UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD
ARLINGTON, TX 76011-4511

May 14, 2015

EA-14-228

Mr. Michael R. Chisum
Site Vice President
Entergy Operations, Inc.
17265 River Road
Killona, LA 70057-0751

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – NRC INTEGRATED INSPECTION REPORT 05000382/2015001 AND FINAL SIGNIFICANCE DETERMINATION OF GREEN FINDING NRC INSPECTION REPORT 05000382/2015009

Dear Mr. Chisum:

On March 31, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Waterford Steam Electric Station, Unit 3. On April 16, 2015, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented five findings of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCV's) consistent with Section 2.3.2.a. of the NRC Enforcement Policy.

This letter also provides you the final significance determination of the preliminary Greater than Green finding identified in NRC Inspection Report 05000382/2014007 (ML15022A637), dated January 22, 2015. A detailed description of the finding is contained in Section 1R21.2.12.3 of that report. The finding was associated with the failure to identify and correct through-wall corrosion on the emergency diesel generator A and B day tank vents.

At your request, a Regulatory Conference was held on April 7, 2015, to discuss your position on the preliminary Greater than Green finding and to present new information based on testing your staff conducted. A copy of your presentation provided at the Regulatory Conference is attached to the summary of the Regulatory Conference (ML15099A563), dated April, 9, 2015. In your presentation, you discussed testing methodologies used by Entergy to demonstrate that the emergency diesel generator day tank scupper roof drain would remove water at a higher rate than predicted, and that the emergency diesel engines would continue to operate at a higher-than-expected level of water contamination of the fuel oil supply. Specifically, you presented the results of water flow testing of the scupper roof drain, and of testing of a similar Cooper Bessemer diesel engine with various amounts of water in the fuel oil supply.

After thoroughly considering the information reviewed during our inspections and the information you provided at the Regulatory Conference, the NRC has concluded that the finding is appropriately characterized as Green, a finding of very low safety significance. This finding also involved a violation of NRC requirements. See Section 4OA5 of this report for additional information.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC resident inspector at the Waterford Steam Electric Station.

If you disagree with a cross-cutting aspect assignment 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 the Waterford Steam Electric Station.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Ryan E. Lantz
Deputy Director
Division of Reactor Projects

Docket No. 50-382
License No. NPF-38

Enclosure:
Inspection Report 05000382/2015-001
w/ Attachment: Supplemental Information

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Letter to Michael R. Chisum from Ryan E. Lantz, dated May 14, 2015

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – NRC INTEGRATED INSPECTION REPORT 05000382/2015001 AND FINAL SIGNIFICANCE DETERMINATION OF GREEN FINDING NRC INSPECTION REPORT 05000382/2015009

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000382
License:	NPF-38
Report:	05000382/2015001
Licensee:	Entergy Operations, Inc.
Facility:	Waterford Steam Electric Station, Unit 3
Location:	17265 River Road Killona, LA 70057
Dates:	January 1 through March 31, 2015
Inspectors:	F. Ramírez, Senior Resident Inspector C. Speer, Resident Inspector L. Carson II, Senior Health Physicist N. Greene, PhD., Health Physicist J. O'Donnell, Health Physicist P. Hernandez, Health Physicist J. Dixon, Senior Reactor Inspector, Engineering Branch 1 G. Replogle, Senior Reactor Analyst
Approved By:	Ryan Lantz Deputy Director Division of Reactor Projects

SUMMARY

IR 05000382/2015001; 01/01/2015 – 03/31/2015; Waterford Steam Electric Station, Unit 3; Integrated Inspection Report, Equipment Alignment; Fire Protection; Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation Report; Follow-up of Events and Notice of Enforcement Discretion; Other Activities.

The inspection activities described in this report were performed between January 1 and March 31, 2015, by the resident inspectors at Waterford 3 and inspectors from the NRC's Region IV office. Five findings of very low safety significance (Green) are documented in this report. All of these findings involved violations of NRC requirements. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process." Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas." Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," because the licensee did not identify and perform testing for safety-related components to demonstrate that they would perform satisfactorily in service. Specifically, prior to February 12, 2015, the licensee did not identify and perform testing to demonstrate that, as described in the licensee's design basis, the dry cooling tower tube bundle isolation valves could be used to isolate a dry cooling tower tube bundle following a tornado missile strike on the non-missile-protected portions of the dry cooling tower. The licensee entered this condition into their corrective action program as Condition Report CR-WF3-2015-00828. The planned corrective actions are to develop seat leakage criteria for the dry cooling tower tube bundle isolation valves and to perform periodic seat leakage testing.

