Waterford 3
1Q/2009 Plant Inspection Findings

Initiating Events

Significance: G Dec 31, 2008
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Inadequate Test Procedure for Safety Injection Valves S1-405A(B) Post Modification Testing
Green. The inspectors reviewed a self revealing noncited violation of 10 CFR 50, Appendix B, Criterion III due to the failure by the licensee to perform adequate post modification testing to evaluate the adequacy of design modifications made to the actuators of low pressure safety injection Isolation Valves SI-405A(B). This led to the licensee failing to identify a fundamental difference in the manner that the air operated valve actuator operated resulting in the valve popping open instead of slowly opening, creating a pressure transient that resulted in the lifting of the low temperature overpressure relief valve causing an intersystem loss-of-coolant event. The licensee entered this deficiency into their corrective action program as Condition Report CR-WF3-2008-4161.
This finding was more than minor because, if left uncorrected, it would have become a more significant safety concern. The inspectors utilized NRC Manual Chapter 0609, Appendix G, “Shutdown Operations Significance Determination Process,” to characterize the significance of the issue. Using the worst case scenario of having both Valves SI-405A(B) inoperable, the finding was of very low safety significance because multiple systems or components would still be available to remove decay heat and respond to a loss-of-inventory event. This performance deficiency would not result in any loss of instrumentation needed for safe shutdown and cool down of the plant. This finding had a crosscutting aspect in Human Performance, specifically the Resources aspect [H.2(a)] because the licensee failed to maintain adequate design margins. Specifically, the licensee’s pneumatic actuator for SI-405B could not overcome the pressure locking mechanism until twelve minutes into a fifteen minute time limit, after receiving the open demand signal. This led to the instantaneous valve disc displacement when the valve popped open causing the pressure surge, which resulted in the opening of relief valve SI-406B and subsequent loss of inventory event (Section 4OA5).

Inspection Report# : 2008005 *(pdf)*

Mitigating Systems

Significance: G Dec 31, 2008
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Untimely Corrective Actions
• Green. The inspectors reviewed a self revealing noncited violation of 10 CFR 50, Appendix B, Criterion XVI due to the failure by the licensee to take prompt corrective actions following the identification of an inadequate testing method used for determining the integrity of the Essential Chiller B heat exchanger tubing. Failure to take this timely action resulted in an inadvertent tube rupture and inoperability of Essential Chiller B. The licensee entered this deficiency into their corrective action program as Condition Report CR-WF3-2008-5342.
This finding was more than minor because it is associated with the Mitigating Systems attributes for Equipment Performance and would impact the availability and reliability of systems that respond to initiating events. The inspectors evaluated this finding using Manual Chapter 0609, Attachment 4, and determined that it was of very low safety significance (Green) because, assuming worst case degradation of both the B and AB Essential Chillers failing, the redundant A Essential Chiller would still have been available for accident mitigation. This finding had a crosscutting aspect in Problem Identification and Resolution, specifically the Corrective Action Program aspect [P.1

(d)] because the licensee failed to take appropriate corrective actions to address a degrading condition in a timely manner. Specifically, the failure to perform timely tube inspections of Essential Chiller B, following the identification of an inadequate testing methodology used for identifying Essential Chiller heat exchanger tubing degradation (Section 4OA2).

