



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

July 12, 2010

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

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3—NRC PROBLEM
IDENTIFICATION AND RESOLUTION INSPECTION
REPORT 05000382/2010006

Dear Mr. Kowalewski:

On May 28, 2010, the U. S. Nuclear Regulatory Commission completed a team inspection at Waterford Steam Electric Station, Unit 3. The enclosed report documents the inspection findings, which were discussed on May 28, 2010, with Mr. Charles Amone, General Manager, Plant Operations, and other members of your staff.

The inspection examined activities conducted under your license as they relate to identification and resolution of problems, safety and compliance with the Commission's rules and regulations and with the conditions of your operating license. The team reviewed selected procedures and records, observed activities, and interviewed personnel. The team also interviewed a representative sample of personnel regarding the condition of your safety conscious work environment.

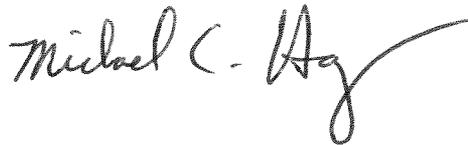
This report documents three NRC-identified violations of very low safety significance (Green). All of these findings were determined to involve violations of NRC requirements. However, because of the very low safety significance of the violations and because they were entered into your corrective action program, the NRC is treating these violations as noncited violations consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest these noncited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 612 E. Lamar Blvd., Suite 400, Arlington, Texas, 76011-4125; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington DC 20555-0001; and the NRC Resident Inspector at Waterford. In addition, if you disagree with the crosscutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV, and the NRC Resident Inspector at Waterford.

Entergy Operations, Inc.

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

Sincerely,

A handwritten signature in black ink that reads "Michael C. Hay". The signature is written in a cursive style with a long, sweeping tail on the letter "y".

Michael C. Hay, Chief
Technical Support Branch
Division of Reactor Safety

Dockets: 50-382
Licenses: NPF-38

Enclosures: Inspection Report 05000382/2010006
Attachment 1, Supplemental Information
Attachment 2, Initial Information Request

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 05000382
License: NPF-38
Report: 05000382/2010006
Licensee: Entergy Operations, Inc
Facility: Waterford Steam Electric Station, Unit 3
Location: Hwy. 18
Killona, Louisiana

Dates: May 10 through May 28, 2010
Team Leader: L. Willoughby, Senior Resident Inspector
Inspectors: H. Freeman, Senior Reactor Engineer
S. Garchow, Senior Operations Engineer
G. George, Reactor Inspector
D. Overland, Resident Inspector

Approved By: Michael C. Hay, Chief
Technical Support Branch
Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000382/2010006; November 1, 2008, – May 28, 2010; Waterford Steam Electric Station, Unit 3 Biennial Baseline Inspection of the Identification and Resolution of Problems

The team inspection was performed by a Senior Resident Inspector, a Senior Reactor Engineer, a Senior Operations Engineer, a Reactor Inspector, and a Resident Inspector. Three noncited violations of significance were identified during this inspection. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process". Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG 1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Identification and Resolution of Problems

The team reviewed approximately 600 condition reports, work orders, engineering evaluations, root and apparent cause evaluations, and other supporting documentation to determine if problems were being properly identified, characterized, and entered into the corrective action program for evaluation and resolution. The team reviewed a sample of system health reports, self-assessments, trending reports and metrics, and various other documents related to the corrective action program. Overall the team found the licensee's corrective action program as being effective. Management encourages personnel to identify abnormal conditions and document them in the corrective action program so that they may be addressed. The team found that the licensee consistently applied prioritization in areas affecting power generation; however, there were inconsistencies identified in other areas.

The licensee appropriately evaluated industry operating experience for relevance to the facility and had entered applicable items in the corrective action program. The licensee used industry operating experience when performing root cause and apparent cause evaluations. The licensee performed effective quality assurance audits and self-assessments, as demonstrated by self-identification of corrective action program areas for improvement.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a noncited 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).

- Green. The team identified a noncited 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).

- Green. The team identified a noncited 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 4OA2.5c).

B. Licensee-Identified Violations

None.

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution (71152)

The team based the following conclusions on the sample of corrective action documents that were initiated in the assessment period, which ranged from November 1, 2008, through the end of the on-site portion of the inspection on May 28, 2010.