  The inspectors determined that the performance deficiency was more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to establish a test program for a safety-related component to demonstrate that it would perform satisfactorily following a tornado missile strike could impact the system's ability to perform its safety function in the event of a tornado. The inspectors performed the initial significance determination using NRC Inspection Manual 0609, Appendix A, Exhibit 4, "External Event Screening Questions." The finding required a detailed evaluation because it would degrade one or more trains of a system that supports a risk significant system or function. Therefore, a senior reactor analyst performed a bounding detailed risk evaluation. The analyst determined that the finding was of very low safety significance (Green). The bounding change to the core damage frequency was less than 2.9E-7/year. The finding was not significant with respect to the large early release frequency. The dominant core damage sequences included tornado-induced losses of offsite power, failure of the train B dry cooling tower pressure

boundary, random failure of the train A component cooling water system, random failures of the emergency diesel generators, and failure to recover offsite power in 4 hours. Risk was minimized because the diesel generators have air cooled radiators and do not require component cooling water to remain functional. The low tornado frequency also minimized the risk.

The inspectors concluded that the finding did not have a cross-cutting aspect because the most significant contributor to the performance deficiency of not identifying the need for a leak test occurred more than two years ago and did not reflect current licensee performance. (Section 1R04)

- Green. The inspectors identified a finding of very low safety significance and an associated non-cited violation of Waterford Steam Electric Station, Unit 3, License Condition 2.C.9, and the fire protection program for the licensee's failure to identify and correct a condition adverse to fire protection. Specifically, the inspectors identified that the ventilation dampers that are used to maintain the environmental conditions of the No. 2 diesel fire pump room and that are needed for pump protection were damaged and not functional for an extended period of time. As a result, the reliability of the No. 2 diesel fire pump could have been impacted at high environmental temperatures. The licensee entered this condition into their corrective action program as Condition Report CR-WF3-2015-00132. The licensee manually opened the dampers and additional planned corrective actions included repairing the broken dampers' linkage before the temperatures outside reach 90ºF.

  This performance deficiency was determined to be more than minor because if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. Specifically, if left uncorrected, the licensee's failure to repair the damaged ventilation damper in the No. 2 diesel fire pump room would result in an ongoing degraded condition, which could have impacted the capability of the No. 2 diesel fire pump to fulfill its function of providing a water supply to the site's Fire Protection Systems. Using Inspectional Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that the use of Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," was required because the finding involved fixed fire protection systems. Using Inspection Manual Chapter 0609, Appendix F, Attachment 1, "Fire Protection SDP Phase 1 Worksheet," the finding screened as Green because the reactor would have been able to reach and maintain a safe shutdown condition. Specifically, since only the No. 2 diesel fire pump was impacted by the performance deficiency, the No. 1 diesel fire pump and the motor driven pump would have been able to supply the fire systems because they are all rated for full flow capacity.

  This finding had a cross-cutting aspect in the area of human performance, avoid complacency, because individuals did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, licensee personnel frequently tour the fire pump house for operations and maintenance activities; however, a thorough review of the work site had not been performed [H.12]. (Section 1R05)

- Green. A self-revealing, non-cited violation of Technical Specification 6.8.1.a and Regulatory Guide 1.33, Revision 2, Appendix A, was identified for the failure to perform maintenance that could affect the performance of safety-related equipment in accordance

with written procedures, documented instructions, or drawings appropriate to the circumstances. Specifically, prior to December 17, 2014, the licensee used a procedure that contained insufficient detail for tightening a thermal overload connection that resulted in a loose connection on a motor starter and eventual trip of a wet cooling tower fan, resulting in the A train of ultimate heat sink being declared inoperable. The licensee entered this condition into their corrective action program as Condition Report CR-WF3-2014-04430. The corrective action taken to restore compliance was to add additional detail to the procedure to ensure thermal overload connections are verified secure after their mechanical connections are tightened.

The inspectors determined that the performance deficiency was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to ensure successful tightening of the thermal overload connections for the wet cooling tower fans adversely impacted the capability of the system to perform its function. The inspectors performed the initial significance determination using NRC Inspection Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings." The inspectors determined the finding was of very low safety significance (Green) because it affected one train for less than the allowed outage time. When the A train of ultimate heat sink was declared inoperable, the B train of ultimate heat sink was already inoperable for planned maintenance. As a result, the B train maintenance was unrelated to the performance deficiency. In addition, the finding did not affect the design or qualification of the system, did not represent the loss of a safety system or function, did not represent the loss of function of at least a single train for greater than its Technical Specification allowed outage time, and did not represent an actual loss of function of one or more non-Technical Specification trains of equipment.

