



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
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November 5, 2004

Joseph E. Venable  
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Entergy Operations, Inc.  
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**SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - NRC INTEGRATED  
INSPECTION REPORT 05000382/2004004**

Dear Mr. Venable:

On September 26, 2004, the NRC completed an inspection at your Waterford Steam Electric Station, Unit 3. The enclosed report documents the inspection findings which were discussed on September 27, 2004, with you and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC has identified three issues that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that violations are associated with these issues. These violations are being treated as noncited violations (NCVs), consistent with Section VI.A of the Enforcement Policy. These findings are described in the subject inspection report. If you contest the findings or significance of the findings, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Waterford Steam Electric Station, Unit 3, facility.

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

Entergy Operations, Inc.

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Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

**/RA/**

William B. Jones, Chief  
Project Branch E  
Division of Reactor Projects

Docket: 50-382  
License: NPF-38

Enclosure:  
NRC Inspection Report  
050000382/2004004  
w/attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 50-382

License: NPF-38

Report: 05000382/2004004

Licensee: Entergy Operations, Inc.

Facility: Waterford Steam Electric Station, Unit 3

Location: Hwy. 18  
Killona, Louisiana

Dates: June 27 through September 26, 2004

Inspectors: M. C. Hay, Senior Resident Inspector  
G. F. Larkin, Resident Inspector  
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T. McConnell, Reactor Inspector, Plant Engineering Branch

Approved By: W. B. Jones, Chief, Project Branch E

ATTACHMENT: Supplemental Information

Enclosure

## SUMMARY OF FINDINGS

IR05000382/2004004; 06/27/2004-09/26/2004; Waterford Steam Electric Station, Unit 3; Equipment Alignment, Identification and Resolution of Problems.

The report covered a 13-week period of inspection by resident inspectors and regional reactor engineering inspectors. The inspection identified three Green findings. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

### A. NRC-Identified and Self-Revealing Findings

#### Cornerstone: Mitigating Systems

- Green. The inspectors identified a noncited violation of 10 CFR 50.49(j) for the failure to maintain an auditable record demonstrating that electric equipment important to safety is environmentally qualified for its intended application. Specifically, it was identified that nonconservative temperature profiles were utilized to calculate the qualified life of ASCO NP8300 series solenoid-operated valves.

The finding was more than minor since if left uncorrected it would become a more significant safety concern. Specifically, the failure to maintain electrical equipment in an environmentally qualified configuration could adversely impact the ability of such mitigating equipment to perform its safety function during design-basis accident conditions. This finding was of very low safety significance since additional analysis demonstrated that affected electrical equipment currently installed in the plant was environmentally qualifiable. Therefore, this deficiency did not result in any loss of affected equipment safety function (Section 1R04.2).

Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, for the failure to maintain design control of the containment safety injection sump recirculation piping. This deficiency resulted in inappropriately maintaining a section of the piping void of water, potentially affecting the operability of the high-pressure safety injection and containment spray pumps during postulated design-basis accident conditions following a recirculation actuation signal.

This finding was more than minor because it potentially affected the mitigating system cornerstone objective of ensuring the capability of the high-pressure safety injection and containment spray systems to perform their design-basis

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functions. The finding was determined to be of very low safety significance because the design deficiency was confirmed not to result in loss of function per Generic Letter 91-18, Revision 1 (Section 1R04.2).

Cornerstone: Barrier Integrity

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for failure to determine the cause and preclude recurrence of main steam isolation solenoid-operated dump valve failures. This failure affected the primary containment isolation function for the main steam system isolation valves. The primary cause of this finding was related to the crosscutting area of problem identification and resolution.

The finding was greater than minor because if left uncorrected the finding could become a more safety significant concern. The finding was only of very low safety significance because it did not represent an actual reduction of the atmospheric pressure control function of the reactor containment, it did not result in an actual open pathway affecting the physical integrity of reactor containment, and the main steam isolation valves were inoperable for less time than the allowed Technical Specification outage time (Section 4OA2). The valve was repaired and returned to service.

B. Licensee-Identified Violations

Violations of very low safety significance, which were identified by Entergy have been reviewed by the inspectors. Corrective actions taken or planned by Entergy have been entered into Entergy's corrective action program. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

## REPORT DETAILS

Summary of Plant Status: The plant was operated at approximately 100 percent power from June 27 through September 26, 2004, except when reactor power was reduced to approximately 88 percent on September 1, 2004, to conduct high-pressure turbine valve testing.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection (71111.01)

##### a. Inspection Scope

Inspections were conducted to verify the status of Entergy Operations, Inc.'s (Entergy's) hurricane season preparations. The inspectors completed a walkdown of three areas inside and outside the plant on August 10, 2004. The walkdown included the following areas:

- Electrical distribution switchyard, including the auxiliary and startup transformers
- Main turbine generator
- Ultimate heat sink

The inspectors also reviewed Operating Procedure OP-901-521, "Severe Weather and Flooding," Revision 4; and the Updated Final Safety Analysis Report, Section 3.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment (71111.04)

##### a. Inspection Scope

##### .1 Partial System Walkdowns

The inspectors performed the following three partial system equipment alignment inspections during this inspection period:

- On July 9, 2004, the inspectors performed a partial equipment alignment inspection of emergency diesel generator Train A while emergency diesel generator Train B was inoperable. A review of select maintenance work orders and corrective action documents was performed to assess the material condition and performance of emergency diesel generator Train A. System configuration was assessed using Operating Procedure OP-009-002, "Emergency Diesel Generator," Revision 18. A walkdown of accessible portions of the system was performed to assess material condition, such as system leaks and housekeeping issues, that could adversely affect system operability.

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- On August 24, 2004, the inspectors performed a partial walkdown of the mechanical and electrical components of a critical portion of auxiliary component cooling system Train B. This walkdown was completed during an unplanned maintenance outage that rendered Train A inoperable. System configuration was assessed using Operating Procedure OP-002-001, "Auxiliary Component Cooling Water," Revision 13, as well as applicable sections of the Updated Final Safety Analysis Report.
- On August 31, 2004, the inspectors walked down the accessible electrical and mechanical portions of containment spray system Train B. The walkdown was completed while containment spray system Train A was unavailable due to a planned system outage. The inspectors performed the walkdown using Operating Procedure OP-009-001, "Containment Spray," Revision 11.

b. Findings

No findings of significance were identified.

.2 Complete Equipment Alignment

a. Inspection Scope

The inspectors performed a complete equipment alignment inspection of the containment spray system. A walkdown of the mechanical and electrical components in the system was performed to verify that the system was configured and operated in accordance with operating procedures. The inspectors reviewed the system design requirements in the Updated Final Safety Analysis Report to verify the system's ability to perform its safety function for design-basis events. The inspectors reviewed applicable design documentation and selected condition reports to verify that degraded conditions were identified at the appropriate threshold and that corrective actions were adequate and implemented in a timely manner.

b. Findings

Failure to Maintain Adequate Environmental Qualification Records

Introduction. A Green noncited violation of 10 CFR 50.49(j) was identified for the failure to maintain an auditable record demonstrating that electric equipment important to safety is environmentally qualified for its intended application. Specifically, it was identified that nonconservative temperature profiles were utilized to calculate the qualified life of ASCO NP8300 series solenoid-operated valves.

