.03.04-05	Residual Heat Removal System	59
FP-OP-COO1	Conduct of Operations	12
B.08.01.02-05	EDG Emergency Service Water	17
B.08.05-05	Fire Protection	55
C.1	Startup Procedure	74
C.3	Shutdown Procedure	69
C.4-C	SHUTDOWN OUTSIDE CONTROL ROOM	36
C.5-1100	RPV CONTROL	12
C.5-1200	PRIMARY CONTAINMENT CONTROL	17
C.5-2002	EMERGENCY RPV DEPRESSURIZATION	8
C.5-2006	RPV FLOODING	13
B.03.01-01	Core Spray Cooling System	6
B.03.02-01	HPCI	10

PROCEDURES

Number	Description or Title	Revision
B.03.03-01	Reactor Pressure Relief	11
B.09.06-01	4.16 KV Station Auxiliary	10
0000-D	OPERATIONS DAILY LOG - PART D	88
C.2-05	POWER OPERATION	42
OWI-02.07	OPERATIONS WORK CONTROL	36
0255-04-IA-1-2	RHR LOOP B QUARTERLY PUMP AND VALVE TESTS	84
0278-B	ATWS - RECIRC TRIP FOR REACTOR PRESSURE AND LEVEL TRIP UNIT TEST AND CALIBRATION	21
0095	Core Spray System Tests, (Early Test Procedure)	15
0187-02	12 EMERGENCY DIESEL GENERATOR/12 ESW QUARTERLY PUMP AND VALVE TESTS	77
0-SI-32-902-B	Aux Air Compressor Cooling Water Inlet Valve Full Cycle Exercising During Normal Operation – Train B	12
0255-03-IA-1-2	Core Spray Loop B Quarterly Pump and Valve Tests	52
0255-03-III-1A	Core Spray Comprehensive Pump and Valve Tests	19
0255—3-IA-2A	Core Spray – Shutdown Valve Operability Test	23
0255-17-ID-15	SRV RV-2-71D and RV-2-71G Pneumatic Supply Leakage Test	9
EWI-08.15.02	Motor Operated Valve Program Engineering Standards	10
EWI-08.16.01	Check Valve Program	8
4100-04-OCD	12 Emergency Diesel Generator 2 Starting Syste4m	10
B.03.01-05	Operations Manual Section: Core Spray Cooling System	32
B.09.08-05	Operations Manual Section: Emergency Diesel Generator	37
1136	RHR HX Efficiency Test	30
0255-04-IA-1-2	RHR Loop B Quarterly Pump and Valve Tests	84
B.03.04-05	RHR System Operation	59
4125-PM	East Service Water Bay Inspection/Dredging	12
1371	Drywell Prestart Inspection	8
A.6	Acts of Nature	41
NSP-MSC-0580	Relief Valve Setpoint and Leak Checks	3
0112	Safety Relief Valves Operability Check	35
0131	Safety Relief Valve Bellows Monitor Check and Calibration	14
0255-07-IB-1	Main Sinspectors Safety/Relief Valve Bench Checks and Inspections	15
0255-07-IB-4	Main Sinspectors Safety/Relief Valve Pilot Valve Assembly As-Found Setpoint and Leak Checks	7
C.4-B.03.03.B	Relief Valve Leaking	11
C.4-B.03.03.A	Stuck Open Relief Valve	18
OSP-EFT-0557	Control Room Ventilation Heat Load Removal Test	2
0255-11-III-4	14 ESW Quarterly Pump and Valve Tests	57
B.08.01.04-05	Emergency Service Water	23

