UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BLVD
ARLINGTON, TEXAS 76011-4511

December 14, 2011

Donna Jacobs, Vice President, Operations
Entergy Operations, Inc.
Waterford Steam Electric Station, Unit 3
17265 River Road
Killona, LA 70057-0751

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – NRC COMPONENT DESIGN BASES INSPECTION, NRC INSPECTION REPORT 05000382/2011007

Dear Ms. Jacobs:

On November 16, 2011, the US Nuclear Regulatory Commission (NRC) completed a Component Design Bases Inspection at your Waterford Steam Electric Station, Unit 3. The enclosed report documents our inspection findings. The preliminary findings were discussed on October 7, 2011, with Mr. K. Nichols, Director, Engineering, and other members of your staff. After additional in-office inspection, a final telephonic exit meeting was conducted on November 16, 2011, with Ms. Jacobs, Vice President, Operations, 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 team reviewed selected procedures and records, observed activities, and interviewed cognizant plant personnel.

Based on the results of this inspection, the NRC has identified eight findings that were evaluated under the risk significance determination process. Violations were associated with all of the findings. All of the findings were found to have very low safety significance (Green) and the violations associated with these findings are being treated as noncited violations, consistent with the NRC Enforcement Policy.

If you contest any of the noncited violations, or the significance of the violations you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the US Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 612 East Lamar Blvd., Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, US Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Waterford Steam Electric Station, Unit 3. The information you provide will be considered in accordance with Inspection Manual Chapter 0305. In addition, if you disagree with the characterization of the crosscutting 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 IV, and the NRC Resident Inspector at Waterford Steam Electric Station, Unit 3.

In accordance with Code of Federal Regulations, Title 10, Part 2.390 of the NRC's Rules of Practice, a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Thomas R. Farnholtz, Chief
Engineering Branch 1
Division of Reactor Safety

Docket: 50-382
License: NPF-38

Enclosure:
NRC Inspection Report 05000382/2011007
w/Attachment:
1. Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	50-382
License:	NPF-38
Report:	05000382/2011007
Licensee:	Entergy Operations, Inc.
Facility:	Waterford Steam Electric Station, Unit 3
Location:	17265 River Road Killona, Louisiana
Dates:	September 6 through November 17, 2011
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Inspectors:	E. Uribe, Reactor Inspector, Engineering Branch 2, Region IV C. Smith, Project Engineer, Reactor Projects Branch F, Region IV N. Hernandez, Operations Engineer, Operations Branch, Region IV
Accompanying Personnel:	H. Campbell, Ph.D., Mechanical Contractor, Beckman and Associates J. Leivo, Electrical Contractor, Beckman and Associates
Approved By:	Thomas R. Farnholtz, Chief Engineering Branch 1

SUMMARY OF FINDINGS

IR 05000382/2011007; 09/06/2011 – 11/17/2011; Waterford Steam Electric Station, Unit 3, baseline inspection, NRC Inspection Procedure 71111.21, “Component Design Basis Inspection.”

The report covers an announced inspection by a team of four regional inspectors and three contractors. Eight findings were identified. All of the findings were of very low safety significance. The final significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, “Significance Determination Process.” Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, “Reactor Oversight Process,” Revision 4, dated December 2006.

A. NRC-Identified Findings

Cornerstone: Mitigating Systems

- Green. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” which states, in part, that “measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.” Specifically, prior to September 28, 2011, the licensee failed to assure that design basis information associated with loading the auxiliary component cooling water pumps on the Class 1E Bus was correctly translated in various design basis calculations. This finding was entered into the licensee’s corrective action program as Condition Reports CR-WF3-2011-06737 and CR-WF3-2011-06808.

  The team determined that the failure to verify the adequacy of the design for loading the auxiliary component cooling water pumps on the Class 1E Bus in various design basis calculations was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the inadequate design calculations could have prevented continued operation of the emergency diesel generator under degraded voltage, short circuit, and increased fuel oil consumption conditions. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee revised the associated calculations to include the required 295 brake horsepower value and reanalyzed for verification of operability. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance (Section 1R21.2.2).

- Green. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, “Test Control,” which states, in part, “A program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate acceptance limits contained in applicable documents." Specifically, as of October 4, 2011, the licensee did not have an adequate test procedure to verify containment spray pump design basis accident performance requirements. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06852.

The team determined that the failure to either have a stand-alone design basis accident containment spray pump verification test or to have it adequately incorporated into the in-service testing requirements was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, neither the design basis analysis nor related in-service test surveillances, accounted for the inherent uncertainty of the flow element in the overall instrument uncertainty evaluation. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance (Section 1R21.2.6).

- Green. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design bases are correctly translated into specifications, drawings, procedures, and instructions." Specifically, as of October 4, 2011, the licensee extrapolated the values for required pump net positive suction head beyond those provided in vendor certified curves without adequate analysis or justification. Consequently, the licensee, per the station-approved net positive suction head analysis, could have operated the safety-related pumps in beyond-analyzed or vendor-approved flow regimes. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06870.

  The team determined that the failure to provide adequate justification for extrapolation of net positive suction head values beyond those provided in the certified pump vendor data was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, potential pump cavitation at higher than analyzed or vendor-approved operation, could have rendered mitigating equipment (i.e., pumps) to fail. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee performed additional analyses to assure that the pumps could safely operate in the required flow regimes. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance (Section 1R21.2.6).

- Green. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," which states, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished." Specifically, as of October 7, 2011, when developing and implementing preventive maintenance procedures and work orders for transformers and electrical connections, the licensee failed to provide specific acceptance criteria and instructions addressing the potential vulnerability of these connections to degradation from galvanic reaction or differential thermal expansion, particularly in a high humidity outdoor environment. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06832.

  The team determined that the failure to provide suitable acceptance criteria and instructions in preventive maintenance procedures and work orders applicable to the aluminum/copper electrical connections to the transformers was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, inadequate preventive maintenance of the aluminum/copper connections could lead to degradation of the electrical connections to the station service transformer and loss of the ultimate heat sink. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance (Section 1R21.2.8).

- Green. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design bases are correctly translated into specifications, drawings, procedures, and instructions. The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program." Specifically, prior to October 7, 2011, the licensee failed to establish and maintain an analysis supporting the adequacy of a single four-inch overflow (bulkhead) drain for protecting the ultimate heat sink motor control center from flooding during a design basis probable maximum precipitation event. Failure of the motor control center as a result of flooding from the probable maximum precipitation event could result in the loss of the associated ultimate heat sink, because the motor control center serves both the dry cooling tower and wet cooling tower fan motors. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06701.

The team determined that the failure to establish and maintain an analysis supporting the adequacy of a single four-inch overflow (bulkhead) drain for protecting the ultimate heat sink motor control center from flooding during a design basis probable maximum precipitation event was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the design basis analysis for the four-inch bulkhead drain did not ensure that the motor control center would be adequately protected during a probable maximum precipitation event. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee performed calculations to justify the adequacy of the installed bulkhead drain for the probable maximum precipitation event. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance (Section 1R21.2.8).

Green. The team identified a Green violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program." Specifically, prior to October 7, 2011, the licensee failed to analyze the dry cooling tower fan motors for premature trip as a result of reverse rotation caused by a tornado event that could result in the loss of the dry cooling tower heat removal capability. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06850.

The team determined that the failure to establish and maintain an analysis supporting the ability of the dry cooling tower fan motors to operate successfully during and following a design basis tornado event was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the design basis analysis did not ensure that the dry cooling tower fan motors would perform as required under reverse rotation conditions, without premature trip, during a design basis tornado. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee prepared an evaluation of the effect on fan motor starting current and duration for reverse rotation conditions. For reverse rotation conditions that would extend the locked rotor current time by a factor of two, the licensee's analysis showed ample margin for the instantaneous trip settings from the magnetic-only breaker and the thermal overload protection, such that premature trip would be precluded. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance (Section 1R21.2.11).

- Green. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions." Specifically, prior to October 7, 2011, the licensee did not have an adequate technical basis for increasing the auxiliary component cooling water pump motor bearing temperature alarm setpoints or establishing an upper limit on motor bearing temperature, which directed operators to secure the pump. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06573.

  The team determined that the failure to provide an adequate basis for increasing the high bearing temperature alarm setpoints and establishing a high temperature motor trip criterion was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee performed an engineering justification for the bearing temperatures based on industry guidance. This finding was determined to have a cross-cutting aspect in the area of human performance associated with the decision making component because the licensee did not use conservative assumptions in decision making and adopt a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action [H.1(b)] (Section 1R21.2.15).

  Green. The team identified a Green noncited violation of 10 CFR 50.65(a)(4), which states, in part, that "the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." Specifically, on October 28, 2010 the turbine driven essential feedwater pump was out of service for maintenance for approximately 12 hours. During this time the licensee unknowingly entered the Orange risk window (crossed a risk threshold) due to a faulty assumption in the probabilistic risk assessment model. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06653.

  The team determined that the failure to perform adequate risk assessments is a performance deficiency. This finding was more than minor because it was associated with the human performance attribute of the Mitigating Systems Cornerstone, adversely affecting the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the issue was identified as requiring a Phase 2 evaluation. A Region IV Senior Reactor Analyst performed a Phase 2 significance determination using NRC Inspection Manual Chapter 0609, Appendix K, “Maintenance Risk Assessment and Risk Management Significance Determination Process.” In accordance with Appendix K:

$$\text{Delta-CDF} = [\text{CCDP}_{\text{Actual}} – \text{CCDP}_{\text{flawed}}] * \text{duration} /8760$$

The licensee bounded the duration of the turbine driven essential feedwater pump maintenance at 8 hours in a year. The flawed ICDP was 3.1E-5, the actual ICDP was 3.1E-5 + 1.9E-5 = 5.0E-5. The difference was 1.9E-5.