The inspectors concluded that the finding did not have a cross-cutting aspect because the most significant contributor to the performance deficiency occurred more than two years ago and did not reflect current licensee performance. (Section 4OA3)

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," which 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 nonconformance are promptly identified and corrected. Specifically, prior to October 22, 2014, the licensee failed to identify and correct through-wall corrosion on the emergency diesel generator A and B day tank vents. The licensee's measures are established by Procedures EN-DC-178, "System Walkdowns," which requires inspection for corrosion, and EN-LI-102 "Corrective Action Program," which requires that a condition report be initiated promptly/timely for a condition adverse to quality, and that operability, functionality, and immediate reportability be reviewed. Attachment 9.2 of EN-LI-102, Section 4, "Design and Licensing Basis Issues," specifically provides examples of adverse conditions as they concern design basis issues, and corrosion is a specific example cited. In response to this issue, the licensee performed an immediate operability determination based on severe weather in the area, installed a temporary repair using a rubber wrap, and installed a small concrete berm to minimize the potential impact of

water in the immediate area. This finding was entered into the licensee's corrective action program as Condition Reports CR-WF3-2014-05413 and CR-WF3-2014-05529.

The failure to identify and correct through-wall corrosion on the emergency diesel generator A and B day tank vents was a performance deficiency. This performance deficiency was more than minor because it was associated with the design control and equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to events to prevent undesirable consequences. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the finding screened to Exhibit 4, "External Events Screening Questions," because it screened as potentially risk-significant due to seismic, flooding, or severe weather. Per Exhibit 4, the finding screened to a detailed risk evaluation because if the safety functions of emergency diesel generators A and B were assumed completely lost, it would degrade two trains of a multi-train system and it would degrade one or more trains of a system that supports a risk-significant system.

A Region IV senior reactor analyst performed a detailed risk evaluation. The finding was determined to be of very low safety significance (Green). The change to the core damage frequency was approximately $4x10^{-7}$/year. The risk-important sequences included a heavy rain event greater than or equal to 6 inches per hour followed by a random loss of offsite power within the next two weeks. The risk significance was mitigated by the tolerance of the diesel generators to water in the fuel oil and the operators' ability to restore offsite power within 4 hours of the loss of offsite power.

This finding had a cross-cutting aspect in the area of human performance associated with procedure adherence because the licensee failed to ensure that individuals follow process, procedures, and work instructions [H.8]. (Section 4OA5)

Cornerstone: Public Radiation Safety

- Green. The inspectors identified a non-cited violation of 10 CFR 71.5, "Transportation of Licensed Material," and 49 CFR 172, Subpart I, "Safety and Security Plans." Specifically, licensee personnel failed to adequately develop their transportation security plan. This resulted in three Category 2 shipments being transported on public highways without security risk assessments being performed. The planned corrective actions were still being evaluated. The inspectors determined that no immediate safety concern existed because the shipments that had been made were received with no issues and the licensee had no pending Category 2 or higher shipments. The licensee documented the issue in its corrective action program as Condition Report CR-W3-2015-00506.

  The licensee's failure to adequately develop their transportation security plan is a performance deficiency. Procedure EN-RW-106, "Integrated Transportation Security Plan," did not include all the components required by 49 CFR 172.802, "Components of a Security Plan." The performance deficiency is more than minor because it is associated with the program and process attribute of the Public Radiation Safety cornerstone. It adversely affects the cornerstone objective to ensure adequate protection of public health and safety

from exposure to radioactive materials released into the public domain. In accordance with Inspection Manual Chapter 0609, Attachment 4, “Initial Characterization of Findings,” and Appendix D, “Public Radiation Safety Significance Determination Process,” dated February 12, 2008, the inspectors determined the finding has very low safety significance (Green) because Waterford had an issue involving transportation of radioactive waste, but it did not involve: (1) a radiation limit being exceeded, (2) a breach of package during transport, (3) a certificate of compliance issue, (4) a low level burial ground nonconformance, or (5) a failure to make notifications or provide emergency information.

