UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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April 21, 2005

Joseph E. Venable
Vice President Operations
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SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - NRC SAFETY SYSTEM DESIGN AND PERFORMANCE CAPABILITY INSPECTION REPORT 05000382/2005008

Dear Mr. Venable:

On February 18, 2005, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Waterford Steam Electric Station, Unit 3. The enclosed report documents the inspection findings, which were discussed on February 18 and March 10, 2005, with members of your staff.

This 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. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

This report documents five NRC identified findings of very low safety significance (Green). Three of these findings were determined to involve violations of NRC requirements; however, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these findings as noncited violations consistent with Section VI.A of the NRC Enforcement Policy. These findings are described in the subject inspection report. If you contest the noncited violations or significance of the findings, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Waterford Steam Electric Station, Unit 3.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be made 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/

Jeff Clark, P. E., Chief
Engineering Branch
Division of Reactor Safety

Docket: 50-382
License: NPF-38

Enclosure:
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050000382/2005008
w/attachment: Supplemental Information

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	05000382
License:	NPF-38
Report No.:	05000382/2005008
Licensee:	Entergy Operations, Inc.
Facility:	Waterford Steam Electric Station, Unit 3
Location:	Hwy. 18 Killona, Louisiana
Dates:	January 24 through March 10, 2005
Team Leader	C. E. Johnson, P.E., Senior Reactor Inspector, Engineering Branch
Inspectors:	J. Adams, Reactor Inspector, Engineering Branch G. George, Reactor Inspector, Engineering Branch B. Henderson, Reactor Inspector, Engineering Branch C. Paulk, Senior Reactor Inspector, Engineering Branch J. Tapia, P.E., Senior Reactor Inspector, Engineering Branch
Accompanying Personnel:	J. Kirkland, Project Engineer, Technical Support Staff
Approved By:	Jeff Clark, P. E., Chief Engineering Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000382/2005-008; 01/24-03/10/2005; Waterford Steam Electric Station, Unit 3; Safety System Design and Performance Capability.

The NRC conducted an inspection with a team of six regional inspectors the first week, and seven regional inspectors the second week. The inspection identified 2 Green findings and 3 Green noncited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609 "Significance Determination Process." Findings for which the significance determination process does not apply are indicated by "No Color" or by the severity level of the applicable violation. The NRC described its program for overseeing the safe operation of commercial nuclear power reactors in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified Findings

Cornerstone: Mitigating Systems

- Green. A noncited violation of Waterford Technical Specification 6.8.1 was identified for failure to properly develop and implement procedures. Technical Specification 6.8.1 states in part that written procedures shall be established, implemented and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, which references activities affecting safety-related structures. Contrary to this, station personnel failed to develop and implement procedures to relate the design basis ambient conditions to the operation of the ultimate heat sink cooling tower fans. As a result, no monitoring to recognize that a design basis limit has been exceeded, nor any actions required in the event that the design basis limit has been exceeded have been included in station procedures. This issue was entered into the corrective action program as Condition Report CR-WF3-2005-0000590.

  The finding is greater than minor because it affects the Mitigating Systems Cornerstone objective, in that, if left uncorrected could result in the plant operating outside the design basis limits. The team determined this finding to be of very low safety significance because there was no evidence found that the licensee had exceeded their design basis limit. (Section 1R21.2b1)

- Green: A finding of very low safety significance was identified for inadequate design of the diesel-driven sump pump associated with the dry cooling tower in that it did not provide an analysis to ensure that the support arrangement of the discharge hoses was adequate to support the discharge line. This finding is important to safety but not covered under 10 CFR Part 50, Appendix B Criterion. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2005-00592.

This finding is greater than minor because it affected an attribute and the objective of the Mitigating Systems Cornerstone in that the design inadequacies did not provide assurance that the support arrangement for the diesel-driven sump pump was structurally adequate. The finding is of very low safety significance because, although it represented a design inadequacy, it did not contribute to a loss-of-mitigation equipment function, and did not increase the likelihood of a flood. (Section 1R21.3b)

- Green. A noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified for failure to perform a complete and adequate design of a Seismic Category 1 structure. Specifically, the licensee failed to perform a complete analysis of the component cooling water surge tank baffle plate. The surge tank was designed and constructed with a baffle plate internal to the tank, providing two independent trains of component cooling water. The analysis performed on the tank did not include an analysis of the baffle plate welds to ensure adequate performance for all applicable load scenarios. The licensee subsequently performed an analysis to demonstrate the adequacy of the baffle plate welds. This issue was entered into the corrective action program as Condition Report CR-WF3-2005-00313.

  The finding is greater than minor because it affects the Mitigating Systems Cornerstone objective, in that, not providing adequate design analyses for the baffle plate welds did not ensure that all load scenarios were included in the analysis. Failure of these baffle plate welds could have resulted in a loss of both trains of component cooling water surge tank. This finding is determined to be of very low safety significance because the licensee performed a calculation that demonstrated the adequacy of the welds, and there was no actual loss of a safety function. (Section 1R21.4b1)

- Green. A finding with two examples of very low safety significance was identified for weaknesses in the maintenance rule program in regards to the component cooling water pumps, the reactor protection system and the reactor trip breakers. Specifically, the team found that the licensee did not monitor the performance or condition of structures, systems, or components in a manner sufficient to provide reasonable assurance that equipment reliability and degraded performance would not be masked and appropriate corrective actions would not be identified or implemented.