Delta-CDF = 1.9E-5 * 12/8760 = 2.6E-8

Therefore, the issue was determined to have very low safety significance (Green). This finding was determined to have a cross-cutting aspect in the area of problem identification and resolution associated with the self and independent assessments component because the licensee performed a probabilistic risk assessment model update in April 2009, which failed to identify the faulty assumption [P.3(a)] (Section 1R21.4).

B. Licensee-Identified Violations

No findings were identified.

REPORT DETAILS

1 REACTOR SAFETY

Inspection of component design bases verifies the initial design and subsequent modifications and provides monitoring of the capability of the selected components and operator actions to perform their design bases functions. As plants age, their design bases may be difficult to determine and important design features may be altered or disabled during modifications. The plant risk assessment 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.

1R21 Component Design Bases Inspection (71111.21)

To assess the ability of the Waterford Steam Electric Station, Unit 3, equipment and operators to perform their required safety functions, the team inspected risk significant components and the licensee's responses to industry operating experience. The team selected risk significant components for review using information contained in the Waterford Steam Electric Station, Unit 3, Probabilistic Risk Assessment and the U. S. Nuclear Regulatory Commission's (NRC) standardized plant analysis risk model. In general, the selection process focused on components that had a risk achievement worth factor greater than 1.3 or a risk reduction worth factor greater than 1.005. The items selected included components in both safety-related and nonsafety-related systems including pumps, circuit breakers, heat exchangers, transformers, and valves. The team selected the risk significant operating experience to be inspected based on its collective past experience.

.1 Inspection Scope

To verify that the selected components would function as required, the team reviewed design basis assumptions, calculations, and procedures. In some instances, the team performed calculations to independently verify the licensee's conclusions. The team also verified that the condition of the components was consistent with the design bases and that the tested capabilities met the required criteria.

The team reviewed maintenance work records, corrective action documents, and industry operating experience records to verify that licensee personnel considered degraded conditions and their impact on the components. For the review of operator actions, the team observed operators during simulator scenarios, as well as during simulated actions in the plant.

The team performed a margin assessment and detailed review of the selected risk-significant components to verify that the design bases have been correctly implemented and maintained. This design margin assessment considered original design issues, margin reductions because of modifications, and margin reductions identified as a result of material condition issues. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as failed performance test results; significant corrective actions; repeated maintenance;

10 CFR 50.65(a)1 status; operable, but degraded conditions; NRC resident inspector input of problem equipment; system health reports; industry operating experience; and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in-depth margins.

The inspection procedure requires a review of 15 to 25 samples that include risk-significant and low design margin components, containment-related components, and operating experience issues. The sample selection for this inspection was 15 components, one of which is containment-related, five operating experience items, and three Event Scenario-Based activities. The selected inspection and associated operating experience items supported risk significant functions including the following:

a. Electrical power to mitigation systems: The team selected several components in the electrical power distribution systems to verify operability to supply alternating current (AC) and direct current (DC) power to risk significant and safety-related loads in support of safety system operation in response to initiating events such as loss of offsite power, station blackout, and a loss-of-coolant accident with offsite power available. As such the team selected:

   - Emergency diesel generator sequencer
   - 4kV breaker manual closure capability
   - Train B ultimate heat sink motor control center
   - Process analog control cards

b. Mitigating systems needed to attain safe shutdown. The team reviewed components required to perform the safe shutdown of the plant. As such the team selected:

   - Component cooling water pump motor
   - Auxiliary component cooling water pump motor
   - Emergency diesel generator room exhaust fans
   - Dry cooling tower Train A fan motors
   - Turbine driven essential feedwater pump steam inlet piping (heat trace)
   - Emergency diesel generator train B control air system
   - Dry cooling tower train A
   - Emergency diesel generator room fans
   - High pressure safety injection pumps
   - Control room air handling units
   - Low pressure safety injection pumps
   - Containment spray pumps

.2 Results of Detailed Reviews for Components

.2.1 Train A Component Cooling Water Pump Motor

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the component cooling water pump motors. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically the team reviewed:

- Schematics and control wiring diagrams of record for the motor feeder breaker.
- Preventive maintenance procedures for the motor.
- Vendor manual, nameplate data, and specifications for the motor.
- Calculations of record and supporting documentation for determining brake horsepower loads.
- Calculations of record for determining minimum terminal voltage under design/licensing basis conditions.
- Calculations of record for overcurrent protection settings and alarms.
- Completion of last preventive maintenance work orders.
- Listing of condition reports for the past 3 years involving the component cooling water pump motor.
- Piping and instrumentation diagram for the component cooling water system.

b. Findings

No findings were identified.

.2.2 Train A Auxiliary Component Cooling Water Pump Motor

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the auxiliary component cooling water pump motors. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically the team reviewed:

- Schematics and control wiring diagrams of record for the motor feeder breaker.
- Preventive maintenance procedures for the motor.
- Vendor manual, nameplate data, and specifications for the motor.

- Calculations of record and supporting documentation for determining brake horsepower loads.
- Calculations of record for determining minimum terminal voltage under design/licensing basis conditions.
- Calculations of record for overcurrent protection settings and alarms.
- Completion of last preventive maintenance work orders.
- Listing of condition reports for the past three years involving the auxiliary component cooling water pump motor.
- Piping and instrumentation diagram for the auxiliary component cooling water system.

b. Findings

Introduction. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," involving four non-conservative design basis calculations. Specifically, prior to September 28, 2011, the licensee failed to correctly update four electrical design calculations which incorporate the required brake horsepower for both the Train A and Train B Auxiliary Component Cooling Water Pumps.

Description. The team reviewed calculations ECM82-032, "Calculations for Motors Driven by Emergency Diesel Generators," ECE91-050, "Degraded Voltage Relay Setpoint & Plant Load Study," ECM95-008, "Ultimate Heat Sink Design Basis" and design basis document W3-DBD-04, "Component Cooling Water & Auxiliary Component Cooling Water Design Basis Document." The team determined that various values were used to evaluate the capability of the auxiliary component cooling water pump motors under various design basis conditions. As specified in ECE91-050, the values of 240 brake horsepower and 3000 gallons per minute are used as inputs to demonstrate the capability of the auxiliary component cooling water pumps during a degraded voltage condition. The team also identified that ECM82-032 determines that the values of 295 brake horsepower and 5850 gallons per minute are required for the auxiliary component cooling water pump motors based on a bounding, worst accident design flow rate.

The team requested the licensee to provide a justification for the inconsistencies identified. As a result of the team's request, the licensee determined that the 240 brake horsepower value was non-conservative and outdated. The licensee reviewed design documentation and determined that the value of 295 brake horsepower failed to be incorporated in four design basis calculations.

On September 28, 2011, the licensee addressed the team's concern and identified that the update was not appropriately translated into two electrical design calculations. The licensee then initiated Condition Report CR-WF3-2011-06737 specifying that they used a non-conservative value and evaluated the significance on the operability of the system.

On October 3, 2011, the licensee initiated Condition Report CR-WF3-2011-06806, identifying two additional calculations that had been negatively impacted by the discrepancy. The licensee performed an additional evaluation to determine the significance of this deficiency on the system. The team reviewed the information and determined that the auxiliary component cooling water system was operable; however, the condition identified had an adverse impact on the system's capability. The team reviewed the immediate and prompt operability determinations, corrective actions associated with the identified condition as well as the affected calculations (listed below):

- Calculation ECE90-006, "Emergency Diesel Generator Loading and Fuel Oil Consumption"
- Calculation ECE91-050, "Degraded Voltage Relay Setpoint and Plant Load Study"
- Calculation ECE91-055, "AC Short Circuit Calculations"
- Calculation MN(Q)9-9, "Wet Cooling Tower Losses During LOCA"

The team identified that design control measures for verifying or checking the adequacy of design were not implemented. Design changes are required to be subjected to design control measures commensurate with those applied to the original design.

Analysis. The team determined that the failure to verify the adequacy of the design for loading the auxiliary component cooling water pumps on the Class 1E Bus in various design basis calculations was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the inadequate design calculations could have prevented continued operation of the emergency diesel generator under degraded voltage, short circuit, and increased fuel oil consumption conditions. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee revised the associated calculations to include the required 295 brake horsepower value and reanalyzed for verification of operability. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions." Contrary to the above, the licensee failed to ensure that measures were established to assure that applicable design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, prior to September 28, 2011, the licensee failed to assure that design basis information associated with loading the auxiliary component cooling water pumps on the Class 1E Bus was correctly translated in various design basis calculations. This finding was entered into the licensee's corrective action program as Condition Reports CR-WF3-2011-06737 and CR-WF3-2011-06808. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a noncited violation consistent with the NRC Enforcement Policy:

NCV 05000382/2011007-01, "Failure to Assure Design Basis Input was Correctly Translated into Design Basis Calculations."

.2.3 Emergency Diesel Generator Sequencer Relays

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the emergency diesel generator operating signals under both accident and non-accident conditions. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically the team reviewed:

- Updated safety analysis report commitments.
- Emergency diesel generator sequencer circuit diagram.
- System one line and schematic diagrams.
- Sizing and rating specifications for ground fault protection components.
- Calculations for normal and accident loading and degraded voltage conditions.
- Post modifications acceptance testing and inspection procedures.
- Emergency diesel generator alarm operator response procedures.
- Waterford 3 fire hazards analysis.

b. Findings

No findings were identified.

.2.4 Low Pressure Safety Injection Pump, SI-MPMP 0001B

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the B Train Low Pressure Safety Injection Pump. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Safety-related calculations addressing required low pressure safety injection pump performance requirements during design bases accidents.
- Recent system health reports and selected condition evaluations and corrective actions, to assess the current condition of the equipment.
- Calculations addressing the uncertainties of the instruments used to verify pump performance during required technical specification surveillances with focus on the measurement of pump flow, including flow element uncertainty, and associated developed head.

