

# Waterford 3

## 3Q/2010 Plant Inspection Findings

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### Initiating Events

**Significance:**  Mar 31, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Control Transient Combustibles (Section 1R05)**

The inspectors identified five examples of a green noncited violation of Waterford Steam Electric Station, Unit 3's license condition 2.C.9 for the failure to perform a transient combustible evaluation prior to introducing transient combustibles into procedurally controlled vital plant areas. Specifically, procedures limit the amount of transient combustibles that may be introduced into the control room ventilation equipment room, the component cooling water Train B heat exchanger room, and the main steam isolation valve Train B roof area. Any amounts greater than the preset procedural limits require a transient combustible evaluation to be performed. In all five cases, this evaluation was not performed prior to introduction of the transient combustibles. This violation has been entered into the licensee's corrective action program as condition reports CR-WF3-2010-0482, CR-WF3-2010-0598, and CR-WF3-2009-4035.

The performance deficiencies associated with this violation were the failure to comply with Waterford Steam Electric Station, Unit 3's license condition 2.C.9. Specifically, the procedural requirements to perform a transient combustible evaluation prior to introducing the transient combustibles into designated fire zones were not performed. Since several of the previously described fire zones fail to meet 10 CFR50, Appendix R train separation requirements, use of Inspection Manual Chapter 0612, Appendix E to screen for minor examples is not appropriate. This condition is greater than minor because, if left uncorrected, it would become a more significant safety concern, since continued introduction of unevaluated transient combustible loading into controlled areas could significantly reduce the ability to achieve a safe shutdown condition, in the event of a fire in that controlled area. The inspectors evaluated the finding using Inspection Manual Chapter 0609, Appendix F, Fire Protection Significance Determination Process, to assess the safety significance. Since the severity of the observed deficiencies was assigned a low degradation rating, it was determined to be of very low risk significance. This finding had a crosscutting aspect in the area of human performance associated with the work practices component in that the licensee failed to utilize appropriate human error prevention techniques by (1) discussing transient combustible controls and expectations during pre-job briefs and (2) effectively utilizing human performance barriers, such as posted door signs [H.4(a)].

Inspection Report# : [2010002](#) (*pdf*)

**Significance:**  Dec 31, 2009

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

#### **Failure to Update Drawings after Design Change**

A self-revealing Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, was identified for the licensee's failure to prescribe an activity affecting quality by documented instructions, procedures, or drawings appropriate to the circumstance. Specifically, for all reactor coolant pump heat exchanger to pump cover bolted connection gasket replacements between the refueling outage of 1986 (RF-1) and the refueling outage of 2009 (RF-16), the licensee prescribed the wrong gasket material, gasket size, and fastener preload because they had failed to incorporate a design change implemented during RF-1 into their instructions, procedures, or drawings. Station modification package SMP-1427, an engineering change implemented during RF-1 in response to industry operating experience, called for a thicker gasket, different gasket material, and an increased bolt preload in order to increase gasket compression and reduce the probability of leakage. As a consequence of failing to incorporate SMP-1427 changes into procedures, all heat exchanger gasket replacements since RF-1, four gasket replacements in total, have utilized thinner gaskets with less than the vendor recommended compression. The licensee documented this condition in CR-WF3-2009-5501.

The licensee's failure to prescribe appropriate gasket replacement requirements is more than minor because it is associated with the equipment performance attribute of the initiating events cornerstone and affects the cornerstone objective to limit the likelihood of those events that upset plant stability. The finding has very low safety significance because, although the finding contributes to the likelihood of a reactor trip, mitigation equipment is still available. This finding had a crosscutting aspect in the area of problem identification and resolution associated with operating experience in that the licensee did not institutionalize operating experience through changes to the station procedures [P.2(b)].

Inspection Report# : [2009005](#) (pdf)

**Significance:**  Dec 31, 2009

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **Reactor Coolant Pump Vapor Seal Leakage**

A self-revealing Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, was identified for the licensee's failure to promptly correct a condition adverse to quality. Specifically, the licensee did not promptly correct reactor coolant pump vapor seal leakage that resulted in boric acid accumulation on the component cooling water heat exchanger and cover areas of three reactor coolant pumps. Corrective actions for this condition were implemented during refuel outage 15, but these corrective actions failed to correct the condition and the vapor seal leakage continued through operating cycle 16. This resulted in some additional boric acid corrosion and degradation to reactor coolant pump covers and carbon steel component cooling water flanges. The licensee implemented a design modification to correct the condition and documented the condition in CR-WF3-2009-5501.