Description. During review of control wiring diagrams for containment spray isolation Valves CS-125A and -125B, the inspectors noted that normally energized ASCO

solenoids were utilized to support the valves' safety functions to open and close. The inspectors reviewed the established replacement frequency for the solenoid-operated valves and noted that the frequency appeared unusually long. The inspectors noted that the solenoid-operated valves were required to meet the environmental qualification requirements of 10 CFR 50.49 and requested for review the applicable qualification records for the components.

A review of environmental qualification Record LPL-EQA-03.02, "Environmental Qualification Assessment for ASCO NP-1 Solenoid Valves Used at the Waterford SES Unit No. 3," Revision 7, was performed. The record documented that all normally energized ASCO NP-1 solenoid coils had a qualified life of more than 40 years. The inspectors reviewed the methodology used to calculate this qualified life and determined that Entergy had performed service temperature testing that resulted in nonconservative temperature profiles being obtained. These nonconservative temperature profiles were obtained due to Entergy performing service temperature testing in an oven using forced air flow and installation of thermocouples that failed to provide representative temperatures of the materials being assessed.

The inspectors noted that the vendor had provided service temperature profiles for the ASCO NP-1 solenoid-operated valves. A comparison of the temperature profiles between the Entergy and vendor test data demonstrated that Entergy results were significantly lower than the vendor. These lower temperatures would result in extending the qualified life of the affected equipment. Upon questioning the validity of the temperature profile testing methods used, Entergy determined that the method was nonconservative; therefore, the calculated qualified life of the solenoid valves was incorrect.

Entergy recalculated the qualified life of all ASCO NP-1 solenoid valves. These calculations concluded that the alternating current solenoid's revised qualified life reduced to 24.49 years outside containment and 11.23 years inside containment. For direct current solenoids, Entergy determined that the qualified life reduced to 8.7 years outside containment and 4.5 years inside containment.

Analysis. The deficiency associated with this finding was the failure to maintain an auditable record demonstrating that electric equipment important to safety was environmentally qualified for its intended application. The finding was more than minor because if left uncorrected it would become a more significant safety concern. Specifically, the failure to maintain electrical equipment in an environmentally qualified configuration could adversely impact the ability of such equipment to perform its safety function during design-basis accident conditions. This finding was only of very low safety significance since additional analysis demonstrated that affected electrical equipment currently installed in the plant was environmentally qualifiable. Therefore, this deficiency did not result in any loss of safety function of affected equipment.

Enforcement. 10 CFR 50.49(j) requires, in part, that a record of the qualification must be maintained in auditable form to permit verification that each item of electric equipment important to safety is qualified for its application and meets its specified performance requirements under predicted environmental conditions. The failure to maintain an auditable record demonstrating that ASCO NP8300 series solenoid-operated valves were environmentally qualified for their intended application is a violation of 10 CFR 50.49(j). Because this deficiency was of very low safety significance and entered into Entergy's corrective action program as Condition Reports 2004-02382 and -02497, this violation is being treated as a noncited violation: NCV 50-382/0404-01, Failure to Maintain Adequate Environmental Qualification Records.

#### Failure to Maintain Design Control of Safety Injection Sump Suction Piping

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, for the failure to maintain design control of the containment safety injection sump recirculation piping. This deficiency resulted in inappropriately maintaining a section of the suction piping void of water, potentially affecting the operability of the high-pressure safety injection and containment spray pumps during postulated design-base accident conditions following a recirculation actuation signal.

Description. During a sample review of Entergy's corrective action program records for the containment spray system, the inspectors noted that Condition Report CR-WF3-1999-00486, initiated on April 18, 1999, documented that, during normal plant operation, an air void of approximately 26 cubic feet exists between the containment safety injection sump outlet isolation valves and the respective downstream check valves. The initiator stated that this voided condition was not adequately addressed by analysis to ensure that the emergency core cooling system pumps would not be adversely affected following a recirculation action signal during a loss of coolant accident scenario.

The inspectors noted that following loss of coolant accident scenarios the containment spray, low-pressure safety injection, and high-pressure safety injection pumps automatically start and take a suction from the refueling water storage pool. When the pool level approaches the 10 percent full level, a recirculation actuation signal opens the containment safety injection sump isolation valves and stops the low-pressure safety injection pumps. Manual operator actions are taken to close the refueling water storage pool isolation valves after operators verify proper flow characteristics of the high-pressure safety injection and containment spray pumps.

The inspectors noted that Entergy had determined that air in the containment sump suction piping would have no adverse affect on the ability of the emergency core cooling system to perform its safety function. This determination was based on a review of isometric drawings and engineering judgement. It was concluded that, due to low flow

rates and piping configuration, the majority of the air void would rise back into the safety injection sump following the opening of the containment sump isolation valve.

The inspectors reviewed the referenced isometric drawings and noted that the piping configuration was sloped 1/8-inch per foot from the air-voided piping back to the containment sump, and the flow velocity following opening of the containment sump isolation valves at pump runout conditions would be approximately 2.44-feet per second. Based on these conditions, the inspectors concluded that it would be improbable for the air void to reach the emergency core cooling system pump suction. However, the inspectors were concerned that air entrainment by water could potentially affect the pumps' net positive suction head analysis. A review of Entergy's analysis indicated that these concerns were not adequately addressed.

The inspectors reviewed Entergy's Updated Final Safety Analysis Report and noted no discussion was provided indicating that the containment sump suction piping would contain a voided section of piping following recirculation actuation. A review of the high-pressure safety injection and containment spray pumps' net positive suction head analysis also revealed that this voided condition had not been considered. A review of Entergy's safety evaluation report contained in NUREG-0787, Section 6.3, "Emergency Core Cooling System," was performed. The safety evaluation stated, in part, "During normal operation, the ECCS lines will be maintained in a filled condition. Suitable vents are provided and administrative procedures will require that ECCS lines be returned to a filled condition following events such as maintenance that require draining of any of the lines." The inspectors reviewed system drawings and noted that vent and fill lines were available to support maintaining the voided sump suction piping filled with water. The inspectors concluded that Entergy had not adequately maintained design control of the emergency core cooling system since the system was not maintained full of water during normal plant operation, and analysis and/or testing had not been performed to demonstrate successful emergency core cooling system pump performance for the voided condition.

Entergy initiated Condition Report 2004-02251 on July 24, 2004, to address the inspectors concerns. Entergy determined that the system was operable but degraded in accordance with Generic Letter 91-18. A consultant evaluated the effect the voided condition would have on operation of the safety injection system following a recirculation actuation signal. The evaluation included analytic modeling of the transient and utilization of relevant published data on air entrainment and stratified flow. In addition, scoping scale model testing was performed to demonstrate that flow behavior was consistent with the analysis. The evaluation concluded that air in the sump suction piping would not prevent the high-pressure safety injection and containment spray pumps from performing their design functions. The flow velocities were determined to be low enough to allow the water and air time to stratify after passing through the check valve on the downstream end of the voided piping and the air to distribute along the upper portion of the pipe downstream of the sump check valve. The stratified air would

not travel down the incline to the pumps' supply header because the flow velocities are too low.

