UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

February 11, 2009

Kevin T. Walsh, Vice President,
Operations
Waterford 3
Entergy Operations, Inc.
17265 River Road
Kilona, LA 70057-3093

Subject: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - NRC INTEGRATED INSPECTION REPORT 05000382/2008-005

Dear Mr. Walsh:

On December 31, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Waterford Steam Electric Station, Unit 3. The enclosed integrated inspection report documents the inspection findings, which were discussed on January 19, 2009, with you and members of your staff.

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

This report documents one NRC identified and three self-revealing findings of very low safety significance (Green). All of these findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as a noncited violation(s), consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest the violation(s) or the significance of the noncited violation(s), 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, D.C. 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 612 E. Lamar Blvd, Suite 400, Arlington, Texas, 76011-4125; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Waterford Steam Electric Station, Unit 3 facility.

In accordance with 10 CFR 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 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 James Drake for/

Jeff A.Clark, P.E.
Chief, Project Branch E
Division of Reactor Projects

Docket: 50-382
License: NPF-38

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w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	05000382
License:	NFP-38
Report:	05000382/2008005
Licensee:	Entergy Operations, Inc.
Facility:	Waterford Steam Electric Station, Unit 3
Location:	Hwy. 18 Killona, LA
Dates:	September 17 through December 31, 2008
Inspectors:	R. Azua, Senior Resident Inspector D. Overland, Resident Inspector G. Replogle, Senior Project Engineer B. Correll, Reactor Inspector Paul J. Elkmann, Senior Emergency Preparedness Inspector
Approved By:	Jeffrey A. Clark, Chief, Project Branch E Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000382/2008005; 09/17/2008 – 12/31/2008; Waterford Steam Electric Station, Unit 3, Integrated Resident and Regional Report; Heat Sink Performance; Routine Review of Identification and Resolution of Problems; and Other.

The report covered a 3 ½ - month period of inspection by resident inspectors and announced baseline inspections by regional based inspectors. Four (4) Green noncited violations of significance were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 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 and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. The inspectors reviewed a self revealing noncited violation of 10 CFR 50, Appendix B, Criterion III due to the failure by the licensee to perform adequate post modification testing to evaluate the adequacy of design modifications made to the actuators of low pressure safety injection Isolation Valves SI-405A(B). This led to the licensee failing to identify a fundamental difference in the manner that the air operated valve actuator operated resulting in the valve popping open instead of slowly opening, creating a pressure transient that resulted in the lifting of the low temperature overpressure relief valve causing an intersystem loss-of-coolant event. The licensee entered this deficiency into their corrective action program as Condition Report CR-WF3-2008-4161.

  This finding was more than minor because, if left uncorrected, it would have become a more significant safety concern. The inspectors utilized NRC Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," to characterize the significance of the issue. Using the worst case scenario of having both Valves SI-405A(B) inoperable, the finding was of very low safety significance because multiple systems or components would still be available to remove decay heat and respond to a loss-of-inventory event. This performance deficiency would not result in any loss of instrumentation needed for safe shutdown and cool down of the plant. This finding had a crosscutting aspect in Human Performance, specifically the Resources aspect [H.2(a)] because the licensee failed to maintain adequate design margins. Specifically, the licensee's pneumatic actuator for SI-405B could not overcome the pressure locking mechanism until twelve minutes into a fifteen minute time limit, after receiving the open demand signal. This led to the instantaneous valve disc displacement when the valve popped open causing the pressure surge, which resulted in the opening of relief valve SI-406B and subsequent loss of inventory event (Section 4OA5).

Cornerstone: Mitigating Systems

- Green. The inspectors reviewed a self revealing noncited violation of 10 CFR 50, Appendix B, Criterion XVI due to the failure by the licensee to take prompt corrective actions following the identification of an inadequate testing method used for determining the integrity of the Essential Chiller B heat exchanger tubing. Failure to take this timely action resulted in an inadvertent tube rupture and inoperability of Essential Chiller B. The licensee entered this deficiency into their corrective action program as Condition Report CR-WF3-2008-5342.

  This finding was more than minor because it is associated with the Mitigating Systems attributes for Equipment Performance and would impact the availability and reliability of systems that respond to initiating events. The inspectors evaluated this finding using Manual Chapter 0609, Attachment 4, and determined that it was of very low safety significance (Green) because, assuming worst case degradation of both the B and AB Essential Chillers failing, the redundant A Essential Chiller would still have been available for accident mitigation. This finding had a crosscutting aspect in Problem Identification and Resolution, specifically the Corrective Action Program aspect [P.1(d)] because the licensee failed to take appropriate corrective actions to address a degrading condition in a timely manner. Specifically, the failure to perform timely tube inspections of Essential Chiller B, following the identification of an inadequate testing methodology used for identifying Essential Chiller heat exchanger tubing degradation (Section 4OA2).

- Green. The inspectors reviewed a self revealing noncited violation of Technical Specification 6.8.1.a for failure to provide documented instructions appropriate to the circumstances as recommended in Appendix A of Regulatory Guide 1.33. The failure by the licensee to provide adequate guidance for the replacement of the Essential Chiller AB compressor motor temperature sensor resulted in the reintroduction of a failure mechanism that had previously been corrected. This subsequently led to the failure of the temperature sensor wiring and inoperability of Essential Chiller AB. The licensee entered this deficiency into their corrective action program as Condition Report CR-WF3-2008-5471.

  This finding was more than minor because it is associated with the Mitigating Systems attributes for Equipment Performance and would impact the availability and reliability of systems that respond to initiating events. The inspectors evaluated this finding using Manual Chapter 0609, Attachment 4, and determined that it was of very low safety significance (Green) because the redundant Essential Chillers A and B would still have been available for accident mitigation. Based on the guidance provided in Manual Chapter 0612, Appendix B, Section 1-5, “Screen for Cross-Cutting Aspects,” this finding did not have a crosscutting aspect because it was not considered to be reflective of current licensee performance. Specifically, the licensee’s failure to update the model work instructions in 2000 was a latent issue, whereby the licensee did not have a reasonable opportunity to identify the problem prior to August, 2008. In addition, the licensee has since instituted programs and processes such that the problem would not reasonably occur today (Section 4OA2).

- Green. The inspectors identified a noncited violation of 10 CFR 50, Appendix B, Criterion III to address three examples of inadequate calculations involving shutdown cooling Valves SI-405A and SI-405B. The calculations were also

used, in part, to support valve operability, which made an existing operability assessment invalid. First, a calculation performed by a contractor to estimate the bounding thrust requirements for pressure locking contained errors and used mathematical formulas out of their intended context without applying uncertainties to account for the differences. Recent operational experience with these valves was inconsistent with the calculation's conclusions. In addition, the licensee failed to meet their quality assurance program requirements that specified that engineers perform a design verification of the calculation prior to use. Second, the licensee's calculation, that demonstrated valve actuator thrust capabilities, contained errors. Specifically, it failed to account for the friction between the actuator piston disk and walls as well as the weight of components. Third, a calculation that determined that the temperature within the valve bonnet would not heat up during small break loss of coolant accidents and faulted steam generator accidents was inadequate, in that it failed to address a faulted steam generator event, it used heat transfer calculation methods on water that were intended only for solid materials, it failed to model all components, and it failed to determine the temperatures inside the valve bonnets, which was the overriding variable of interest. The licensee entered the finding into the corrective action program as Condition Report CR-WF3-2009-00127.

This finding was more than minor because it was similar to non-minor finding Example 3.j in NRC Inspection Manual Chapter 0612 Appendix E, “Examples of Minor Issues,” in that there was a reasonable doubt concerning the operability of Valves SI-405A(B). The inspectors utilized NRC Manual Chapter 0609, Appendix G, “Shutdown Operations Significance Determination Process,” to characterize the significance of the issue. Using the worst case scenario of having both SI-405A(B) valves inoperable, the finding was of very low safety significance because multiple systems or components would still be available to remove decay heat and respond to a loss of inventory event. These systems included the emergency feedwater system, main feedwater system, auxiliary feed water system, atmospheric dump valves, charging pumps, safety injection tanks, and the high-pressure safety injection system. This performance deficiency would not result in any loss of instrumentation needed for safe shutdown and cool down of the plant. The finding had a crosscutting aspect in the area of problem identification and resolution (P.1(c)) because engineers failed to thoroughly evaluate the potential for valve pressure-locking. The calculations were completed in 2008 and were indicative of current performance (Section 4OA2).