  This finding is more than minor because it affects the Mitigating Systems Cornerstone attributes of equipment reliability, in that, degraded performance could be masked and appropriate corrective actions not identified or implemented. This finding was of very low safety significance because no performance criteria were exceeded and there was no actual loss-of-safety function. Licensee personnel initiated Condition Report CR-WF3-2005-00322 to address this finding. (Section 1R21.4b2)

- Green. A noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified for failure to provide justification for not providing over-pressure protection to air accumulators servicing safety-related valves, in accordance with ASME Code, Section VIII, Division 1. ASME Code, Section VIII, Division 1, paragraph UG-125, states that all pressure vessels (i.e., air accumulators), irrespective of size or pressure, shall be provided with pressure relief devices to protect against excessive pressure and these devices must be installed so that they may not be readily rendered inoperable.

The team identified that the air accumulators, as installed, did not have any unisolable pressure relieving devices, therefore, causing the potential to over-pressure the air accumulators, challenging their structural integrity. The licensee had not provided an engineering analysis or justification for omitting over-pressure protection. The licensee initiated Condition Report CR-W3-2005-00596 to address NRC operability concerns.

The finding is greater than minor because it affects the mitigating system cornerstone and if left uncorrected the accumulators could potentially be over-pressurized and render equipment availability. Using the Phase 1 worksheet in Manual Chapter 0609 "Significance Determination Process," the finding was determined to have very low safety significance because the air accumulators were later found to have a maximum allowable working pressure greater than the highest pressure that could be achieved in the system; therefore, the structural integrity of the design would not be challenged. (Section 1R21.4b3)

Report Details

1. REACTOR SAFETY

Introduction

The NRC performed an inspection to verify that the licensee adequately preserved the facility safety system design and performance capability and that the licensee preserved the initial design in subsequent modifications of the systems selected for review. The scope of the review also included any necessary nonsafety-related structures, systems, and components that provided functions to support safety functions. The inspection effort also reviewed the licensee's programs and methods for monitoring the capability of the selected systems to perform the current design basis functions. This inspection verified aspects of the initiating events, mitigating systems, and barrier cornerstones.

The licensee based the probabilistic risk assessment model for the Waterford 3 Steam Electric Station on the capability of the as-built safety systems to perform their intended safety functions successfully. The team determined the area and scope of the inspection by reviewing the licensee's probabilistic risk analysis models to identify the most risk significant systems, structures, and components according to their ranking and potential contribution to dominant accident sequences and/or initiators. The team also used a deterministic effort in the selection process by considering recent inspection history, recent problem area history, and all modifications developed and implemented.

The team reviewed in detail the component cooling water system. The primary review prompted parallel review and examination of support systems, such as, electrical power, instrumentation, and related structures and components.

The team assessed the adequacy of calculations, analyses, engineering processes, and engineering and operating practices that were used by the licensee to support the performance of the safety system selected for review and the necessary support systems during normal, abnormal, and accident conditions. Acceptance criteria utilized by the NRC inspection team included NRC regulations, the technical specifications, applicable sections of the Final Safety Analysis Report, applicable industry codes and standards, as well as, industry initiatives implemented by the licensee's programs.

1R21 Safety System Design and Performance Capability (71111.21)

.1 System Requirements

a. Inspection Scope

The team inspected the following attributes of the component cooling water system and associated support systems: (1) process medium (water, steam, and air), (2) energy sources (ac and dc electrical systems), (3) control systems, and (4) equipment

protection. The team examined the procedural instructions to verify that instructions were consistent with actions required to meet, prevent, and/or mitigate design basis accidents. The team also considered requirements and commitments identified in the Final Safety Analysis Report, technical specifications, design basis documents, and plant drawings.

b. Findings

No findings of significance were identified.

.2 System Condition and Capability

a. Inspection Scope

The minimum sample size for this procedure is one risk-significant system for mitigating an accident. The team completed the required sample size by reviewing the component cooling water system. The primary review prompted parallel review and examination of support systems, such as, component cooling water makeup, air accumulators, and related structures and components.

The team assessed the adequacy of calculations, analyses, engineering processes, and engineering and operating practices that licensee personnel used for the selected safety system and the necessary support systems during normal, abnormal, and accident conditions. Acceptance criteria used by the team included NRC regulations, the technical specifications, applicable sections of the Updated Final Safety Analysis Report, applicable industry codes and standards, and industry initiatives implemented by the licensee's programs.

The team reviewed the periodic testing procedures for the component cooling water system to verify that the licensee periodically verified the capability of the system. The team also reviewed the system's operations by conducting system walkdowns.

The team verified that procedures and training support local manual operation of component cooling water flow control valves should the instrument air system be lost.

b. Findings

b1. Component Cooling Water Dry Cooling Towers

Introduction. The team identified a noncited violation of very low safety significance (Green) for failure to develop and implement procedures, without which operation outside of the design basis with no action required could be allowed. This failure violates Technical Specification, Section 6.8.1, which requires procedures and programs to comply with the requirements of Regulatory Guide 1.33.

Description. During an inspection of the licensee's technical documents, the team reviewed the documents relating to the design of the ultimate heat sink. This consisted of reviewing Calculation EC-M95-008, "UHS [Ultimate Heat Sink] Design Basis," Technical Specification 3/4.7.4, and Section 9.2.5 of the Final Safety Analysis Report.