.1 **Assessment of the Corrective Action Program Effectiveness**

a. Inspection Scope

The team reviewed several hundred condition reports, including associated root cause, apparent cause, and direct cause evaluations, from approximately twelve thousand condition reports that had been issued between November 1, 2008, and May 28, 2010, to determine if problems were being properly identified, characterized, and entered into the corrective action program for evaluation and resolution. The team reviewed a sample of system health reports, operability determinations, self-assessments, trending reports and metrics, and various other documents related to the corrective action program. The team evaluated the licensee's efforts in establishing the scope of problems by reviewing selected logs, work requests, self-assessments results, audits, system health reports, action plans, and results from surveillance tests and preventive maintenance tasks. The team reviewed work requests and attended the licensee's daily corrective action review board and the management review committee meetings to assess the reporting threshold, prioritization efforts, and significance determination process, as well as observing the interfaces with the operability assessment and work control processes when applicable. The team's review included verifying that the licensee considered the full extent of cause and extent of condition for problems, as well as how the licensee assessed generic implications and previous occurrences. The team assessed the timeliness and effectiveness of completed or planned corrective actions, and looked for additional examples of similar problems. The team conducted interviews with plant personnel to identify other processes that may exist where problems may be identified and addressed outside the corrective action program.

The team also reviewed corrective action documents that addressed past NRC-identified violations to ensure that the corrective actions addressed the issues as described in the inspection reports. The inspectors reviewed a sample of corrective actions closed to other corrective action documents to ensure that corrective actions were still appropriate and timely.

The team considered risk insights from both the NRC's and Waterford's risk assessments to focus the sample selection and plant tours on risk significant systems and components. The team selected the following risk significant systems: emergency diesel generator and low pressure safety injection. The samples reviewed by the team

focused on, but were not limited to, these systems. The team also expanded their review to include five years of evaluations involving these systems to determine whether problems were being effectively addressed. The team conducted a walkdown of these systems to assess whether problems were identified and entered into the corrective action program.

b.. Assessments

1. Assessment - Effectiveness of Problem Identification

The team concluded that the licensee documented approximately 95 percent of deficiencies as conditions adverse to quality and entered them into the corrective action program in accordance with the corrective action program guidance and NRC requirements. The team determined that the licensee was identifying problems at a low threshold and was entering them into the corrective action program. The team did not identify any conditions adverse to quality that were not placed in the corrective action program. The licensee had written approximately 12,000 condition reports during the two year review period.

2. Assessment - Effectiveness of Prioritization and Evaluation of Issues

The licensee did not have weaknesses when performing and/or documenting evaluations of conditions adverse to quality during this assessment period. The team reviewed approximately 50 that involved operability reviews to assess the quality, timeliness, and prioritization of operability assessments. The team noted that the immediate and prompt operability assessments reviewed were completed in a timely manner. The team found that the licensee consistently applied prioritization in areas affecting power generation; however, there were inconsistencies identified in other areas. For example, the team found that the licensee had allowed various deficiencies and degradations of the fire protection systems to accumulate over the years. The team concluded that any singular deficiency would not impact the operation of the systems but that the totality of the deficiencies may have operational or maintenance impacts. As with other issues that did not affect power generation, the licensee appeared to apply the prioritization process more rigorously once interest was expressed in this area.

3. Assessment – Effectiveness of Corrective Action Program

Overall, the team concluded that the licensee did develop appropriate corrective actions to address problems. However, the team noted that four violations were identified over the assessment period associated with inadequate corrective actions indicating an area which may need focused attention. These included:

- A violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," that had been issued 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 (05000382/2009010-02).

- A violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Actions," that had been issued because the licensee failed to identify the cause for a significant condition adverse to quality. The train B 125 Vdc battery bank failed to pass a technical specification surveillance requirement discharge test during a Spring 2008 outage. The root cause procedure required that the licensee sequester the battery in a controlled area so that vital information related to the failure could be obtained. However, the licensee disposed of the battery instead (05000382/2009003-03).
- A violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," that had been issued because the licensee failed to implement instructions that were intended to help troubleshoot a defective 125 Vdc battery cell. In response to the degraded cell, the licensee had established additional measures to monitor the cell following charging to ensure proper cell operation. However, the licensee did not perform the monitoring (05000382/2009002-02).
- A violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," 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 Refueling Outage 15, but these corrective actions failed to correct the condition and the vapor seal leakage continued through operating Cycle 16 (05000382/2009005-02).

.2 Assessment of the Use of Operating Experience

a. Inspection Scope

The team examined the licensee's program for reviewing industry operating experience, including reviewing the governing procedure and self assessments. Operating experience notifications that had been issued during the assessment period were reviewed to assess whether the licensee had appropriately evaluated the notification for relevance to the facility. The team then examined whether the licensee had entered those items into their corrective action program and assigned actions to address the issues. The team reviewed a sample of root cause evaluations and corrective action documents to verify if the licensee had appropriately included industry operating experience.

b. Assessment

Overall, the team determined that the licensee was adequately evaluating industry operating experience for relevance to the facility. The licensee has entered applicable items in the corrective action program in accordance with station procedures. Both

internal and external operating experience was being incorporated into lessons learned for training and pre-job briefs. However, the team noted that two violations were identified over the assessment period associated with operating experience. These included:

- A violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was issued because the licensee did not account for reduction of flow from the emergency feedwater system and establishing the acceptance criteria for the performance of the motor-driven emergency feedwater pumps when analyzing the flow rate to the steam generators. The licensee had received NRC Information Notice 2008-02, which specifically identified the diesel under-frequency as a potential problem for ac motor-operated pumps, and test acceptance criteria concerns which would have ensured the capability of the equipment to perform its function under the most limiting conditions. The licensee failed to identify the applicability of these potential problems to the emergency feedwater motor-operated pumps and take appropriate actions (05000382/2009009-04).
- A 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 (Refueling Outage 1) and the refueling outage of 2009 (Refueling Outage 16), the licensee procured the wrong gasket material, gasket size, and fastener preload because they had failed to incorporate a design change implemented during Refueling Outage 1 into their instructions, procedures, or drawings (05000382/2009005-03).

.3 Assessment of Self-Assessments and Audits

a. Inspection Scope

The team reviewed a sample size of three licensee self-assessments, surveillances, and audits to assess whether the licensee was regularly identifying performance trends and effectively addressing them. The team reviewed audit reports to assess the effectiveness of assessments in specific areas. The team evaluated the use of self- and third party assessments, the role of the quality assurance department, and the role of the performance improvement group related to licensee performance. The specific self-assessment documents reviewed are listed in the attachment.

b. Assessment

The team concluded that the licensee has an adequate self-assessment process. However, based upon the number of findings issued over the assessment period, the team concluded that increased attention was warranted related to the quality of self-assessments. The examples include:

- A violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," with three examples.

Example 1: The licensee did not use the correct size emergency feedwater system suction piping in calculation MNQ10-12, "Net Positive Suction Head Available for Emergency Feedwater Pumps." The motor-driven pump suction piping is 4 inches in diameter but the licensee nonconservatively used 6-inch piping in the calculations.

Example 2: Calculation ECM91-001, Revision 3, "Emergency Diesel Generator Fuel Oil Transfer Pump Recirculation and Discharge Flow," arbitrarily assumed that the suction strainer of the fuel oil transfer pump would only be 10 percent clogged. The licensee could not justify the 10 percent clogging assumption or find any justification for selecting the 10 percent value. Also, there is no discussion or any physical comparison to ensure that the mesh of the installed "Leslie" strainer was the same as that of the "Hayward" strainer identified in an attachment to the calculation.

Example 3: Calculation EC-101-003, Revision 0, "IST Instrumentation Uncertainties," determines the adequacy of permanent plant instrumentation for inservice testing use. The calculation determined that some specific instruments shall not be used for inservice testing applications. Contrary to the calculation requirements, Procedure OP 903 014, used for the comprehensive test of the emergency feedwater pumps, specified that the forbidden flow instruments shall be used for verification of emergency feedwater system flow rate.

The licensee had conducted a Waterford 3 Component Design Basis Assessment, April 20-23, 2009, that included the emergency feedwater turbine-driven pump and the emergency diesel generator fuel oil transfer pump in the "Scope of Components to be Reviewed During CDBI Assessment," and failed to identify any of these three issues (050382/2009009-02).

- A violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for failure to analyze the effects of the acceptable back leakage of 25 gallons per minute from the emergency feedwater pump discharge check valves on the integrity of the emergency feedwater pumps and the integrity of its suction piping. The acceptable back leakage could possibly cause the pump to reverse rotate, and provide a path for high pressure fluid to go through the pump and pressurize low pressure suction piping. The licensee had conducted a Waterford 3 Component Design Basis Assessment, on April 20 - 23, 2009, that included the emergency feedwater AB turbine-driven pump in the "Scope of Components to be Reviewed During CDBI Assessment," and failed to identify the impact of reverse flow on the integrity of the pump and its suction piping (05000382/2009009-04).
- A violation of License Condition 2.C.9 for failure to identify conditions adverse to the fire protection program. Specifically, during required inspections of the

material condition of the sprinkler system, the licensee failed to identify several instances of either bent or misaligned sprinkler head deflector plates, which were not protected as required (05000382/2009006-01).

.4 Assessment of Safety-Conscious Work Environment

a. Inspection Scope

The inspection team conducted individual interviews with 17 individuals. The individuals represented various functional organizations and ranged across contractor, staff, and supervisor levels. The team conducted these interviews to assess whether conditions existed that would challenge the establishment of a safety conscious work environment at Waterford 3.

b. Assessment

The team concluded that the licensee is maintaining a safety conscious work environment. This conclusion was based on interviews of personnel at all levels of the organization. During interactions with licensee personnel, the team queried the personnel in the safety conscious work environment area. The queries revealed that personnel were willing to raise issues, not just nuclear safety issues, up the chain of command. Sometimes they would raise an issue to the Employee Concerns Program coordinator. The team inquired about raising issues to the NRC and determined that employees would not hesitate in raising an issue to the NRC. The team also concluded that the licensee personnel would utilize this route after the other means of raising an issue were exhausted.