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Status

The plant began the inspection period on September 17, 2008, at 100 percent power and remained at approximately 100 percent power for the rest of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

1R04 Equipment Alignments (71111.04)

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- October 9, 2008: Emergency Feedwater Train A
- November 24, 2008: Dry Cooling Tower A
- December 15, 2008: Control Ventilation Area System Train B

The inspectors selected these systems based on their risk significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could affect the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Updated Final Safety Analysis Report, technical specification requirements, administrative technical specifications, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of three (3) partial system walkdown samples as defined in Inspection Procedure 71111.04-05.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Quarterly Fire Inspection Tours

a. Inspection Scope

The inspectors conducted fire protection walkdowns that were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- October 15, 2008: Fire areas RAB 19, 20 and 21
- November 3, 2008: Outdoor fire hose stations
- November 14, 2008: Fire areas RAB 8A, 8B, 8C and Cooling Tower B
- November 17, 2008: Fire areas RAB 2, 31 and 32

The inspectors reviewed areas to assess if licensee personnel had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant; effectively maintained fire detection and suppression capability; maintained passive fire protection features in good material condition; and had implemented adequate compensatory measures for out of service, degraded or inoperable fire protection equipment, systems, or features, in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to affect equipment that could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed, that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's corrective action program. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of four (4) quarterly fire-protection inspection samples as defined in Inspection Procedure 71111.05-05.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report, the flooding analysis, and plant procedures to assess susceptibilities involving internal flooding; reviewed the corrective action program to determine if licensee personnel identified and corrected flooding problems; inspected underground bunkers/manholes to verify the adequacy of sump pumps, level alarm circuits, cable splices subject to submergence, and drainage for bunkers/manholes; and verified that operator actions for coping with flooding can reasonably achieve the desired outcomes. The inspectors also walked down the -35 ft. Elevation Wing Area, on October 16, 2008, to verify the adequacy of equipment seals

located below the flood line, floor and wall penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, and control circuits, and temporary or removable flood barriers. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one (1) flood protection measures inspection sample as defined in Inspection Procedure 71111.06-05.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

Triennial Review

a. Inspection Scope

The inspector reviewed design documents (e.g., calculations and performance specifications), program documents, test and maintenance procedures, and corrective action documents for the inspection samples selected. The inspector also interviewed chemistry and engineering personnel.

The inspector selected heat exchangers that ranked high in the plant specific risk assessment and were directly or indirectly connected to the safety-related service water system. The inspector selected the following heat exchangers:

- Auxiliary Component Cooling Water (ACCW) System Wet Cooling Towers
- Component Cooling Water (CCW) System Dry Cooling Towers
- Component Cooling Water (CCW) Heat Exchanger

For heat exchangers directly connected to the safety-related service water system, the inspector verified whether testing, inspection and maintenance, or the biotic fouling monitoring program provided sufficient controls to ensure proper heat transfer. Specifically, the inspector reviewed: (1) heat exchanger test methods and test results from performance testing; (2) chemical treatments for microfouling and controls for macrofouling; and (3) whether test results appropriately considered differences between testing conditions and design conditions.

For heat exchangers directly or indirectly connected to the safety-related service water system, the inspector verified the licensee: (1) performed condition monitoring and operation consistent with design assumptions in the heat transfer calculations; (2) evaluated the potential for water hammer, as applicable; and (3) instituted appropriate chemistry controls for the heat exchangers.

For the ultimate heat sink and its subcomponents, the inspector verified the licensee established appropriate controls for macrofouling and biological fouling. Since the licensee had a forced-draft cooling tower, a system walk-down was performed to verify the licensee had: (1) sufficient reservoir capacity; (2) performed periodic monitoring and trending of sediment build-up; and (3) periodic performance monitoring of heat transfer capability.

On December 3, 2008, the inspector examined the internal condition of the 'B' Essential Chiller and associated cooling water pipe to determine the effectiveness of the chemistry control program.

Documents reviewed by the inspector are listed in the attachment.

These activities constitute completion of three (3) samples as defined in Inspection Procedure 71111.07-05.

b. Findings

Introduction. An unresolved item was identified related to not testing the CCW and ACCW heat exchangers within the timeframe committed to in the licensee's response to Generic Letter (GL) 89-13 "Service Water System Problems Affecting Safety-Related Equipment." This finding is issued as an unresolved item to evaluate the results of performance tests for the CCW heat exchanger and ACCW wet cooling tower. The licensee had not tested these heat exchangers and wet cooling towers in the last 7 years. This issue is unresolved pending the results of the scheduled performance testing.

Description. The CCW heat exchangers and ACCW wet cooling towers, along with the CCW dry cooling towers make up the Ultimate Heat Sink for the Waterford plant. In letter dated January 29, 1990, the licensee's response to GL 89-13 committed to conducting performance testing of the above heat exchangers and cooling towers within a 5-year frequency. The performance tests of the CCW heat exchangers and ACCW wet cooling towers have exceeded the 5-year testing frequency committed to by the licensee in response to GL 89-13. Specifically, these heat exchangers were last tested as follows:

- A CCW/ACCW 4/10/00
- B CCW/ACCW 12/11/01

Analysis. The inspector was concerned that, by not conducting performance testing as committed to in letter dated January 29, 1990, possible heat exchanger degradation may not have been promptly identified. The licensee planned to test these heat exchangers on December 8, 2008. The inspector will review the test results to determine if a performance deficiency was more than minor. There was no immediate safety concern because water chemistry controls were maintained throughout the period since the last tests, and no operational signs of fouling existed.

Enforcement. Additional information was needed to determine whether this issue involved a violation of NRC requirements. The finding will be tracked as an unresolved item for significance determination once the testing is complete: URI 05000382/2008005-05, Review results of 'B' Train performance testing of CCW HX and ACCW Wet Cooling Tower.

1R11 Licensed Operator Requalification Program (71111.11Q)

a. Inspection Scope

On October 16, 2008, the inspectors observed a crew of licensed operators in the plant's simulator to verify that operator performance was adequate, evaluators were identifying

and documenting crew performance problems and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- Licensed operator performance
- Crew's clarity and formality of communications
- Crew's ability to take timely actions in the conservative direction
- Crew's prioritization, interpretation, and verification of annunciator alarms
- Crew's correct use and implementation of abnormal and emergency procedures
- Control board manipulations
- Oversight and direction from supervisors
- Crew's ability to identify and implement appropriate technical specification actions and emergency plan actions and notifications

The inspectors compared the crew's performance in these areas to pre-established operator action expectations and successful critical task completion requirements. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one quarterly licensed-operator requalification program sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q)

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk significant systems:

- November 7, 2008: Containment Vacuum Relief valve differential pressure
- November 28, 2008: Essential Chiller Compressor Bearing Temperature

The inspectors reviewed events such as where ineffective equipment maintenance has resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- Implementing appropriate work practices
- Identifying and addressing common cause failures
- Scoping of systems in accordance with 10 CFR 50.65(b)
- Characterizing system reliability issues for performance

- Charging unavailability for performance
- Trending key parameters for condition monitoring
- Ensuring proper classification in accordance with 10 CFR 50.65(a)(1) or (a)(2)
- Verifying appropriate performance criteria for structures, systems, and components classified as having an adequate demonstration of performance through preventive maintenance, as described in 10 CFR 50.65(a)(2), or as requiring the establishment of appropriate and adequate goals and corrective actions for systems classified as not having adequate performance, as described in 10 CFR 50.65(a)(1)

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of two (2) quarterly maintenance effectiveness samples as defined in Inspection Procedure 71111.12-05.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed licensee personnel's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- October 2, 2008: Scheduled maintenance to replace Reactor Trip Circuit Breaker Number 7
- October 15, 2008: Scheduled maintenance outage of Startup Transformer A
- November 4, 2008: Planned maintenance to repair an Instrument Air leak on Turbine Bypass Valve MS-319B
- December 10, 2008: Emergent work to complete a thermal performance test on Ultimate Heat Sink Train B

The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that licensee personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When licensee personnel performed emergent work, the inspectors verified that the licensee personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance

work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of four (4) maintenance risk assessments and emergent work control inspection samples as defined in Inspection Procedure 71111.13-05.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the following issues:

- August 13, 2008: Evaluation of Dry Cooling Tower Trains A and B electric and diesel driven sump pump capacities
- October 7, 2008: Evaluation of source and impact of signal noise on Containment Sump Level Monitors.
- December 29, 2008: Evaluation of erratic operation of the output controller for Auxiliary Component Cooling Water Header A Component Cooling Water heat exchanger outlet temperature control Valve ACC-126A

The inspectors selected these potential operability issues based on the risk-significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and Updated Safety Analysis Report to the licensee's evaluations, to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors also reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of three (3) operability evaluations inspection samples as defined in Inspection Procedure 71111.15-05

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

The inspectors reviewed the following temporary modification to verify that the safety functions of important safety systems were not degraded:

- November 24, 2008: Temporary modification to use Temperature Element RC ITE0111 X (Reactor Coolant System hot leg 1) as replacement for core protection calculator Channel D Temperature Element RCITE0112HD1 (Reactor Coolant System hot leg 1) that had failed

The inspectors reviewed the temporary modification and the associated safety evaluation screening against the system design bases documentation, including the Updated Final Safety Analysis Report and the technical specifications, and verified that the modification did not adversely affect the system operability/availability. The inspectors also verified that the installation and restoration were consistent with the modification documents and that configuration control was adequate. Additionally, the inspectors verified that the temporary modification was identified on control room drawings, appropriate tags were placed on the affected equipment, and licensee personnel evaluated the combined effects on mitigating systems and the integrity of radiological barriers.