Analysis. The deficiency associated with this finding was the failure to maintain design control of the containment safety injection sump suction piping. This finding was greater than minor because it potentially affected the mitigating system cornerstone objective of ensuring the capability of the high-pressure safety injection and containment spray systems to perform their design-basis functions. This finding was evaluated using the NRC Manual Chapter 0609, Significance Determination Process, Phase 1, worksheet under the mitigating systems cornerstone. The finding was determined to be of very low safety significance because the design deficiency was confirmed not to result in loss of function per Generic Letter 91-18, Revision 1.

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that measures be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. The failure to maintain the containment sump suction piping full of water is a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Because the deficiency has been entered into Entergy's corrective action program as Condition Report 2004-02251, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-382/0404-02, Failure to Maintain Design Control of Safety Injection Sump Recirculation Piping.

1R05 Fire Protection (711111.05)

a. Inspection Scope

The inspectors conducted six inspections to assess whether Entergy had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capabilities, and maintained passive fire protection features in good material condition.

The following areas were inspected:

- Fire Zones RAB 30, 31, and 32 on July 1, 2004
- Fire Zone RAB 8B on July 16, 2004
- Fire Zones RAB 33, 35, 36, 37, 38, and 39 on August 10, 2004
- Fire Zones RAB 1B, 2, 15, 17, 18, and 23 on August 19, 2004
- Fire Zones CTB, RAB 1A, 8A, 8B, 9, 32, 33, 35, and 36 on August 31, 2004

- Fire Zones RAB 17, 18, 19, 20, 21, 23, 33, 35, 36, 37, 38, and 39 on August 31, 2004

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors conducted a review of Entergy's external flood protection measures to ensure that flood risks are adequately mitigated. The inspectors reviewed Procedure OP-901-521, "Severe Weather and Flooding," Revision 3; the Updated Final Safety Analysis Report, Chapters 2 and 3; and Drawing G-580, "Nuclear Plant Island Structure Flood Wall Penetrations," Revision 3. The inspectors inspected the reactor auxiliary building flood wall water-tight doors and pipe penetrations below the +30-foot mean sea level elevation and the reactor auxiliary building roof drainage system to ensure that the reactor auxiliary building flood wall and roof protection measures were adequately addressed.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

.1 Biennial Heat Sink Performance (71111.07B)

a. Inspection Scope

From August 30 through September 3, 2004, the inspectors performed the biennial heat sink performance inspection. The inspectors selected four safety-related heat exchangers for this inspection, including the component cooling water heat exchanger, safeguards pump room cooler, shutdown cooling heat exchanger, and essential chillers.

The inspectors reviewed test, inspection, licensing, design, and vendor documents and verified that: (1) testing, inspection/maintenance, and biotic fouling controls were adequate to ensure proper heat transfer; (2) acceptance criteria properly considered the differences between test/inspection conditions and design-basis requirements; (3) acceptance criteria were consistent with accepted industry practices and testing accounted for instrument uncertainties, either implicitly or explicitly; (4) the frequency of testing or inspection was adequate to detect degradation prior to loss of acceptable heat removal capabilities; (5) as-found test/inspection results were appropriately evaluated

and findings were properly dispositioned; and (6) the ultimate heat sink and subcomponents demonstrated adequate performance.

The inspectors reviewed 14 service water related condition reports and verified that heat exchanger problems were properly documented, dispositioned, and corrected.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

On August 17, 2004, the inspectors observed two licensed operator simulator training examinations. During the examinations, the inspectors evaluated the operator's ability to recognize, diagnose, and respond to failed instruments, a loss of coolant accident, a rapid plant downpower, failures of mitigating system components, and entry into their emergency plan for the evacuation of site personnel. All scenario critical tasks were satisfactorily completed. The inspectors observed and evaluated the following areas:

- Understanding and interpreting annunciator and alarm signals
- Diagnosing events and conditions based on signals or readings
- Understanding plant systems
- Use and adherence of Technical Specifications
- Crew communications including command and control
- The crew's and evaluator's critiques

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope

During the inspection period, the inspectors reviewed Entergy's implementation of the Maintenance Rule. The inspectors considered the characterization, safety significance, performance criteria, and appropriateness of goals and corrective actions. The inspectors assessed Entergy's implementation of the Maintenance Rule to the requirements outlined in 10 CFR 50.65 and Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2. The inspectors reviewed the following three components and/or systems that displayed performance problems:

- Condensate makeup and storage system
- Reactor auxiliary building room coolers
- Reactor auxiliary building controlled ventilation area system

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed risk assessments for planned or emergent maintenance activities to evaluate Entergy's implementation of 10 CFR 50.65(a)(4) requirements for assessing and managing any increase in risk from these activities. The following five risk evaluations were reviewed:

- On July 6-7, 2004, during emergent repairs on the Control Element Assembly 40 power control circuit
- On July 28, 2004, during emergent repairs on emergency diesel generator Train A
- On August 18, 2004, during emergent repairs on emergency diesel generator Train B
- On September 1, 2004, during forced outage preparations for repair of Main Transformer B lightning arresters
- On September 21, 2004, during planned maintenance on high pressure safety injection system Train A

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the technical adequacy of five operability evaluations to verify that they were sufficient to justify continued operation of a system or component. The inspectors considered that, although equipment was potentially degraded, the operability evaluation provided adequate justification that the equipment could still meet its



Technical Specification, Updated Final Safety Analysis Report, and design-basis requirements and that the potential risk increase contributed by the degraded equipment was thoroughly evaluated. The following five evaluations were reviewed:

- Operability evaluation addressing emergency diesel Generator B engine-driven jacket water pump leakage (Condition Report CR-WF3-2004-2547)
- Operability evaluation addressing multiple ASCO NP8300 series solenoid operated valves that potentially exceeded qualified service life conditions (Condition Report CR-WF3-2004-2497)
- Operability evaluation addressing adverse trend in main steam isolation solenoid operated dump valve failures (Condition Report CR-WF3-2004-02468)
- Operability evaluation addressing affects of voided containment sump suction piping supporting the high-pressure safety injection and containment spray pumps (Condition Report CR-WF3-2004-02251)
- Operability evaluation addressing deficiencies identified as affecting the main steam isolation valve closure time analysis (Condition Report CR-WF3-2004-02217)

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (71111.16)

a. Inspection Scope

The inspectors performed a review of operator workarounds. This review evaluated the individual and cumulative effects of operator workarounds to assess the associated impact affecting the operator's ability to respond in a correct and timely manner to plant transients and accidents.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed postmaintenance tests to verify system operability and

functional capabilities. The inspectors considered whether testing met design and licensing bases, Technical Specifications, and Entergy's procedural requirements. The inspectors reviewed testing results for the following six components:

- Main steam isolation valve Train B following maintenance to replace a failed solenoid on April 13, 2002
- Containment spray Train A following a planned maintenance outage on August 31, 2004
- Auxiliary component cooling water Valve ACC-126A following emergent repairs on June 20, 2004, due to a failure of a valve controller card
- Emergency diesel generator Train B following emergent repairs on August 16, 2004, due to a failure of the jacket water pump shaft seal
- Component cooling water Valve CC-963B following planned maintenance on August 10, 2004
- Chilled water Valve CHW-887 following planned maintenance on June 20, 2004

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed or reviewed the following seven surveillance tests to ensure the systems were capable of performing their safety function and to assess their operational readiness. Specifically, the inspectors considered whether the following surveillance tests met Technical Specifications, the Updated Final Safety Analysis Report, and Entergy's procedural requirements:

- Surveillance Procedure OP-903-030, "Safety Injection Pump Operability Verification," Revision 13, performed on July 24, 2004. This surveillance verifies the functional capability of high-pressure safety injection Pump B.
- Surveillance Procedure OP-903-121, "Safety Systems Quarterly IST Valve Tests," Revision 5, performed on August 12, 2004. This surveillance verifies that the valve stroke test times were adequate for Valve SI-225B to perform its safety function.