- Quarterly and full flow surveillance procedures and test results used to monitor potential low pressure safety injection pump degradation.

b. Findings

No findings were identified.

.2.5 Control Room Air Handling Units

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the control room air handling units. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- System health reports, conditions reports and associated corrective actions.
- Design Change number 01150338, (Installed ductwork access panels for valves HVC-101 and HVC-102, thereby improving testability of system for leakage).
- Engineering Request ER-W3-2006-0111, (Design change to control room ventilation unit low differential pressure auto-start logic circuitry).
- Selected test results for surveillance procedures:
  - HVC-101 & HVC-102 leak test.
  - Control room air conditioning system surveillance.
  - Control room pressure test.
- Calculations addressing control room air handling units, (fan capacities, ductwork sizing and losses, required motor size).

b. Findings

No findings were identified.

.2.6 Containment Spray Pump

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the Train B Containment Spray Pump. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Safety-related calculations addressing required containment spray pump performance requirements during design bases accidents.

- Calculations addressing the uncertainties of the instruments used to verify pump performance during required technical specification surveillances with focus on the measurement of pump flow and associated developed head.
- The calculation to evaluate flow uncertainty for the heat removal low flow alarm setpoint.
- Quarterly and full flow surveillance procedures and test results used to monitor potential containment spray pump degradation.
- Recent health reports and selected condition reports and associated corrective actions.
- Waterford 3 Station response to NRC Bulletin 88-04, "Potential Safety-Related Pump Loss."
- Waterford 3 Station evaluation of NRC Information Notice 97-90, "Use of Nonconservative Acceptance Criteria in Safety-Related Pump Surveillance Tests."

b. Findings

The team identified two findings associated with the containment spray pumps.

1. Introduction. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," involving the failure to establish a test procedure that demonstrated the containment spray pump performance required to mitigate the impact of design basis accidents. As a result the design basis accident pump verification was incomplete.

   Description. The team determined that the licensee did not have a methodology for performing the required design basis accident pump verification for the containment spray pumps. This test requires running the pump in higher flow rate regimes than the standard inservice tests and the utilization of test instruments with greater accuracy and less uncertainty than those installed in the plant.

   Analysis. The team determined that the failure to either have a stand-alone design basis accident containment spray pump verification test or to have it adequately incorporated into the in-service testing requirements was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, neither the design basis analysis nor related in-service test surveillances, accounted for the inherent uncertainty of the flow element in the overall instrument uncertainty evaluation. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, “Test Control,” which states, in part, “A program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate acceptance limits contained in applicable documents.” Contrary to the above, the licensee failed to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate acceptance limits contained in applicable documents. Specifically, as of October 4, 2011, the licensee did not have an adequate test procedure to verify containment spray pump design basis accident performance requirements. This finding was entered into the licensee’s corrective action program as Condition Report CR-WF3-2011-06852. Because this finding is of very low safety significance and has been entered into the licensee’s corrective action program, this violation is being treated as a noncited violation, consistent with the NRC Enforcement Policy: NCV 05000382/2011007-02, “Failure to Establish an Adequate Containment Spray Pump Design Basis Verification Surveillance Test.”

2. Introduction. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” involving the failure to provide an adequate basis for extrapolation of vendor supplied pump net positive suction head values.

   Description. The team reviewed calculation EMC07-001 as a sample calculation for both the low pressure safety injection pumps and the containment spray pumps. In addition, because the high pressure safety injection pump net positive suction head evaluation was included in the calculation, the high pressure safety injection pump analysis was also evaluated. The team determined that the high pressure safety injection pump was the most challenged regarding margin to available net positive suction head. However, the licensee failed to obtain additional pump vendor net positive suction head data, or to provide justification for the extrapolation performed in calculation EMC07-007, for all analyzed pumps.

   Analysis. The team determined that the failure to provide adequate justification for extrapolation of net positive suction head values beyond those provided in the certified pump vendor data was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, potential pump cavitation at higher than analyzed or vendor-approved operation, could have rendered mitigating equipment (i.e., pumps) to fail. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee performed additional analyses to assure that the pumps could safely operate in the required flow regimes. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design bases are correctly translated into specifications, drawings, procedures, and instructions." Contrary to the above, the licensee failed to ensure that measures were established to assure that applicable design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, as of October 4, 2011, the licensee extrapolated the values for required pump net positive suction head beyond those provided in vendor certified curves without adequate analysis or justification. Consequently, the licensee, per the station-approved net positive suction head analysis, could have operated the safety-related pumps in beyond-analyzed or vendor-approved flow regimes. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06870. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a noncited violation consistent with the NRC Enforcement Policy: NCV 05000382/2011007-03, "Failure to Provide an Adequate Basis for Extrapolation of Vendor Supplied Pump Net Positive Suction Head Values."

.2.7 Reactor Coolant Pump Seal Package and Related Components

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the reactor coolant pump seal packages, including the thermal barrier heat exchanger. The team also conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Discussions with reactor coolant system engineers regarding reactor coolant pump modifications including:
    - Reactor coolant pump seal history, with focus on vapor seal design changes.
    - Heat exchanger modifications.
    - Reactor Coolant Pump 2B gasket leaks.
- Corrective action reports including the root cause evaluation for the Reactor Coolant Pump 2B seal leakage.
- Engineering Change EC number 21253, "Eliminate Reactor Coolant Pump Vapor Stage Seal from Operating at Low Pressure 1B."
- Calibration reports for the controlled bleed-off and component cooling seal water return temperature loops.

b. Findings

No findings were identified.

.2.8 Train B Ultimate Heat Sink Motor Control Center, 3B315-S

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with Train B Ultimate Heat Sink Motor Control Center 3B315-S. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- One-line diagrams and design basis documents for the dry cooling tower and the electrical distribution system serving the equipment, to identify requirements and interfaces.
- Voltage drop calculations to verify sufficient voltage would be available at individual component control devices under design basis conditions.
- Engineering specifications for the motor control center to assess its suitability for the application.
- System health reports, selected condition evaluations, and corrective actions to assess the current condition of the equipment.
- Maintenance procedures and records to assess whether the components were being maintained in accordance with procedures and vendor recommendations.
- Material condition, based on visual non-intrusive inspection of readily accessible equipment at power, including supporting, structures, systems, and components.
- Potential vulnerability to hazards, including tornado missiles, flooding and probable maximum precipitation events, and drainage features for mitigating flooding.
- Interfaces with supporting equipment, including the 4160/480 Vac station service transformer serving the motor control center.

b. Findings

The team identified two findings involving the ultimate heat sink motor control centers.

1. Introduction. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," involving the failure to have preventive maintenance procedures or records, beyond external non-intrusive visual inspections, for the medium voltage aluminum to copper connections to the 4160/480 Vac station service transformers that serve their respective ultimate heat sink motor control centers.

   Description. Aluminum to copper connections were installed between the medium voltage field cables, which are aluminum, and the copper leads of the station service transformer associated with the ultimate heat sink motor control centers. Galvanic corrosion between aluminum and copper is a known interaction (the aluminum acts like a sacrificial anode), and degradation at the connection of dissimilar conductors is a potential concern regarding fire, overheating, and unanalyzed voltage drop resulting from the resistance of a degraded connection. In addition, if the connection is subjected to thermal cycling, the connection can loosen over time as a result of the different coefficients of thermal expansion for aluminum and copper. The transformer is outdoors in an open cooling tower cell and is exposed to high humidity conditions therefore moisture intrusion is also be a concern.

To assess the effectiveness of the licensee's preventive maintenance for this configuration, the team reviewed work order 51662460 (11/10/2009), "Inspect and Clean Transformer," which states in steps 9.2.2 and 9.2.3: "Inspect transformer terminals for corrosion," with the acceptance criteria: "Transformer terminals are free of corrosion buildup," and: "all exposed electrical connections are tight." No further details were presented or referenced in the work orders.

Similarly, Maintenance Procedure ME-004-085, "Sealed, Dry Type, Gas Filled Station Service Transformers," Revision 7 included step 9.2.2, "Inspect transformer terminals for evidence of overheating or corrosion" (Acceptance criteria: Transformer terminals are free of corrosion build up) and step 9.2.2.1: "If required, then clean terminals and apply coat of NO-OX-ID-A grease." Discussions with the licensee indicated that the reference to NO-OX-ID-A grease applies only to the copper-to-copper connections on the transformer, and other procedures prescribe allowable joint compounds for aluminum-to-copper connections.

Even if the conductors were exposed and visible for inspection, aluminum oxide is not readily visible and the oxide forms rapidly when exposed to air. Therefore, a visual inspection alone may not be effective. In addition, the use of an appropriate joint compound on aluminum/copper connections typically requires that the compound be wire-brushed in while cleaning the connection, then the compound reapplied after cleaning. Because aluminum oxide forms rapidly, it is necessary to protect the surface with the compound while brushing. No such procedural directions were presented or referenced in the work order or preventive maintenance instructions reviewed by the team. From discussions with the licensee, the team concluded that at least since startup, these connections have not been subjected to preventive maintenance activities specifically appropriate for aluminum/copper connections.

Analysis. The team determined that the failure to provide suitable acceptance criteria and instructions in preventive maintenance procedures and work orders applicable to the aluminum/copper electrical connections to the transformers was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, inadequate preventive maintenance of the aluminum/copper connections could lead to degradation of the electrical connections to the station service transformer and loss of the ultimate heat sink. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial

Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," which states, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished." Contrary to the above, the licensee failed to include appropriate qualitative acceptance criteria in procedures for determining that important activities have been satisfactorily accomplished. Specifically, as of October 7, 2011, when developing and implementing preventive maintenance procedures and work orders for transformers and electrical connections, the licensee failed to provide specific acceptance criteria and instructions addressing the potential vulnerability of these connections to degradation from galvanic reaction or differential thermal expansion, particularly in a high humidity outdoor environment. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06832. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a noncited violation consistent with the NRC Enforcement Policy: NCV 05000382/2011007-04, "Failure to Provide Adequate Preventive Maintenance Procedures for Aluminum/Copper Electrical Connections to the Ultimate Heat Sink Transformers."