These activities constitute completion of one (1) sample for temporary plant modifications as defined in Inspection Procedure 71111.18-05. No other temporary plant modifications were available for review throughout CY-08 beyond this and those documented in the previous resident inspection reports. Thus it was not possible to complete the suggested number of reviews specified in Inspection Procedure 71111.18.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the following postmaintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- October 3, 2008: Following replacement of Reactor Trip Circuit Breaker Number 7 with a spare breaker

- October 14, 2008: Following replacement of a failed relay in the starting circuit of Chemical Volume Control Pump A when it failed to start on demand

- November 5, 2008: Following scheduled gearbox maintenance on Dry Cooling Tower B bundle Number 8 inlet and outlet isolation valves, CC-141B and CC-175B

- November 11, 2008: Following tube inspection and replacement and repair of compressor motor temperature sensor for Essential Chiller B

- November 25, 2008: Following scheduled maintenance of Component Cooling Water Pump B

The inspectors selected these activities based upon the structure, system, or component's ability to affect risk. The inspectors evaluated these activities for the following (as applicable):

- The effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed

- Acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate

The inspectors evaluated the activities against the technical specifications, the Updated Final Safety Analysis Report, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with postmaintenance tests to determine whether the licensee was identifying problems and entering them in the corrective action program and that the problems were being corrected commensurate with their importance to safety. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of five (5) postmaintenance testing inspection samples as defined in Inspection Procedure 71111.19-05.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report, procedure requirements, and technical specifications to ensure that the three surveillance activities listed below demonstrated that the systems, structures, and/or components tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the significant surveillance test attributes were adequate to address the following:

- Preconditioning

- Evaluation of testing impact on the plant

- Acceptance criteria
- Test equipment
- Procedures
- Jumper/lifted lead controls
- Test data
- Testing frequency and method demonstrated technical specification operability
- Test equipment removal
- Restoration of plant systems
- Fulfillment of ASME Code requirements
- Updating of performance indicator data
- Engineering evaluations, root causes, and bases for returning tested systems, structures, and components not meeting the test acceptance criteria were correct
- Reference setting data
- Annunciators and alarms setpoints

The inspectors also verified that licensee personnel identified and implemented any needed corrective actions associated with the surveillance testing.

- October 9, 2008: Operations Procedure OP-903-046, "Emergency Feed Pump Operability Check," Revision 302, was used to perform inservice testing and to ensure operability of the Emergency Feedwater (turbine driven) Pump AB, in accordance with plant Technical Specifications 4.7.1.2.b., "Emergency Feedwater System," and 6.5.8., "Inservice Testing Program"
- October 15, 2008: Operations Procedure OP-903-050, Component Cooling Water and Auxiliary Component Cooling Water Pump and Valve Operability Test," Revision 020, was used to perform the quarterly inservice testing of Component Cooling Water Pump A in accordance with Technical Specification 6.5.8., "Inservice Testing Program"
- December 3, 2008: Operations Procedure OP-903-006, "Reactor Trip Circuit Breaker Test," Revision 009, was used to perform functional testing of the Reactor Trip Breakers in accordance with Technical Specification 4.3.1.1, Table 4.3-1, "Reactor Protective Instrumentation Surveillance Requirements," Item 13

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of three (3) surveillance testing inspection samples as defined in Inspection Procedure 71111.22-05.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert Notification System Testing (71114.02)

a. Inspection Scope

The inspector discussed with licensee staff the operability of fixed and mobile offsite siren systems and helicopter-mounted public address systems to determine the adequacy of the licensee's methods for testing the alert and notification system in accordance with 10 CFR Part 50, Appendix E. The licensee's alert and notification system testing program was compared with criteria in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, Federal Emergency Management Agency (FEMA) Report REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants," and the licensee's current FEMA-approved alert and notification system design report, "Updated Final Report, Alert and Notification System, Waterford-3 Steam Electric Station," Revision 4, dated March 2005. The inspector also reviewed Procedure EPP-424, "Siren Testing and Siren System Administration Controls," Revisions 9 and 10, and Desk Guide 16, "Siren System Administrative Data," Revision 12.

These activities constitute completion of one (1) sample as defined in Inspection Procedure 71114.02-05.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization Augmentation Testing (71114.03)

a. Inspection Scope

The inspector discussed with licensee staff the operability of primary and backup systems for augmenting the on-shift emergency response staff to determine the adequacy of licensee methods for staffing emergency response facilities. The inspector reviewed the procedures listed below, and the references listed in the Attachment to this report related to the emergency response organization augmentation system, to evaluate the licensee's ability to staff the emergency response facilities in accordance with the licensee's emergency plan, and the requirements of 10 CFR Part 50, Appendix E.

- EP-002-015, "Emergency Responder Activation," Revision 8
- Emergency Management Resource Book, Section VII, "Emergency Pager System," revised September 2008
- EP-003-050, "Emergency Organization Documentation and Control," Revision 15

- EPP-462, “Evaluation of Pager Tests,” Revision 0
- Desk Guide 20, “Evaluation of Pager Tests,” Revision 1

These activities constitute completion of one(1) sample as defined in Inspection Procedure 71114.03-05.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspector performed an on-site review of Revision 36 to the Waterford-3 Steam Electric Station Emergency Plan, implemented September 18, 2008. This revision further described the organization of the licensee’s emergency planning group, transferred the function of providing training to offsite emergency response personnel from the emergency planning group to the Manager, Training and Development, replaced two required line-of-sight radios with four satellite telephones, deleted one Technical Support Center communicator and two Emergency Operation Facility communicators from the emergency response organization, updated titles, and corrected minor administrative errors.

This revision was compared to its previous revision, to the criteria of NUREG-0654, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,” Revision 1, and to the standards in 10 CFR 50.47(b) to determine if the revision adequately implemented the requirements of 10 CFR 50.54(q). This review was not documented in a Safety Evaluation Report and did not constitute approval of the licensee’s changes; therefore, these revisions are subject to future inspection. The inspector also reviewed Procedure EN-EP-305, “Emergency Planning 10CFR50.54(q) Review Program,” Revision 1, and Desk Guide 09, “Emergency Plan and Procedure Maintenance, Revisions and Changes Guidelines,” Revision 4.

These activities constitute completion of one (1) sample as defined in Inspection Procedure 71114.04-05.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies (71114.05)

a. Inspection Scope

The inspector reviewed the licensee’s corrective action program requirements in Procedures EN-LI-102, “Corrective Action Process,” Revisions 11 and 12, and EN-LI-119, “Apparent Cause Evaluation Process,” Revisions 6 and 7. The inspector reviewed summaries of 121 condition reports (corrective action requests) and 174 work tracking system entries assigned to the emergency preparedness department between January 2006 and September 2008, and selected 20 condition reports for detailed

reviews against program requirements. The inspector evaluated the response to the corrective action requests to determine the licensee's ability to identify, evaluate, and correct problems in accordance with the licensee program requirements and 10 CFR 50.47(b)(14) and 10 CFR 50 Appendix E. The inspector also reviewed other documents as listed in the Attachment to this report.

These activities constitute completion of one (1) sample as defined in Inspection Procedure 71114.05-05.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

Training Observations

a. Inspection Scope

The inspectors observed a simulator training evolution for licensed operators on September 24, 2008, which required emergency plan implementation by a licensee operations crew. This evolution was planned to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the corrective action program. As part of the inspection, the inspectors reviewed the scenario package and other documents listed in the attachment.

These activities constitute completion of one (1) sample as defined in Inspection Procedure 71114.06-05.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Data Submission Issue

a. Inspection Scope

The inspectors performed a review of the data submitted by the licensee for the fourth Quarter 2008 performance indicators for any obvious inconsistencies prior to its public release in accordance with Inspection Manual Chapter 0608, "Performance Indicator Program."

This review was performed as part of the inspectors' normal plant status activities and, as such, did not constitute a separate inspection sample.

b. Findings

No findings of significance were identified.

.2 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures performance indicator for the period from the third quarter 2007 through the fourth quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC Integrated Inspection reports for the period of September 2007 through December 2008 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one safety system functional failures sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.3 Mitigating Systems Performance Index - Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Cooling Water Systems performance indicator for the period from the third quarter 2007 through the fourth quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's operator narrative logs, issue reports, mitigating systems performance index derivation reports, event reports and NRC integrated inspection reports for the period of September 2007 through December 2008 to validate the accuracy of the submittals. The inspectors reviewed the mitigating systems performance index component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one mitigating systems performance index cooling water system sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.4 Reactor Coolant System Specific Activity

a. Inspection Scope

The inspectors sampled licensee submittals for the Reactor Coolant System Specific Activity performance indicator for the period from the fourth quarter 2007 through the fourth quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's reactor coolant system chemistry samples, technical specification requirements, issue reports, event reports and NRC integrated inspection reports for the period of December 2007 through December 2008 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one reactor coolant system specific activity sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.5 Reactor Coolant System Leakage

a. Inspection Scope

The inspectors sampled licensee submittals for the Reactor Coolant System Leakage performance indicator for the period from the fourth quarter 2007 through the fourth quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's operator logs, reactor coolant system leakage tracking data, issue reports, event reports and NRC integrated inspection reports for the period of December 2007 through December 2008 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one reactor coolant system leakage sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.6 Drill/Exercise Performance

a. Inspection Scope

The inspector sampled licensee submittals for the Drill/Exercise Performance performance indicator for the period from the October 2007 through June 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revisions 4 and 5, and the licensee's Performance Indicator Procedures EN-EP-201, "Emergency Planning Performance Indicators," Revisions 6 and 7, and EN-LI-114, "Performance Indicator Process," Revisions 3 and 4, were used. The inspector reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspector reviewed licensee records and processes including procedural guidance on assessing opportunities for the performance indicator; assessments of performance indicator opportunities during pre-designated control room simulator training sessions, performance during the 2007 biennial exercise, and performance during other drills. Specific documents reviewed are described in the attachment to this report. The inspector also performed Temporary Instruction 2515\175, "Emergency Response Organization, Drill/Exercise Performance Indicator, Program Review."