The team's review of Calculation EC-M95-008 found that adequate assumptions were used in the design basis for the ultimate heat sink. Attachment 8.5, "Equivalent Meteorological Conditions for UHS to Dissipate Design Basis Heat Load," of the calculation postulated that the worst-case meteorological condition at the site location was a dry bulb temperature of 102°F and a corresponding wet bulb temperature of 77°F. One degree was added to the wet bulb temperature to establish the design basis worst-case meteorological condition of 102°F dry bulb temperature with a simultaneous 78°F wet bulb temperature.

The calculation further describes what the equivalent meteorological conditions are for a 102°F dry bulb temperature and simultaneous 78°F wet bulb temperature. A graphical representation of the equivalent conditions is approximated by the equation $T_{WB} = 1/5(1104 - 7*T_{DB})$ where T_{WB} is the wet bulb temperature and T_{DB} is the dry bulb temperature.

The graphical representation of this equation provides the design basis for the ultimate heat sink operation for various ambient conditions. Any combination of dry and wet bulb temperatures that lies on or below the line are acceptable (i.e., within the design basis) and any temperature combination above that line is outside the design basis. The team determined that this approach for determining this design basis was proper and adequate.

The team's review of Section 9.2.5 of the Final Safety Analysis Report indicates that data and assumptions developed in Equation EC-M95-008 were properly incorporated in the Final Safety Analysis Report. The graphical representation of the equivalent worst-case meteorological conditions is included as Table 9.2-5a of the Final Safety Analysis Report.

The team also reviewed the technical specifications with regard to the ultimate heat sink. Limiting Condition for Operation 3.7.4 states that two independent trains of the ultimate heat sink shall be operable with each train consisting of a dry cooling tower and a wet cooling tower. It further stipulates the number of fans required for differing ambient conditions. For the most severe ambient conditions, the limiting condition for operation requires each ultimate heat sink train to have all of its fans operable. For the most severe ambient conditions, all fans for the dry cooling tower must be operable if the dry bulb ambient temperature is greater than or equal to 98°F, and all fans for the wet cooling tower must be operable if the wet bulb ambient temperature is greater than or equal to 75°F. There are additional requirements for varying combinations of dry and wet bulb conditions.

Two issues were identified with the ambient temperature when comparing the design basis requirements of the Final Safety Analysis Report and the actions required by the technical specifications. First, dry bulb and wet bulb temperatures are taken and analyzed independently of one another and, as a result, there is no indication to the

control room if ambient temperatures are of such a combination of dry and wet bulb temperatures that the design basis has been exceeded. Secondly, in the event that conditions exist where the ambient temperatures exceed the design basis, there is no action required by the technical specifications. Consequently, the plant could be in a condition where it is operating outside of the design basis set forth in the Final Safety Analysis Report, yet still be in complete compliance with the requirements of the technical specifications.

Analysis. The team determined that the licensee's failure to develop and implement procedures relating to the design basis of the ultimate heat sink, as required by the Waterford Steam Electric Station, Unit 3, Technical Specification 6.8.1, is a performance deficiency. The finding is greater than minor because it affects the Mitigating Systems Cornerstone objective in that if left uncorrected could result in the plant operating outside the design basis limits. Using the Phase 1 worksheet in Inspection Manual Chapter 0609, “Significance Determination Process,” this finding is determined to be of very low safety significance because there was no actual loss of a safety function, and the design basis limits had not been exceeded.

Enforcement. A noncited violation of Waterford Steam Electric Station, Unit 3, Technical Specification 6.8.1, was identified for failure to properly develop and implement procedures. Technical Specification 6.8.1 states, in part, that written procedures shall be established, implemented and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, which references activities affecting safety-related structures. Contrary to this, station personnel failed to develop and implement procedures to relate the design basis ambient conditions with regard to the operation of the ultimate heat sink cooling tower fans. As a result, no monitoring to recognize that a design basis limit has been exceeded, nor any actions required in the event that the design basis limit has been exceeded have been included in station procedures. This issue was entered into the corrective action program as Condition Report CR-WF3-2005-0000590. This violation is being treated as noncited, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000382/2005008-01).

.3 System Walkdowns

a. Inspection Scope

The team performed walkdowns of the accessible portions of the component cooling water system, and required support systems. The team focused on the installation and configuration of switchgear, motor control centers, manual transfer switches, field cabling, raceways, piping, components, and instruments. During the walkdowns, the team assessed:

- The placement of protective barriers and systems,
- The susceptibility to flooding, fire, or environmental conditions,
- The physical separation of trains and the provisions for seismic concerns,

- Accessibility and lighting for any required local operator action,
- The material condition and preservation of systems and equipment, and
- The conformance of the currently-installed system configurations to the design and licensing bases, and
- The physical separation of the onsite and offsite electrical power sources.

Overall, the plant configuration was in agreement with the as-built drawings, and the external material condition of the equipment was good. The team concluded that redundancy of systems and physical separation was appropriate.

b. Findings

Introduction. The team identified a finding for inadequate design of the diesel-driven sump pump associated with the dry cooling tower in that it did not include an analysis for the support arrangement of the discharge hoses.

Description. During the team walkdown of the component cooling water system and support systems, the team noted that the licensee had added a portable diesel sump pump located in the dry cooling tower area. During an inspection of the licensee's technical documents, the team reviewed Design Change 3521, Revision 4, which was the methodology utilized to install the diesel-driven sump pump and hoses as permanent plant equipment. Although the diesel-driven sump pump associated with the dry cooling tower was designated as nonsafety related, Safety Class 3, Seismic Category 1, the pump and its components are important to safety because they are relied upon to maintain the operability of the dry cooling tower, a component of the ultimate heat sink.