The finding has a resources cross-cutting aspect in the human performance cross-cutting area, because licensee management did not ensure that personnel, equipment, procedures, and other resources were available and adequate to support nuclear safety [H.1]. (Section 2RS8)

PLANT STATUS

The Waterford Seam Electric Station, Unit 3, began the inspection period at 100 percent power and maintained 100 percent power for the duration of the inspection period.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

On January 8, 2015, the inspectors completed an inspection of the station's readiness for impending adverse weather conditions. The inspectors reviewed plant design features, the licensee's procedures to respond to freezing temperatures, and the licensee's planned implementation of those procedures. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant.

These activities constituted one sample of readiness for impending adverse weather conditions, as defined in Inspection Procedure 71111.01.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdown

a. Inspection Scope

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

- On January 8, 2015, containment spray train A following maintenance
- On January 16, 2015, high pressure safety injection train AB following maintenance
- On February 3, 2015, dry cooling tower A with B out of service for maintenance
- On March 11, 2015, low pressure safety injection train B following maintenance

The inspectors reviewed the licensee's procedures and system design information to determine the correct lineup for the systems, and visually verified that critical portions of the trains were correctly aligned for the existing plant configuration.

These activities constituted four partial system walk-down samples as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

.2 Complete Walkdown

a. Inspection Scope

On February 21, 2015, the inspectors performed a complete system walk-down inspection of the component cooling water system. The inspectors reviewed the licensee's procedures and system design information to determine the correct component cooling water train B lineup for the existing plant configuration. The inspectors also reviewed outstanding work orders, open condition reports, and other open items tracked by the licensee's operations and engineering departments. The inspectors then visually verified that the system was correctly aligned for the existing plant configuration.

These activities constituted one complete system walk-down sample, as defined in Inspection Procedure 71111.04

b. Findings

Failure to Identify and Perform Testing of Safety-Related Dry Cooling Tower Tube Bundle Isolation Valves

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for failure of the licensee to identify and perform testing for safety-related components to demonstrate that they would perform satisfactorily in service. Specifically, prior to February 12, 2015, the licensee did not identify and perform testing to demonstrate that the dry cooling tower (DCT) tube bundle isolation valves could be used to isolate a DCT tube bundle following a tornado missile strike on the non-missile-protected portions of the DCT.

Description. On February 10, 2015, the inspectors noted that in the test program for the DCT tube bundle isolation valves, leak criterion was not established for the safety-related DCT tube bundle isolation valves, and valve seat leakage was not tested by the licensee. On February 12, 2015, the licensee initiated Condition Report CR-WF3-2015-00828 to develop seat leakage criteria and testing for the valves.

The DCTs are heat exchangers that provide cooling for the component cooling water (CCW) system and are part of the site's ultimate heat sink. Sixty percent of each DCT train is protected from tornado-generated missiles by grating located above the tube bundles. Updated Final Safety Analysis Report (UFSAR) Section 9.2.5.3.3 states that, in the event of a tornado strike on the non-missile-protected portions of the DCT, the damaged DCT cells can be isolated to prevent the loss of CCW out of the damaged tube bundles such that the DCT can be placed back into service. The licensee accomplishes this action using the DCT tube bundle isolation valves.

The safety-related source of makeup water to the CCW system following a tornado missile strike comes from the condensate storage pool (CSP). The basis for Technical Specification 3.7.1.3 states that 3500 gallons of CSP volume is reserved for makeup to the CCW system and that this volume is sufficient to ensure CCW is available for at least 24 hours following a tornado missile strike.

The inspectors reviewed licensee calculation ECM97-006, "Design Basis for CCW Makeup," Revision 1. The calculation concludes that up to 2017 gallons of the 3500 gallons reserved for CCW makeup in the CSP volume will be required following a tornado missile strike on the non-missile-protected portion of the DCT, resulting in 1483 gallons of margin in the CSP for makeup to the CCW system. However, the design-basis calculations do not account for leakage out of damaged DCT cells after isolation of the associated tube bundles.

The inspectors also reviewed licensee calculation MN(Q)-9-62, "CCW Water Loss Due to a Tornado Missile Penetrating a Dry Cooling Tower," Revision 1, and found that a DCT cell damaged by a tornado missile strike could produce a leak rate of approximately 472 gallons per minute. That calculation is based on the assumption that the leak stops after the DCT is isolated. Per UFSAR Section 9.2.5.3.3, operations personnel would be required to isolate the damaged DCT cell and return the DCT to service.