2. Introduction. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," involving the failure to establish and maintain an analysis supporting the adequacy of a single, four-inch diameter overflow (bulkhead) drain for protecting the ultimate heat sink motor control center from flooding during a design basis probable maximum precipitation event.

   Description. The motor control centers serving the dry cooling tower and wet cooling tower fans are mounted on an elevated concrete pad located at the lowest floor elevation of the exposed outdoor cooling tower cells. Design basis flooding events include probable maximum precipitation. The licensee had previously determined that the acceptable limit for flooding of the motor control center was 18 ½ inches above the cell floor.

   Updated Safety Analysis Report Section 2.4.2.3.3 states: "The safety-related equipment in Cooling Tower areas "A" and "B" are Motor Control Centers 3A315-S and 3B315-S, and Transformers A and B. To further preclude the possibility of flooding the motor control centers and the transformers, openings are provided for their respective dry cooling tower cubicles. These openings will drain water from the cubicle in the event of localized drain clogging in the dry cooling tower cells." Based on this statement, the team concluded that the single four-inch bulkhead opening in the cell wall is credited for protecting the motor control centers from flooding.

The team determined that the licensee failed to translate design requirements of the ultimate heat sink motor control center into specifications, drawings, procedures, and instructions. Specifically, the licensee failed to ensure the sizing of the four-inch bulkhead drain was adequate to protect the motor control center from flooding.

Analysis. The team determined that the failure to establish and maintain an analysis supporting the adequacy of a single four-inch overflow (bulkhead) drain for protecting the ultimate heat sink motor control center from flooding during a design basis probable maximum precipitation event was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the design basis analysis for the four-inch bulkhead drain did not ensure that the motor control center would be adequately protected during a probable maximum precipitation event. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee performed calculations to justify the adequacy of the installed bulkhead drain for the probable maximum precipitation event. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design bases are correctly translated into specifications, drawings, procedures, and instructions. The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program." Contrary to the above, the licensee failed to ensure that measures were established to assure that applicable design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, prior to October 7, 2011, the licensee failed to establish and maintain an analysis supporting the adequacy of a single four-inch overflow (bulkhead) drain for protecting the ultimate heat sink motor control center from flooding during a design basis probable maximum precipitation event. Failure of the motor control center as a result of flooding from the probable maximum precipitation event could result in the loss of the associated ultimate heat sink because the motor control center serves both the dry cooling tower and wet cooling tower fan motors. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06701. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a noncited violation consistent with the NRC Enforcement Policy: NCV 5000382/2011007-05, "Failure to Establish an Analysis to Support the Adequacy of the Four Inch Bulkhead Drain to Protect the Ultimate Heat Sink During Flood Events."

.2.9 Process Analog Control System Cards

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the process analog control system cards. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Card calibration as documented in Condition Report CR-WF3-2009-01052.
- Recent corrective action history for selected process analog control system cards. Specifically, the team selectively reviewed the card failure history, a sample of condition reports, condition evaluations, corrective actions, and extent of condition.
- Loop diagrams; vendor manuals, bulletins, and correspondence; troubleshooting procedures, and grounding/shielding configurations.
- The diversity of the anticipated transient without scram mitigation system hardware relative to the reactor trip, and engineered safety features implementation, to assess conformance to the licensee's anticipated transient without scram submittal and to assess any impact of card failures on anticipated transient without scram functions.
- Replacement of NTD cards with dual driver NTD cards as documented in Condition Reports CR- WF3-2011-01228 and CR-WF3-2011-05531.
- Dry cooling tower fan issues as documented in Condition Report CR-WF3-2011-01356.
- Reclassification of the process analog control system cards as documented in Condition Reports CR-WF3-2011-00288, A/R 58215, 58224, 58981.

b. Findings

No findings were identified.

.2.10 Emergency Diesel Generator Room Exhaust Fan Motors

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the emergency diesel generator room exhaust fan motors. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- One-line diagrams and design basis documents for the electrical distribution system serving the equipment, to identify requirements and interfaces.
- Brake horsepower load, to verify consistency with emergency diesel generator loading.
- Voltage drop calculations, to verify sufficient voltage would be available at individual component control devices under design basis conditions.
- Maintenance procedures and records to ensure the components are being maintained in accordance with vendor recommendations.
- Potential vulnerability to hazards, including flooding, wind, and seismic interaction.
- Control wiring diagrams, to selectively confirm implementation of functional requirements.
- Functional test procedures, surveillance procedures, and results to confirm adequate performance of instrumentation and control functions.

b. Findings

No findings were identified.

.2.11 Train A Dry Cooling Tower Fan Motors

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the Train A Dry Cooling Tower fan motors. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- One-line diagrams and design basis documents for the fans and the electrical distribution system serving the equipment.
- Brake horsepower load, to verify consistency with emergency diesel generator loading.
- Voltage drop calculations to verify sufficient voltage would be available at individual component control devices under design basis conditions.
- Electrical protection to assess vulnerability to premature trip.
- System health reports, selected condition evaluations and corrective actions.
- Maintenance procedures and records.
- Material condition and installation configuration.
- Potential vulnerability to hazards, including tornado missiles; tornado winds and differential pressure; and seismic interaction.
- Control wiring diagrams to selectively confirm implementation of functional requirements.
- Functional test procedures, surveillance procedures, and results.

b. Findings

Introduction. The team identified a Green violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” involving the failure to establish and maintain an analysis of the effects of reverse rotation of the dry cooling tower fan resulting from tornado or extreme winds (including hurricane winds) and a failure to evaluate the potential for premature trip from overcurrent protection or excessive torque on the shaft.

Description. The updated safety analysis report states that: “All dry cooling tower components are designed for safe shutdown earthquake loads and the maximum pressure differentials caused by the design tornado.”

Updated Safety Analysis Report Section 9.2.5.2: states that: “The dry cooling tower fans can be started and shutoff automatically to maintain the component cooling water system temperature between 88 deg F and 92 deg F.”…”Electrical cooling tower loads will automatically be sequenced on the diesel generators in case of loss of offsite power.”

Updated Safety Analysis Report Section 9.2.5.3 assumes a loss of offsite power and failure of one emergency diesel generator during a design basis tornado.

The team determined there is no mechanical or electrical feature to prevent reverse rotation (windmilling) of the dry cooling tower fans. So if the fan is idle, then subjected to reverse rotation from a tornado or severe wind event, then started automatically (on low temperature or a loss of offsite power signal), the starting current under these reverse rotation conditions could approach or exceed the trip setting and trip the fans prematurely on overcurrent. If this were to occur, the fan circuit breakers would require manual reset at the motor control centers in the outdoor dry cooling tower cells before additional starting attempts could be accomplished. There is also potential for excessive torque on the shaft if the fans are started with extreme reverse rotation. The licensee failed to provide an analysis of this postulated condition.

Analysis. The team determined that the failure to establish and maintain an analysis supporting the ability of the dry cooling tower fan motors to operate successfully during and following a design basis tornado event was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the design basis analysis did not ensure that the dry cooling tower fan motors would perform as required under reverse rotation conditions, without premature trip, during a design basis tornado. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, “Phase 1 – Initial Screening and Characterization of Findings,” the issue was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee prepared an evaluation of the effect on fan motor starting current and duration for reverse rotation conditions. For reverse rotation conditions that would extend the locked rotor current time by a factor of two, the licensee’s analysis showed ample margin for the instantaneous trip settings from the magnetic-only breaker and the thermal overload protection, such that premature trip would be precluded. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Enforcement. The team identified a Green violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” which states, in part, that “measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.” Contrary to the above, the licensee failed to ensure that measures were established to assure that applicable design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, prior to October 7, 2011, the licensee failed to analyze the dry cooling tower fan motors for premature trip as a result of reverse rotation caused by a tornado event that could result in the loss of the dry cooling tower heat removal capability. This finding was entered into the licensee’s corrective action program as Condition Report CR-WF3-2011-06850. Because this finding is of very low safety significance and has been entered into the licensee’s corrective action program, this violation is being treated as a noncited violation consistent with the NRC Enforcement Policy: NCV 5000382/2011007-06, “Failure to Establish an Analysis of the Effect of Reverse Rotation of Dry Cooling Tower Fan Motors Resulting from a Tornado Event.”

.2.12 Turbine Driven Essential Feedwater Pump Steam Inlet Piping Heat Tracing

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the essential feedwater pump steam inlet piping heat tracing. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Selected assumptions, design inputs, and methodology used in the licensee’s analysis that determined the minimum temperatures required for limiting the amount of condensation volume in the piping, so as to prevent adverse dynamic effects on the control system and piping system during startup of the turbine driven essential feedwater water pump.
- Piping isometric drawings to selectively confirm that the installed configuration was in agreement with the assumptions in the analysis.
- Electrical loading calculations, to verify sufficient load margin on the 120 Vac branch circuits.
- Maintenance procedures and records to assess whether the heat tracing was maintained in accordance with vendor recommendations.
- Material condition and installation configuration for selected thermocouples, the heat trace panel, and devices installed within the panel.

- Functional test procedures, surveillance procedures, and results to assess adequate performance of instrumentation and control functions.

b. Findings

No findings were identified.

.2.13 Emergency Diesel Generator Fuel Oil Transfer Pump

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the emergency diesel generator fuel oil transfer pump. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Piping, instrumentation, and structural drawings.
- Fuel oil tank sizing related to meeting technical specification requirements for adequate volume.
- Instrumentation calculations and completed calibrations for tank level measurement.
- Required specifications for buried tank.
- Completed surveillances performed to satisfy technical specifications surveillance requirements.
- Required fuel oil transfer pump cross-connect capability and associated procedures.
- Required fuel oil transfer pump design to prevent turbulence.

b. Findings

No findings were identified.