Inspection Report# : 2008005 *(pdf)*

Significance: G Dec 31, 2008
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Essential Chiller AB Component Failure Due to Inadequate Procedural Guidance
• Green. The inspectors reviewed a self revealing noncited violation of Technical Specification 6.8.1.a for failure to provide documented instructions appropriate to the circumstances as recommended in Appendix A of Regulatory Guide 1.33. The failure by the licensee to provide adequate guidance for the replacement of the Essential Chiller AB compressor motor temperature sensor resulted in the reintroduction of a failure mechanism that had previously been corrected. This subsequently led to the failure of the temperature sensor wiring and inoperability of Essential Chiller AB. The licensee entered this deficiency into their corrective action program as Condition Report CR-WF3-2008-5471.
This finding was more than minor because it is associated with the Mitigating Systems attributes for Equipment Performance and would impact the availability and reliability of systems that respond to initiating events. The inspectors evaluated this finding using Manual Chapter 0609, Attachment 4, and determined that it was of very low safety significance (Green) because the redundant Essential Chillers A and B would still have been available for accident mitigation. Based on the guidance provided in Manual Chapter 0612, Appendix B, Section 1-5, “Screen for Cross-Cutting Aspects,” this finding did not have a crosscutting aspect because it was not considered to be reflective of current licensee performance. Specifically, the licensee’s failure to update the model work instructions in 2000 was a latent issue, whereby the licensee did not have a reasonable opportunity to identify the problem prior to August, 2008. In addition, the licensee has since instituted programs and processes such that the problem would not reasonably occur today (Section 4OA2).

Inspection Report# : 2008005 *(pdf)*

Significance: G Dec 31, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate Calculations Used for Operability determination of SI-405 A(B)
Green. The inspectors identified a noncited violation of 10 CFR 50, Appendix B, Criterion III to address three examples of inadequate calculations involving shutdown cooling Valves SI-405A and SI-405B. The calculations were also used, in part, to support valve operability, which made an existing operability assessment invalid. First, a calculation performed by a contractor to estimate the bounding thrust requirements for pressure locking contained errors and used mathematical formulas out of their intended context without applying uncertainties to account for the differences. Recent operational experience with these valves was inconsistent with the calculation's conclusions. In addition, the licensee failed to meet their quality assurance program requirements that specified that engineers perform a design verification of the calculation prior to use. Second, the licensee's calculation, that demonstrated valve actuator thrust capabilities, contained errors. Specifically, it failed to account for the friction between the actuator piston disk and walls as well as the weight of components. Third, a calculation that determined that the temperature within the valve bonnet would not heat up during small break loss of coolant accidents and faulted steam generator accidents was inadequate, in that it failed to address a faulted steam generator event, it used heat transfer calculation methods on water that were intended only for solid materials, it failed to model all components, and it failed to determine the temperatures inside the valve bonnets, which was the overriding variable of interest. The licensee entered the finding into the corrective action program as Condition Report CR-WF3-2009-00127.

This finding was more than minor because it was similar to non-minor finding Example 3.j in NRC Inspection Manual Chapter 0612 Appendix E, “Examples of Minor Issues,” in that there was a reasonable doubt concerning the operability of Valves SI-405A(B). The inspectors utilized NRC Manual Chapter 0609, Appendix G, “Shutdown

Operations Significance Determination Process," to characterize the significance of the issue. Using the worst case scenario of having both SI-405A(B) valves inoperable, the finding was of very low safety significance because multiple systems or components would still be available to remove decay heat and respond to a loss of inventory event. These systems included the emergency feedwater system, main feedwater system, auxiliary feed water system, atmospheric dump valves, charging pumps, safety injection tanks, and the high-pressure safety injection system. This performance deficiency would not result in any loss of instrumentation needed for safe shutdown and cool down of the plant. The finding had a crosscutting aspect in the area of problem identification and resolution (P.1(c)) because engineers failed to thoroughly evaluate the potential for valve pressure-locking. The calculations were completed in 2008 and were indicative of current performance (Section 4OA2).

Inspection Report# : 2008005 *(pdf)*

Significance: G Sep 16, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate pressure locking calculation
Green. The inspectors identified a noncited violation of 10 CFR 50, Appendix B, Criterion III (Design Control) for an inadequate "pressure locking" design calculation for shutdown cooling Valves SI-405A and SI-405B. Plant engineers also used the calculation to support valve operability following a valve malfunction, which appeared to be caused by pressure locking. Entergy engineers had derived valve bonnet leakage rates (for pressure locking conditions) from local leak rate testing results. However, a national laboratory had already proven the Entergy theory invalid and plant engineers had taken no steps to validate the theory themselves. Finally, in response to an NRC generic letter concerning pressure locking and thermal binding of valves, the licensee engineers' conclusions were based on incorrect facts and improper assumptions. Licensee personnel entered the noncited violation into the corrective action program as Condition Report CR WF3 2008 4292.