The Employee Concerns Program (ECP) coordinator is active in providing another route for employees to raise issues up to management's attention. The coordinator frequently roams the facility to make contact with employees in their work environment. This practice appears effective in that employees know the coordinator and feel comfortable in talking to her. The ECP coordinator does not limit issues raised by employees to just nuclear or nuclear related issues, but also assists in obtaining an answer to any employee issue. For example, if an employee had a Human Resource issue, the coordinator would either provide the name of an individual who the employee could speak to about their issue or would introduce the two parties directly. Another example involved a maintenance supervisor who put out instructions to his crew that seemed incorrect. Since the supervisor was new, employees did not feel comfortable trying to clarify the instructions. An employee raised this to the ECP coordinator and the coordinator then discussed the issue with the supervisor. The ECP coordinator determined the crew misunderstood the instructions so the supervisor clarified the instructions at the next crew meeting.

.5 Specific Issues Identified During This Inspection

a. Failure to Prevent Repetitive Voiding in the Low Pressure Safety Injection System

Introduction. The inspectors identified a Green noncited 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, the 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.

Description. In 1996, in Condition Report CR-WF3-1996-1965, the licensee identified nitrogen voiding in the low pressure safety injection (LPSI) system. This condition was determined to be a significant condition adverse to quality. The root cause analysis concluded that the voiding was due to leakage of nitrogen entrained water past LPSI header to reactor coolant loop 2B inside containment check valve SI-142A.

In 2001, in CR-WF3-2001-1295, the licensee again identified nitrogen voiding in the LPSI system. During this occurrence, the voiding caused the LPSI pump A to become air bound and inoperable. The root cause analysis again determined the source of the voiding to be continuing leakage past valve SI-142A, as well as the LPSI header to reactor coolant loop 2B flow control valve SI-138A. This condition was also determined to be a significant condition adverse to quality. Corrective actions to prevent repetition (CAPRs) included replacing both valves SI-142A and SI-138A.

In 2007, in CR-WF3-2007-4096, the licensee again identified nitrogen voiding in the LPSI system. This condition was considered a condition adverse to quality and an apparent cause evaluation determined the source of the voiding to be continuing leakage past SI-138A. The reason for the leakage past SI-138A was listed as indeterminate. It should be noted that the causal determination also specifically concluded that "seating force is not affecting seat leakage." The CAPRs were to rework SI-142A and SI-138A during Refueling Outage RF15. Valve SI-142A was reworked during the outage (nothing was found to be wrong with the valve), however, SI-138A was deleted from the work scope and no work was performed on the valve.

In 2009, in CR-WF3-2009-4155, the licensee again identified nitrogen voiding in the LPSI system. This condition report was a roll-up condition report that documents an adverse trend detailing 40 occasions where a void was discovered in the LPSI system during the current fuel cycle. On at least one such occasion, the voiding caused the LPSI system to be declared inoperable. The root cause analysis again determined the source of the voiding to be leakage past SI-138A. This condition was also determined to be a SCAQ. The CAPR was to rework SI-138A. When this valve was finally reworked, no problems were found. A subsequent corrective action (per vendor recommendation) was to increase seating force for SI-138A. It is worth noting that a low seating force is still not listed in the root cause analysis as the root cause for leakage past SI-138A, and the increase in seating force is still not identified as a CAPR in the root cause analysis.

Over the last 14 years, the licensee has experienced many occurrences of voiding in the LPSI system. On more than one occasion, this voiding has rendered the LPSI system

inoperable. Four causal determinations have identified the source of the voiding (leakage past valves SI-142A and SI-138A), but have failed to identify why leakage past these valves continued to occur, despite valve replacement and rework activities. Subsequently, corrective actions have failed to prevent repetition.

Analysis. Failure to preclude repetition of a significant condition adverse to quality is a performance deficiency. 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 has 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.