Although the diesel sump pump was designed as a Safety Class 3, Seismic Category 1 Structure, no analyses were performed for the design of the discharge hose support structure to ensure adequate performance for all applicable load scenarios.

Analysis. The team determined that the licensee's failure to analyze the dry cooling tower diesel driven sump pump discharge hose supports was a performance deficiency because the equipment was important to safety. The finding is greater than minor because it affects the Mitigating Systems Cornerstone objective in that an unanalyzed design of the structural support for the discharge line did not provide assurance that the support arrangement for the diesel-driven sump pump was structurally adequate. The finding is of very low safety significance because, although it represented a design inadequacy, it did not contribute to a loss of mitigation equipment function, and did not increase the likelihood of a flood. Using the Phase 1 worksheet in Manual Chapter 0609, "Significance Determination Process," the team determined that this finding is of very low safety significance because although it represented a design inadequacy, it did not contribute to a loss-of-mitigation equipment function, and did not increase the likelihood of a flood.

Enforcement. The team determined that the finding did not represent a noncompliance because it occurred on nonsafety-related secondary plant equipment. The finding was

of very low safety significance and has been entered into the licensee's corrective actions program as Condition Report CR-WF3-2005-00592. No violation of regulatory requirements occurred (05000382/2005008-002).

.4 Design Review

a. Inspection Scope

The team reviewed the current as-built instrument and control, electrical, and mechanical design of the component cooling water system and required support systems. These reviews included an examination of design assumptions, calculations, required system thermal-hydraulic performance, electrical power system performance, protective relaying, control logic, and instrument setpoints and uncertainties. The team specifically focused on the design basis analysis for the performance of the component cooling water pumps and component cooling water makeup pumps, such as, the design flow required, net-positive suction head, and the capacity of the surge tank, wet and dry cooling towers to verify that a sufficient amount of water would be available during an accident to dissipate heat loads required by design. The team also reviewed the licensee's calculations and methodology for ensuring the component cooling water system was protected against seismic, flooding, fire, and high energy line break events.

The team reviewed calculations, drawings, specifications, vendor documents, Updated Final Safety Analysis Report, technical specifications, emergency operating procedures, and permanent modifications.

b. Findings

b1. Component Cooling Water Surge Tank

Introduction. The team identified a noncited violation of very low safety significance (Green) for failure to perform an analysis for the design of the component cooling water surge tank baffle plate to ensure that the weld connections were in compliance with applicable ASME Code requirements.

Description. During an inspection of the licensee's technical documents, the team reviewed Sections 3.2, "Classification of Structures," and 9.2.2, "Cooling Water for Reactor Auxiliaries," of the Final Safety Analysis Report. Section 9.2.2 of the Final Safety Analysis Report states that the component cooling water surge tank is designed with an internal baffle plate welded to the bottom and sides of the tank, providing two independent sources of water within a single structure. This design ensures that a loss of water in one component cooling water train would not affect the redundant train.

Section 3.2 of the Final Safety Analysis Report indicates that the component cooling water surge tank is a Safety Class 3, Seismic Category 1 structure. Accordingly, all materials that are internal to the surge tank are also required to be designed as Safety Class 3, Seismic Category 1 structures.

Although the surge tank was designed as a Safety Class 3, Seismic Category 1 structure, no analyses were performed for the design of the baffle plate welds to ensure adequate performance for all applicable load scenarios.

Analysis. The team determined that the licensee's failure to analyze the component cooling water surge tank baffle plate is a performance deficiency because the licensee is expected to meet the requirements of 10 CFR Part 50, Appendix B, Criterion III. The finding is greater than minor because it affects the Mitigating Systems Cornerstone objective in that, not providing adequate design analyses for the baffle plate welds did not ensure that all load scenarios were included in the analysis. Failure of these baffle plate welds could have resulted in a loss of redundancy of both trains of component cooling water within the surge tank. Using the Phase 1 worksheet in Inspection Manual Chapter 0609, "Significance Determination Process," this violation is determined to be of very low safety significance because the licensee performed a calculation, which demonstrated the adequacy of the welds, and there was no actual loss of a safety function.

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, 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. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Contrary to the above, the licensee failed to include the design of the baffle plate welds in the design of the component cooling water surge tank. The violation was of very low safety significance and has been entered into the licensee's corrective actions program as Condition Report CR-WF3-2005-00313. This violation is being treated as an noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000382/2005008-003).

b2. Maintenance Rule

Introduction: The team identified a finding with two examples of very low safety significance (Green) for weaknesses found in the licensee's maintenance rule program.

Description. During the review of the status of the component cooling water system, the team noted an example of performance criteria that could allow the masking of degraded performance. Additionally, the team noted examples of performance criteria for the plant protection system and the reactor trip breakers that would allow the licensee to experience two failures to generate a reactor trip signal or to trip the reactor before assessing the performance of the systems.

The first example is associated with the method of accounting for unavailability and reliability of the component cooling water pumps. The team noted that licensee personnel counted unavailability and functional failures on a train basis, including the swing train.

The team found that the monitoring of the unavailability of the component cooling water system on a train basis has the potential to mask degrading performance because the unavailable time would be charged to either Train A or B, even if the swing pump was supplying the train. As a result, ineffective maintenance on Pump A would not be noticed

since Train A would be supplied by Pump AB and there would be no unavailability counted against Train A.