These activities constitute completion of one drill/exercise performance sample as defined by Inspection Procedure 71151-05, and one sample as defined by Temporary Instruction 2515\175.

b. Findings

No findings of significance were identified.

.7 Emergency Response Organization Drill Participation

a. Inspection Scope

The inspector sampled licensee submittals for the Emergency Response Organization Drill Participation performance indicator for the period from the October 2007 through June 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revisions 4 and 5, were used. The inspector reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspector reviewed licensee records and processes including procedural guidance on assessing opportunities for the performance indicator and revisions of the roster of personnel assigned to key emergency response organization positions. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one (1) emergency response organization drill participation sample as defined by Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.8 Alert and Notification System

a. Inspection Scope

The inspector sampled licensee submittals for the Alert and Notification System performance indicator for the period from the October 2007 through June 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revisions 4 and 5, were used. The inspector reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspector reviewed licensee records and results of periodic silent and full-cycle alert notification system operability tests. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one (1) alert and notification system sample as defined by Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Physical Protection

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's corrective action program at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. The inspectors reviewed attributes that included: the complete and accurate identification of the problem; the timely correction, commensurate with the safety significance; the evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent of condition reviews, and previous occurrences reviews; and the classification, prioritization, focus, and timeliness of corrective. Minor issues entered into the licensee's corrective action

program because of the inspectors' observations are included in the attached list of documents reviewed.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure, they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

1. Introduction: The inspectors reviewed a self revealing noncited violation of 10 CFR 50, Appendix B, Criterion XVI due to the failure by the licensee to take prompt corrective actions following the identification of inadequate testing method used for determining the integrity of the Essential Chiller heat exchanger tubing. Failure to take this timely action resulted in an inadvertent tube rupture and inoperability of Essential Chiller B.

Description: In May of 2006, the licensee detected a significant Freon leakage associated with Essential Chiller A condenser. The licensee discovered that a condenser tube had failed due to fretting at the first tube support plate. During their investigation, the licensee discovered that recently performed eddy current tests had failed to identify the tube wall thinning. The licensee determined that this was due to an inherent limitation in the examination method to obtain adequate examination coverage in this area of the tube.

The tubing in the essential chiller condenser is "integrally finned," meaning that areas along the outer portion of the tube are re-shaped into spiral fins in order to improve thermal performance of the tubing. These tubes are formed through an extrusion process which results in the portions that are finned to have a reduced wall thickness and inside diameter. The areas along the tube that are not finned are the portions which pass through the support plates. Therefore, wherever the tube aligns with the support plates, the tube has a larger inside diameter with a greater wall thickness. It is this change in inner diameter and wall thickness which created a limitation with the eddy current examination.

The eddy current technique that had been historically performed on the essential chiller integrally finned tubing, employed a bobbin coil, which is a solid state probe that is passed through the tubes. For this inspection method to be effective, the probe has to be within a specific size range in relation to the tube diameter. The probe must be small enough to slide easily through the tube inner diameter, but has to be large enough to fill a minimum of 80% of the tube to obtain reliable data. The step change in inner diameters between the finned and un-finned areas of the tube resulted in the limiting condition for the eddy current examination. When a probe was selected which could fit through the smaller diameter portions of the tubing, it was unable to maintain an 80% probe to tube inner diameter ratio when passing through the un-finned portions of the tubing. In addition, the licensee found that the examination in the non-finned areas was further challenged with the increased tube thickness because the calibration of the equipment was based on the tubing thickness of the finned portions of the tubes.

The licensee determined that the condenser tubing for Essential Chillers B and AB needed to be tested using a new eddy current testing methodology which was developed to overcome the limitations demonstrated by the previous testing method. However, based on a review of these previously performed eddy current tests on

Essential Chillers B and AB the licensee determined that there were no indications of significant tube degradations and no immediate concerns. This was done even though the tube failure in Essential Chiller A, provided indication that the previously used inadequate testing methodology invalidated assumptions regarding tube degradation and/or integrity in Essential Chillers B and AB. The last eddy current testing of the condenser tubing for Essential Chiller B was performed in 2001. As a result of this determination, the licensee scheduled the inspection for Essential Chiller B for November 11, 2008. On November 6, 2008, condenser tube #1, row 13 of Essential Chiller B failed due to fretting at the first support plate.

Analysis: The failure to take prompt corrective actions for a condition adverse to quality which resulted in the Essential Chiller B tube rupture, and subsequent system train inoperability, is a performance deficiency. This finding was more than minor because it is associated with the Mitigating Systems attributes for Equipment Performance and would impact the availability and reliability of systems that respond to initiating events. The inspectors evaluated this finding using Manual Chapter 0609, Attachment 4, and determined that it was of very low safety significance (Green) because, assuming worst case degradation of both the B and AB Essential Chillers failing, the redundant A Essential Chiller would still have been available for accident mitigation. This finding had a crosscutting aspect in Problem Identification and Resolution, specifically the Corrective Action Program aspect [P.1(d)] because the licensee failed to take appropriate corrective actions to address a degrading condition in a timely manner. Specifically, the failure to perform timely tube inspections of Essential Chiller B, following the identification an inadequate testing methodology used for identifying Essential Chiller heat exchanger tubing degradation.

Enforcement: Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion XVI (Corrective Action), requires, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, in 2006, a testing methodology used for determining the integrity of Essential Chiller heat exchanger tubing was found to be inadequate, however, the licensee failed to take timely corrective actions to inspect the remaining chillers resulting in a subsequent tube failure in Essential Chiller B. Because the violation is of very low safety significance and has been entered into the licensee's corrective action program as Condition Report CR-WF3-2008-5342, this violation is being treated as a noncited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000382/2008005-01, *Untimely Corrective Actions.*

2. Introduction: The inspectors reviewed a self revealing noncited violation of Technical Specification 6.8.1.a for failure to provide documented instructions appropriate to the circumstances as recommended in Appendix A of Regulatory Guide 1.33. The failure by the licensee to provide adequate guidance for the replacement of the Essential Chiller AB compressor motor temperature sensor resulted in the reintroduction of a failure mechanism that had previously been corrected. This subsequently led to the failure of the temperature sensor wiring and inoperability of Essential Chiller AB.

   Description: On December 4, 2000, the Essential Chiller AB tripped on high motor compressor temperature. The licensee identified that the wiring for the compressor motor temperature sensor had broken due to mechanical induced fatigue. The licensee determined that the wires, which are located inside the compressor housing in a Freon environment, were subject to some turbulent flow. This turbulence and noted slackness

in the wiring allowed a sail-effect to exist whereby the wires would work themselves backward and forward. This effect resulted in the mechanical induced failure of the wiring. As a result of this failure, the licensee installed tubing sleeves to protect the temperature element wiring. As part of this modification, the licensee provided instructions in Engineering Request ER-W3-2001-0039 to "pull the slack in the wires toward the thrust bearing end of the tubing sleeves to eliminate wire slack at the terminal ends." The engineering request also provided instructions to secure the wiring with tie wraps.

In August of 2008, as part of planned preventive maintenance, the licensee replaced the temperature sensor for the compressor motor for Essential Chiller AB. On November 29, 2008, the Essential Chiller AB tripped due to high compressor motor temperature. The licensee discovered that the compressor motor temperature sensor wires had failed due to mechanically induced fatigue. The licensee's investigation identified that when the temperature sensor was replaced, the preventive maintenance (model) work instructions did not incorporate the guidance provided in Engineering Request ER-W3-2001-0039. The licensee identified that they had failed to take appropriate actions to update documentation impacted by the engineering request when it was issued in 2000. As a result, the slack in the wires were not pulled taut towards the thrust bearing. The slack wires where then subject to the previously described sail-effect which created mechanically induced fatigue which ultimately resulted in the failure of the wires. This failure to provide adequate work instruction for an activity affecting quality, is a performance deficiency which resulted in the inoperability of a safety related component and the unplanned entry into the licensee's technical specifications.