Enforcement. Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion XVI, "Corrective Action," states in part that for significant conditions adverse to quality "measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition." Contrary to the above, the licensee failed to assure that the cause of the condition was determined and corrective actions taken to preclude repetition. Specifically, on several occasions, the cause of the leakage past SI-138A (and subsequent system voiding) was not adequately determined and the corrective actions taken (replacing and reworking the valve) failed to preclude repetition. This violation of Appendix B, Criterion XVI, is being treated as an NRC-identified noncited violation, consistent with Section VI.A of the Enforcement Policy: NCV 05000382/2010006-01, "Failure to Prevent Repetitive Voiding in the Low Pressure Safety Injection System." This violation was entered into the licensee's corrective action program as CR-WF3- 2010-3050.

b. Nonconservative Technical Specification 3.7.5 Action Statement

Introduction. The team identified a Green, noncited violation of 10 CFR 50.36(b), "Technical Specifications," for failure to derive technical specifications from the analyses and evaluation included in the Updated 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.

Description. The inspectors reviewed updated safety analysis report Section 2.4, "Hydrologic Engineering," and Technical Specification 3.7.5, "Flood Protection," to determine the design basis flood protection for Waterford 3 safety related equipment and facilities.

The Waterford 3 nuclear plant island structure is built to withstand flood elevations up to 30 feet mean sea level. At Waterford 3, there are eight watertight access doors and numerous penetrations below 30 feet mean sea level that are sealed or secured when an external flood impacts the facility.

Updated Safety Analysis Report, Section 2.4.3.7, "PMF- Induced Levee Failure," provides the design basis for a probable maximum flood induced levee failure due to heavy rainfall and high river levels on the Mississippi River. When describing the levee failure, Section 2.4.3.7 states: "The levee is assumed to fail completely and instantaneously, and the length of the breach is sufficiently great that spreading effects are negligible at the center of the flow, in which the NPIS [nuclear plant island structure] is located. Instantaneous levee failure is hypothesized to occur as a result of either piping or toe erosion which undermines the embankment." In addition, Section 2.4.3.7 states, "A river stage of 27.0 ft. MSL [mean sea level] has previously been established as a reasonably conservative design basis for levee failure." Based on the evaluation provided in the Updated Safety Analysis Report, a levee failure with river stage of 27.0 feet mean sea level will result in a flooding stage of 24.6 feet mean sea level.

Technical Specification 3.7.5, "Flood Protection," requires monitoring potential flooding and securing all openings below 30 feet mean sea level when site flooding becomes a possibility. The Technical Specification 3.7.5, Limiting Condition for Operation states:

Flood protection shall be provided for all safety-related systems, components, and structures when the water level of the Mississippi River exceeds +27.0 ft. Mean Sea Level USGS [U.S. Geological Survey] datum, at the levee fronting the Waterford Unit 3 site.

The action statement for Technical Specification 3.7.5 states:

With the water level at the levee fronting the Waterford Unit 3 site above elevation +27.0 ft. Mean Sea Level USGS datum initiate and complete within 12 hours procedures ensuring that all doors and penetrations below the +30.0 ft. elevation are secure.

Based on the stated information, 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. The Updated Safety Analysis Report evaluation assumes a levee failure occurs at a Mississippi River level of +27.0 feet mean sea level. The levee failure is conservatively assumed to be an instantaneous and complete breach of sufficient length that spreading of the resultant wave of water is negligible. Although the instantaneous failure of the levee at +27.0 feet mean sea level is highly unlikely, the inspectors concluded the action statement was not developed to take conservative action when flooding conditions were present. If the resultant wave of water were to progress toward the NPIS, the licensee would have significantly less time than the action statement allows to ensure that all doors and penetrations below +30.0 feet mean sea level are secure to protect safety related equipment and facilities.

Analysis. Failure to derive Technical Specification 3.7.5, "Flood Protection," from the analyses and evaluation included in the safety analysis report is a performance deficiency. Specifically, the licensee failed to meet the requirements of 10 CFR 50.36, "Technical Specifications." 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. This finding was not assigned a crosscutting aspect because the performance deficiency did not reflect current performance at the facility.

Enforcement. 10 CFR 50.36, "Technical Specifications," paragraph (b), states, "Each license authorizing operation of a production or utilization facility of a type described in § 50.21 or § 50.22 will include technical specifications. The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to § 50.34. The Commission may include such additional technical specifications as the Commission finds appropriate." Contrary to this, since March 16, 1985, the licensee failed to include, in their operating license, technical specifications that were derived 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. Because this violation was of very low safety significance and it was entered into the corrective action program as CR-WF3-2010-03232, this violation is being treated as a noncited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000382/2010006-02, "Nonconservative Technical Specification 3.7.5 Action Statement."

c. Failure to Correct Multiple Conditions Adverse to Quality

Introduction. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, 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.