The team also found that the monitoring of functional failures for the component cooling system on a train basis has the potential to mask degrading performance of the pump because the failures would be charged only to a train. The team noted that licensee personnel had a performance criterion for Pump AB that would allow the pump to experience two functional failures before an assessment would be needed to determine if goals and monitoring would be required. In the system established by the licensee, if Pump AB was aligned to Train A, any failure would be charged to Train A; and the same for Train B. Therefore, Pump AB could experience up to four functional failures before an assessment would be required (e.g., one failure when aligned to Train A, one failure when aligned to Train B, and two failures when in the swing position). The team found this method of measuring availability and functional failures could mask degraded performance.

The second example is associated with the performance criteria established for the plant protection system and the reactor trip breakers. The team noted that licensee personnel established a performance criterion of >1 functional failure in an 18-month period. Because one of the functions for each is to trip the reactor when required, a functional failure would be a failure to either generate a trip signal when required (for the plant protection system) or to trip the reactor when a trip signal is present (for the reactor trip breakers). Either of these conditions would be an anticipated transient without a scram.

With respect to the plant protection system and the reactor trip breakers, the team found that a performance criterion of >1 functional failure would not require licensee personnel to assess for the establishment and monitoring of goals until the second anticipated transient without a scram. The team found that the performance criteria were not appropriate for these components.

Analysis. The team identified weaknesses in the licensee's maintenance rule program in regards to the component cooling water pumps, the reactor protection system, and the reactor trip breakers. Specifically, the team found that licensee personnel did not monitor the performance or condition of structures, systems, or components, in a manner sufficient to provide reasonable assurance that equipment reliability and degraded performance would not be masked and appropriate corrective actions would not be identified or implemented. This finding is more than minor because it affects the Mitigating Systems cornerstone attributes of equipment reliability in that degraded performance could be masked and appropriate corrective actions not identified or implemented. This finding was of very low safety significance because no performance criteria were exceeded and there was no actual loss of safety function. Licensee personnel initiated Condition Report CR-WF3-2005-00322 to address this finding. Using the Phase 1 worksheet in Manual Chapter 0609, "Significance Determination Process," the team determined that this finding is of very low safety significance because no performance criteria were exceeded and there was no actual loss of safety function.

Enforcement. The team determined that on the basis of equipment performance, no performance criteria were exceeded. The team found that neither of the issues constituted a violation of regulatory requirements. However, the team determined that

these examples were more than minor because the potential for degraded performance could be masked and appropriate corrective actions not identified or implemented.

The team determined that this finding was of very low safety significance (Green) because there was no unacceptable performance and there was no actual loss of function. Licensee personnel initiated Condition Report CR-WF3-2005-00322 to address the identified weaknesses (05000382/2005008-004).

b3. Component Cooling Water Air Accumulators

Introduction. The team identified a noncited violation having very low safety significance (Green) for failure to adequately design air accumulators that service safety related valves. Specifically, the licensee did not evaluate the potential to overpressurize air accumulators, with no pressure relief devices, as required by American Society of Mechanical Engineers Code, Section VIII.

Description. During an inspection of licensee's technical documents, the team reviewed design basis documents, calculations, and drawings that assessed the design adequacy of air accumulators. On a loss of instrument air, these air accumulators supply essential air to safety-related valves, as listed in Table 9.3.1 of the Waterford Final Safety Analysis Report and Design Basis Document W3-DBD-014. These accumulators service valves on the component cooling water, containment spray, and chemical volume and control systems.

According to Engineering Request W3-1999-0527-000 and Design Basis Document W3-DBD-014, the air accumulators were installed to meet American Society of Mechanical Engineers (ASME) Code, Section VIII, Division 1, 1977 Edition. In addition, air accumulators servicing valves CC-134 and CC-135 were replaced in 1998, due to identified corrosion, in accordance with ASME Code, Section VIII, Division 1, 1998 Edition, 2000 Addenda, as allowed by Section 3.2.3 of the Final Safety Analysis Report.

ASME Code, Section VIII, Division 1, paragraph UG-125, states that all pressure vessels (i.e. air accumulators), irrespective of size or pressure, shall be provided with pressure relief devices to protect against excessive pressure and these devices must be installed so that they may not be readily rendered inoperable. The team identified that the air accumulators, as installed, did not have any unisolable pressure relieving devices; therefore, causing the potential to overpressurize the air accumulators, challenging their structural integrity and possibly rendering the valves they service inoperable during accident conditions.

When the NRC identified this issue to the licensee, the licensee stated that there was no evaluation performed to assess the potential to overpressurize the air accumulators. The licensee initiated Condition Report CR-W3-2005-00596 to address NRC operability concerns. Through the licensee's assessment and the team's evaluation, the accumulators were found to have a maximum allowable working pressure greater than the highest pressure that could be achieved in the system. Therefore, the structural integrity of the design would not be challenged.

After further discussion with the licensee, the licensee contended that the air accumulators' adherence to ASME Section VIII is not a design or license basis requirement, but that the air accumulators are only to be designed to seismic Category I, as stated in Final Safety Analysis Report, Section 9.3.1.3. The licensee, also, contended that Ebasco Specifications 1564.109A , the design specifications for the applicable valves, states, "[f]or Air Accumulators, Quality Assurance Requirements shall be comparable to that of the ASME Section VIII Division 1 . . .", and that this statement does not specifically state that the air accumulators are required to be Section VIII vessels. However, the licensee stamped the air accumulators as ASME Section VIII, Division 1, pressure vessels; therefore, invoking all requirements of that specific ASME code.