.2.14 Emergency Diesel Generator Air Start Systems

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the emergency diesel generator air start systems. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Piping and instrumentation drawings.
- Air sizing calculation to ensure adequate air flow for starting .
- Air start/stop control logic.

- Required specifications for DC solenoid valves.
- Completed surveillances of the emergency diesel generator system.
- Airflow measurement tests to ensure air receiver capacity was in accordance with design.
- Corrective actions addressing air compressor performance, maintenance, and operability evaluations.

b. Findings

No findings were identified.

.2.15 Dry Cooling Towers (ACCMPMP0001 and CCMPMP0001)

a. Inspection Scope

The team reviewed the updated safety analysis report, system description, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with the dry cooling towers. The dry cooling towers provide safety-related cooling for both the component cooling water and the auxiliary component cooling water systems. The team also performed walkdowns, and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Piping and instrumentation drawings.
- Component cooling water pump and driver.
- Auxiliary component cooling water pump and driver.
- Preventative maintenance records for the dry cooling tower fan gear motors.
- Surveillances performed for the component cooling water system and the auxiliary component cooling water system.
- Vendor guidance for maintenance and operation of component cooling water and auxiliary component cooling water pumps and motors.
- Calculations used to evaluate inservice testing and design basis test performance requirements (includes instrument uncertainties coupled with performance requirements).
- Corrective actions associated with the dry cooling tower, component cooling water, and auxiliary component cooling water systems addressing heat sink performance, maintenance, and operability determinations.

b. Findings

Introduction. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” involving the failure to provide adequate temperature limits for the auxiliary component cooling water pump bearings. Specifically, the engineering justification for increasing the high temperature alarm setpoints and establishing a high temperature trip for the motors was based on incorrect vendor guidance.

Description. During a review of the auxiliary component cooling water system, the team noted that the motor bearing high temperature alarm was changed from a value of 160 degrees Fahrenheit to a value of 180 degrees Fahrenheit. This increase in alarm temperature resulted from both Train A and Train B historically operating at a temperature closer to 175 degrees Fahrenheit. A shutdown limit of 203 degrees Fahrenheit has been imposed since operation began and remained unchanged. The high temperature alarm setpoint serves as a notification to operators that the bearing (or associated oil) is degrading.

In the summer months of 2009 and 2010, operations personnel at the plant noted that inboard bearing temperatures on the Train B motor exceeded the newly established high temperature alarm setpoint of 180 degrees Fahrenheit (approximately 180 - 182 degrees Fahrenheit). The engineering justification for increasing the motor bearing high temperature setpoints from 160 degrees Fahrenheit to 180 degrees Fahrenheit was based on information obtained from the pump vendor manual. However, the pump bearings were manufactured by Kingsbury, Incorporated, whereas the motor bearings were manufactured by Milwaukee Bearing Company.

The team determined that engineering personnel failed to translate design requirements of the auxiliary component cooling water motor bearings into specifications, drawings, procedures, and instructions. The change in bearing alarm temperature occurred in 2008, and high temperature alarms were again evaluated during the summer months of 2009 and 2010. The team determined that the licensee had recent opportunities to ensure the high bearing temperature limits had an adequate technical basis and the violation was indicative of current performance. However, the licensee did not use conservative assumptions in decision making and adopt a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. The licensee performed an engineering calculation to justify the motor bearing temperature limits and has contacted the manufacturer and vendor of the bearings to obtain guidance for motor bearings.

Analysis. The team determined that the failure to provide an adequate basis for increasing the high bearing temperature alarm setpoints and establishing a high temperature motor trip criterion was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the issue was determined to have very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee performed an engineering justification for the bearing temperatures based on industry guidance. This finding was determined to have a cross-cutting aspect in the area of human performance associated with the decision making component because the licensee did not use conservative assumptions in decision making and adopt a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action [H.1(b)].

Enforcement. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions." Contrary to the above, the licensee failed to ensure that measures were established to assure that applicable design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, prior to October 7, 2011, the licensee did not have an adequate technical basis for increasing the auxiliary component cooling water pump motor bearing temperature alarm setpoints or establishing an upper limit on motor bearing temperature, which directed operators to secure the pump. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06573. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with the NRC Enforcement Policy: NCV 5000382/2011007-07, "Failure to Provide an Adequate Basis for Temperature Limits of Auxiliary Component Cooling Water Pump Motor Bearings."

.3 Results of Reviews for Operating Experience

.3.1 Inspection of Generic Letter 1996-01 – Testing of Safety-Related Logic Circuits

a. Inspection Scope

The team reviewed the licensee's responses to Generic Letter 96-01, "Testing of Safety-Related Logic Circuits," and their compliance with the commitments specified in the responses. The team reviewed the Generic Letter 96-01 Program Document, the validity of logic circuit testing, as well as inspecting electrical contacts in safety-related logic circuits. The team reviewed the schedule of inspection and testing as well surveillance procedures.

b. Findings

No findings were identified.

.3.2 Inspection of Information Notice 2007-09 – Equipment Operability Under Degraded Voltage Conditions

a. Inspection Scope

The team reviewed the licensee's evaluation of NRC Information Notice 2007-09, "Equipment Operability Under Degraded Voltage Conditions," to verify that the review adequately addressed the industry operating experience. The team verified that the licensee's review documented on Condition Report HQN-2007-0863 adequately addressed the issues in the information notice. The team verified that the licensee assured that emergency diesel generators' minimum voltage under degraded voltage conditions is sufficient and adequate to ensure operability, and that the specified surveillance requirement minimum required voltage was above the calculated minimum voltage required for component operability.

b. Findings

No findings were identified.

.3.3 Inspection of Information Notice 2003-06 – Failure of Safety-Related Linestarter Relays at San Onofre Nuclear Generating Station

a. Inspection Scope

The team reviewed the licensee's evaluation of NRC Information Notice 2003-06, "Failure of Safety-Related Linestarter Relays at San Onofre Nuclear Generating Station," to verify that the review adequately addressed the industry operating experience. The team verified that the licensee's review documented on Condition Report LO-NOE-2004-0028 adequately addressed the issues in the information notice. The team verified that the licensee evaluated the degradation introduced by the use of excessive amounts of trichloroethane-based cleaners during preventive maintenance and that corrective actions were implemented.

b. Findings

No findings were identified.

.3.4 NRC Bulletin 1988-04 - Potential Safety-Related Pump Loss

a. Inspection Scope

The team reviewed the licensee's evaluation of NRC Bulletin 1988-04, "Potential Safety-Related Pump Loss," to verify that the review adequately addressed the industry operating experience. The team reviewed safety-related pump testing procedures and data related to pump loss.

b. Findings

The team's finding associated with pump testing is addressed in Section 1R21.2.6 of this report.

.3.5 Information Notice 1997-90 - Use of Nonconservative Acceptance Criteria in Safety-Related Pump Surveillance Tests

a. Inspection Scope

The team reviewed the licensee's evaluation of NRC Bulletin 1988-04, "Potential Safety-Related Pump Loss," to verify that the review adequately addressed the industry operating experience. The team reviewed safety-related pump testing procedures and data.

b. Findings

The team's finding associated with pump testing is addressed in Section 1R21.2.6 of this report.

.4 Results of Reviews for Operator Actions:

The team selected risk-significant components and operator actions for review using information contained in the licensee's probabilistic risk assessment. This included, but was not limited to, components and operator actions that had a risk achievement worth factor greater than two or Birnbaum value greater than 1E-6. Operator actions that do not have written guidance and are not frequently trained on were also considered.

a. Inspection Scope

For the review of operator actions, the team observed operators during simulator scenarios associated with the selected components as well as observing simulated actions in the plant.

The selected operator actions were:

- Loss of seal cooling to the reactor coolant pumps.
- Ability to transfer loads to the start-up transformer when the auto-transfer feature fails to operate during a loss of DC Power.
- Ability to reset the main steam isolation signal to allow use of the steam bypass for cooldown following a steam generator tube rupture.
- Response to loss of room cooling for the safe guards pump rooms and the switchgear rooms.
- Manually gag shut a main steam safety valve.
- Replenish emergency diesel generator air receivers.

b. Findings

Introduction: The team identified a Green noncited violation of 10 CFR 50.65(a)(4) involving the failure to adequately manage the risk involved with a maintenance window for the turbine driven emergency feedwater pump.

Description. While observing in plant job performance measures, inspectors identified manual compensatory actions were not achievable for some plant conditions. Specifically, basic event UHFVACRER, for Loss of Room Cooling, assumed a 90 percent success rate for operators' use of portable fans as a compensatory measure to cool vital equipment. The inspectors identified that during a loss of offsite power, non-safety lighting circuits would not be available; therefore, the electrical outlets to power portable fans also would not have power.

The team noted that the licensee performed a probabilistic risk assessment model update in April 2009, which failed to identify the faulty assumption.

The team sought information from a Region IV Senior Reactor Analyst to evaluate the impact of the probabilistic risk assessment error on Waterford 3 maintenance risk assessments. The licensee stated that they did not have the expertise to perform a modified risk assessment.

Maintenance risk assessments are required by 10 CFR 50.65(a)4 (the Maintenance Rule). The licensee used their probabilistic risk assessment model to determine risk thresholds that were then used in their EOOS computer program. Plant personnel used the EOOS program to determine the risk associated with planned maintenance. Therefore, an inappropriate assumption in the licensee's probabilistic risk assessment could invalidate the EOOS derived risk results.

The analyst noted that an EOOS number of 10.0 was equivalent to the zero maintenance baseline risk of 2.7E-6. This was the conditional core damage probability (CCDP) with a full year of exposure. This is also referred to as the instantaneous risk. As risk increased, the EOOS generated value decreased. The licensee's Green to Yellow maintenance risk threshold was based on doubling of the zero maintenance risk = 5.49E-6. The corresponding EOOS value was 9.33. The Yellow-Orange threshold was 4.3E-5 with an EOOS value of 7.74. It's important to note that the risk value for Yellow-Orange threshold was 5 percent above the risk associated with taking the turbine driven essential feedwater pump out of service for maintenance (Reference: Calculation PRA-W3-01-001S10, Section 4.9).