Description. While performing a generic review of condition reports documenting conditions adverse to quality, the inspectors observed several repeat condition reports involving system components with active boric acid leaks. Following up on this observation, the inspectors selected 18 components from a list of licensee identified active boron leaks and performed a detailed review of the relevant historical condition reports for each of the selected components. This review was generally limited to condition reports that had been initiated in 2003 or later. The inspectors noted the following:

- Approximately one-half of the 18 selected components reviewed have documented boric acid leaks dating back to 2004 and most of these to at least 2003. Thus, the oldest leaks in the plant are at least six or seven years old.
- The licensee's list of active boron leaks includes a variety of components in the high pressure safety injection, fuel pool cooling and cleaning, low pressure safety injection, chemical volume control, and boric acid make-up systems.
- The licensee has attempted to repair some of the components, but these repairs have not been effective in resolving the leaks. For example, chemical volume control letdown line thermal relief valve CVC-1081, has been leaking since at least August 21, 2003. Valve repairs were attempted in May 2005, December 2006, and May 2008. Typically, within a month of each repair the valve was again documented as leaking. This valve was replaced in March 2010 and is now being monitored to determine if the most recent repairs were effective.
- The majority of the components reviewed continue to leak primarily due to delays in scheduling the repair work. For example, high pressure safety injection pump AB has boric acid leaks dating back to early 2001. The earliest condition report reviewed documenting this leak, CR-2001-00247, was closed out to work order 424950. Work order 424950 was then closed out to work order 47467 and scheduled to work in July 2004. Since then, the work has been rescheduled at least four times, most recently in May 2010. This work order is currently scheduled to be completed in September 2011.
- Several condition reports documenting the radiation dose being accumulated due to boric acid leak activities such as recleaning, reinspecting, repair of leakage collection devices, rework, etc. were reviewed. The inspectors noted the licensee's boric acid program requires each active leak to be inspected every 60 to 90 days and some of these inspections require a containment entry while at power.

Analysis. The repeated failure to promptly correct boric acid leaks is a performance deficiency. 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., 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.

Enforcement. Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion XVI, "Corrective Action," states in part that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material, and equipment, and nonconformances are promptly identified and corrected." Contrary to the above, the licensee failed to establish measures to assure conditions adverse to quality were promptly identified and corrected. Specifically, several deficiencies involving boric acid leaks dating back as far as 2001 have been entered into the corrective action program and have not yet been corrected. This violation of Appendix B, Criterion XVI, is being treated as an NRC identified noncited violation, consistent with Section VI.A of the Enforcement Policy: NCV 05000382/2010006-03, "Failure to Correct Multiple Conditions Adverse to Quality." This violation was entered into the licensee's corrective action program as Condition Report CR-WF3-2010-3235.

40A6 Meetings

Exit Meeting Summary

On May 28, 2010, the team presented the inspection results to Mr. Charles Arnone, General Manager, Plant Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

C. Alay System Engineering Manager
C. Argonne General Manager, Plant Operations
C. Becknell Employee Concerns Program Coordinator
L. Blocker Planning Scheduling and Outage Manager
K. Cook Operations Manager
C. Fugate Assistant Operations Manager
G. Hawkins Project Manager
M. Hayden Engineering Supervisor
R. Jones Training Superintendent
B. Lanka Design Engineer Manager
B. Lindsey Maintenance Manager
W. McKinney Corrective Action and Assessment Manager
S. Melancon Entergy Continuous Improvement Manager
R. Murillo, Nuclear Safety Assurance Director (Acting)
K. Nichols Engineering Director
J. Pierce Outage Manager
R. Putnam Engineering Programs and Components Manager
B. Steelman Licensing Manager (Acting)
G. Sullivan Security Manager (Acting)

NRC Personnel

M. Hay Chief, Technical Support Branch
H. Freeman Senior Reactor Engineer

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000382/2010006-01 NCV Failure to Prevent Repetitive Voiding in the Low Pressure Safety Injection System
05000382/2010006-02 NCV Nonconservative Technical Specification 3.7.5 Action Statement
05000382/2010006-03 NCV Failure to Correct Multiple Conditions Adverse to Quality

LIST OF DOCUMENTS REVIEWED

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
QA-03-2009-WF3-1	Quality Assurance Audit Report – Corrective Action Program	June 26, 2009
QA-18-2008-WF3-1	Quality Assurance Audit Report – Technical Specifications	March 10, 2009
QA-19-2010-WF3-1	Quality Assurance Audit Report – Training	March 19, 2010
EC-16729	Increase Seat Load of LPSI Flow Control Valves SI-138 A/B and SI-139 A/B	0
QS-2009-WF3-19	QA Follow-up Surveillance of Corrective Action Program Audit	December 9, 2009
G-1114	Shutdown Cooling Flowpath through LPSI	October 24, 1991
OP-009-008	Safety Injection System	28
W3-DBD-001	Safety Injection System	302
5817-13338	6" Globe Valve - Safety Injection System	0
ECP 02-004	Operability Evaluation of LPSI A Discharge Piping	0
OP-902-002	Loss of Coolant Accident Recovery Procedure	12
OP- 901-521	Severe Weather and Flooding	302
OP- 903-064	Mississippi River Level Monitoring	6
EN-OP-104	Operability Determination Process	4
OP-100-014	Technical Specification and Technical Requirements Compliance	306