Since there was no analysis to provide reasonable assurance that the air accumulators, with no pressure relief device, would be adequately protected from excessive pressure by unexpected sources of heat, the air accumulators are in violation of the ASME Section VIII code.

Analysis. The team determined that the licensee's failure to analyze the effects of excessive pressure in the air accumulators is a performance deficiency because the licensee failed to meet the requirements of 10 CFR Part 50, Appendix B, Criterion III. The finding is greater than minor because it affects Mitigating Systems Cornerstone in that not providing a design analysis did not ensure adequate protection against excessive pressure in air accumulators. Failure of these air accumulators could have resulted in a loss of motive force to the valves during loss of instrument air. Using the Phase 1 worksheet in Inspection Manual Chapter 0609, "Significance Determination Process," this violation is determined to be of very low safety significance because the licensee performed a calculation which demonstrates that the accumulators have a maximum allowable working pressure greater than the highest pressure that could be achieved in the system.

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are adequately translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included is design documents and that deviations from such standards are controlled. Contrary to the above, the licensee failed to provide adequate assurance that the air accumulators met ASME Section VIII code requirements. Because the violation was of very low safety significance and has been entered into the licensee's corrective action program as Condition Report CR-W3-2005-00596, this violation is being treated as a noncited violation, consistent with Section VI.A of the Enforcement Policy (NCV 0500382/2005008-005).

.5 Safety System Inspection and Testing

a. Inspection Scope

The team reviewed the program and procedures for testing and inspecting selected components for the component cooling water system and required support systems. The review included the results of surveillance tests required by the technical specifications and selective review of inservice tests.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution

a. Inspection Scope

The team reviewed approximately 45 condition reports written on the component cooling water system and verified that corrective actions taken were appropriately evaluated and corrected. The sample included open and closed condition reports for the past three years and are listed in the attachment to this report. Inspection Procedure 71152, "Identification and Resolution of Problems," was used as guidance to perform this part of the inspection. Older condition reports that were identified while performing other areas of the inspection were also reviewed.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

Exit Meeting Summary

The team leader presented the inspection results to Mr. K. Walsh, General Manager, Plant Operations, and other members of your staff at the conclusion of the onsite inspection on February 18, 2005.

On March 10, 2005, a telephonic exit meeting was held where the team leader presented the inspection results to Mr. A. Harris, Acting Director, Nuclear Assurance, and other staff members.

At the conclusion of this meeting, the team leader asked the licensee's management whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

J. Burke, Acting Manager, Quality Assurance
K. Cook, Manager, Systems Engineering
R. Dodds, Director, Outage
A. Harris, Acting Director, Nuclear Safety Assurance
J. Holman, Manager, Nuclear Engineering
J. Hunsaker, Manager, Site Support
J. Laque, Manager, Maintenance
J. Lewis, Manager, Emergency Planning
R. Madjerich, Manager, Operations
T. Mitchell, Director, Engineering
R. Murillo, Acting Manager, Licensing
R. Osborne, Manager, Engineering Programs and Components
B. Pellegrin, Supervisor, Design Engineering - Mechanical
K. Peters, Manager, Design Engineering
G. Pierce, Vice President Technical Assistant
O. Pipkins, Senior Licensing Engineer, Licensing
R. Porter, Supervisor, Engineering Design - Configuration
R. Putnam, Supervisor, Engineering - Systems
C. Walker, Manager, Materials, Purchasing & Contracts
K. Walsh, General Manager, Plant Operations

NRC

R. Azua, Acting Senior Resident Inspector**
J. Clark, Branch Chief, Engineering Branch**
G. Larkins, Resident Inspector

**Participated in telephonic exit.

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000382/2005008-01	NCV	Failure to develop and maintain procedures affecting a design basis limit (Section 1R21.2b1)
05000382/2005008-02	FIN	Failure to analyze the Dry Cooling Tower diesel driven sump pump discharge hose supports (Section 1R21.3b)

05000382/2005008-03	NCV	Failure to maintain design control over Seismic Category 1 structure (Section 1R21.4b1)
05000382/2005008-04	FIN	Degraded performance could be masked and appropriate corrective actions not identified or implemented (Section 1R21.4b2)
05000382/2005008-05	NCV	Failure to design, fabricate, and construct air accumulators to meet ASME Code (Section 1R21.4b3)

DOCUMENTS REVIEWED

Procedure

Number	TITLE	REVISION
OP-003-024	Sump Pump Operation	9
OP-901-414	Effluent Discharge High Radiation	1
OP-901-411	High Activity in Component Cooling Water System	1
OP-901-510	Component Cooling Water System Malfunction	4
OP-003-019, Attachment 11.1	Nitrogen System Standby Valve Lineup	12
OP-500-010	Valve Operators Nitrogen Backup Actuated/Trouble	12
OP-901-511	Instrument Air Malfunction	4
OP-903-119	Secondary Auxiliaries Quarterly IST Valve Tests	7
STA-001-005	Leakage Testing of Air and Nitrogen Accumulators for Safety Related Valves	6
NG-IPIS-0942AS	Nitrogen Block Valve Control for Nitrogen Accumulator III	1
OP-009-005	Shutdown Cooling	15
PE-004-024	ACCW and Component Cooling Water System Flow Balance	2
CE-002-008	Maintaining Condensate Storage Pool Chemistry	6
EN-LI-102	Corrective Action Process	1