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

Inspection Report# : 2008004 *(pdf)*

Significance: G Sep 16, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to follow integrated EDG test procedure
Green. The inspectors identified a noncited violation of Technical Specification 6.8.1.c (Procedures) for the failure to open the Train A low pressure safety injection pump suction valve prior to pump operation during a surveillance. The butterfly valve was installed 90 degrees out of position and was closed when operators believed it was open. After starting the pump, operators observed loud noises coming from the unit and secured it 8 minutes later. Pump operation without adequate net positive suction head could cause damage. The valve's postmaintenance test was scheduled after the noted surveillance test, and the surveillance was not intended to check the valve's function. The safety injection train was considered inoperable but available at the time. Licensee personnel entered the noncited violation into the corrective action program as Condition Reports CR-WF3-2008-2280 and CR-WF3-2008-3045.

This finding was more than minor because it affected both the configuration control and the equipment performance attributes of the Mitigating Systems Cornerstone objective to ensure reliability of the low pressure safety injection system. In addition, this condition, if left uncorrected, would also become a more significant safety concern. Equipment could be damaged without adequate postmaintenance checks prior to operation. Using the NRC Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the finding was of very low risk significance because it did not: (1) represent a loss of safety function; (2) represent an actual loss of a single train of equipment for more than its Technical Specification allowed outage time; or (3) screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

This finding had a crosscutting aspect in the area of human performance, associated with the decision-making component, in that, the plant personnel used nonconservative assumptions and chose to use the pump suction valve for system operation prior to verifying that the valve was properly assembled [H.1(b)]
Inspection Report# : 2008004 *(pdf)*

Significance: G Apr 07, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to re-evaluate previously identified boric acid leaks
The inspectors identified a violation of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Actions,” for the failure to implement corrective actions for a condition adverse to quality. Specifically, the licensee developed a corrective action to evaluate the condition of existing boric acid leaks. However, the effort failed to identify and evaluate multiple existing boric acid leaks on safety related components, including some that had deteriorated since initial discovery. The licensee entered this deficiency into their corrective action program as Condition Report CR WF3 2007 3951.

This finding was more than minor because, if left uncorrected, it would have become a more significant safety concern. Specifically, some unchecked boric acid leaks may have worsened and corroded safety related equipment. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the finding had very low risk significance because it was a qualification deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments." This finding had a crosscutting aspect in the Human Performance area, Work Practices component, because engineers failed to implement proper error prevention techniques when identifying boric acid leaks for additional review H.4 (a).

Inspection Report# : 2008002 *(pdf)*

Significance: G Apr 07, 2008
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Failure to correct "Fuel Oil Receipt and Transfer" procedure
The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” for failure to implement adequate corrective actions for a deficient emergency diesel generator fuel tank filling procedure (a condition adverse to quality). The licensee had identified the deficiency following a previous event when fuel oil leaked out of multiple fuel oil injectors during a diesel run. Procedural steps were needed to adequately vent the fill line following pressurization during fuel oil tank filling. However, the licensee only corrected the procedure in one section and, when a different section was used, the problem reoccurred. The fuel oil leak led to the emergency diesel generator being declared inoperable. In addition, the fuel oil created a potential fire hazard. The licensee entered this deficiency into their corrective action program as Condition Report CR WF3 2008 1345.