Condition Reports

CR-WF3-1996-01965	CR-WF3-2001-00247	CR-WF3-2001-00716	CR-WF3-2001-01295
CR-WF3-2001-01295	CR-WF3-2001-01330	CR-WF3-2001-01350	CR-WF3-2001-01361
CR-WF3-2001-01383	CR-WF3-2001-01386	CR-WF3-2001-01387	CR-WF3-2001-01391
CR-WF3-2002-00016	CR-WF3-2002-00022	CR-WF3-2002-00448	CR-WF3-2003-00977
CR-WF3-2003-01229	CR-WF3-2003-02106	CR-WF3-2003-02350	CR-WF3-2003-02554

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CR-WF3-2003-03721	CR-WF3-2004-00146	CR-WF3-2004-00720	CR-WF3-2004-01104
CR-WF3-2004-01765	CR-WF3-2004-02926	CR-WF3-2004-03495	CR-WF3-2004-03506
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CR-WF3-2010-00190	CR-WF3-2010-00191	CR-WF3-2010-00192	CR-WF3-2010-00193
CR-WF3-2010-00194	CR-WF3-2010-00195	CR-WF3-2010-00196	CR-WF3-2010-00197
CR-WF3-2010-00198	CR-WF3-2010-00199	CR-WF3-2010-00200	CR-WF3-2010-00201
CR-WF3-2010-00202	CR-WF3-2010-00203	CR-WF3-2010-00204	CR-WF3-2010-00205
CR-WF3-2010-00206	CR-WF3-2010-00207	CR-WF3-2010-00208	CR-WF3-2010-00210
CR-WF3-2010-00211	CR-WF3-2010-00212	CR-WF3-2010-00213	CR-WF3-2010-00214
CR-WF3-2010-00215	CR-WF3-2010-00216	CR-WF3-2010-00217	CR-WF3-2010-00218
CR-WF3-2010-00219	CR-WF3-2010-00435	CR-WF3-2010-00473	CR-WF3-2010-00478
CR-WF3-2010-00480	CR-WF3-2010-00484	CR-WF3-2010-00489	CR-WF3-2010-00686
CR-WF3-2010-00686	CR-WF3-2010-00737	CR-WF3-2010-00793	CR-WF3-2010-00805
CR-WF3-2010-00824	CR-WF3-2010-00853	CR-WF3-2010-00964	CR-WF3-2010-01008
CR-WF3-2010-01011	CR-WF3-2010-01055	CR-WF3-2010-01065	CR-WF3-2010-01098
CR-WF3-2010-01106	CR-WF3-2010-01114	CR-WF3-2010-01137	CR-WF3-2010-01163
CR-WF3-2010-01251	CR-WF3-2010-01269	CR-WF3-2010-01547	CR-WF3-2010-01655
CR-WF3-2010-01727	CR-WF3-2010-01765	CR-WF3-2010-01800	CR-WF3-2010-01897
CR-WF3-2010-02030	CR-WF3-2010-02092	CR-WF3-2010-02097	CR-WF3-2010-02254

Condition Reports

CR-WF3-2010-02257	CR-WF3-2010-02440	CR-WF3-2010-02491	CR-WF3-2010-02515
CR-WF3-2010-02533	CR-WF3-2010-02562	CR-WF3-2010-02581	CR-WF3-2010-02582
CR-WF3-2010-02585	CR-WF3-2010-02785	CR-WF3-2010-02819	CR-WF3-2010-02865
CR-WF3-2010-02869	CR-WF3-2010-02894	CR-WF3-2010-02901	CR-WF3-2010-02957
CR-WF3-2010-02974	CR-WF3-2010-02984	CR-WF3-2010-03002	CR-WF3-2010-03048
CR-WF3-2010-03050	CR-WF3-2010-03071	CR-WF3-2010-03107	CR-WF3-2010-03187
CR-WF3-2010-03231	CR-WF3-2010-03232	CR-WF3-2010-03235	CR-WF3-2010-03365

Work Orders

13105	16683	29877	40406
42937	47467	64429	66799
66824	67408	68357	83421
089707	095398-01	96121	096396-01
117379	118393	118394	130414
130985	131952	133413	140795
147365	157646	157649	170221
175533	191912-08	196806	198943
217826	221198	51545899	51566832
51696029	51697400	51801522-02	52193539
52212312-02	52216974		