The inspectors noted that on February 5, 2015, the licensee had initiated Condition Report CR-WF3-2015-00688 to document their failure to successfully isolate a DCT tube bundle. The licensee had attempted to isolate DCT tube bundle 2A using the associated DCT tube bundle isolation valves. Though not safety-related due to being associated with a missile-protected DCT cell, the tube bundle isolation valves associated with DCT tube bundle 2A are the same as the safety-related tube bundle isolation valves in the non-missile-protected portions of the DCT. The isolation of DCT tube bundle 2A was unsuccessful because the associated tube bundle isolation valve leaked at approximately 12.5 gallons per minute. If the calculation was based on safety-related tube bundle isolation valves leaking at this rate, the 1483-gallon margin in the CSP would last for approximately 118.6 minutes.

Based on the issues described above, the inspectors determined that the licensee could not demonstrate that the DCT tube bundle isolation valves could be used to isolate a DCT tube bundle following a tornado-missile strike.

Analysis. The inspectors concluded that the failure to identify and perform testing for the DCT tube bundle isolation valves to demonstrate that they would perform satisfactorily in

service in accordance with requirements contained in applicable design documents was a performance deficiency. The inspectors determined that the performance deficiency was more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to establish a test program for leakage past the safety-related DCT tube bundle isolation valves to demonstrate that they would perform satisfactorily following a tornado-missile strike could adversely affect the system's ability to perform its safety function in the event of a tornado-missile strike on the non-missile-protected portions of the DCT.

The inspectors used NRC Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," to evaluate this issue for its impact on the Mitigating Systems Cornerstone. The inspectors performed the initial significance determination using NRC IMC 0609, Appendix A, Exhibit 4, "External Event Screening Questions." The finding required a detailed evaluation because it would degrade one or more trains of a system that supports a risk significant system or function. Therefore, a senior reactor analyst performed a bounding detailed risk evaluation.

Tornado Statistics: About one out of every three tornadoes (29 percent) is classified as "strong." Strong tornadoes have an average path length of 9 miles and a path width of 200 yards (approximately 1 square mile of land affected). Although very rare (about 2 percent are violent), violent tornadoes can last for hours. Average path lengths and widths are 26 miles and 425 yards, respectively.
(See http://www.weatherexplained.com/Vol-1/Tornadoes.html)

Since the strong tornados can affect approximately 1 square mile, weaker tornados, on average, would affect significantly less than 1 square mile. Most tornados are of the weaker variety. Violent tornados can affect approximately 6 to 7 square miles (on average), but are relatively rare. Therefore, the analyst assumed that the average tornado would affect 1 square mile of land.

The average number of tornados in Louisiana per year was 27
(See http://www.erh.noaa.gov/cae/svrwx/tornadobystate.html).

The total area for the state of Louisiana was 51,840 square miles
(See http://www.enchantedlearning.com/usa/states/area.shtml).

Plant Area: For this risk evaluation, the analyst assumed that the Waterford-3 nuclear island and switchyard occupied one square mile of land. This was conservative, in that this equipment occupies less than one square mile.

The analyst conservatively assumed that a tornado within a 1 square mile area would cause a loss of offsite power and cause physical damage to the train B dry cooling tower train. This in turn would cause the train B component cooling water train to fail. Because the dry cooling towers are at least partially protected from missiles by the

surrounding building, this is a very conservative assumption. Not all tornados will result in damaging this equipment.

Tornado Frequency: The frequency of a tornado hitting the Waterford-3 nuclear island and switchyard was therefore, λ = 27 tornados/year / 51840 sq miles = 5.2E-4/yr. Since not all of these tornados would directly hit a dry cooling tower and cause damage (the tower is in partially shielded area), the analyst reduced this frequency by one order of magnitude.

λ = 5.2E-5/yr

Calculations: The analyst used the NRC's Waterford-3 Standardized Plant Analysis Risk (SPAR) model, Revision 8.16, with a truncation limit of E-11, to evaluate this finding. The analyst assumed a full year exposure period. In addition, if a tornado struck a dry cooling tower, the analyst assumed complete failure of the train.

The analyst noted that either dry cooling tower could fail during a tornado event. However, both dry cooling towers would not be expected to fail from the same tornado. The analyst arbitrarily selected the B train as the train that fails.

A tornado could also cause a consequential transient and a loss of offsite power. The analyst only solved these sequences in the NRC's SPAR model.