The analyst noted that the turbine driven essential feedwater pump was taken out of service for maintenance on October 28, 2010 for approximately 12 hours. Since this was the most risk significant maintenance performed at Waterford 3, the analyst focused solely on this maintenance for the remainder of this evaluation.

The subject manual action (alternate room cooling) was incorporated into the probabilistic risk assessment model as a "basic event." The licensee assumed that the operators would be successful accomplishing this task 90 percent of the time (failure probability = 0.1). However, the licensee provided no proceduralized instruction, operators received no training, and there was no obvious source of power for the portable fans during loss of offsite power events. Therefore, the licensee did not have an adequate basis to assume that the action could be accomplished. Accordingly, for at least the loss of offsite power cases, the failure probability should have been close to 1.0. The analyst noted that the failure probability for other sequences (other than loss of offsite power events) could also be higher than 0.1. However, for the sequences where offsite power was available, operators might reasonably try to implement alternate cooling methods without written instructions. There was also a nonsafety-related power source readily available. The analyst did not attempt to calculate a new probability for these sequences, but instead focused on the loss of offsite power sequences exclusively.

The analyst used the Waterford 3 SPAR model, Revision 8.15, with a truncation limit of E-9 to assist with the calculations. The analyst used a truncation of E-9 to be consistent with the assumptions used to derive the EOOS thresholds. Again, the analyst focused only on the turbine driven essential feedwater pump maintenance windows.

First, the analyst used the zero-maintenance assumptions in the SPAR model and calculated the CCDP for the loss of offsite power sequences when the turbine driven essential feedwater pump was out of service for maintenance (CCDP = 2.4E-5). Then the analyst performed a second run, but also included the failure of the alternate room cooling manual action (CCDP = 4.3E-5). The difference was 1.9E-5. This was a relatively large change. The analyst noted that emergency diesel generators and chillers have fairly high failure rates when compared to other components. The turbine driven essential feedwater pump helps to mitigate that risk when it is in service. The inability to implement this manual action meant that safety-related equipment could over-heat and fail if the chiller failed.

Since the licensee's risk assessment considers all probabilistic risk assessment sequences, not just those involving losses of offsite power, the analyst calculated the CCDP for all sequences when taking the turbine driven essential feedwater pump out of service for maintenance (CCDP = 3.1E-5). The overall percentage change to the risk calculations caused by crediting the alternate room cooling manual action was:

Percentage Change = 1.9E-5/3.1E-5 = 61 percent

Since the risk difference was greater than the available 5 percent margin, noted previously, the probabilistic risk assessment error resulted in the licensee unknowingly entering the Orange risk window.

Analysis. The team determined that the failure to perform adequate risk assessments is a performance deficiency. This finding was more than minor because it was associated with the human performance attribute of the Mitigating Systems Cornerstone, adversely affecting the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the issue was identified as requiring a Phase 2 evaluation. A Region IV Senior Reactor Analyst performed a Phase 2 significance determination using NRC Inspection Manual Chapter 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." In accordance with Appendix K:

$$\text{Delta-CDF} = [\text{CCDP}_{\text{Actual}} - \text{CCDP}_{\text{flawed}}] * \text{duration} / 8760$$

The licensee bounded the duration of the turbine driven essential feedwater pump maintenance at 8 hours in a year. The flawed ICDP was 3.1E-5, the actual ICDP was 3.1E-5 + 1.9E-5 = 5.0E-5. The difference was 1.9E-5.

Delta-CDF = 1.9E-5 * 12/8760 = 2.6E-8

Therefore, the issue was determined to have very low safety significance (Green). This finding was determined to have a cross-cutting aspect in the area of problem identification and resolution associated with the self and independent assessments component because the licensee performed a probabilistic risk assessment model update in April 2009, which failed to identify the faulty assumption [P.3(a)].

Enforcement. The team identified a Green noncited violation of 10 CFR 50.65(a)(4), which states, in part, that "the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." Contrary to the above, the licensee failed to assess and mange the increase in risk that may result from the proposed maintenance activities. Specifically, on October 28, 2010 the turbine driven essential feedwater pump was out of service for maintenance for approximately 12 hours. During this time the licensee unknowingly entered the Orange risk window (crossed a risk threshold) due to a faulty assumption in the probabilistic risk assessment model. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2011-06653. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a noncited violation consistent with the NRC Enforcement Policy: NCV 5000382/2011007-08, "Failure to Adequately Manage the Risk Involved with a Maintenance Window for the Turbine Driven Essential Feedwater Pump."

4OA5 Other Activities

(Closed) URI 05000382/2009009-05 Installation of Emergency Feedwater Pump Discharge Check Valve '207 AB'

The inspectors opened an unresolved item in NRC Inspection Report 05000382/2009009 because documentation for the emergency feedwater pump discharge check valve '207 AB' was unable to be retrieved during the inspection. The licensee used vendor installation instructions for a separate check valve that was never installed. The vendor documentation stated that the installation of the valve shall be a minimum of 5 pipe diameters between the valve's flange and upstream pipe fittings. Check valve '207 AB' was installed contrary to this requirement. However, the licensee was able to obtain the correct and actual vendor instructions for the installed valve and the installed valve did not require any installation constraints that originated the concern. The associated documents were changed and corrected to reflect the original, installed check valve in Engineering Change EC-00019716 as a result of the corrective action described in Condition Report CR-WF3-2009-04957. The inspectors determined there was no requirement to install the check valve at least 5 pipe diameters from the upstream fittings. This unresolved item was closed.

4OA6 Meetings, Including Exit

On October 7, 2011, the team leader presented the preliminary inspection results to Mr. K. Nichols, Director, Engineering, and other members of the licensee's staff. On November 17, 2011, the team leader conducted a telephonic final exit meeting with Ms. D. Jacobs, Vice President, Operations, and other members of the licensee's staff. The licensee acknowledged the findings during each meeting. While some proprietary information was reviewed during this inspection, no proprietary information was included in this report.

4OA7 Licensee Identified Violations

No findings were identified.

Attachments: 1 - Supplemental Information

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

M. Adams, Supervisor, Engineering
S. Adams, Director, Nuclear Safety Assurance
L. Blocker, Manager, Planning, Scheduling and Outage
J. Clarelle, Shift Manager, Operations
K. Cook, General Manager, Plant Operations
B. Ford, Senior Manager, Licensing
D. Gallardo, Senior Engineer, Design Engineering
R. Gilmore, Manager, Engineering
A. Griffin, Engineer, Programs and Components
T. Haslauer, Engineer, System engineering
J. Jarrell, Manager, Operations
K. Labauve, Engineer, System Engineering
B. Lanka, Manager, System engineering
B. Lindsey, Manager, Maintenance
M. Mason, Senior Licensing Specialist
M. McCloskey, Engineer, Design Engineering
P. McKenna, Technical Specialist, System Engineering
W. McKinney, Manager, Corrective Actions
K. Nichols, Director, Engineering
P. Ola, Senior Lead Engineer, System Engineering
J. Pollock, Licensing Specialist
C. Pramono, Engineer, System Engineering
P. Stanton, Supervisor, Design Engineering
B. Steelman, Manager, Licensing
J. Taylor, Senior Engineer, System Engineering
R. Tran, Senior Lead Engineer, Design Engineering
E. Wilbur, Senior Lead Engineer, System Engineering
C. Zenon, Technical Specialist, System Engineering

NRC Personnel

M. Davis, Senior Resident Inspector
D. Overland, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

05000382/2009009-05	URI	Installation of Emergency Feedwater Pump Discharge Check Valve ‘207 AB’ (4OA5)

Opened and Closed

05000382/2011007-01	NCV	Failure to Assure Design Basis Input was Correctly Translated into Design Basis Calculations (1R21.2.2)
05000382/2011007-02	NCV	Failure to Establish an Adequate Containment Spray Pump Design Basis Verification Surveillance Test (1R21.2.6)
05000382/2011007-03	NCV	Failure to Provide an Adequate Basis for Extrapolation of Vendor Supplied Pump Net Positive Suction Head Values (1R21.2.6)
05000382/2011007-04	NCV	Failure to Provide Adequate Preventive Maintenance Procedures for Aluminum/Copper Electrical Connections to the Ultimate Heat Sink Transformers (1R21.2.8)
05000382/2011007-05	NCV	Failure to Establish an Analysis to Support the Adequacy of the Four Inch Bulkhead Drain to Protect the Ultimate Heat Sink During Flood Events (1R21.2.8)
05000382/2011007-06	NCV	Failure to Establish an Analysis of the Effect of Reverse Rotation of Dry Cooling Tower Fan Motors Resulting from a Tornado Event (1R21.2.11)
05000382/2011007-07	NCV	Failure to Provide an Adequate Basis for Temperature Limits of Auxiliary Component Cooling Water Pump Motor Bearings (1R21.2.15)
05000382/2011007-08	NCV	Failure to Adequately Manage the Risk Involved with a Maintenance Window for the Turbine Driven Essential Feedwater Pump (1R21.4)

LIST OF DOCUMENTS REVIEWED

Calculations

NUMBER	TITLE	REVISION/ DATE
EC-M98-013	WCT Basin Flow to Condensate Storage Pool and EFW Pump	0
EC-0020277	Oil Sight Glasses on Aux CCW and CCW Pumps	1