PROCEDURES

Number	Description or Title	Revision
EWI-05.02.01	Maintenance Rule Program Document	18
OWI-02.03	Reactor Building Daily Check Sheet	68
1047-03	Operations Reactor Side Checklist Weekly Procedure	
Ops Man B.03.04-06	Operations Manual Section: Residual Heat Removal System	59
EWI-12.01.01	Gas Accumulation Program	1
FP-PE-NDE-426	Ultrasonic Examination for Determination of Fluid Levels	2
EWI-08.15.01	Motor Operated Valve Program	20
EWI-08.16.01	Check Valve Program	8
C.5-3502	Containment Spray	16
OSP-RHR-0556	LPCI Discharge Venting	5
OSP-RHR-0561	Core Spray Discharge Venting	6
Ops Man C.5-3502	Operations Manual Section: Containment Spray	16
N/A	Monticello Generating Station Transmission Operation Guide	N/A
4027-PM	Klockner-Moeller B34 and B44 Maintenance Procedure	20
4847-PM	GE 7700 Line Motor Control Center Maintenance Procedure	22
4851-12-PM	ABB K-1600S AND K-3000S 480 Volt Breaker Maintenance	17
4858-16-PM	4 Kv Bus 16 Maintenance	5
4858-PM	4KV, GE, AMH Magne-Blast Air Circuit Breaker Maintenance	32
4946-PM	Ac Induction 4kV/480V Motor Offline (MCE) Testing	8
4948-PM	Ac Induction 4kV/480V Motor Offline (EMAX) Testing	6
B.09.06-05	4.16 KV Station Auxiliary – System Operation	36
B.09.13-05	Operations Manual Section: Instrument AC and Uninterruptible AC Distribution System	24
B.09.13-06	Operations Manual Section: Instrument AC and Uninterruptible AC Distribution System	6
C.4-B.09.02.A	Station Blackout	38
E.2	Operations Manual Section: Master Power Restoration Procedure	3
EWI-08.13.02	Motor Program	6
MWI-3-M-2.01	AC Electrical Load Study	13
OSP-4KV-0575-01	Offsite Power Supply Auto Transfer (2R TO 1R) Test – Division 1	3
OSP-4KV-0575-02	Offsite Power Supply Auto Transfer (2R TO 1R) Test – Division 2	3

SURVEILLANCES (COMPLETED)

Number	Description or Title	Date or Revision
WO00437034	ENG-RHR, 1136 RHR HX Efficiency Test – Div II	3/16/12
WO00419043	ENG-RHR, 1136 RHR HX Efficiency Test – Div II	5/17/11
WO361552-22	Visual Inspection of RHR HX	3/19/11
WO00409317	RHR Loop B QRTR Pump and Valve Tests	5/14/11
WO00416006	RHR Loop B QRTR Pump and Valve Tests	5/20/11
WO00421257	RHR Loop B QRTR Pump and Valve Tests	9/20/11
WO00387900	RHR Loop B QRTR Pump and Valve Tests	6/9/10
WO00391564	RHR Loop B QRTR Pump and Valve Tests	6/9/10
WO00398935	RHR Loop B QRTR Pump and Valve Tests	9/28/10
WO00404079	RHR Loop B QRTR Pump and Valve Tests	11/10/10
WO00365141	RHR Loop B QRTR Pump and Valve Tests	3/31/09
WO00371182	RHR Loop B QRTR Pump and Valve Tests	11/16/09
WO00377653	RHR Loop B QRTR Pump and Valve Tests	9/3/09
WO00383893	RHR Loop B QRTR Pump and Valve Tests	12/1/09
WO00426992	RHR Loop B QRTR Pump and Valve Tests	11/10/11
WO00404801	Comprehensive 14 RHR Pump and VLV Tests	11/10/10
WO00404802	Comprehensive 12 RHR Pump and VLV Tests	11/10/10
WO00407234	RV-2005 RHR Div 2 Discharge HDR RV Setpoint and Leak Check	3/17/11
WO00366843	RV-1991 RHR Div 2 Discharge HDR RV Setpoint and Leak Check	11/16/09
WO00388993	RV-1993 RHR Div 2 Discharge HDR RV Setpoint and Leak Check	10/04/11
WO00416126	0112 SRV's Oper Cycle	1/3/11
WO00394398	0112 SRV's Oper Cycle	5/31/11
WO00343907	Perform SRV Bellows Monitor	4/9/09
WO343864-02	AN2 Leak Test	12/1/09
WO394368-01	AN2 Leak Test	9/27/11
WO00434747	14 ESW Pump Flow Test	1/16/12
WO00421000	14 ESW Comprehensive PMP and Valve Test	10/11/11
WO00415056	14 ESW Pump Flow Test	6/7/11
WO00343716	0255-03-IA-2B Valve Position Indication Test	4/27/10
WO00344292	0255-04-ID-2 LPCI Loop B Testable CHK VLV Leak Test	12/21/09
WO00345604	0255-04-IA-2 RHR Sys – Cold S/D Valve Operability	5/13/09
WO00368932	Perform IST Cold Shutdown Tests	11/22/10
WO00394263	0255-03-IA-2B CSP Valve Position Ind. Test	9/2/11
WO00395567	0255-04-IA-2 RHR Sys- Cold S/D Valve Operability	5/19/11
WO 394338-01	16 250 V DC Battery Capacity Test	04/08/11
0193-02	NO. 16 250 Vdc Battery Operability Check (Div II)-Quarterly	02/16/12