The analyst calculated the incremental conditional core damage probability (ICCDP) assuming that a tornado occurs that defeats the train B dry cooling tower. As a surrogate for the dry cooling tower, the analyst set the basic event for the train B component cooling water heat exchanger to 1.0 (fail). Because the model wasn't identifying all of the applicable cutsets, the analyst also failed train B emergency diesel generator (fail to start = 1.0). In addition, the analyst set the basic events for the transient and loss of offsite power (LOOP) to 1.0. Setting both events to 1.0 simultaneously was conservative because LOOP events would not occur with every transient. The analyst calculated the base case (without the component cooling water failure) and the current case (with the component cooling water failure).

The ICCDP was 5.7E-3.

The ΔCDF was the tornado frequency multiplied by the ICCDP. The ΔCDF was:

ΔCDF = 5.2E-5/yr * 5.6E-3 = 2.9E-7/year.

The dominant core damage sequences included tornado induced losses of offsite power, failure of the train B dry cooling tower pressure boundary, random failure of the train A component cooling water system, random failures of the train A emergency diesel generator, and failure to recover offsite power in 4 hours. The low tornado frequency helped to minimize the risk.

Large Early Release Frequency (LERF): To address the contribution to the conditional large early release frequency, the analyst used NRC IMC 0609, Appendix H,

"Containment Integrity Significance Determination Process," dated May 6, 2004. The finding was not significant to LERF because it did not directly affect the steam generator tube rupture or the intersystem loss of coolant accident sequences.

The inspectors concluded that the finding did not have a cross-cutting aspect because the most significant contributor to the performance deficiency of not identifying the need for a leak test occurred more than three years ago and did not reflect current licensee performance.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion XI, "Test Control" requires, in part, that "a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents."

Contrary to the above, prior to February 12, 2015, the licensee did not assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Specifically, the licensee did not identify and perform testing to demonstrate that the DCT tube bundle isolation valves could be used to isolate a DCT tube bundle following a tornado-missile strike on the non-missile-protected portions of the DCT as described in the site's design basis documents. As a result, the licensee could not demonstrate that the safety-related DCT tube bundle isolation valves would perform satisfactorily in service. The licensee entered this condition into their corrective action program as Condition Report CR-WF3-2015-00828. The planned corrective action is to develop seat-leakage criteria for the DCT tube bundle isolation valves and to perform periodic seat-leakage testing.

Because this violation was of very low safety significance and the licensee entered the issue into their corrective action program, this violation was treated as a non-cited violation, consistent with Section 2.3.2.a. of the Enforcement Policy:
NCV 05000382/2015001-01, "Failure to Identify and Perform Testing of Safety-Related Dry Cooling Tower Tube Bundle Isolation Valves."

1R05 Fire Protection (71111.05)

Quarterly Inspection

a. Inspection Scope

The inspectors evaluated the licensee's fire protection program for operational status and material condition. The inspectors focused their inspection on six plant areas important to safety:

- On January 5, 2015, fire area RAB 8A, switchgear room A

- On January 5, 2015, fire area RAB 33, shutdown cooling heat exchanger rooms A and B
- On January 8, 2015, fire area FWPH-001, diesel fire pump house
- On February 5, 2015, fire area NS-CP-001, condensate polisher building – first floor
- On February 10, 2015, fire area RAB 21, component cooling water pump B
- On February 10, 2015, fire area RAB 17, component cooling water heat exchanger B

For each area, the inspectors evaluated the fire plan against defined hazards and defense-in-depth features in the licensee's fire protection program. The inspectors evaluated control of transient combustibles and ignition sources, fire detection and suppression systems, manual firefighting equipment and capability, passive fire protection features, and compensatory measures for degraded conditions.

These activities constituted six quarterly inspection samples, as defined in Inspection Procedure 71111.05.

b. Findings

Failure to Identify and Correct a Condition Adverse to Fire Protection

Introduction: The inspectors identified a non-cited violation of License Condition 2.C.9, "Fire Protection," for the licensee's failure to identify and correct a condition adverse to fire protection. Specifically, the inspectors identified that the ventilation dampers that are used to maintain the environmental conditions of the No. 2 diesel fire pump room and that are needed for pump protection, were damaged and not functional for an extended period of time. As a result, the reliability of the No. 2 diesel fire pump could have been impacted at high environmental temperatures.