The licensee's failure to promptly correct a condition adverse to quality is more than minor because it is associated with the equipment performance attribute of the initiating events cornerstone and affects the cornerstone objective to limit the likelihood of those events that upset plant stability. The finding has very low safety significance because, although the finding contributes to the likelihood of a reactor trip, mitigation equipment was still available. This finding had a crosscutting aspect in area of human performance associated with work control in that the licensee did not effectively plan for the resources necessary to implement the post maintenance testing associated with the corrective actions implemented during refuel outage 15, and therefore failed to discover that those corrective actions were inadequate to correct the condition[H.3(a)].

Inspection Report# : [2009005](#) (pdf)

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## **Mitigating Systems**

**Significance:**  May 28, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Prevent Repetitive Voiding in the Low Pressure Safety Injection System**

The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the failure to preclude repetition of a significant condition adverse to quality. Specifically, licensee corrective actions to prevent recurrence of voiding in the low pressure safety injection system were not sufficient to prevent nitrogen voids from challenging system operability. This violation was entered into the licensee's corrective action program as CR WF3 2010 3050.

The finding is more than minor because, if left uncorrected, the finding would have the potential to become a more significant safety concern (i.e., continued challenges to system operability). Using Manual Chapter 0609.04, "Phase 1 – Initial screening and Characterization of Findings," the issue screened as having very low safety significance because it: (1) was not a design or qualification deficiency; (2) did not represent a loss of safety function; (3) did not represent an actual loss of a single train of equipment for more than its technical specification allowed outage time; (4) did not represent a loss of risk significant non-technical specification equipment; and (5) did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding had a crosscutting aspect in

the corrective action component of the problem identification and resolution area in that the licensee failed to thoroughly evaluate the problem, such that the resolutions addressed the cause [P.1(c)]. As a result, the resolutions failed to prevent recurrence of the problem (Section 40A2.5a).

Inspection Report# : [2010006](#) (pdf)

**Significance:**  May 28, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Non-conservative Technical Specification 3.7.5 Action Statement**

The team identified a non-cited violation of 10 CFR 50.36 (b), “Technical Specifications,” for failure to derive technical specifications from the analyses and evaluation included in the safety analysis report. Specifically, the licensee failed to derive an action statement for Technical Specification 3.7.5 that meets the assumptions included in the Waterford Unit 3 Updated Safety Analysis Report. The Updated Safety Analysis Report evaluation assumes an instantaneous levee failure occurs at a Mississippi River level of +27 feet mean sea level. The inspectors determined that the action statement for Technical Specification 3.7.5, to complete procedures to secure doors and penetrations in 12 hours, was not derived from the evaluation included in the safety analysis report because the actions would take place after the assumed instantaneous levee failure. The licensee entered this condition into the corrective action program as CR WF3 2010 03232. As a short term compensatory measure, the licensee established criteria for taking appropriate action before the Mississippi River level would reach the +27 feet mean sea level safety limit.

The finding is more than minor because, if left uncorrected the performance deficiency would have the potential to lead to a more significant safety concern. In addition, the performance deficiency adversely affects the Mitigating Systems Cornerstone attribute of external events to ensure the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, “Phase 1 – Initial screening and Characterization of Findings,” the finding was of very low safety significance (Green) because it was a nonconforming condition that did not result in complete unavailability of the equipment (Section 40A2.5b).

Inspection Report# : [2010006](#) (pdf)

**Significance:**  May 28, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Correct Multiple Conditions Adverse to Quality**

The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” for the failure to ensure that conditions adverse to quality are promptly corrected. Specifically, multiple examples of boric acid leaks were identified in the corrective action program where corrective actions had not yet been taken or had been ineffective. At least ten of these active boric acid leaks are five to seven years old.