- Surveillance Procedure OP-903-118, "Primary Auxiliary Quarterly IST Valve Tests," Revision 6, performed on August 24, 2004. This surveillance verifies that valve stroke test times were acceptable for various valves in the auxiliary component water and component cooling water system.
- Surveillance Procedure OP-903-120, "Primary Auxiliary Quarterly IST Valve Tests," Revision 6, performed on August 24, 2004. This surveillance verifies that valve stroke test times were acceptable for various valves in the main steam system.
- Surveillance Procedure OP-003-035, "Auxiliary Feedwater," Revision 0, performed on September 9, 2004. This surveillance tests the functional capability of the auxiliary feedwater pump.
- Surveillance Procedure OP-903-110, "RAB Fluid Systems Leak Test," Revision 5, performed on September 9, 2004. This surveillance tested for containment sump suction piping external leakage between safety injection Valves SI-602B and -604B.
- System Operating Procedure OP-903-030, "Safety Injection Pump Operability Check," Revision 13, performed on September 22, 2004. This surveillance verifies the functional capability of high-pressure safety injection Pump A.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed Temporary Plant Modification T-04-002, "Temporary Exciter Port Hole Cover." The inspectors reviewed the safety screening, design documents, Updated Final Safety Analysis Report, and applicable Technical Specifications to determine that the temporary modification was consistent with the modification documents, drawings, and procedures. The inspectors walked down accessible portions of the affected equipment. The inspectors reviewed the adequacy of postinstallation tests and test results to confirm that the actual impact of the temporary modification on the permanent system and interfacing systems was adequately verified.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed Entergy's submittals for the performance indicators listed below for the period from the second quarter of 2003 through the second quarter of 2004 to verify the accuracy of the performance indicator data reported during that period. Performance indicator definitions and guidance contained in NEI (Nuclear Energy Institute) 99-02, "Regulatory Assessment Indicator Guideline," Revision 2, was utilized.

Mitigating Systems Cornerstone

- Safety System Functional Failures

Barrier Integrity Cornerstone

- Reactor Coolant System Activity
- Reactor Coolant System Leakage

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Annual Sample Review

a. Inspection Scope

The inspectors assessed implementation of Entergy's corrective action process involving multiple failures of main steam isolation solenoid-operated dump valves.

b. Findings

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for the failure to determine the cause and preclude recurrence of main steam isolation solenoid-operated dump valve failures. This failure affected the primary containment isolation function for the main steam system isolation valves.

Description. The inspectors reviewed Condition Report CR-WF3-2002-0778 pertaining to the failure of main steam isolation Valve MS-124B to close on a Channel A

engineered safety features actuation system closure signal on April 13, 2002. Entergy identified that hydraulic dump solenoid-operated Valve MS ISV0124 B1 failed to open due to an open solenoid coil. Entergy determined the failure's apparent cause was due to aging and fatigue. Upon review, the inspectors noted that solenoid-operated Valve MS ISV0124 B1 was installed 3 years prior to its failure.

The inspectors also noted that the apparent cause did not provide an extent of condition analysis for the solenoid-operated valve failure. Upon questioning, it was discovered that seven similar failures had occurred since 1987 (9/87, 12/87, 10/88, 10/95, 7/96, 10/98, 11/00, and 4/02). The inspectors noted that one failure occurred with as little as 18 months of service time and others had failed after 24 and 36 months of in-service time. The inspectors noted that, prior to the last solenoid valve failure on April 13, 2002, Entergy had changed the replacement frequency from 3 years to approximately 4.5 years. The inspectors noted that this replacement frequency change was performed without an assessment of previous failures. The inspectors also noted that no corrective action program documentation existed for three of the seven valve failures (10/88, 10/95, and 11/00). The inspectors determined that Entergy failed to identify and correct the cause of the solenoid-operated dump valve failures, resulting in multiple failure recurrences.

Analysis. The deficiency associated with this finding was the failure to determine the cause and preclude recurrence of main steam isolation solenoid-operated dump valve failures. The finding was greater than minor because if left uncorrected the finding could become a more significant safety concern. The finding was only of very low safety significance because it did not represent an actual reduction of the atmospheric pressure control function of the reactor containment, it did not result in an actual open pathway affecting the physical integrity of reactor containment, and the main steam isolation valves were inoperable for less time than the allowed Technical Specification outage time. In accordance with NRC Manual Chapter 0609, Appendix A, Attachment 1, this issue was characterized as having very low safety significance (Green).

Enforcement. Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion XVI, states, in part, that "Measures shall be established to assure that conditions adverse to quality, such as failures, are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition." The failure to determine the cause to preclude recurrence of main steam isolation solenoid-operated dump valve failures is a violation of 10 CFR Part 50, Appendix B, Criterion XVI. Because this finding was of very low safety significance and has been entered into Entergy's corrective action program as Condition Reports CR-WF3-2004-2468 and -2519, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-382/0404-03, Failure to Prevent Recurrence of Main Steam Isolation Valve Failures.

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40A3 Event Followup (71153)

(Closed) Licensee Event Report 05000382/2004001-00: Failure to Provide Backup Overcurrent Protection Due to Personnel Error

On January 21, 2004, Entergy determined that two 120 volt electrical ac circuits, each going through separate containment electrical penetrations, did not have in-line backup overcurrent protection. This was determined to be a violation of Technical Specification 3.8.4.1a (see Section 40A7 for details). This issue has been entered into Entergy's corrective action process as Condition Report CR-WF3-2004-0185.

40A5 Other Activities

- .1 Temporary Instruction 2515/154, "Spent Fuel Material Control and Accounting at Nuclear Power Plants"

The inspectors collected the data specified in Phases I and II of the Temporary Instruction. The data was forwarded to the individuals identified in the Temporary Instruction for consolidation and assessment.

- .2 (Closed) URI 05000382/2004002-04: Potential Performance Indicator Error Affecting the Emergency ac Power System Unavailability Criteria

As documented in NRC Inspection Report 05000382/2004-02, Section 40A1, "Performance Indicator Verification," the inspectors required NRC headquarters support to ascertain if Entergy's interpretation of guidance contained in NEI (Nuclear Energy Institute) 99-02 was appropriate related to recording T/2 fault exposure hours. After review, it was determined that Entergy's interpretation of the guidance was acceptable requiring no revision to the emergency ac power performance indicator data.