The finding was more than minor because it was similar to nonminor example 4.f in Inspection Manual Chapter 0612, "Examples of Minor Issues," in that emergency diesel generator operability was affected. Further, the oil created a fire hazard. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it did not: (1) represent a loss of safety function; (2)

represent an actual loss of a single train of equipment for more than its Technical Specification allowed outage time; or (3) screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

Inspection Report# : 2008002 *(pdf)*

Significance: G Apr 07, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Essential chiller AB return Header B Isolation Valve CHW 786B Misposition
The inspectors documented a self revealing noncited violation of Technical Specification 6.8.1.c (Procedures) for the failure to correctly position a valve during a surveillance. The procedure required operators to position the essential Chiller AB return Header B isolation Valve CHW 786B closed but operators left the valve in the open position. This resulted in cross connecting the essential services chilled water Loops A and B, which led to an unplanned entry into Technical Specifications 3.7.12 and 3.0.3. The violation was revealed through a control room alarm. The licensee entered this deficiency into their corrective action program as Condition Report CR WF3 2008-0778.

The finding was more than minor because, if left uncorrected, would have become a more significant safety concern. Specifically, with both loops of the essential services chilled water system cross connected, the system was no longer single-failure proof. A leak in one of the essential chilled water loops would have caused both units to become inoperable. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it was a qualification deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessments." This finding had a crosscutting aspect in the Human Performance area, Work Practices component, because operators failed to implement self-checking techniques when performing procedure steps H.4(a).

Inspection Report# : 2008002 *(pdf)*

Significance: G Apr 07, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
ACCW pump failure due to inaccurate operator aid
The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” because the licensee failed to correct a condition adverse to quality (inadequate instructions that led to low fuel oil and the failure of auxiliary component cooling water pump bearing). Specifically, the licensee's corrective action for a previous event called for an operator aid (oil level label). However, the operator aid contained incorrect and confusing information. Consequently, another auxiliary component cooling water pump failed. The licensee entered this deficiency into their corrective action program as Condition Report CR WF3 2008-0350.

The finding was more than minor because it was similar to nonminor violation example 4.f in Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that the problem affected auxiliary component cooling water Pump B operability. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Screening Worksheet, the issue screened as having very low safety significance because it did not: (1) represent a loss of safety function; (2) represent an actual loss of a single train of equipment for more than its Technical Specification allowed outage time; or (3) screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding had crosscutting aspects associated with Human Performance area, resources program component, because the licensee failed to have correct labeling on components H.2(c).

Inspection Report# : 2008002 *(pdf)*

Barrier Integrity

Significance: G Oct 31, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to promptly identify and correct a condition adverse to quality.
The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for failure to promptly identify and correct a condition adverse to quality. Specifically, from March 20, 2007, through October 27, 2008, personnel failed to identify and correct a condition, which allowed containment vacuum relief valve differential pressure switches to operate in pressures that exceeded the designed operating pressure of the switches. The licensee implemented interim corrective actions to ensure operability. Specifically, the licensee increased the test frequency and adjusted the switches to reduce the effects of the deficient condition. The licensee entered this deficiency into their corrective action program as Condition Report 2008 05106.

The performance deficiency associated with this finding involved the failure to promptly identify and correct a condition adverse to quality that could affect containment integrity. This finding was greater than minor because it affected the Configuration Control attribute of the Barrier Integrity Cornerstone objective to provide reasonable assurance that the containment physical design barrier protected the public from radionuclide releases caused by an event. Using the NRC Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the team determined the finding had very low safety significance because it did not represent an actual open pathway in the physical integrity of the reactor containment building. This finding had a crosscutting aspect in the area of human performance, associated with the decision making component, in that, licensee personnel failed to make conservative decisions related to equipment operation in accordance with design requirements (H.1(b)).

Inspection Report# : 2008007 *(pdf)*

Significance: G Oct 31, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate operability determination of a pressure boundary valve
The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion V, for a failure to follow procedure, when the licensee failed to complete an adequate operability evaluation for Valve SI 142A. Specifically, on August 21, 2008, the licensee failed to follow Procedure EN OP 104, "Operability Determinations," Revision 3, because personnel did not determine the leak rate solely through the required pressure boundary valve. The licensee entered this deficiency into their corrective action program as Condition Report 2008 05077.