Calculations

NUMBER	TITLE	REVISION/ DATE
DCP-3293	Design Change for Valves ACC 114 and 116	1
EC-S97-001	Containment Spray Flow Analysis	0
EC-S98-015	3716 MWt Containment P & T Response Analysis	1
EC-I01-007	Determination of ECCS Measurement Channels Functional Safety Significance	0
EC-I95-002	Containment Spray Flow A & B Instrumentation Loop Uncertainty	0
EC-I91-043	SDC AND LPSI Flow Instrument Loop Uncertainty	1
EC-I91-052	LPSI Header Flow A & B Instrumentation Loop Uncertainty Calculation	1
ECM-97-025	Required Submergence to Prevent Vortexing in CSP	0
ECM-07-001	NPSH Analysis of Safety Injection and Containment Spray Pumps	1
ECS10-001	Waterford 3 Reload Analysis Groundrules	1
EC-I01-003	IST Instrumentation Uncertainties	0
EC-M96-026	Required Submergence to Prevent Vortexing in the RWSP	0
EC-M98-027	Safety Injection System – LPSI Flow Rate Calculation	1
EC-M98-068	LPSI System Performance Surveillance Requirement Basis	0
MNQ6-41	Containment Spray Flow Rate	3
MNQ6-2	Safety Injection System-HPSI Pressure Drop Calculation	3
NOSG-LPL-90-01	Control Room Habitability	0
HVAC-001	Control Room Supply AH-12 Static Pressure (3A-SA & #B-SA)	3
EC-E91-056	Relay Coordination Study [Attachment I, p.30; Attachment 22]	1

Calculations

NUMBER	TITLE	REVISION/ DATE
EC-E91-152	Load Study for Freeze Protection Panels 1-1 & 2-1 thru 2-6	1
EC-E91-500	Degraded Voltage Impact on AC Starters/Contactors and Auxiliary Devices	1
EC-M00-004	EFW Turbine Steam Supply RELAP Model [Sections 1, 2, 3, & 5, as applicable to heat tracing]	0
EC-M99-010	Dry Cooling Tower Basin Ponding Analysis	1
EC-M89-032	Calculations for Motors Driven by Emergency Diesel Generators	3
EC-I96-006	ACCW To CCW Heat Exchangers Pressure Loop Uncertainty Calculation	January 7, 2002
EC-I91-036	Component Cooling Water Heat Exchanger Outlet Temperature (Dry Fan Control) Instrument Loop Uncertainty Calculation	1
EC-I01-010	Determination of Cooling Water Systems Measurement Channels Functional Safety Significance	0
EC-E91-500	Degraded Voltage Impact on AC Starters/Contractors and Auxiliary Devices	1
EC-M89-032	Calculation for Motors Driven by Emergency Diesel Generators	3
EC-M95-008	Ultimate Heat Sink Design Basis	3
MN(Q)9-50	ACCW System Resistance	2
MN(Q)9-53	Ultimate Heat Sink Test	1
MN(Q)9-9	Wet Cooling Tower Losses During LOCA	5
MN(Q)9-44	ACCW Pumps NPSH	2
MN(Q)9-49	Component Cooling Water System Design Pressure	1
MN(Q)9-65	CCW Temperature Evaluation	2
EC-E91-050	Degraded Voltage Relay Setpoint & Plant Load Study	5

Calculations

NUMBER	TITLE	REVISION/ DATE
EC-E91-055	AC Short Circuit Calculation	5
EC-E90-006	Emergency Diesel Generator Loading and Fuel Oil Consumption	8
EC-M98-013	WCT Basin Flow to Condensate Storage Pool and EFW Pump	0
EC-0020277	Oil Sight Glasses on Aux CCW and CCW Pumps	0
DCP-3293	Design Change for Valves ACC	1

Design Basis Documents

NUMBER	TITLE	REVISION
W3-DBD-002	Emergency Diesel Generator & Automatic Load Sequencer Design Basis Document	301
W3-DBD-004	Component Cooling Water Auxiliary Component Cooling Water Design Basis Document	301
W3-DBD-011	Electrical Distribution (AC Portion) Design Basis Document	1
W3-DBD-008	Electrical Distribution (DC Portion) Design Basis Document	1
W3-DBD-001	Safety Injection System Design Basis Document	3
W3-DBD-009	Reactor Coolant System & Steam Generator Blowdown System Design Basis Document	3
W3-DBD-038	Safety Related HVAC Control Room Design Basis Document	1
W3-DBD-001	Safety Injection System Design Basis Document	3
W3-DBD-009	Reactor Coolant System & Steam Generator Blowdown System Design Basis Document	2
W3-DBD-038	Safety Related Control Room HVAC System Design Basis Document	1

Drawings

NUMBER	TITLE	REVISION/ DATE
G853 S22	HVAC Air Flow Diagram Control Room	6
G853 S23	HVAC Air Flow Diagram Control Room	2
G160	Flow Diagram Component Closed Cooling Water System	17
G163	Flow Diagram Containment Spray & Refueling Water Storage Pool	42
G179	Flow Diagram Reactor Coolant Pump Seals	20
7132-5089	B&W Pump Performance Chart, Containment Spray Pump, Impeller 71-420-017	October 26, 2007
1564-1451	Containment Spray Pumps Nuclear Performance Test	October 3, 1974
1564-1630	Containment Spray Pumps Design Curve	May 15, 1975
G167, SH. 1	Flow Diagram Safety Injection System	49
G167, SH. 2	Flow Diagram Safety Injection System	52
G167, SH. 3	Flow Diagram Safety Injection System	19
G167, SH. 4	Flow Diagram Safety Injection System	17
1564-4460	DUO-CHEK Valve Installation DIMS and Parts List, TRW Mission	1
B288, SH. 34	Cable & Conduit List Installation Notes – General Instructions Low and Medium Voltage Splices	12
B288, SH. 36	Cable & Conduit List Installation Details – Splice Terminations	4
B289, SH. 2	Power Distribution & Motor Data MCC Breaker Settings	16
B289, SH. 2A	Power Distribution & Motor Data MCC Overload Settings	6
B289, SH. 90	Power Distribution & Motor Data, 480V MCC 3A315-S One Line Diagram	8
B289, SH. 91	Power Distribution & Motor Data, 480V MCC 3A315-S One Line Diagram	10

Drawings

NUMBER	TITLE	REVISION/ DATE
B289, SH. 93	Power Distribution & Motor Data, 480V MCC 3A315-S One Line Diagram	8
B289, SH. 94	Power Distribution & Motor Data, 480V MCC 3A315-S One Line Diagram	9
B289, SH. 176	480V MCC-3B315-S Front View	7
B289, SH. 197A	Power Distribution & Motor Data 208/120V Distribution Panel FP1-1	7
B424 SH. 744	Control Wiring Diagram Dry Tower A Fan No. 14	8
B424 SH. 1041S	Control Wiring Diagram Diesel Generator A Room Exhaust Fan E-28	14
B424 SH. 1551S	Control Wiring Diagram SG No. 1 Emergency Feedwater Control Valves	10
B424 SH. 1552	Control Wiring Diagram SG No. 2 Emergency Feedwater Control Valves	13
B424 SH. 2976	Control Wiring Diagram Diverse Reactor Trip System (DRTS)	2
B424 SH. 2978	Control Wiring Diagram Diverse Emergency Feedwater Actuation System (DEFAS) – Sheet 1	3
B424 SH. 2979	Control Wiring Diagram Diverse Emergency Feedwater Actuation System (DEFAS) – Sheet 2	2
B424 SH. 2980	Control Wiring Diagram Diverse Emergency Feedwater Actuation System (DEFAS) – Sheet 3	2
B425 P1115A	Control Loop Diagram Steam Generator No. 1 Pressure	3
B425 L1115A1	Control Loop Diagram Steam Generator No. 1 Level	5
B425 L1115A2	Control Loop Diagram Steam Generator No. 1 Level	6
B425 P6701A	Control Loop Diagram Containment Pressure (Narrow Range) Channel A	2
B425 T5013B	HVR – Emergency Diesel Generator B Room Temperature Control	2

Drawings

NUMBER	TITLE	REVISION/ DATE
G285	Main One Line Diagram	19
G286	Key Auxiliary One Line Diagram	17
G373 S01	Cooling Tower Area Conduit & Grounding – Sheet 1	18
G763	Floor Plans Sheet 1	20
G764	Floor Plans Sheet 2	18
G765 S01	Floor Plans Sheet 3	21
G765 S02	Floor Plans Sheet 3A - Fuel Handling & Reactor Aux. Bldg.	14
G863 S01	HVAC – RAB Equipment Room Plan El +46'-0"	21
G863 S02	HVAC – RAB Equipment Room Part Plans El +88'-0" & 91'-0" & Sections	13
G864 S01	HVAC – RAB Equipment Room Sections Sh. 1	13
G880 S02	Riser Diagrams & Details – Plumbing & Drainage	22
1564-2118	MCC 3B315-S Outline, B/M, Specs & Notes	6
2837A12-8, SH. 16	Group 2 Card Schematic Diagram (NLP)	0
2837A12-11, SH. 17	Group 2 Card Schematic Diagram (NLP)	0
50082A-447	Special Axivane Fan Model 84-26 ½ -870 Controllable Pitch	May 6, 1977
5817-5217-R0	Waterford Station Unit #3 System	5
D127	EFW piping/heat trace isometric drawing	1
8821D32, SH. 22	Interconnecting Wiring Diagram Cabinet 03	3
B424, SH. 752	Waterford 3 CWD Auxiliary Component Cooling Water Pump A	15