Description: On January 8, 2015, the inspectors toured the diesel fire pump house to perform a fire protection walk down. While inspecting the No. 2 diesel fire pump room, the inspectors noted that the linkages for two ventilation dampers inside the room were disconnected from their associated motors. Specifically, one of the dampers' linkage was sheared and the other was not attached to its motor. As a result of this condition, neither of the dampers could be operated. The inspectors notified the licensee and the licensee placed this issue their corrective action program.

A review of the issue revealed that the licensee had documented Engineering Response (ER) ER-W3-2005-0094-000, "Freeze Protection Restoration Requirements for Security Diesel Room and Fire Pump Rooms." As the inspectors verified later by reviewing the pump's vendor manual, this ER mentioned that the operating ambient temperature range for the diesel fire pump is 50 to 115ºF. The ER also documented that freeze protection covers for these dampers that are normally installed for protection during winter operation

months, should be removed before outside ambient temperatures reached 90ºF. This requirement was established to ensure proper operation of the diesel fire pumps. When the inspectors asked to review maintenance information for these dampers, the licensee was unable to locate any record of maintenance activities that were performed on these dampers after 1999. As a result, the inability to exercise these dampers potentially existed for up to 16 years, and could have impacted the operation of the No. 2 diesel fire pump, especially in the summer months when the environmental temperatures are higher than the rest of the operating year.

Also, the inspectors asked the licensee for calculations performed for the No. 2 diesel fire pump room to demonstrate that the conditions inside the room would continually be maintained such that the temperatures inside would not reach 115ºF and challenge the operation of the diesel fire pump. However, the licensee did not have a calculation that addressed that issue and, therefore, was not able to demonstrate that the environmental conditions needed to ensure proper operation of the No. 2 diesel fire pump could be maintained during warmer months. Furthermore, because prior to January 8, 2015, the licensee had not periodically tested or performed preventive maintenance on the No. 2 diesel fire pump room ventilation dampers for possibly up to 16 years. The inspectors identified this issue when doing a routine tour of this room and the ventilation dampers are located in an open area, with the motor and linkages clearly visible. The inspectors verified that licensee personnel routinely tour this room during operator rounds (two times per day) and the system engineer periodically conducts a tour of this area on a quarterly basis. The inspectors concluded that this condition adverse to fire protection had existed for some extended period of time and was not identified and corrected which is contrary to the requirements in UNT-005-013, "Fire Protection Program."

Analysis: The inspectors determined that the failure to identify and correct a condition adverse to fire protection in accordance with UNT-005-013, "Fire Protection Program," was a performance deficiency that warranted further evaluation. The inspectors determined that this performance deficiency was more than minor because if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. Specifically, if left uncorrected, the licensee's failure to repair the damaged ventilation dampers in the No. 2 diesel fire pump room would result in an ongoing degraded condition, which could have impacted the capability of the No. 2 diesel fire pump to fulfill its function of providing a water supply to the site's fire protection systems.

Using IMC 0609, Attachment 4, "Initial Characterization of Findings," the inspectors determined that because the finding involved fixed fire protection systems, the use of IMC 0609, Appendix F, "Fire Protection Significance Determination Process" was required. In accordance with IMC 0609, Appendix F, Attachment 1, "Fire Protection SDP Phase 1 Worksheet," the finding screened as Green because the reactor would have been able to reach and maintain a safe shutdown condition. Specifically, since only the No. 2 diesel fire pump was impacted by the performance deficiency, the No. 1 diesel fire pump and the motor-driven fire pump would have been able to supply the fire systems required full-flow capacity.

This finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency, because individuals did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, licensee personnel frequently tour the fire pump house for operations and maintenance activities, however, a thorough review of the work site had not been performed [H.12].

Enforcement: Waterford Steam Electric Station, Unit 3, License Condition 2.C.9 states, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility through Amendment 36 and as approved in the Safety Evaluation Report through Supplement 9. Final Safety Analysis Report, Section 9.5.1.3.1.C, states that the fire protection program quality assurance program is documented in Procedure UNT-005-013, "Fire Protection Program." Procedure UNT-005-013, Section 5.8.8, states in part, that conditions adverse to quality relating to the fire protection program will be identified and corrected in accordance with EN-LI-102, "Corrective Action Process."

Contrary to the above, prior to January 8, 2015, the licensee failed to identify and correct a condition adverse to quality relating to the fire protection program. Specifically, the ventilation dampers in the No. 2 diesel fire pump room were in a degraded condition and unable to control the room temperature to protect the operation of the pump. As a result, the capability of the pump to perform its function could have been impacted at high ambient temperatures. The licensee manually opened the dampers and additional planned corrective actions included repairing the broken linkage.