The failure to promptly correct boric acid leaks is a performance deficiency. The finding is more than minor because, if left uncorrected, the finding could become a more significant safety concern (i.e., potential for damage to carbon steel components or inhibiting the safety-function of others). Using Manual Chapter 0609.04, “Phase 1 – Initial screening and Characterization of Findings,” the issue screened as having very low safety significance because it: (1) was not a design or qualification deficiency; (2) did not represent a loss of safety function; (3) did not represent an actual loss of a single train of equipment for more than its technical specification allowed outage time; (4) did not represent a loss of risk significant non-technical specification equipment; and (5) did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding had a crosscutting aspect in the problem identification and resolution, corrective action component [P.1(d)] in that the licensee failed to effectively correct identified boric acid leaks in a timely manner (Section 40A2.5c).

Inspection Report# : [2010006](#) (pdf)

**Significance:**  Mar 04, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Conduct Timely Corrective Actions to Replace Faulty Relays**

A self-revealing NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," occurred because Entergy did not conduct timely corrective actions to preclude repetition of a significant condition adverse to quality that involved Tyco relay replacements. Specifically, Entergy extended the due date of corrective actions to preclude repetition of suspected faulty relays without an adequate justification. As a result, this led to additional relay failures that challenged the reliability of risk significance safety systems. Entergy entered this issue into their corrective action program for resolution as condition reports CR-WF3-2010-1330 and CR-WF3-2010-4199. The immediate corrective actions after the additional failures included initiating work requests to replace the faulty relays. The planned corrective actions included an evaluation of the effectiveness and timeliness of the Tyco replacement project.

The finding is more than minor because it is associated with the equipment performance attribute of the Mitigating System cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, Entergy did not provide an adequate justification to extend corrective actions beyond its original due date such that it could not affect the availability, reliability, and capability of risk significance safety systems. The inspectors determined that the finding is of very low safety significance (Green) because it is not a design or qualification deficiency, did not represent a loss of a safety function of a system or a single train greater than it Technical Specification allowed outage time, and did not screen as potentially risk significant due to external events. The finding has a cross-cutting aspect in the corrective action component of problem identification and resolution area because Entergy did not take appropriate corrective actions to address safety issues in a timely manner, commensurate with their safety significance and complexity [P.1.d] (Section 4OA2).

Inspection Report# : [2010003](#) (pdf)

**Significance:**  Oct 19, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to identify an adverse trend in failures of time-delay relays**

The team identified a violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because the licensee failed to perform a root cause analysis and implement corrective actions to prevent repetition of a significant condition adverse to quality. Specifically, multiple failures of Agastat E7024PB relays that were installed in or designated for safety-related applications constituted a significant condition adverse to quality. The evaluations for the individual relay failures were narrow and did not identify the adverse trend until eight relays had failed in service and seven had failed pre-installation bench tests over a two-year period. The failure of these relays would prevent auto-starting of critical equipment during a loss of offsite power, potentially creating a substantial safety hazard.

The failure of the licensee to recognize that the adverse trend in failures of Agastat E7024PB relays constituted a significant condition adverse to quality, to perform a root cause evaluation, and to initiate corrective actions to prevent recurrence is a performance deficiency. This performance deficiency is more than minor because it is associated with the mitigating systems cornerstone attribute of equipment performance because it affects the availability and reliability of systems which respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the performance deficiency was determined to require a Phase 2 analysis because of the potential for a loss of safety system function. A Phase 2/Phase 3 Significance Determination was performed by an NRC Senior Reactor Analyst. Based on a bounding analysis, the analyst quantitatively determined that the actual change in core damage frequency (?CDF) due to the increased failure rate of Agastat E7024PB relays would be less than 4.0E-7/year. Therefore, this performance deficiency was determined to be of very low safety significance (Green).

This performance deficiency was determined to have a Problem Identification and Resolution cross-cutting aspect in the Corrective Action Program component because the licensee failed to periodically trend and assess information from the Corrective Action Program and other assessments in the aggregate to identify programmatic and common cause problems.