SURVEILLANCES (COMPLETED)

Number	Description or Title	Date or Revision
1282-02	NO. 16 250 Vdc Battery Operability Check (Div II)-Monthly and Weekly Test	03/06/12

WORK ORDERS

Number	Description or Title	Date
00343936	PM 4125 (Inspect East Service Water Bay)	4/24/09
00394436	PM 4125 (Inspect East Service Water Bay)	5/17/11
00435760	Perform 4180-PM to Inspect P-202B/D	2/6/12
00158017	V-AEC-14A Condenser Insp/clean	1/8/07
00150842	Perform instrument PM on LRW-6	12/19/06
00389950	I andC-LRW, Check, Calibrate, Perform PM	8/13/10
00394552	OPS-LRW, Perform 1252	4/9/11
00432839	RP-ARM, 1024 Area Radiation Monitor Calibration	12/20/11
00345601	RHR Pump Room Sump Pump Surveillance Procedure	4/26/09
00311664	D-10, 125Vdc Charger for 11 Battery 480V Supply	07/21/04
00280727	Procedure: 12 Emergency Diesel Generator 2 Air Start System	10/25/06
00379208	T-80A Thru F Perform UT Inspection of EDG Air Start Tanks	11/12/10
00379209	T-79D Thru F – UT Inspection of EDG Air Start Tanks	1/14/11
00387425	Procedure: I and C PM 7180 Parts A and B EDG Instruments	4/14/10
00394374	Procedure: 0255-17-ID-15, SRV RV-2-71D and RV-2-71G Pneumatic Supply Leakage Test	3/21/11
00394246	Procedure: 0255-03-IA-2B, Valve Position Indication Test	4/30/11
00394572	MOV-1752 Test Data Analysis	3/7/12
00406961	Replace TOPWORKS for RV-2-71D and As Found Test	10/20/11
00407585	Procedure: 0255-03-III-1A, Core Spray Comprehensive Pump and Valve Tests	12/21/10
00418234	Procedure: 0255-07-IB-1, Main Sinspectors Safety/Relief Valve Bench Checks and Inspections	11/21/10
00422772	Procedure: 0255-03-ID-2, Core Spray “B” Loop Injection Line Isolation Valve Leak Test	3/16/11
00437464	Procedure: 0255-03-IA-1-2, Core Spray Loop B Quarterly Pump and Valve Tests	2/21/12
00358821	Core Spray, Perform Walkdown for GL 2008-01	8/06/08
00358820	RHR, Perform Walkdown for GL 2008-01	8/12/08
00365544	RHR A, Perform UT Inspection of Piping per GL 2008-01	8/29/08
00358822	HPCI, Perform Walkdown for GL 2008-01	9/22/08
00280488	0137-21-01 CS “A” Loop Injection Line ISOL VLV LLRT	5/18/09