CALCULATIONS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
ECM 99-010	DCT Basin Ponding Analysis	1
MNQ3-5	Flooding Analysis Outside Containment	3
EC-C91-015	PEIR-20066 Evaluation of NRC Generic	0

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
LO-NOE-2009-00302	NRC Information Notice 2009-06 "Construction Related Experience with Flood Protection Features"	No date available

Information Request
March 22, 2010
Biennial Problem Identification and Resolution Inspection –
Waterford 3
Inspection Report Number 05000382/2010006

This inspection will cover the period from November 1, 2008, to May 28, 2010. All requested information should be limited to this period unless otherwise specified. To the extent possible, the requested information should be provided electronically in Adobe PDF or Microsoft Office format. Lists of documents should be provided in Microsoft Excel or a similar format. Please provide a complete (not truncated) description of the condition.

Please provide the following no later than April 2, 2010:

1. Document Lists

Note: for these summary lists, please include the document/reference number, the document title or a description of the issue, initiation date, and current status.

- a. Summary list of all corrective action documents related to significant conditions adverse to quality that were opened, closed, or evaluated during the period
- b. Summary list of all corrective action documents related to conditions adverse to quality that were opened or closed during the period
- c. Summary lists of all corrective action documents which were upgraded or downgraded in priority/significance during the period
- d. Summary list of all corrective action documents that subsume or "roll up" one or more smaller issues for the period
- e. Summary lists of operator workarounds, engineering review requests and/or operability evaluations, temporary modifications, and control room and safety system deficiencies opened, closed, or evaluated during the period
- f. Summary list of plant safety issues raised or addressed by the Employee Concerns Program (or equivalent)
- g. Summary list of all Apparent Cause Evaluations completed during the period
- h. Summary list of all Root Cause Evaluations planned or in progress but not complete at the end of the period
- i. Summary list of all corrective action documents involving problems with capacitors in safety-related systems over the past 5 years

- j. Summary list of corrective action documents involving problems of high resistance across relay and breaker auxiliary contacts on safety-related equipment over the past 5 years

2. Full Documents, with Attachments

- a. Root Cause Evaluations completed during the period
- b. Quality assurance audits performed during the period
- c. All audits/surveillances performed during the period of the Corrective Action Program, of individual corrective actions, and of cause evaluations
- d. Corrective action activity reports, functional area self-assessments, and non-NRC third party assessments completed during the period (do not include INPO assessments)
- e. Corrective action documents generated during the period for the following:
 - i. NCV's and Violations issued
 - ii. LER's submitted
- f. Corrective action documents generated for the following (for those that were evaluated but determined not to be applicable, provide a summary list):
 - i. NRC Information Notices, Bulletins, and Generic Letters issued or evaluated during the period
 - ii. Part 21 reports issued or evaluated during the period
 - iii. Vendor safety information letters (or equivalent) issued or evaluated during the period
 - iv. Other external events and/or Operating Experience evaluated for applicability during the period
- g. Corrective action documents generated for the following:
 - i. Emergency planning drills and tabletop exercises performed during the period
 - ii. Maintenance preventable functional failures which occurred or were evaluated during the period
 - iii. Adverse trends in equipment, processes, procedures, or programs which were evaluated during the period

- iv. Action items generated or addressed by plant safety review committees during the period

3. Logs and Reports

- a. Corrective action performance trending/tracking information generated during the period and broken down by functional organization
- b. Corrective action effectiveness review reports generated during the period
- c. Current system health reports or similar information
- d. Radiation protection event logs during the period
- e. Security event logs and security incidents during the period (sensitive information can be provided by hard copy during first week on site)
- f. Employee Concern Program (or equivalent) logs (sensitive information can be provided by hard copy during first week on site)
- g. List of Training deficiencies, requests for training improvements, and simulator deficiencies for the period

4. Procedures

- a. Corrective action program procedures, to include initiation and evaluation procedures, operability determination procedures, apparent and root cause evaluation/determination procedures, and any other procedures which implement the corrective action program.
- b. Quality Assurance program procedures
- c. Employee Concerns Program (or equivalent) procedures
- d. Procedures which implement/maintain a Safety Conscious Work Environment

5. Other

- a. List of risk significant components and systems
- b. Organization charts for plant staff and long-term/permanent contractors

Note: "Corrective action documents" refers to condition reports, notifications, action requests, cause evaluations, and/or other similar documents, as applicable.

This information should be uploaded on the Certrec IMS website no later than April 2, 2010. In addition, all electronic documents should be loaded onto a CD or DVD and sent via overnight carrier to:

U.S. NRC Region IV
612 E. Lamar Blvd.
Suite 400
Arlington, TX 76011

Atten: Harry Freeman

Please note that the NRC is not currently able to accept electronic documents on thumb drives or other similar digital media.