Inspection Report# : [2009010](#) (pdf)

**Significance:** G Oct 19, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

**Inappropriate extension of qualified service life of Agastat relays**

The team identified a violation of 10 CFR 50, Appendix B, Criterion III, “Design Control,” which occurred when the licensee inappropriately extended the service life of 322 safety-related Tyco/Agastat series E7000 time-delay relays without having an adequate technical basis. Specifically, the licensee’s engineering justification for extending the qualified life beyond the manufacturer-recommended ten years considered only degradation due to thermal aging; it failed to consider other known modes of degradation in accordance with applicable industry standards. Further, the team identified that a performance monitoring program intended to assess any increased failure rate due to this change was inappropriately canceled.

The failure of the licensee to perform a complete analysis of aging effects as required by industry standards in extending the qualified life of safety-related Agastat E7000-series relays is a performance deficiency. This performance deficiency is more than minor because it is associated with the mitigating systems cornerstone attribute of design control because it affects the availability and reliability of systems which respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609.04, “Phase 1 – Initial Screening and Characterization of Findings,” this performance deficiency was determined to be of very low safety significance (Green) because it is a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, only one of the identified relay failures had occurred beyond the recommended 10-year service life; this failure did not result in the failure of multiple redundant trains of safety-related equipment. This finding was determined not to have a cross-cutting aspect because it is not indicative of current licensee performance.

Inspection Report# : [2009010](#) (*pdf*)

**Significance:** G Oct 07, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to follow technical specification requirements for Reactor Protective Instrumentation.**

The inspectors identified a Green non-cited violation of technical specification 3.3.1, Reactor Protective Instrumentation. The technical specifications require all four channels (A, B, C, and D) of local power density, departure from nucleate boiling ratio, and reactor coolant flow instruments to be operable when in Mode 1. These Channel B instruments require an input from the Channel B log power instrument, which was previously declared inoperable. With the Channel B log power instrument inoperable, the Channel B local power density, departure from nucleate boiling ratio, and reactor coolant flow instruments should also have been declared inoperable. The licensee entered this finding in their corrective action program as condition reports CR WF3-2009-4401 and CR-WF3-2009-4407.

The failure to either trip or bypass the inoperable channels within one hour was more than minor because it affected the configuration control attribute of the mitigating systems cornerstone. Specifically, deliberate operator action was required to ensure that proper reactor protection system coincidence and reliability were maintained. Also, if left uncorrected, the potential existed for reactor protective trips to be inadvertently removed while at power. The failure to meet the technical specifications was considered to be of very low safety significance (Green), since there was no actual loss of safety function. This finding has a cross-cutting aspect in the decision-making component of the human performance area because the licensee failed to verify the validity of underlying assumptions and identify unintended consequences of failing to comply with technical specification 3.3.1 by declaring the log power Channel B inoperable and not placing DNBR, LPD, and reactor coolant flow channels in either bypass or trip condition (H.1.b). (Section 1R15)

Inspection Report# : [2009004](#) (*pdf*)

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## Emergency Preparedness

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## Occupational Radiation Safety

**Significance:**  Dec 31, 2009

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **Failure to follow radiation protection procedural requirements**

The inspectors reviewed a self-revealing, noncited violation of Technical Specification 6.8.1 which resulted from a worker failing to follow radiation protection procedures. A contract radiation worker went to work near steam generator 1 rather than the area for which he/she was briefed and received multiple electronic dosimeter dose rate alarms, but did not leave the area until receiving a continuous dose alarm. In response, the licensee investigated the occurrence and restricted the individual's access. Additional actions were being evaluated. This issue was entered into the licensee's corrective action program as Condition Reports CR WF3-2009-05648 and CR WF3-2009-06852.

This finding is greater than minor because it involved the program attribute of exposure control and affected the cornerstone objective in that the failure of the worker to follow procedural guidance resulted in the worker being unknowledgeable to the dose rates in all areas entered. The inspectors used the Occupational Radiation Safety Significance Determination Process and determined the finding had very low safety significance because it was not: (1) an as low as reasonably achievable (ALARA) finding, (2) an overexposure, (3) a substantial potential for overexposure, or (4) an inability to assess dose. The finding had a crosscutting aspect in the area of human performance, work practices component, because the worker failed to use human error prevention techniques such as self and peer checking [H.4(a)].

Inspection Report# : [2009005](#) (*pdf*)

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## Public Radiation Safety

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### Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## Miscellaneous

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