The failure to perform an adequate operability evaluation on safety related plant equipment in accordance with Procedure EN OP 104 is a performance deficiency. The team determined this finding was greater than minor from review of Manual Chapter 0612, Appendix E, "Examples of Minor Issues." The finding was similar to non minor finding Example 3.j in that reasonable doubt existed related to the operability of Valve SI 142A. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings", the team determined the finding had very low safety significance because it did not represent an actual open pathway in the physical integrity of the reactor containment building. The finding had a crosscutting aspect in the area of problem identification and resolution because the licensee failed to thoroughly evaluate valve operability (P.1(c)).

Inspection Report# : 2008007 *(pdf)*

Emergency Preparedness

Occupational Radiation Safety

Significance: G May 14, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to conspicuously post a radiation area
The inspectors identified a NCV of 10 CFR 20.1902 because the licensee failed to post a radiation area conspicuously. On May 14, 2008, the inspectors toured the hot machine shop and noted a box with high radiation area signs attached. Dose rates around the box ranged from 55 to 90 millirems per hour at 30 centimeters. The inspectors noted there was no posting to identify the radiation area. The nearest radiation area posting was on the entry door of the decontamination room, outside the hot machine shop. As a result of the inspectors' finding, the licensee erected a rope barricade around the radiation area and posted it conspicuously.

The finding was more than minor because it was associated with one of the cornerstone attributes and the finding affected the Occupational Radiation Safety cornerstone objective, in that, uninformed workers could unknowingly accrue additional radiation dose. Because the finding involved the potential for unplanned, unintended dose resulting from conditions that were contrary to NRC regulations, the finding was evaluated using the Occupational Radiation Safety Significance Determination Process. The inspectors determined that the finding had no more than very low safety significance because: (1) it did not involve (ALARA) planning and controls, (2) there was no personnel overexposure, (3) there was no substantial potential for personnel overexposure, and (4) the finding did not compromise the licensee's ability to assess dose. The finding also had a cross-cutting aspect in the area of human performance, resource component, because the licensee did not have complete procedures. (H.2.c)

Inspection Report# : 2008003 *(pdf)*

Significance: G Apr 30, 2008
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Failure to follow procedure when entering the radiological controlled area
The inspectors reviewed two examples of a self-revealing, noncited violation of Technical Specification 6.8.1 because workers failed to follow procedural requirements when preparing to enter the radiological controlled area.

The first example, on April 28, 2008, involved a contract employee who informed the radiation protection shift control technician he would be working on the Reactor Coolant Pump 1B platform where dose rates were below 350 millirems per hour. Subsequently, the contract employee entered another area, one which had not been surveyed and on which the worker had not been briefed, and received a dose rate alarm measuring 553 millirems per hour. The second example, on April 30, 2008, involved a rigger who was assigned to help rig and lift a reactor coolant pump seal from the pump to the top of the D-ring. However, the rigger did not report to radiation protection personnel to receive a briefing on the dose rates in the area of Reactor Coolant Pump 1A. Before being reassigned, the rigger was briefed for an area with dose rates less than 180 millirems per hour, but during his work on the reactor coolant pump, the worker entered an area with dose rates as high as 628 millirems per hour and received a dose rate alarm. Radiation protection personnel counseled the workers and documented the occurrences in the corrective action program.

The occurrence involved the program attributes of exposure control and affected the cornerstone objective, in that the failure of the workers to follow procedural guidance and inform radiation protection personnel of the worker's intended activities work area resulted in the workers being unknowledgeable of 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 ALARA finding, (2) an overexposure, (3) a substantial potential for overexposure, or (4) an inability to assess dose. The finding had a cross-cutting aspect in the area of human performance, work practices component, because the workers failed to use human error prevention techniques such as self and peer checking. (H.4.a)

Inspection Report# : 2008003 *(pdf)*

Public Radiation Safety

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.

Miscellaneous

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