Analysis: The failure by the licensee to provide adequate work instructions, which resulted in the reintroduction of a failure mechanism in the compressor motor temperature sensor wiring for Essential Chiller AB, is a performance deficiency. This finding was more than minor because it is associated with the Mitigating Systems attributes for Equipment Performance and would impact the availability and reliability of systems that respond to initiating events. The inspectors evaluated this finding using Manual Chapter 0609, Attachment 4, and determined that it was of very low safety significance (Green) because the redundant Essential Chillers A and B would still have been available for accident mitigation. Based on the guidance provided in Manual Chapter 0612, Appendix B, Section 1-5, "Screen for Cross-Cutting Aspects," this finding did not have a crosscutting aspect because it was not considered to be reflective of current licensee performance. Specifically, the licensee's failure to update the model work instructions in 2000 was a latent issue, whereby the licensee did not have a reasonable opportunity to identify the problem prior to August, 2008. In addition, the licensee has since instituted programs and processes such that the problem would not reasonably occur today.

Enforcement: Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion V (Instructions, Procedures and Drawings), requires, in part that activities affecting quality shall be prescribed by documented instructions or procedures. Contrary to the above, on August 6, 2008, the work instructions provided to replace the compressor motor temperature sensor for Essential Chiller AB did not provide adequate guidance. This resulted in the reintroduction of a failure mechanism of the sensor wires which subsequently led to the sensor failure and inoperability of the essential chiller train. Because the violation is of very low safety significance and has been entered into the licensee's corrective action program as Condition Report CR-WF3-2008-5471, this

violation is being treated as a noncited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000382/2008005-02, *Inadequate Procedural Guidance.*

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. The inspectors accomplished this through review of the station's daily corrective action documents.

The inspectors performed these daily reviews as part of their daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings of significance were identified.

.3 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on repetitive equipment issues, but also considered the results of daily corrective action item screening discussed in Section 4OA2.2, above, licensee trending efforts, and licensee human performance results. The inspectors nominally considered the 6-month period of June 2008 through November 2008, although some examples expanded beyond those dates where the scope of the trend warranted.

The inspectors also included issues documented outside the normal corrective action program in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's corrective action program trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

These activities constitute completion of one (1) single semi-annual trend inspection sample as defined in Inspection Procedure 71152-05.

b. Findings

No findings of significance were identified.

.4 Annual Sample Review

a. Inspection Scope

The inspector selected 20 condition reports for detailed review against the requirements of Procedures EN-LI-102, "Corrective Action Process," Revisions 11 and 12, and EN-LI-119, "Apparent Cause Evaluation Process," Revisions 6 and 7. The inspector reviewed attributes that included: the complete and accurate identification of the problem; the timely correction, commensurate with the safety significance; the evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent of condition reviews, and previous occurrences reviews; and the classification, prioritization, focus, and timeliness of corrective actions. The inspector also reviewed one condition report generated during the inspection to ensure issues were correctly characterized. These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure, they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings and Observations

No findings of significance were identified.

.5 Selected Issue Follow-up Inspection

a. Inspection Scope

During a review of items entered in the licensee's corrective action program, the inspectors recognized a corrective action items documenting Operator Workarounds and Burdens and Operability of Safety Injection Valves 405 A(B). The inspectors considered the following during the review of the licensee's action: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

These activities constitute completion of two (2) in-depth problem identification and resolution samples as defined in Inspection Procedure 71152-05.

b. Findings

1. (Closed) Unresolved Item 05000382/2008004-03, Operability of safety injection Valves SI-405A(B)

Introduction. The inspectors identified a Green noncited violation of 10 CFR 50, Appendix B, Criterion III to address three examples of inadequate calculations involving shutdown cooling Valves SI-405A and SI-405B. The calculations were also used, in part, to support valve operability, which made the existing operability assessment invalid. First, a calculation performed by a contractor to estimate the bounding thrust requirements for pressure locking contained errors and used mathematical formulas out of their intended context without applying uncertainties to account for the differences.

Recent operational experience with these valves was inconsistent with the calculation's conclusions. In addition, the licensee failed to meet their quality assurance program requirements that specified that engineers perform a design verification of the calculation prior to use. Second, the licensee's calculation, that demonstrated valve actuator thrust capabilities, contained errors. Specifically, it failed to account for the friction between the actuator piston disk and walls as well as the weight of components. Third, a calculation that determined that the temperature within the valve bonnet would not heat up during small break loss of coolant accidents and faulted steam generator accidents was inadequate, in that it failed to address a faulted steam generator event, it used heat transfer calculation methods on water that were intended only for solid materials, it failed to model all components, and it failed to determine the temperatures inside the valve bonnets, which was the overriding variable of interest.

Description. **Background:** During the previous inspection period, the inspectors had identified that the licensee's calculations utilized to support valve operability for shutdown cooling Valve SI-405 A and B were inadequate (NCV 05000382/2008004-02). The licensee performed a subsequent operability assessment and determined that the Valves were operable but the inspectors identified an unresolved item to address concerns with the second operability assessment and supporting calculations.

The SI-405A(B) valves are repositioned open by plant operators to place shutdown cooling and low-temperature/over-pressure protection valves (SI-406A(B)) in service. The SI-405 valves are in series between the SI-401A(B) and SI-407A(B) valves, which are also opened for shutdown cooling operations.

On September 1, while placing Train B shutdown cooling in service, Valve SI-405B had failed to initially move when the control room operator repositioned the valve's control room switch to open. The indication showed full closed for about 12 minutes. The valve indication then showed mid-position, which was followed by full open indication. The licensee determined that the valve was stuck in its seat until the valve actuator developed sufficient thrust to move the valve disk. Then, the valve popped to almost the full open position.

Subsequent to the event, plant engineers calculated that at approximately the 4 minute point in the valve stroke, the vented side of the valve actuator reached an equilibrium pressure with containment. Accordingly, the valve actuator, with maximum air pressure on the high pressure side of the piston, could not move the valve disk while the actuator applied the maximum possible thrust for approximately 8 minutes. Leakage from the valve bonnet to the piping likely occurred while the valve was stuck closed, which reduced the thrust needed to move the valve. When the pressure locking condition lessened, the valve opened.

MPR Calculation: In response to the inspectors' operability concerns, Entergy personnel performed a second operability determination, as documented in CR-WF3-2008-04294. The licensee contracted with MPR Associates, an engineering firm, to assess the potential for pressure locking of Valves SI-405A(B). MPR produced a calculation titled, "Pressure-Locking Evaluation of SI-405A(B)," dated Sept. 11, 2008 that concluded that the air operated actuators could overcome the thrust requirements for a bounding pressure locking event. The MPR calculation assumed that bonnet pressure was 2250 psig (normal plant operating pressure) and that no pressure existed in the

upstream and downstream piping sections. However, the inspectors identified that the MPR calculation was inadequate for the following reasons:

- The calculation failed to adequately predict actual valve performance on September 1, 2008, when a pressure locking event occurred. The calculation concluded that the worst case pressure locking demands (assuming 2250 psid in the valve bonnet) would not result in a pressure locking condition. In other words, the actuator had more than sufficient thrust to prevent the valve from locking up because of pressure locking. However, on September 1, 2008, the valve actuator applied the maximum thrust for about 8 minutes but the actuator could not move the valve. If the MPR calculation adequately predicted pressure locking loads, this should not have occurred. Further, the event occurred several hours after depressurization had begun, bonnet pressure was not likely close to 2250 psid and the pressure on the other side of the disk was well above 0 psig (about 300 psig). These factors would reduce the actual pressure locking thrust requirements.

- The MPR calculation contained an error. MPR had performed case studies using different valve friction coefficients. The MPR calculation had determined that the pressure locking thrust requirements would reduce as the valve friction coefficient increased from 0.35 to 0.5. This should not occur. In response to NRC questions, MPR found that the model contained an error. It had predicted a tension load between to facing components that had no hard connection (which was not possible).

- The MPR calculation improperly modeled the "reverse piston effect." The reverse piston effect is the force applied in the valve closing direction caused by the differential pressure between the valve bonnet and the opposite sides of the valve disks. The valve disks are at a 5 degree angle to vertical. The reserve piston effect provides a significant majority of closing direction thrust associated with pressure locking for these valves. MPR had inappropriately subtracted out the area of the hub (the component connecting the disks). For these valves, the area of the hub provided a substantial fraction of the overall area assumed in the calculation. The inspectors performed a free-body diagram and noted that the vertical forces associated with hub area were still present, so the hub area should not have been subtracted out.

- Waterford-3 engineers used and relied upon the calculation in their operability assessment but neither licensee engineers nor MPR had performed a calculation design verification. The inspectors noted that the licensee's procedure that governed calculations EN-DC-126, "Engineering Calculation Process," Revision 1, stated, in part:

  > “Calculations prepared in accordance with this procedure to support a reasonable expectation of operability do not need to be design verified...”

  This procedure stipulation was inconsistent with the Waterford-3 "Quality Assurance Program Manual," Revision 18, dated April 15, 2008, Section B.3.d (Design Verification) which stated, in part:

> "Independent design verification is to be completed before design outputs are used by other organizations for design work... In all cases [emphasis added], the design verification is to be completed before relying on the item to perform its function."