- .3 Temporary Instruction 2515/159: Review of Generic Letter 89-13: "Service Water System Problems Affecting Safety-Related Equipment"

In accordance with Temporary Instruction 2515/159, this report section is an approved one-time deviation from the NRC's normal report format specified in NRC Inspection Manual Chapter 0612, "Power Reactor Inspection Reports," dated January 14, 2004.

The purpose of this inspection is to help the NRC evaluate licensee activities associated with historical operating experience and NRC generic communications. Generic Letter 89-13 was selected as the focus for Temporary Instruction 2515/159 because service water systems have a dominant role in plant risk profiles and the recommendations made in Generic Letter 89-13 are important to plant safety. The temporary instruction requires the inspectors to verify that licensees continue to properly implement programs and commitments associated with the generic letter. The NRC will

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assess the need for future regulatory actions based on the results of these inspections.

The inspectors evaluated the following five topical areas:

a. The Effectiveness of Generic Letter 89-13 in Communicating Information

Generic Letter 89-13 was clear in communicating information about service water system problems, both in the initial letter and the supplement. Entergy took actions which it officially committed to in its response. Many of Entergy's current programs, however, were driven by more recent experiences, rather than through continued follow-through on the generic letter. Additionally, concerns identified during two NRC engineering inspections (NRC Inspection Reports 50-382/97-25 and 50-382/98-201) provided a continuing awareness of service water issues beyond the initial issuance of the generic letter.

b. Licensee Actions that are Being Implemented for the Five Recommended Actions of Generic Letter 89-13

Recommendation 1: For Open-Cycle Service Water Systems, Implement and Maintain an Ongoing Program of Surveillance and Control Techniques to Significantly Reduce the Incidence of Flow Blockage Problems as a Result of Biofouling

Entergy properly implemented this recommendation. The inspectors reviewed Entergy's response to Generic Letter 89-13 and the operational history of the auxiliary component cooling water system for the past two operating cycles. The inspectors also reviewed the implementation of the periodic inspection program (e.g., Chemical Control Program) and procedures to detect flow blockages from biofouling. The inspectors further reviewed related licensee event reports, condition report forms, maintenance work requests, maintenance procedures, and heat exchanger test results.

Recommendation 2: Implement a Test Program for the Heat Transfer Capability of all Safety-Related Heat Exchangers Cooled by the Service Water System

Entergy continued to properly implement this recommendation. Generic Letter 89-13 recommended thermal performance testing or a maintenance/inspection program to periodically verify heat exchanger operability. Entergy had either performed periodic thermal testing or maintenance/inspection consistent with the generic letter's recommendations. The inspectors selected four heat exchangers for review in validating Entergy's program. The selected heat exchangers included: (1) component cooling water heat exchanger; (2) safeguards pump room cooler; (3) the shutdown cooling heat exchanger; and (4) the essential chillers.

The inspectors reviewed the design basis of the service water system and related heat exchangers. This effort included review of the safety analysis report, safety evaluation

report, drawings, calculations, Technical Specifications, design basis manual, procedures, and training documents of these systems. The inspectors verified that Entergy utilized appropriate acceptance values for fouling and tube plugging and that testing demonstrated design basis capabilities. The inspectors reviewed the applicable calculations to ensure that the thermal performance test acceptance criteria for the heat exchangers were being applied consistently throughout the calculations. Where maintenance and inspection were performed in lieu of testing, the inspectors verified that the activities provided reasonable assurance of heat exchanger operability.

Recommendation 3: Ensure by establishing a routine inspection and maintenance program for open-cycle service water system piping and components that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of the safety-related systems supplied by service water.

The inspectors determined that Entergy had established satisfactory programs (e.g., the chemical control program) for controlling biofouling and corrosion. Entergy had developed adequate maintenance and inspection procedures to ensure that protective coating failure, silting, and biofouling cannot degrade the performance of service water system and related heat exchangers. The inspectors also verified the documented results of Entergy's inspections.

Recommendation 4: Verify that the service water system will perform its intended function in accordance with the design basis for the plant.

Entergy generally continued to meet this recommendation for the service water system. One issue was identified, as documented below, associated with proper accounting of instrument uncertainties during flow balance surveillances.

As noted in response to Recommendations 1, 2 and 3, the inspectors verified that Entergy had performed adequate thermal performance testing and maintenance/inspections to ensure service water operability. In addition, the inspectors verified that the flow balance surveillances ensured adequate flow to all necessary components. The inspectors performed a walkdown of portions of the service water system, including selected heat exchangers, to verify the material condition of the systems. The inspectors observed component lubrication, deficiency tags, and general equipment condition. In review of the design, the inspectors included review of corrective action documents and corrective maintenance and modifications to assure maintenance of the design basis. The inspectors' review included the subsystems utilized to minimize silting and biofouling.

### **Instrument Uncertainties in Flow Balance Testing**

Introduction. The inspectors opened an unresolved item to permit more time to evaluate the acceptability of the auxiliary component cooling water flow balance surveillances.



Entergy did not account for instrument uncertainty explicitly in the surveillance; they stated there is sufficient margin to implicitly account for instrument uncertainty.

Discussion. During review of the flow balance and thermal performance test for the auxiliary component cooling water and component cooling water systems, the inspectors noted that Entergy did not explicitly account for instrument uncertainties in the flow balance of the auxiliary component cooling water system. Entergy informed the inspectors that instrument uncertainties are accounted for during the thermal performance test of the component cooling water heat exchanger, but not specifically accounted for in the flow balance test. Entergy's position is that, since the heat exchanger test includes auxiliary component cooling water flow as one of the parameters and determines the actual design basis performance of the heat exchanger, the heat exchanger performance test provides a prudent accounting for the uncertainties associated with this parameter. The minimum design flow for auxiliary component cooling water is specified as 4500 gallons per minute and it was not clear that this system could meet this minimum design requirement if instrument uncertainty were explicitly accounted for in the flow balance surveillance.

During telephonic calls the week of September 6, 2004, Entergy stated that they would provide additional information that would demonstrate proper accounting of instrument uncertainties, either implicitly or explicitly. This is an unresolved issue pending inspector review of the additional information to verify that adequate thermal performance margin exists to implicitly account for the flow balance uncertainty (URI 05000382/2004004-04).

Analysis. No analysis is required until the inspectors determine the adequacy of Entergy's position.

Enforcement. Enforcement is not appropriate until the issue is resolved.

Recommendation 5: Verify that maintenance practices, operating and emergency procedures, and training that involves the service water system are adequate to ensure that safety-related equipment cooled by the service water system will function as intended and that the operators of this equipment will perform effectively.