Number	TITLE	REVISION
OP-902-009, Appendix 10,	Transferring EFW Pump Suction	1
OP-903-001	CSP surveillance procedure results for 2/6 - 8/2005	26
OP-903-129	Component Cooling Water Makeup Pump Operability Check	2
OP-901-524	Fires in Areas Affecting Safe Shutdown	0
OP-009-005	System Operating Procedure - Shutdown Cooling	15
ENS-DC-112	Engineering Request and Project Initiation Process	3
ENS-DC-115	ER Response Development	6
ENS-DC-116	ER Response Installation	2
ENS-DC-117	Post Modification Testing and Special Instructions	3
ENS-DC-118	ER Response Closure	1
ENS-DC-134	Design Verification	0
ENS-DC-141	Design Inputs	3
CE-002-007	Maintaining Component Cooling Water Chemistry	17
ME-007-019	ASCO/AVCO/MAC/Parker Hannifin Solenoid Valves	8, Change 1
PMC-002-006	Erecting Scaffold	3, Change 1
UNT-005-004	Temporary Alteration Control	16, Change 1
UNT-007-060	Control of Loose Items	1, Change 1
PE-004-024	ACCW and CCW System Flow Balance	2, Change 1

Condition Reports

CR-WF3-1995-0657	CR-WF3-2003-03258	CR-WF3-2004-01518
CR-WF3-2000-0518	CR-WF3-2003-3263	CR-WF3-2004-01541
CR-WF3-2000-1033	CR-WF3-2003-03592	CR-WF3-2004-01716
CR-WF3-2000-1491	CR-WF3-2003-03851	CR-WF3-2004-01854
CR-WF3-2000-1584	CR-WF3-2004-1855	CR-WF3-2004-02029
CR-WF3-2001-0145	CR-WF3-2004-2053	CR-WF3-2004-02174
CR-WF3-2000-227	CR-WF3-2004-2131	CR-WF3-2004-02504
CR-WF3-2000-584	CR-WF3-2004-2172	CR-WF3-2004-02623
CR-WF3-2000-1259	CR-WF3-2004-2174	CR-WF3-2004-03065
CR-WF3-2002-00729	CR-WF3-2004-2438	CR-WF3-2004-03270
CR-WF3-2003-1601	CR-WF3-2004-2518	CR-WF3-2004-03516
CR-WF3-2003-1655	CR-WF3-2004-2623	CR-WF3-2004-03925
CR-WF3-2003-1753	CR-WF3-2004-3061	CR-WF3-2005-00230
CR-WF3-2003-2725	CR-WF3-2004-3479	CR-WF3-2005-00294
CR-WF3-2003-2744	CR-WF3-2004-3690	CR-WF3-2005-00313

Drawing

Number	Title	Revision
B424 Sheet 851	Component Cooling Water Make-up Pump A	
B424 Sheet 852	Component Cooling Water Make-Up Pump B	
LOU-1564 G-185, Sheet 5 of 8,	Component Cooling Water	
L-3439	Component Cooling Water Surge Tank	2
B-289	Power Distribution & Motor Data 480V MCC 3A314-S One Line Diagram	13
ESSE-NG-IC 44	Nitrogen Gas	7
ESSE-NG-IC 46	Nitrogen Gas	10
ESSE-NG-200	Nitrogen Gas	1
G166, SH. 1-2	Flow Diagram, N2, H2, CO2 Systems	36
LOU-1564-B424	Class IE VA's N2 Back-up System Alarm	5
ESSE-NG-IC 44	Nitrogen Gas	7
ESSE-NG-IC 46	Nitrogen Gas	10
ESSE-NG-200	Nitrogen Gas	1
G166, SH. 1-2	Flow Diagram, N2, H2, CO2 Systems	36

Number	Title	Revision
LOU-1564-B424	Class IE VA's N2 Back-up System Alarm	5
LOU-1564 G-907	Reactor Auxiliary Building Pool Liner Details	

Calculations

Number	Title	Revision
EC-M97-059	Design Basis Revisioniew for Atmospheric Dump Valves MS-116A and MS 116B	0
EC-M8 8-024	Accumulator V, VIII, IX, and X Calculations	3
EC-M89-002	Nitrogen Accumulator Leak Rate Calculation	3
EC-M89-089	Allowable IA Accumulator Leak Rate	5
MN(Q)-9-15	N2 Accumulator Allowable Pressure	0
EC-M02-001	Minimum Required EFW Pumps Discharge Pressure during Recirculation	0
EC-M84-001	Tank Volume vs. Level Tables	6
EC-M97-006	Design Basis for Component Cooling Water Makeup	A
EC-M98-009	Component Cooling Water Makeup System Design Basis	0
MNQ9-17	Ultimate Heat Sink Performance During A Tornado Accident Scenario	2
MNQ9-45	Component Cooling Water Makeup Pumps NPSH Available	
EC-S93-005	Component Cooling Water DEI-131 Activity Due to RCS-Component Cooling Water Leak	2
EC-M94-008	Auxiliary Component Cooling Water System Design Pressure	0
MN(Q)-9-49	Component Cooling Water System Design Pressure	1
MN(Q)-9-25	Component Cooling Water Pumps, Head and Flow Characteristics	1
MN(Q)-9-65	Component Cooling Water Temperature Evaluation	1