- MPR had used formulas for stress and strain beyond their intended purpose. MPR utilized engineering formulas from "Rourk's Formulas for Stress and Strain," Third Edition, to develop some of the thrust components associated with pressure locking. However, Rourk had stipulated important restrictions on the usage of these formulas. Specifically, the text stated, in part:

  > "The formulas of this section are based on the following assumptions: (1) The plate is flat, of uniform thickness...Table 11.2, Formulas for flat circular plates of uniform thickness."

  The inspectors noted that the valve disks were neither circular nor flat and of uniform thickness. While the NRC has accepted simplified calculational approximations that have been shown to be conservative (usually with the use of design uncertainties), MPR had not shown that the method was conservative for these valves and had not applied uncertainties to their method. MPR had only demonstrated that their method was conservative for a very limited population of valves when very high valve friction coefficients were used.

Actuator capability calculation: The inspectors identified that Calculation ECM 91-076, "SI 405A(B) Actuator Thrust Calculation," Revision 3, was inadequate. Since the licensee had not used the actuator in its rated configuration, plant engineers performed the calculation to determine the capability under applicable conditions. However, the engineers had failed to account for all design loads. Specifically, the engineers had failed to account for the load between the piston disk and wall (which can be substantial) and the weight of the piston disk. For a very marginal component, these differences result in operability concerns. As evidenced by the pressure locking event on September 1, 2008, the actuator design was marginal.

Inadequate loss of coolant accident analysis: One of the concerns outlined in NCV 05000382/2008004-02 involved the failure of the licensee to address the potential for valve bonnet heatup as a result of a small break loss of coolant accident or a faulted steam generator. These are events that could cause bonnet heatup and where shutdown cooling would still be needed post accident. If the temperature in the valve bonnet increased just two degrees, the bonnet pressure could increase by an additional two hundred psig, which would exacerbate pressure locking. The licensee performed a subsequent calculation entitled "SI 405 Temperature Change for Small Break Loss of Coolant Accident," no date. The calculation had concluded that valve bonnet temperature would decrease by 1 degree Fahrenheit for a small break loss of coolant accident. The inspectors found the calculation inadequate for its intended purpose because:

- The calculation neglected the potential heatup affects from other design basis accidents, such as a faulted steam generator.

- The heat transfer calculation used a formula to estimate the heat transfer through water. However, the method was intended for use with solid components only. Water has different heat transfer mechanisms in play, such as convection.

- The calculation did not model all components (such as other closed valves).

- The calculation did not determine the temperature of the water within the valve bonnet. The temperature of the valve bonnet was is the only outcome that has a bearing on pressure locking.

In response to the NRC concerns, the licensee wrote Condition Report CR-WF3-2009-00127 and initiated plans to revise the operability assessment and correct the other flawed calculations. The revised operability assessment was not available for NRC review at the close of the inspection period.

Analysis. The failures to: 1) perform adequate engineering calculations; 2) meet the design control requirements specified in the Quality Assurance Program Manual; and 3) perform a valid operability determination were performance deficiencies. This finding was more than minor because it was similar to non-minor finding Example 3.j in NRC Inspection Manual Chapter 0612 Appendix E, “Examples of Minor Issues,” in that there was a reasonable doubt concerning the operability of Valves SI-405A(B). The inspectors utilized NRC Manual Chapter 0609, Appendix G, “Shutdown Operations Significance Determination Process,” to characterize the significance of the issue. Using the worst case scenario of having both SI-405A(B) valves inoperable, the finding was of very low safety significance because multiple systems or components would still be available to remove decay heat and respond to a loss of inventory event. These systems included the emergency feedwater system, main feedwater system, auxiliary feed water system, atmospheric dump valves, charging pumps, safety injection tanks, and the high-pressure safety injection system. This performance deficiency would not result in any loss of instrumentation needed for safe shutdown and cool down of the plant. The finding had a crosscutting aspect in the area of problem identification and resolution (P.1(c)) because engineers failed to thoroughly evaluate the potential for valve pressure-locking. The calculations were completed in 2008 and were indicative of current performance.

Enforcement. Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion III (Design Control), requires, in part, that measures be established to provide for the verifying (or checking) the adequacy of design. These measures may include calculations. The licensee used MPR Calculation "Pressure-Locking Evaluation of SI-405A(B)," Entergy Calculation ECM 91-076, and Entergy Calculation"SI405 Temperature Change for Small Break Loss of Coolant Accident," to demonstrate the adequacy of design for the SI-405 valves, as well as valve operability. Contrary to the above, as of December 31, 2008, the design control measures for Valves SI-405A(B) were inadequate, in that all three calculations were inadequate. Because the violation is of very low safety significance and has been entered into the licensee’s corrective action program as Condition Report CR-WF3-2008-04292, this violation is being treated as a noncited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000382/2008005-03, *Second Inadequate SI-405 Operability Assessment.*

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors performed observations of security force personnel and activities to ensure that the activities were consistent with Waterford Steam Electric Station's Unit 3 security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

.2 Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing (TI 2515/176)

a. Inspection Scope

During the inspection period, and in accordance with temporary instruction (TI-2515/176), the inspectors gathered information to assess the adequacy of the Waterford Steam Electric Station's Unit 3 emergency diesel generators endurance and margin testing as prescribed in the licensee's technical specifications.

b. Findings

No findings of significance were identified.

.3 (Closed) Unresolved Item (URI) 05000382/2008-004-01: Intersystem Loss of Coolant Event

Introduction: The inspectors reviewed a self revealing noncited violation of 10 CFR 50, Appendix B, Criterion III due to the failure by the licensee to perform adequate post modification testing to evaluate the adequacy of design modifications made to the actuators of low pressure safety injection Isolation Valves SI-405A(B).

Description: On September 1, plant operators shut down Waterford-3 in preparation for Hurricane Gustav. During initiation of Train B shutdown cooling operations, control room operators identified and responded to an intersystem loss-of-coolant event that lasted approximately 4 minutes. About 800 gallons of reactor coolant was lost through low-temperature over-pressure protection Relief Valve SI-406B. The relief valve unexpectedly opened following an apparent malfunction of Valve SI-405B.

While placing Train B shutdown cooling in service, Valve SI-405B had failed to initially move when the control room operator repositioned the valve's control room switch to open. The indication showed full closed for approximately 12 minutes. The valve indication then showed mid-position, which was followed by full open indication. The air-

operated valve was expected to have a 5 to 6 minute stroke time. Licensee personnel determined that the valve was stuck in its seat until the valve actuator developed sufficient thrust to move the valve disk. Then, the valve popped to almost the full open position.

Entergy engineers determined that the sudden motion of Valve SI-405B created a pressure transient in the residual heat removal piping. Since system pressure was about 350 psig at the time, system pressure combined with the pressure transient that resulted from the opening of Valve SI-406B exceeded the setpoint of Relief Valve SI-406B, which was approximately 430 psia. Once lifted, relief valves will not normally seat at their set pressure but will close at a pressure somewhat below the setpoint. Since system pressure was already relatively high, the valve did not immediately reseat. Operator action was necessary to stop the leakage, by closing Valve SI-401B.

The licensee's review of the design process used to develop the actuators for Valves SI-405A(B) identified, amongst other things that the potential for valve disc pop-out had been recognized during the initial design review process. The offsite review committee recommended that appropriate testing be applied to ensure that the unwedging of the valve seat would not potentially cause a waterhammer event. These instructions were added to the post maintenance test procedure, but were not translated into specific work order instructions for the post modification testing.

Analysis: Failure to establish measures to verify or check the adequacy of design is a performance deficiency. This finding was more than minor because, if left uncorrected, it would have become a more significant safety concern. The inspectors utilized NRC Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," to characterize the significance of the issue. Using the worst case scenario of having both Valves SI-405A(B) inoperable, the finding was of very low safety significance because multiple systems or components would still be available to remove decay heat and respond to a loss-of-inventory event. This performance deficiency would not result in any loss of instrumentation needed for safe shutdown and cool down of the plant. This finding had a crosscutting aspect in Human Performance, specifically the Resources aspect [H.2(a)] because the licensee failed to maintain adequate design margins. Specifically, the licensee's pneumatic actuator for SI-405B could not overcome the pressure locking mechanism until twelve minutes into a fifteen minute time limit, after receiving the open demand signal. This led to the instantaneous valve disc displacement when the valve popped open causing the pressure surge, which resulted in the opening of relief valve SI-406B and subsequent loss of coolant inventory event.

Enforcement. Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion III (Design Control), requires, in part, that measures be established to provide for the verification of design adequacy. These measures may include post modification testing. Contrary to the above, the licensee failed to provide adequate testing requirements which would have identified a fundamental difference in the manner that the air operated valve actuators operated. Specifically, that the actuators popped open, instead of slowly opening, creating a pressure transient that resulted in the lifting of the low temperature overpressure relief valve causing an intersystem loss-of-coolant event. Because the violation is of very low safety significance and has been entered into the licensee's corrective action program as Condition Report CR-WF3-2008-04161, this violation is being treated as a noncited violation, consistent with Section VI.A.1 of the

NRC Enforcement Policy: NCV 05000382//2008005-04, *Inadequate Post Modification Testing Procedure.*

4OA6 Meetings

Exit Meeting Summary

On October 9, 2008, the inspector presented the results of the onsite inspection of the emergency preparedness program to Mr. J. Kowalewski, General Manager, Plant Operations, and other members of his staff, who acknowledged the findings. The inspector confirmed that proprietary, sensitive, or personal information examined during the inspection had been returned to their identified custodians.