WORK ORDERS

Number	Description or Title	Date
00422770	EPRO-CSP, 0225-03-ID-1 SC A Loop INJ Line Isol VLV Leak TST	2/10/12
0066251	LPCI Loop “A” Valves MO-2014, AO-10-46A and RHR-81 Test	4/03/11
00344292	LPCI Loop “B” Valves MO-2015, AO-10-46B Leak Test	4/07/09
00438970	LPCI Discharge Venting	3/11/12
00438965	OSP-CSP-0561 CORE SPRAY DISCHA RGE VENTING	3/09/12
00434295	Core Spray Discharge Venting	1/05/12
00434297	LPCI Discharge Venting	1/04/12
00437214	Core Spray Discharge Venting	2/9/12
00343781 02	PM 4850-302 (152-302) 1R Source To 13 Bus	4/2/09
00343820 02	OSP-4KV-0575-01 Offsite Pwr Auto Xfr (2R TO 1R) TST-DIV-1	4/2/09
00343821 01	OSP-4KV-0575-02 Offsite Pwr Auto Xfr (2R TO 1R) TST-DIV-2	5/2/11
00393139	XFMR, Furans In Oil Testing	8/13/10
00394325	TD-152-402, Perform Relay PM	4/29/11
00400369	TD-4KVB-01, PM 4858 Minor	6/24/11
00407925	OPS-4KVB-04, Remove Breaker	8/15/11
00433610	EPRE - 3750-01, Thermography - Substation and Transformers	2/10/12
00306951	PM 4858-59 (1R Auxiliary Transformer X03)	5/10/04
00347721	Perform 4858-59 (1R Auxiliary Transformer X03)	9/20/08
00394778	TD-X03/XFMR, 1R Transformer, Perform PM ON 1R XFMR (X03)	5/24/11

LIST OF ACRONYMS USED

ADAMS	Agency wide Document Access Management System
AR	Action Request
ASME	American Society of Mechanical Engineers
BWROG	Boiling Water Reactor Owner's Group
CAP	Corrective Action Program
CDBI	Component Design Bases Inspection
CFR	Code of Federal Regulations
CS	Core Spray
CST	Condensate Storage Tank
DRS	Division of Reactor Safety
EC	Engineering Change
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EFT-ESW	Emergency Filtration Train Emergency Service Water
ESW	Emergency Service Water
FSA	Focused Self Assessment
GAR	General Action Request
GE	General Electric
GL	Generic Letter
HPCI	High Pressure Core Injection
IEEE	Institute of Electrical and Electronic Engineers
IMC	Inspection Manual Chapter
IN	Information Notice
IR	Inspection Report
IST	In-service Test
kV	Kilovolt
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
LOP	Loss of Power
LPCI	Low Pressure Coolant Injection
MCC	Motor Control Center
MOV	Motor-Operated Valve
NCV	Non-Cited Violation
NPSH	Net Positive Suction Head
NRC	U.S. Nuclear Regulatory Commission
PARS	Publicly Available Records
PRA	Probabilistic Risk Assessment
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RIS	Regulatory Information Summary
SBLOCA	Small Break Loss of Coolant Accident
SBO	Station Blackout
SDC	Shutdown Cooling
SDP	Significance Determination Process
SER	Safety Evaluation Report
SOV	Solenoid Operated Valve
SPAR	Standardized Plant Analysis Risk
SRV	Safety Relief Valve
TI	Temporary Instructions

TOL	Thermal Overload
TRM	Technical Requirements Manual
TS	Technical Specification
TSTF	Technical Specifications Task Force
USAR	Updated Safety Analysis Report
UT	Ultrasonic Testing
Vac	Volts Alternating Current
Vdc	Volts Direct Current

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Sincerely,

/RA/

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

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