Number	Title	Revision
MN(Q)-9-2	Component Cooling Water Flow for Accident, Shutdown, Refueling, Normal Operations and Tornado Mode	1
MN(Q)-9-52	Design Basis Review Calculation Upgrade Program Phase II, Group 2	2
MN(Q)-9-3	Dry Cooling Tower and Wet Cooling Tower Heat Capacities Under LOCA	2
EC-M95-009	Ultimate Heat Sink Fan Requirements Under Various Ambient Conditions	0
EC-M95-008	Ultimate Heat Sink Design Basis	1

Engineering Requests

Number	Title	Revision
ER-W3-98-0642-01-00	Component Cooling Water Makeup - Engineering Closeout	0
ER-W3-98-0642-03-00	Component Cooling Water Makeup" ER Response Sheet	0
ER-W3-98-0642-03-00	Evaluation of as-left Component Cooling Water Surge Tank Level Switches" ER Response Sheet	0
ER-W3-99-0741-00-00	NG Accumulator Discharge Pressure Gages, Licensee Letter dated November15, 2000, Subject, Supplemental Information RE: Response to Generic Letter 96-06 for the Waterford Steam Electric Station	November15, 2000
ER-W3-2004-0335	Evaluation of Elevated Component Cooling Water Temperature from SCHX	0
ER-W3-2004-0335-001	Updated Guidance to Maintain Acceptable Component Cooling Water Discharge Temp from SCHX Following Implementation of EPU	0
ER-W3-2004-0345-00	Operating Conditions for the SDC Heat Exchanger So Component Cooling Water Exit Temperature Limit Is Not Exceeded	0

Number	Title	Revision
ER-W3-04-0382-000	Final Safety Analysis Report Table 7.5-3 Condensate Storage Pool Level Reg. Guide 1.97 Type Variable and Note 1 of Table 7.5-3	0
ER-W3-2004-0506-000	Consideration of Instrument Uncertainty in the Component Cooling Water-A Component Cooling Water Flow Balance	0
ER-W3-D00-1032-00-00	Rebaseline Component Cooling Water Makeup Pump B IST Flow Acceptance Criteria	

Design Basis Document

Number	Title	Revision
W3-DBD-014	Safety Related Air Operated Valves Design Basis Document	2-5
W3-DBD-04	Component Cooling Water, Auxiliary Component Cooling Water Design Basis Document	3

Annual Reports

Title	Year
Annual Meteorological Monitoring Program Report	2000
Annual Meteorological Monitoring Program Report	2001
Annual Meteorological Monitoring Program Report	2002
Annual Meteorological Monitoring Program Report	2003

Technical Specifications

Section	Title	Revision
3/4.7.4	Ultimate Heat Sink	Amendment 95
3/4.7.4	Ultimate Heat Sink	Amendment 123
3/4.7.4	Ultimate Heat Sink	Amendment 139

Final Safety Analysis Reports

Section	Title	Revision
2.3	Final Safety Analysis Report, Meteorology	11-A
2.5	Final Safety Analysis Report, Geology and Seismology	11-A
3.2	Final Safety Analysis Report, Classification of Components, Structures, and Systems	11-A
3.5	WSES-Final Safety Analysis Report-Unit-3, Missile Protection	
9.2	Final Safety Analysis Report, “Water Systems”	11-A

Miscellaneous

Number	Title	Revision
	Ambient Temperature Data	2000-2004
	Component Cooling Water Make-up Pump A Vendor Pump Curve	January 13, 1978
	Component Cooling Water Make-up Pump B Vendor Pump Curve	January 13, 1978
SC-CC	Component Cooling Water System Description	8
SPC93-017	Component Cooling Water and Shutdown Cooling Heat Exchanger Room Temperature Setpoint	0
SQ-AS-1	Component Cooling Water Surge Tank Seismic Qualification Revision	2
SQ-MN-185A	Seismic Qualification Revision Team (SQRT) Component Cooling Water Pump	2
SQ-MN-185A	Component Cooling Water Pump Seismic Qualification Revision	2
Ebasco Specification LOU 1564 B-430, Sh V-33	Instrument Installation Details	11
Ebasco Specification LOU 1564 B-430, Sh V-33.1	Instrument Installation Details	6

Number	Title	Revision
Ebasco Specification LOU-1564.724	Miscellaneous Shop Fabricated Tanks Nuclear Safety Class 3 and Non-Nuclear Safety Class Seismic Class I and II	10
CEP-IST-1	Inservice Testing Bases Document	3, Change 3M
CEP-IST-2	Inservice Testing Plan	3, Change 3M
MRR-804110	Material Receiving Inspection Report - Buffalo Tank	
3521	Design Change - Route Dry Cooling Tower Sumps Discharge to Circulating Water System	4
0049-00132-001	Relief Valve Setpoint Basis Report	0, 1
50.59 Evaluation 99-043	Evaluation of ER-W3-0642-01-00	

Work Order Package

Dry Cooling Tower Channel “A” Fan Logic Test IAW MI-05-565
Dry Cooling Tower Channel “B” Fan Logic Text IAW MI-05-565

Letters & Memoranda

September 7, 2000. Charles M. Dugger, VP Operations, Entergy Operations, Inc. WSES, Unit 3 - Issuance of Amendment No. 168 RE: Amendment for a Previously Unreviewed Safety Question Regarding Design Basis Concerning Tornado Missile (TAC No. MA7359)

November 5, 2004. Joseph Venable, Vice President Operations, Waterford 3. License Amendment Request NPF-38-255. Removal of Requirements Associated with the Ultimate Heat Sink Dry Cooling Tower Fans (TS 3.7.4)