On December 4, 2008, the inspector presented the triennial heat sink performance inspection results to Mr. K. Nichols, Director of Engineering, and other members of licensee management. Licensee management acknowledged the inspection findings. The inspectors confirmed that no proprietary information was reviewed.

On January 19, 2009, the inspectors presented the inspection results to Mr. K. Walsh, Vice President, Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. The licensee identified that some of the documentation examined by the NRC during this inspection period was considered proprietary, however no proprietary information is discussed in this report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

S. Anders, Superintendent, Plant Security
A. Buford, Engineer, System Engineering
K. Cook, Manager, Operations
C. Fugate, Assistant Manager, Operations
R. Gilmore, Acting Director, Nuclear Safety Assurance
K. Gordon, Assistant Manager, Operations
M. Groome, Senior Lead Engineer, System Engineering
J. Kowalewski, General Manager, Plant Operations
B. Lanka, Manager, Design Engineering
J. Lewis, Manager, Emergency Preparedness
B. Lindsey, Manager, Outage
M. Mason, Senior Licensing Specialist, Licensing
P. Mckenna, Technical Specialist, System Engineering
R. Murillo, Manager, Licensing
K. Nichols, Director, Engineering
A. Pilutti, Manager, Radiation Protection
B. Proctor, Manager, System Engineering
R. Putnam, Manager, Programs and Components
J. Ridgel, Manager, Quality Assurance
G. Scott, Engineer, Licensing
K. Walsh, Vice President of Operations
A. Wemett, Shift Manager, Operations
R. Williams, Senior Licensing Specialist, Licensing

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000382/2008005-05	URI	Failure to Conduct Performance Testing on the CCW heat exchangers and ACCW wet cooling towers per GL 89-13 (Section 1RO7)

Opened and Closed

05000382/2008005-01	NCV	Essential Chiller B Tube Rupture Due to Untimely Corrective Actions (Section 4OA2)
05000382/2008005-02	NCV	Essential Chiller AB Component Failure Due to Inadequate Procedural Guidance (Section 4OA2)
05000382/2008005-03	NCV	Operability of safety injection Valves SI-405A(B) (Section 4OA2)
05000382/2008005-04	NCV	Inadequate Test Procedure for Safety Injection Valves SI-405A(B) Post Modification Testing (Section 4OA5)

Closed

05000382/2008004-01	URI	Intersystem Loss of Coolant Event (Section 4OA5)
05000382/2008004-03	URI	Operability of safety injection Valves SI-405A(B) (Section 4OA2)
05000382/2515/176	TI	Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing

LIST OF DOCUMENTS REVIEWED

Section 1RO4: Equipment Alignment

CONDITION REPORTS

CR-WF3-2007-4147	CR-WF3-2008-0240	CR-WF3-2008-0278	CR-WF3-2008-0291
CR-WF3-2008-0681	CR-WF3-2008-1814	CR-WF3-2008-2138	CR-WF3-2008-2935
CR-WF3-2008-2949	CR-WF3-2008-2974	CR-WF3-2008-3020	CR-WF3-2008-3336
CR-WF3-2008-4566	CR-WF3-2008-4655		

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
OP-009-003	Emergency Feedwater	13
OP-903-052	Controlled Ventilation Area System Operability Check	9
OP-002-003	Component Cooling Water System	305
OP-002-010	Reactor Auxiliary Building HVAC and Containment Purge System	303
Drwg. No. G153 Sheet 4	Flow Diagram – Feedwater, Condensate and Air Evacuation Systems	40 01/18/05

Section 1RO5: Fire Protection

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
UNT-005-013	Fire Protection Program	9
OP-009-004	Fire Protection	11
MM-007-010	Fire Extinguisher Inspection and Replacement	15
FP-001-015	Fire Protection System Impairments	17
MM-004-423	Fire Hydrant Hose House Inspection and Hose Replacement	13
MM-004-424	Building Fire Hose Inspection and Hose Replacement	10

Section 1RO6: Flood Protection Measures

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
OP-901-521	Severe Weather and Flooding	4
OP-902-008	Functional Recovery Procedure	15
FSAR Section 3.6A.6	Flooding Analysis	14-A

Section 1R07: Heat Sink Performance

CONDITION REPORTS

CR-WF3-2006-02434	CR-WF3-2007-00240	CR-WF3-2007-00320	CR-WF3-2007-01122
CR-WF3-2007-01753	CR-WF3-2007-02030	CR-WF3-2007-02054	CR-WF3-2007-02056
CR-WF3-2007-02168	CR-WF3-2007-02367	CR-WF3-2007-02867	CR-WF3-2007-03455
CR-WF3-2008-00498	CR-WF3-2008-04996		

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
CE-002-001	Maintaining Component Cooling Water Chemistry	301
CE-002-003	Maintaining Auxiliary Component Cooling Water Chemistry	302
PE-001-015	Generic Letter 89-13 Heat Exchanger Test Basis	004
PE-001-016	Administrative Procedure – Heat Exchanger Inspection Program	1
PE-004-033	Wet Cooling Tower A(B) Thermal Performance Test	301
PE-004-021	CCW Heat Exchanger Performance Test	1

CALCULATIONS

NUMBER	TITLE	REVISION / DATE
MN(Q) 9-3	Heat Removal Capacities of DCT and WCT After LOCA	3
ECM95-008	Ultimate Heat Sink Design basis	2

MAINTENANCE DOCUMENTS

TITLE	REVISION / DATE
A CCW Heat Exchanger and Wet Cooling Tower Test	4/10/00
B CCW Heat Exchanger and Wet Cooling Tower Test	12/11/01
A CCW Flow Balance Test PE-0004-024, Revision 2	5/13/08
B CCW Flow Balance Test PE-0004-024, Revision 2	5/15/08

MISCELLANEOUS

NUMBER	TITLE	REVISION / DATE
SD-CC	Design Basis for CCW and ACCW	11
GL 89-13	Implementation Overview	
ER-W3-2001-1125-000	CCW Monitoring Plan	0
ER-W3-2001-1125-001	CCW Monitoring Plan Clarifications	0

Commitment List for GL 89-13

ACCW System Health Report

CCW System Health Report

Letter dated January 29, 1990 response to GL 89-13

Section 1R11: Licensed Operator Requalification Program

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
P-112	Simulator Scenario	1
OP-902-000	Standard Post Trip Actions	10
OP-901-202	Steam Generator Tube Leakage or High Activity	9
OP-901-212	Rapid Plant Power Reduction	3
OP-902-007	Steam Generator Tube Rupture Recovery	12

Section 1R12: Maintenance Effectiveness

CONDITION REPORTS

CR-WF3-2001-0863	CR-WF3-2007-0961	CR- WF3-008-1456	CR- WF3-2008-4453
CR-WF3-2008-4583	CR- WF3-2008-4992	CR- WF3-2008-2093	CR- WF3-2008-4826
CR-WF3-2008-5007	CR-WF3-2008-5683		

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
DC-121	Maintenance Rule	1
NUMARC 93-01	Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	3
OP-008-005	Containment Vacuum Relief	300

Section 1R13: Maintenance Risk Assessment and Emergent Work Controls

CONDITION REPORTS

CR-2006-1175 CR-2008-4179

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
OI-037-000	Operations Risk Assessment Guideline	2
EN-WM-101	On-Line Work Management Process	1
OP-903-127	Reactor Trip Circuit Breaker Post Maintenance Test	3
ME-004-155	Reactor Trip Switchgear Breakers	301

WORK ORDERS

44879	51547031	76082	51523240
86691	51655765	51639921	51641394
51642811	51645301	51646600	51647737
51652069	51653558	51654686	152819
51655919	51648845	51649933	51651031

Section 1R15: Operability Evaluations

CONDITION REPORTS

CR-WF3-2008-0016	CR-WF3-2008-0038	CR-WF3-2008-1964	CR-WF3-2008-4639
CR-WF3-2008-4879	CR-WF3-2008-5158	CR-WF3-2008-5834	

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
ME-003-210	Station Battery Bank and Charger (Quarterly)	12
ME-003-200	Station Battery Bank and Charger (Weekly)	301
EN-OP-104	Operability Determinations	4
OI-040-000	Reactor Coolant System Leakage Monitoring	0

Section 1R18: Plant Modifications

CONDITION REPORTS

CR-WF3-2000-0689 CR-WF3-2008-5355

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
EN-DC-136	Temporary Modifications	2
EC-11920	Substitute RCITE0111X RTD for RCITE0112HD1. RCITE0111X will be used for CPC Channel D, COLSS and backfed in loop RCIT0111X for the Reactor Regulating System and indications	
MI-003-225	Resistance Temperature Detector Loop Current Step Hot Response Time Test Channel A, B, C or D or Substitute RTD RCITE0111 X or RC ITE0121 X	302