Entergy properly implemented this recommendation. The inspectors reviewed Entergy's response to Generic Letter 89-13 and the maintenance history of service water system for the past two operating cycles to determine if recurring equipment problems existed. The inspectors also reviewed the maintenance procedures for technical adequacy. Finally, the inspectors reviewed the auxiliary component cooling water and component cooling water system training program plans, procedures, and training records of maintenance and operations personnel identified as involved with the work and operations of the auxiliary component cooling water and component cooling water systems. The inspectors verified the proper alignment of valves in the systems by review of procedures during the system walkdown.

c. Effective Programmatic Maintenance of the Actions in Response to Generic Letter 89-13

Entergy effectively managed their commitment to their Generic Letter 89-13 program. The inspectors checked program changes and verified that Entergy had notified the NRC of commitment changes, where necessary. In addition, as noted in Item b above, Entergy continued to properly implement their Generic Letter 89-13 program in all areas.

d. As applicable, Noteworthy Service Water System Operational History that Supports Inspection Results

Entergy did not experience significant auxiliary and component cooling water operational problems within the recent history. Historical problems included: (1) in 1994, the Train A component cooling water heat exchanger was degraded, but operable, due to biofouling (deposits and microbiological activity, NOTE: film fouling was not specifically addressed by the generic letter); (2) in 1995, Entergy found degraded flow from the Train B essential chiller, due to iron deposits that settled on the seats of manual throttle valves; (3) in 1996, Entergy identified reduced flow to the emergency chillers due to biofouling (film fouling) in the auxiliary component cooling water system (**a closed system?**); and (4) in 1997, Entergy identified that both trains of auxiliary component cooling water were rendered inoperable because operators failed to properly align system valves.

e. Effectiveness assessment of licensee's program procedure(s) on related service water system operating experience

The inspectors reviewed Entergy's Operating Experience Program and associated procedures. The inspectors reviewed auxiliary and component cooling water related condition reports to ensure that Entergy did not experience plant problems due to known issues already identified by industry operating experience and NRC generic communications. No problems were identified.

.4 (Closed) Unresolved Item (URI) 050000382/2003011-02, Concerns Regarding the Timing of Operator Actions Performed Using the Implementing Procedure for Alternative Shutdown Capability.

Introduction. During the August 29, 2003, triennial fire protection inspection, the team attempted to walk through and time the control room evacuation Procedure OP-901-502 with operators simulating the actions. This effort identified a number of actions, which were not performed within the times specified in the safe shutdown analysis (Calculation EC-F00-026). However, Entergy believed the results of the timed walkthrough had been artificially impacted by the test method and were not representative of operator performance during design-basis conditions. The inspectors

reviewed the process used to assess the implementation of Entergy's procedure for control room evacuation during the original inspection and reviewed Procedure OP-901-502.

Description. This review identified that Waterford Steam Electric Station, Unit 3, procedure was not typical, in that it was reactive to equipment failures and spurious operations. The procedure relied on operators to diagnose spurious operations due to fire damage and then implement applicable procedure steps to mitigate those spurious operations. Operators were permitted significant discretion in deciding what steps to perform or not perform and the order of the steps. As a result, it was difficult to measure operator response, since their actions would be specific to conditions present. A more typical procedure for this purpose would be implemented without diagnosis or discretion, in stepwise order, with each operator performing a discrete part of the procedure in parallel in order to attempt to prevent adverse impact from spurious operations.

The primary issue identified in this unresolved item was that the times to complete some important manual actions measured during the original inspection did not appear to meet the allowable times from Entergy's analysis. While this issue was not resolved in subsequent discussions or documentation provided by Entergy, Entergy stated plans to transition to the more common methods to prevent adverse impact from spurious operations.

Analysis. There was not a safety concern while the inspection of this issue is pending. Entergy enhanced the procedure following the original inspection by re-ordering steps to place the more time-critical steps earlier and to provide additional information for time critical steps. Operators received training on the revised procedure and were reminded of the need for prompt action. After revising the procedure, Entergy validated and timed all actions to ensure that Procedure OP-901-502 was adequate to implement alternative and dedicated shutdown capability within the time requirements of the safe shutdown analysis calculation. The validation provided reasonable assurance that there is not an immediate safety concern.

Enforcement. Because Entergy made changes to the control room evacuation procedure since the time of the original inspection, and operators were trained on the revised procedure, it was not practical to verify the original inspection results. Therefore, Unresolved Item 050000382/2003011-02 is closed. A new unresolved item will be opened to confirm completion of the procedure revision and verify that it is adequate to implement alternative and dedicated shutdown capability. This issue is unresolved for compliance and significance (URI 05000382/2004004-05, Review Procedure Revision and Reperform Control Room Evacuation Walkthrough).

#### 40A6 Meetings

##### Exit Meeting Summaries

- .1 On June 8, 2004, the inspectors presented the results of the fire protection followup inspection to Mr. J. Venable and members of his staff, who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.
- .2 The inspectors presented the inspection results to J. Venable, Vice President, Operations and Station Director, and other members of licensee management on September 3, 2004. Entergy management acknowledged the inspection findings. On September 9, 2004, a telephonic conference call was conducted with the NRC staff and representatives for Entergy to clarify the issues in regard to instrument uncertainties and the opportunity for Entergy to provide additional information for review to support their position.

The inspectors asked Entergy whether any materials examined during the inspection should be considered proprietary. Proprietary information was reviewed by the inspectors and left with Entergy at the end of the inspection.

- .3 The resident inspectors presented the inspection results to Mr. J. Venable, Site Vice-President, and other members of Entergy's management at the conclusion of the inspection on September 27, 2004. Entergy acknowledged the findings presented. The inspectors asked Entergy whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

#### 40A7 Licensee Identified Violations

The following violations of very low safety significance (Green) were identified by Entergy and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as noncited violations.

- Licensee Event Report 05000382/2004001-00 reported that backup overcurrent protection did not exist for position indication circuits for hydrogen analyzer containment isolation valves. This is a violation of Technical Specification 3.8.4.1a. Technical Specification 3.8.4.1a requires, in part, that primary and backup containment penetration conductor overcurrent protective devices associated with each containment electrical penetration circuit be operable. This was identified in Entergy's corrective action program as Condition Report CR-WF3-2004-0185. This finding is of very low safety significance because it does not represent an open pathway in the physical integrity of the reactor containment.

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- 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires that testing be performed to demonstrate that components will perform satisfactorily in service. On November 6, 2004, following adjustments made to safety injection Valve SI-602B, Entergy failed to perform a leak test to identify if the adjustments affected the leak tightness of the valve seat. Subsequently, on September 9, 2004, during leak testing, it was identified that Valve SI-602B exhibited excessive leakage. This deficiency was identified in Entergy's corrective action program as Condition Report CR-WF3-2004-02847. This issue is unresolved for significance determination and the appropriate regulatory characterization (URI 05000382/2004004-06, Review Safety Significance of Safety Injection Valve SI-602B Leakage).