Drawings

NUMBER	TITLE	REVISION/ DATE
B424, SH. E752	Waterford 3 CWD Auxiliary Component Cooling Water Pump A	9
5817-673	Interconnecting Wiring Diagram Cabinet 03	5
5817-674	Interconnecting Wiring Diagram Cabinet 03	4
B-289, SH. 2A	Power Distribution and Motor Data MCC Overload Settings	6
B-289, SH. 90	Power Distribution and Motor Data 480V MCC 3A315-5 One Line Diagram	8
B-289, SH. 91	Power Distribution and Motor Data 480V MCC 3A315-5 One Line Diagram	10
B424, SH. 709	Waterford 3 CWD Component Cooling Water Pump B	14
B424, SH. 752	Waterford 3 CWD Auxiliary Component Cooling Water Pump B	15
B424, SH. 2388	Waterford 3 CWD 4.16 KV Bus 3B3-S Undervoltage Relays Sheet 2	13
B424, SH. 2391	Waterford 3 CWD Sequencer B Sh. 1	17
B424, SH. 2392	Waterford 3 CWD Sequencer B Sh. 2	15
B424, SH. E2391	Waterford 3 CWD Sequencer B Sh. 1	3
B424, SH. E2392	Waterford 3 CWD Sequencer B Sh. 2	7
SD-EDG-13/14	Emergency Diesel Generator Air System	10
G-160 SH. 6	Component Cooling Water System Flow Diagram	14
G-160 SH. 2	Component Cooling Water System Flow Diagram	50
G-153 SH. 4	Flow Diagram Feedwater, Condensate, and Air Evacuation Systems	41

Drawings

NUMBER	TITLE	REVISION/ DATE
ESSE-EG-IC-67	D.O. Storage Tank Distribution Header	2
G-874-SO1	Fuel Handling Buildings Plan Plumbing Drainage	11

Procedures

NUMBER	TITLE	REVISION
OP-009-001	Containment Spray	303
OP-903-030	Safety Injection Pump Operability Verification	18
OP-903-108	SI Flow Balance Test	8
OP-903-035	Containment Spray Pump Operability Check	14
OP-009-005	Shutdown Cooling System Operating Procedure	28
OP-901-130	Reactor Coolant Pump Malfunction	7
UNT-005-009	Reporting and Evaluating Out of Calibration Measuring and Test Equipment	301
OP-903-115	Train A Integrated Emergency Diesel Generator/Engineering Safety Features Test	19
OP-903-116	Train B Integrated Emergency Diesel Generator/Engineering Safety Features Test	18
C20.09	Instrument Calibration Record, (Tag. No. SI-IFI-7121B, and SI-IFI-7118)	3
OP-003-014	Control Room Heating and Ventilation (HVC)	303
OP-903-123	Control Room Envelope Pressure Test	303
MM-003-038	HVC-101 and HVC-102 Leak Test	302
MM-003-045	Control Room Air Conditioning	304
PE-005-043	Control Room Tracer Gas Test	0

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MI-005-214	Calibration of Flow Instruments	6
OP-002-001	Auxiliary Component Cooling Water	302
OP-009-002	Emergency Diesel Generator	315
OP-902-009	Standard Appendices	302
EN-DC-153	Preventive Maintenance Component Classification	6
ME-003-330	Maintenance Procedure - 480V GE Switchgear Breakers	304
ME-004-085	Maintenance Procedure – Sealed, Dry-Type, Gas Filled Station Service Transformers	7
ME-004-424	Maintenance Procedure – Heat Tracing	10
ME-004-809	Maintenance Procedure – Low/Medium Voltage Power & Control Cable/Conductor Terminations and Splices	303
ME-007-006	Maintenance Procedure -- 480 VAC and Less Squirrel Cage Induction Motors	12
ME-007-057	Maintenance Procedure – MCE/EMAX Data Acquisition	305
MI-004-300	Maintenance Procedure - Guidelines for Rework of Electronic Equipment	301
MI-005-261	Calibration Procedure Westinghouse 7300 NLP Card Test and Alignment	5
OP-002-007	Freeze Protection and Temperature Maintenance	17
ME-004-330	4KV Induction Motor Maintenance	0
EN-MA-134	Offline Motor Electrical Testing	1
EN-DC-325	Component Performance Monitoring	6
EN-DC-344	Large Motor Program	0
OP-903-126	Functional Testing of LCP-43	6

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EN-DC-159	System Monitoring Program	5
EN-LI-102	Corrective Action Process	16
EN-LI-114	Performance Indicator Process	4
EN-DC-115	Engineering Change Process	12
EN-OP-104	Operability Determination Process	5
ME-003-310	Calibration of Time Delay Relays	9
ME-007-104	A-B Type RTC Solid State Timing Relay Testing	1
ME-007-001	Cable Insulation Resistance and Continuity Testing	8

Engineering Reports

NUMBER	TITLE	REVISION/ DATE
EC 17646	Install Replacement Timer Relays In Aux Panels 1C and 2C	0
EC 17647	Install Replacement Timer Relays In Aux Panels 1C and 2C	0
EC 17648	Install Replacement Timer Relays In Aux Panels 1C and 2C	0
EC 6787	Engineering Change: Drain Opening in DCT Cubicle Walls for MCC 3A315-S & 3B315-S	August 25, 2008
EC 32216	Engineering Change: Ability of DCT Fans to Start and Run If the Fan Blades were Rotating in the Reverse Direction Prior to Starting	October 5, 2011
ER-W3-2006-0135	Replace C105 capacitor per Westinghouse Technical Bulletin	0
CR-WF3-2009-5501	Root Cause Evaluation Report, Boric Acid in the Pump Cover Area of RCP 2B	November 19, 2009

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NUMBER	TITLE	REVISION
CR-96-0414	Root Cause Analysis Report, Component Cooling Water Pump Design Margin	May 31, 1996
	Report on Vortexing in the Refueling Water Storage Pool	July 4, 1997

Condition Reports (CR-WF3-…)

1996-00414	1996-01594	1996-01841	1997-00809	2004-00028
2006-03594	2006-03597	2006-03600	2006-03602	2007-00818
2007-00902	2007-00863	2007-03065	2007-03455	2007-03521
2007-03536	2007-03712	2007-04163	2008-01683	2008-03413
2009-00612	2009-01052	2009-04220	2009-05388	2009-05501
2010-00005	2010-00330	2010-00446	2010-01330	2010-01957
2010-03423	2010-03497	2010-04409	2010-05635	2010-07286
2010-07311	2010-07466	2011-00288	2011-00566	2011-00887
2011-00943	2011-01094	2011-01228	2011-01356	2011-01498
2011-01613	2011-02546	2011-02850	2011-03709	2011-04395
2011-05134	2011-05299	2011-06013	2011-06214	

Condition Reports Generated During this Inspection (CR-WF3-…)

2011-06308	2011-06312	2011-06333	2011-06343	2011-06486
2011-06561	2011-06652	2011-06658	2011-06701	2011-06735
2011-06737	2011-06744	2011-06746	2011-06758	2011-06806
2011-06832	2011-06838	2011-06847	2011-06850	2011-06852
2011-06866	2011-06870	2011-06878	2011-06879	2011-06892
2011-06894	2011-06897	2011-06899	2011-06905	

Maintenance Work Orders

00192723	00270431	52209148	52191816	52348773
52311537	52338339	00192716	52332671	52191816
00270431	00230775	52291659	52296611	52257932
51098382	51098384	51098967	51098966	52253112
52270032	52229712	52223300	51797432	52211751
00246845	00246848	00233931	51522607	51660396
51662460	51702054	52026877	52032920	52186602
52188589	52202485	52210104	52210873	52231470
52284815	52298830	52365815	52213359	52285694
52287908	00222928	00216911	51701012	52025573
52227506	52300248			

Miscellaneous

NUMBER	TITLE	REVISION/ DATE
TD-B015.0035	Auxiliary Component Cooling Water Vendor Correspondence	October 19, 1982
TD-B015.0045	B&W Component Cooling Water and Auxiliary Component Cooling Water Pump Vendor Guidance	4
TD-A180.0015	Allis Chalmers Installation Operation Maintenance Manual	1
TD-A180.0015	Lubriport Laboratories Report- Lubrication Records for DCT Components	January 1, 2008 – April 19, 2011
TD-B015.0025	Babcock and Wilcox Instruction Manual for the Containment Spray Pump Model 6X8X13SMK	4
TD-1075.0065	Ingersoll-Rand High Pressure Safety Injection Pumps Minimum Flow Evaluation	3
TD-1075.0085	Ingersoll-Rand High Pressure Safety Injection Pumps Maintenance Manual	0
DCN IC-1501	Differential Pressure Flow Elements	June 11, 1983
W3P88-1247	Response to NRC Bulletin 88-04	July 18, 1988
W3P88-1840	Followup Response to NRC Bulletin 88-04	November 1, 1988
W3P89-2100	Final Response to NRC Bulletin 88-04	October 31, 1989
CWTR3-10-231	Transmittal of the Westinghouse Evaluation Report of Entergy's Troubleshooting Results for the 7300 System NLP Group 5 Boards	April 8, 2010
CWTR3-10-348	Transmittal of the Westinghouse Evaluation Report of Entergy's May 27, 2010 Troubleshooting Results for the 7300 System NLP Group 5 Boards	July 30, 2010
	Safety Evaluation Report for Waterford Unit 3, Compliance with the ATWS Rule, 10 CFR Part 50.62	September 8, 1989
LOU-1564.262B	Ebasco Specification 210-69, Motor Control Centers	3
LOU-1564.274A	Ebasco Specification 218-73, Electric Process Heating, Freeze Protection, and/or Temperature Maintenance	12

Miscellaneous

NUMBER	TITLE	REVISION/ DATE
	Systems	
SD-HT	Heat Tracing System Description	5
TD-W120.3615	Westinghouse Process Instrumentation 7300 Series, Isolator and Loop Power Supply (NLP) Card (Style 2837A12G01 through G03) Schematic Diagram	0
TIMD033	Approved Model List: R335 (Rochester Instruments) Model ET1215	October 17, 2002
LOU-1564-1670	Component Cooling & Auxiliary Component Cooling Water Pumps	September, 1976
LOU=1564-283	Class IE 4 KV Motors for Station Auxiliary Service	January 10, 1998
LOU-1564-249B	Steel Conduit for Electrical Systems-Interface Material-Non Seismic	September 13, 1984