WORK ORDERS

WO172741

DRAWING NO.s

B425	RCS-Reactor Coolant Hot Leg 1 Temp (Control Wiring Diagram 200R14 / Flow Diagram G172)	4, 5 and 6
B424 Sheet 200	RCS-Loop 1 and 2 Temp (Hot Leg)	20
B424 Sheet 201	RCS-Loop 1 Temp (Hot Leg)	22
B-9270-412-506 Sheet 5	Process Instrument Cabinet – Control Cabinet 1 (CP-28) Wiring Diagram – RCS Loops 1 & 2 Hot Leg Temp.	5
B-9270-412-506 Sheet 6	Process Instrument Cabinet – Control Cabinet 1 (CP-31) Wiring Diagram – RCS Loops 1 & 2 Hot Leg Temp.	8

Section 1R19: Postmaintenance Testing

CONDITION REPORTS

CR-WF3-2006-0366	CR-WF3-2008-0108	CR-WF3-2008-0778	CR-WF3-2008-4456
CR-WF3-2008-4765	CR-WF3-2008-4776	CR-WF3-2008-4782	CR-WF3-2008-4783
CR-WF3-2008-5090	CR-WF3-2008-5239	CR-WF3-2008-5339	CR-WF3-2008-5564
CR-WF3-2008-5683			

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
OP-903-127	Reactor Trip Circuit Breaker Post Maintenance Test	3
ME-004-155	Reactor Trip Switchgear Breakers	301
OP-903-094	Train A ESF AS Subgroup Relay Test – Operating	14
OP-903-118	Component Cooling Water	15
EN-MA-128	Refrigerant Management Program	3
TD-C150.0095	Carrier Start-Up, Operation and Maintenance Instructions for 19FA Hermetic Centrifugal Liquid Chillers, Form 19FA-2SS	2
MM-006-121	Essential Chiller Refrigerant Transfer and Evacuation	3

WORK ORDERS

51663304	168290	124844	51210193
108444	172096		

Section 1R22: Surveillance Testing

CONDITION REPORTS

CR-WF3-2008-0865

PROCEDURES/DOCUMENTS/TEST EQUIPMENT

NUMBER	TITLE	REVISION / DATE
OP-903-046	Emergency Feed Pump Operability Check	302
ODPT040010	Digital Pressure Gauge	Cal. Due Date 04/14/09
ODPT336009	Digital Pressure Gauge	Cal. Due Date 11/20/09
MMMT359002	Vibration Monitor–Data Pack 1500/ENTEK IRD	Cal. Due Date 09/30/09

OP-903-050	Component Cooling Water and Auxiliary Component Cooling Water Pump and Valve Operability Test	20
OP-903-006	Reactor Trip Circuit Breaker Test	9

WORK ORDERS

123368

Section 1EP3: Emergency Response Organization Augmentation Testing

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
	Pager System Surveillance Report	03/28/07
	Pager System Surveillance Report	08/13/07
	Pager System Surveillance Report	12/12/07
	Pager System Surveillance Report	03/17/08
	Pager System Surveillance Report	06/24/08

Section 1EP5: Correction of Emergency Preparedness Weaknesses and Deficiencies

CONDITION REPORTS

CR- WF3-2007-0431	CR- WF3-2007-1010	CR- WF3-2007-1129	CR- WF3-2007-1205
CR- WF3-2007-1642	CR- WF3-2007-1862	CR- WF3-2007-1936	CR- WF3-2007-2002
CR- WF3-2007-2061	CR- WF3-2007-2698	CR- WF3-2007-3213	CR- WF3-2007-4350
CR- WF3-2007-4514	CR- WF3-2007-5661	CR- WF3-2008-0788	CR- WF3-2008-1182
CR- WF3-2008-3049	CR- WF3-2008-3358	CR- WF3-2008-4037	CR- WF3-2008-4305
CR- WF3-2008-4612			

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
EP-002-050	Offsite Dose Assessment	301
EP-003-020	Emergency Preparedness Drills and Exercises	12-2 and 301
EP-003-030	Emergency Program Review, Updating, and Modification	24-2
EP-003-070	Emergency Communications Systems Routine Testing	4
QA-03-2007-WF3-1	Quality Assurance Audit Report, ‘Corrective Action Program’	July 23, 2007

QA-07-2007-WF3-1	Quality Assurance Audit Report, 'Emergency Preparedness Review Report'	June 7, 2007
QS-2007-W3-009	Follow-up to 2007 Waterford3 Emergency Plan Combined Review, QA-7-2007-WF3-1	December 10, 2007
QS-2007-W3-011	Follow-up to 2007 Corrective Action Program Audit QA-03-2207-WF3-1	January 8, 2008
QA-19-2008-WF3-1	Quality Assurance Training Audit Report	September 22, 2008
QS-2008-W3-004	Quality Assurance Surveillance Report, 'Emergency Preparedness Review	April 29, 2008
	Assessment: NRC Headquarters Incident Response Center	March 29, 2007
LO-WLO-2007-00047	First Quarter 2007 Roll-Up Assessment, Emergency Planning Department	
LO-WLO-2007-00058	Emergency Planning Combined Review Follow-up Assessment	January 23, 2008
LO-WLO-2007-00077	Second Quarter 2007 Roll-Up Assessment, Emergency Planning Department	
LO-WLO-2007-00118	Emergency Planning Performance Indicator Assessment	October 4, 2007
LO-WLO-2008-00004	Third and Fourth Quarters 2007 Roll-Up Assessment, Emergency Planning Department	
CR-WLO-2008-0042	Emergency Planning Performance Indicator Assessment	October 3, 2008
W3D3-2008-0020	Event 08-01, Unusual Event, August 31, 2008, Hurricane Gustav	October 5, 2008
	Drill Evaluation Report, March 15, 2007	
	Drill Evaluation Report, June 21, 2007	
	Drill Evaluation Report, July 26, 2007	
	Drill Evaluation Report, November 7, 2007	
	Drill Evaluation Report, December 5, 2007	
	Drill Evaluation Report, March 5, 2008	
	Drill Evaluation Report, March 25, 2008	

Section 4OA1: Performance Indicator Verification

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
EP-001-001	Recognition and Classification of Emergencies	21 and 22
EP-001-010	Unusual Event	24-2
EP-002-010	Notifications and Communications	301 and 302
EP-002-052	Protective Action Guidelines	20
	Waterford Steam Electric Station Emergency Plan	35

Section 4OA2: Identification and Resolution of Problems

CONDITION REPORTS

CR-WF3-2000-1588	CR-WF3-2001-0863	CR-WF3-2006-0366	CR-WF3-2008-0108
CR-WF3-2008-0114	CR-WF3-2008-0778	CR-WF3-2008-4456	CR-WF3-2008-5007
CR-WF3-2008-5090	CR-WF3-2008-5239	CR-WF3-2008-5339	CR-WF3-2008-5529
CR-WF3-2008-5564	CR-WF3-2008-5683	CR-WF3-2009-0127	

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
EN-LI-102	Corrective Action Process	10
	Letters from the licensee to the NRC concerning Generic Letter 95-07	Feb. 13, 1996 August 1, 1996
	Letters from the NRC to the licensee concerning Generic Letter 95-07	March 14, 1996 June 24, 1996
	NRC Generic Letter 95-07, "Pressure-Locking and Thermal-Binding of Safety-Related Power-Operated Gate Valves	August 17, 1995
	Waterford 3 Quality Assurance Program Manual	18
	MPR Calculation - Pressure-Locking Evaluation of SI-405A(B)	Sept. 11, 2008
	Maintenance and Instruction Manual for Model 24RAH-A001 Shutdown Cooling Suction Isolation Valve Actuator	0
	SI405 Temperature Change for Small Break Loss of Coolant Accident	N/A
	Answers to NRC Questions	Nov. 20, 2008

ECM 91-076	SI 405A(B) Actuator Thrust Calculation	3
EN-DC-126	Engineering Calculation Process	1
EN-DC-149	Acceptance of Vendor Documents	2
EN-OP-104	Operability Determinations	3
OP-009-008	Safety Injection System	24

Section 4OA5: Other Activities

CONDITION REPORTS

CR-WF3-2000-1347	CR-WF3-2002-0468	CR-WF3-2002-0547	CR-WF3-2005-1362
CR-WF3-2008-0306	CR-WF3-2008-4161	CR-WF3-2008-4278	

PROCEDURES/DOCUMENTS

NUMBER	TITLE	REVISION / DATE
EN-DC-112	Engineering Change Request and Project Initiation Process	1
EN-DC-114	Project Management	8
EN-DC-116	Engineering Change Installation	2
EN-DC-118	Engineering Change Closure	3
EN-DC-141	Design Inputs	5
EC-935	Replace SI-405 A (B) Hydraulic Valve Operators With Reliable Valve Operators During RF-15	
EC-1782	Replace Hydraulic Actuator for SI-405 A	
EC-1784	Replace Hydraulic Actuator for SI-405 B	