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee Personnel

S. S. Anders, Superintendent, Plant Security  
W. Brian, Director, Engineering  
N. T. Brumfield, Manager, Quality Assurance  
K. Burke, Supervisor, Quality Assurance  
R. A. Dodds, Manager, Plant Licensing Staff  
P. Fresneda, Supervisor, Programs Engineering  
C. Fugate, Assistant Manager, Operations (Shift)  
A. J. Harris, Manager, Engineering Projects  
J. Holman, Manager, Nuclear Engineering  
B. L. Houston, Manager, Radiation Protection  
J. Laque, Manager, Maintenance  
J. J. Lewis, Manager, Emergency Preparedness  
R. Madjerich, Manager, Operations  
T. G. Mitchell, Director, Engineering  
R. J. Murillo, Senior Staff Engineer, Licensing  
R. Osborne, Manager, Programs and Components  
K. J. Peters, Director, Nuclear Safety Assurance/Emergency Preparedness  
R. D. Peters, Manager, Planning and Scheduling/Outage  
G. Pierce, Supervisor, Chemistry  
R. J. Porter, Technical Assistant, Vice President Support  
J. E. Venable, Vice President, Operations  
K. T. Walsh, General Manager, Plant Operations  
A. E. Wemett, Assistant Manager, Operations (Support)

#### NRC

W. B. Jones, Chief, Project Branch E, DRP

### ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

05000382/2004004-01	NCV	Failure to Maintain Adequate Environmental Qualification Records (Section 1R04)
05000382/2004004-02	NCV	Failure to Maintain Design Control of Safety Injection Sump Recirculation Piping (Section 1R04)
05000382/2004004-03	NCV	Failure to Prevent Recurrence of Main Steam Isolation Valve Failures (Section 4OA2)

05000382/2004004-04	URI	Instrument Uncertainties for Auxiliary Component Cooling Water System (Section 4OA5)
05000382/2004004-05	URI	Review Revised Procedure and Re-perform Control Room Evacuation Walkthrough (Section 4OA5)
05000382/2004004-06	URI	Review Safety Significance of Safety Injection Valve SI-602B Leakage (Section 4OA7)

Closed

05000382/2004004-01	NCV	Failure to Maintain Adequate Environmental Qualification Records (Section 1R04)
05000382/2004004-02	NCV	Failure to Maintain Design Control of Safety Injection Sump Suction Piping (Section 1R04)
05000382/2004004-03	NCV	Failure to Prevent Recurrence of Main Steam Isolation Valve Failures (Section 4OA2)
05000382/2004-001-00	LER	Failure to Provide Backup Overcurrent Protection Due to Personnel Error (Section 4OA3)
05000382/2004002-04	URI	Potential Performance Indicator Error Affecting the Emergency ac Power System Unavailability Criteria(Section 4OA5)
05000382/2003011-02	URI	Concerns Regarding the Timing of Operator Actions Performed Using the Implementing Procedure for Alternative Shutdown Capability (Section 4OA5)

**LIST OF DOCUMENTS REVIEWED**

**Section 1R01: Adverse Weather Protection**

Procedure

Operation Procedure 901-521, "Severe Weather and Flooding," Revision 3

Miscellaneous

FSAR Section 3.3, "Wind And Tornado Loadings"

FSAR Section 3.5, "Missile Protection"

Design Basis Document W3-DBD-003, "Emergency Feedwater System," Revision 2-6

W3F1-97-0132, Tornado Missile Protection

Design Basis Document W3-DBD-004, "Auxiliary Component Cooling Water," Revision 3-6  
Regulatory Guide 1.76, "Design Basis Tornado for Nuclear Power Plants"

#### **Section 1R04: Partial System Walkdown**

##### Procedures

Operating Procedure OP-002-001, "Auxiliary Component Cooling Water," Revision 13

Operating Procedure OP-009-001, "Containment Spray," Revision 11

Operating Procedure OP-009-002, "Emergency Diesel Generator," Revision 18

Surveillance Procedure OP-903-068, "Emergency Diesel Generator and Subgroup Relay Operability Verification," Revision 13

##### Condition Report

CR WF3-2004-1044

##### Miscellaneous

Design Basis Document W3-DBD-004, "Auxiliary Component Cooling Water," Revision 3-6

#### **Section 1R05: Fire Protection**

##### Procedures

Maintenance Procedure MM-007-010, "Fire Extinguisher Inspection and Extinguisher Replacement," Revision 13

Administrative Procedure UNT-005-013, "Fire Protection Program," Revision 9

Fire Protection Procedure FP-001-015, "Fire Protection System Impairments," Revision 17

#### **Section 1R06: Flood Protection Measures**

##### Procedure

Procedure OP-903-521, "Severe Weather and Flooding," Revision 3

##### Miscellaneous

FSAR Section 3.3, "Wind And Tornado Loadings"

FSAR Section 3.4, "Water Level Flood Design"



FSAR Section 2.4.2, "Floods"

Calculation MN(Q)-3-5, "Flooding Analysis Outside Containment," Revision 3

NUREG-800, Chapter 3.6.1, Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment

Drawing G-580, "Nuclear Plant Island Structure Flood Wall Penetrations," Revision 2

Information Notice 83-44, "Potential Damage to Redundant Safety Equipment as a Result of Backflow Through the Equipment and Floor Drain System"

#### Condition Reports

CR WF3-2003-1753, CR WF3-2004-1680, and CR WF3-2003-2376

### **Section 1R12: Maintenance Rule Implementation**

#### Procedure

Nuclear Management Manual DC-121, "Maintenance Rule," Revision 1

#### Miscellaneous

Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"

### **Section 1R13: Maintenance Risk Assessments and Emergent Work Evaluation**

#### Procedures

Surveillance Procedure OP-901-501, "PMC or Core Operating Limit Supervisory System Malfunction," Revision 6

Surveillance Procedure OP-903-033, "Cold Shutdown IST Valve Tests," Revision 17

#### Condition Reports

CR WF3-2004-2777, CR WF3-2004-0016, CR WF3-2004-0973, CR WF3-2004-0551, CR WF3-2003-1794, CR WF3-2004-0016, and CR WF3-2004-0955

#### Miscellaneous

Operational Decision Making Instructions Implementation Action Plan, "Waterford 3 Main Transformer Lightning Arrestor Hot Spot," Revision 0

### **Section 1R15: Operability Evaluations**

## Procedure

Operating Procedure OP-009-003, "Emergency Feedwater," Revision 11

## Miscellaneous

Calculation EC-M97-006, "Design Basis for CCW Makeup," Revision A

Calculation EC-M97-006, "Makeup Requirements for CCW Makeup System," Revision 2

## Condition Reports

CR WF3-2004-2547, CR WF3 2004-2539, CR WF3 2003-2452, and CR WF3-2004-1068

## **Section 1R19: Postmaintenance Testing**

### Procedure

Surveillance Procedure OP-903-068, "Emergency Diesel Generator and Subgroup Relay Operability Verification," Revision 13

### Condition Reports

CR WF3-2004-2382, CR WF3-2004-2445, CR WF3-2002-0778, CR WF3-2003-2519, CR WF3-2003-2468, CR WF3-1996-1112, CR WF3-2000-0318, CR WF3-2001-0963, CR WF3-2000-0318, CR WF3-2004-1958, PER-87-112, PER-87-086, CR WF3-2004-2547, CR WF3-2004-2539, CR WF3-2003-0636, CR WF3-2004-2595, CR WF3-2004-2251, and CR WF3-2004-2847

### Miscellaneous

Program Section Procedure CEP-IST-1, "IST Bases Document," Revision 3

Design Bases Document W3-DBD-026, "Containment Isolation and Leak Testing," Revision 0

Design Bases Document W3-DBD-006, "Main Steam System," Revision 2

### Work Orders

435535, 421067, 421425, 414679, 47109, 25725, 50976183, 50976176, 50686648, 50285275, 21594, 00005472, 24499, 50010594, 24498, 1138477, and 15278

## **Section 1R22: Surveillance Testing**

### Procedures

Surveillance Procedure OP-903-121, "Safety Systems Quarterly IST Valve Tests," Revision 5

System Operating Procedure OP-003-035, "Auxiliary Feedwater," Revision 0

Surveillance Procedure OP-903-120, "Primary Auxiliary Quarterly IST Valve Tests," Revision 6

Surveillance Procedure OP-903-118, "Primary Auxiliary Quarterly Valve Tests," Revision 6

Surveillance Procedure OP-903-030, "Safety Injection Pump Operability Check," Revision 13

Surveillance Procedure OP-903-034, "Containment Spray Line Up Verification," Revision 5

Surveillance Procedure OP-903-110, "RAB Fluid System Leak Test," Revision 5

Surveillance Procedure OP-903-035, "Containment Spray Pump Operability Check,"  
Revision 11

#### Condition Report

CR WF3-2004-2613

#### Miscellaneous

Engineering Calculation EC-M98-069, "HPSI System Performance surveillance Requirement Basis," Revision 1

#### Work Orders

50976176, 50285275, 50686648, 50979745, 50969939, 24175, 50976693, and 50973295

### **Section 1R23: Temporary Plant Modifications**

#### Procedure

Administrative Procedure UNT-005-004, "Temporary Alteration Control"

#### Miscellaneous

TA-04-002, "Temporary Exciter Port Hole Cover," Revision 0

### **Section 4OA3: Event Followup**

#### Condition Reports

CR WF3-2004-0185 and CR WF3-2004-0243

### **Section 4OA5: Other Activities**

Calculation EC-F00-026, Safe Shutdown Analysis

OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown, Revision 8,  
Changes 0 through 4

W2.101, Procedure Compliance and Usage, Revision 5 Change 0

W2.109, Procedure Development, Review and Approval, Revision 5, Change 1

Waterford Alternative Shutdown Capability Evaluation

Condition Reports

2003-02440  
2003-02448  
2004-01277  
2004-01737

Updated Final Safety Analysis Report, Waterford Steam Electric Station, Unit 3

NUREG-787, Safety Evaluation Report Related to the Operation of Waterford Steam Electric Station, Unit 3

OP-901-502 Revision 8 Change 4 Timeline Validation, dated 12/8/03

White Paper Responses to Items Identified During Waterford 3 Triennial Fire Protection Inspection Conducted August 11, 2003 through August 29, 2003, dated September 15, 2003

Calculations

MN(Q)9-1, "Shutdown Heat Exchanger U-Value," Revision 0, DRN 03-1231

MN(Q)9-50, "ACCW System Resistance," Revision 1

5-A, "Safeguard Pump Rooms A&B," Revision 4, DRN No. 01-3688

EC-M95-008, "Ultimate Heat Sink Design Basis," Revision 1, DRN No. 03-509

Condition Reports

1999-00778	2004-02623	2002-01203	2002-01969	2004-01958	2003-03298
2004-01920	2004-01601	2002-01876	2002-02068	2004-01404	2003-03123
2004-02703	2004-02711	2002-01898	2004-02138	2004-00928	

Procedures

PE-004-024, "ACCW and CCW System Flow Balance," Revision 2

PE-001-015, "Administrative Procedure - Generic Letter 89-13 Heat Exchanger Test Basis," Revision 3

PE-001-016, "Administrative Procedure - Heat Exchanger Inspection Program," Revision 1

PE-004-033, "Wet Cooling Tower A(B) Thermal Performance Test," Revision 0, Change 1

PE-004-029, "Shutdown Cooling Heat Exchanger B Performance Test," Revision 0, Change 1  
HP-002-201, "Radiological Survey Techniques and Frequencies," Revision 17, Change 2  
PE-004-021, "CCW Heat Exchanger Performance Test," Revision 1, Change 1  
PE-004-024, "ACCW and CCW System Flow Balance," Revision 2  
OP-002-001, "ACCW," Revision 13  
OP-100-014, "Technical Specification and Technical Requirements Compliance," Revision 13  
OP-901-001, "Technical Specifications Surveillance Logs," Revision 26  
OP-901-510, "CCW Malfunction," Revision 4  
OP-903-049, "CCW and ACCW Operability Check," Revision 10  
OP-903-050, "CCW and ACCW Pump And Valve Operability Test," Revision 17  
NQECP-25, "Administration of Piping Inspection for Microbiological Influenced Corrosion (MIC)," Revision 4

#### Maintenance Orders

MAI 419595, "CCW Heat Exchanger A Eddy Current Tests," dated March 31, 2002  
MAI 24785, "Essential Chiller AB Tube Cleaning and Eddy Current Testing," dated April 29, 2003  
MAI 244718, "Essential Chiller A Tube Cleaning and Eddy Current Testing," dated November 5, 2002

#### Heat Exchanger Tests

PE-004-021, "Component Cooling Water Heat Exchanger A Thermal Performance Test," dated April 10, 2000  
PE-004-021, Component Cooling Water Heat Exchanger B Thermal Performance Test," dated December 11, 2001

#### Miscellaneous

Letter W3P90-0207, Louisiana Power & Light letter to NRC regarding Generic Letter 89-13, dated January 29, 1990  
ER-W3-2004-0335-000, "Engineering Evaluation to Determine if Components in the CCW System Are Operable with an Increase in Shutdown Cooling Temperature," Revision 0

Evaluation of Wet Cooling Tower B and CCW Heat Exchanger Test on 12/11/01

Engineering Report W3-ME-00-0002, "Wet Cooling Tower A Thermal Capacity Test 4/10/00," dated April 28, 2000

ER-W3-2001-1125-000, "CCW Monitoring Plan," Revision 0

W3-DBD-04, "ACCW and CCW Design Base Document," Revision 3

ACCW Flow Balance Test Results

Work Order 50973769, Auxiliary Component Cooling Water Pump B IST Data

ACCW Pump B Performance Trend, 11/26/01 and 12/11/01

#### Assessments/Audits

LO-WLO-2001-0001 CA 81, "Heat Exchanger," dated 6/4-6/2002

LO-WLO-2004-0062, "Heat Exchanger and Heat Sink Assessment," dated 4/27-29/2004

#### Modifications

ER-W3-2000-1073-000, "Final Implementation ACCW Jockey Pump Discharge Check Valve ACC-1045A Replacement," Revision 0

ER-W3-2000-1073-001, "Partial Implementation - Replacement of component ACC-1043B," Revision 0

### **LIST OF ACRONYMS**

NRC	Nuclear Regulatory Commission
PDR	Public Document Room
CFR	Code of Federal Regulations