Because the issue was of very low safety significance, and was entered into the Corrective Action Program as CR-WF3-2015-00132, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a. of the NRC Enforcement Policy: NCV 05000382/2015001-02, "Failure to Identify and Correct a Condition Adverse to Fire Protection."

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

On March 9, 2015, the inspectors completed an inspection of the station's ability to mitigate flooding due to internal causes. After reviewing the licensee's flooding analysis, the inspectors chose one plant area containing risk-significant structures, systems, and components that were susceptible to flooding:

- Component cooling water pump room AB

The inspectors reviewed plant design features and licensee procedures for coping with internal flooding. The inspectors walked down the selected areas to inspect the design features, including the material condition of seals, drains, and flood barriers. The

inspectors evaluated whether operator actions credited for flood mitigation could be successfully accomplished.

These activities constitute completion of one flood protection measures sample as defined in Inspection Procedure 71111.06.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

On February 27, 2015, the inspector completed an inspection of the readiness and availability of risk-significant heat exchangers. The inspector verified the licensee used the industry standard periodic maintenance method outlined in EPRI NP-7552 for the component cooling water heat exchangers. Additionally, the inspector walked down the component cooling water heat exchangers to observe performance and material condition and verified that the component cooling water heat exchangers were correctly categorized under the Maintenance Rule and were receiving the required maintenance.

These activities constitute completion of one heat sink performance annual review sample, as defined in Inspection Procedure 71111.07.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)

.1 Review of Licensed Operator Requalification

a. Inspection Scope

On March 23, 2015, the inspectors observed an evaluated simulator scenario performed by an operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance.

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

b. Findings

No findings were identified.

.2 Review of Licensed Operator Performance

a. Inspection Scope

On March 2, 2015, the inspector observed the performance of on-shift licensed operators in the plant's main control room. At the time of the observations, the plant was in a period of heightened activity due to emergency diesel generator train A testing. The inspector observed the operators' performance of the following activities:

- Procedural implementation, including the pre-job brief
- Operability determination
- Crew update briefings
- Alarm response

In addition, the inspector assessed the operators' adherence to plant procedures, including the conduct of operations procedure and other Operations department policies.

These activities constitute completion of one quarterly licensed operator performance samples, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed two instances of degraded performance or condition of safety-related structures, systems, and components (SSCs):

- On February 24, 2015, component cooling water system
- On March 18, 2015, seismic monitoring system

The inspectors reviewed the extent of condition of possible common cause SSC failures and evaluated the adequacy of the licensee's corrective actions. The inspectors reviewed the licensee's work practices to evaluate whether these may have played a role in the degradation of the SSCs. The inspectors assessed the licensee's characterization of the degradation in accordance with 10 CFR 50.65 (the Maintenance Rule), and verified that the licensee was appropriately tracking degraded performance and conditions in accordance with the Maintenance Rule.

These activities constituted completion of two maintenance effectiveness samples, as defined in Inspection Procedure 71111.12.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed two risk assessments performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk:

- On January 7, 2015, scheduled maintenance associated with containment spray train A
- On January 28, 2015, scheduled maintenance associated with auxiliary component cooling water and reactor trip breaker testing

The inspectors verified that these risk assessments were performed timely and in accordance with the requirements of 10 CFR 50.65 (the Maintenance Rule) and plant procedures. The inspectors reviewed the accuracy and completeness of the licensee's risk assessments and verified that the licensee implemented appropriate risk management actions based on the result of the assessments.

The inspectors also observed portions of three emergent work activities that had the potential to cause an initiating event or to affect the functional capability of mitigating systems:

- On February 3, 2015, emergent work associated with auxiliary component water header A component cooling water heat exchanger outlet temperature control valve (ACC-126A)
- On March 3, 2015, emergent work associated with emergency diesel generator A
- On March 22, 2015, emergent work associated with station service transformer 32B

The inspectors verified that the licensee appropriately developed and followed a work plan for these activities. The inspectors verified that the licensee took precautions to minimize the impact of the work activities on unaffected SSCs.

These activities constitute completion of five maintenance risk assessments and emergent work control inspection samples, as defined in Inspection Procedure 71111.13.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

The inspectors reviewed five operability determinations that the licensee performed for degraded or nonconforming SSCs:

- On January 15, 2015, operability determination of dry cooling tower B
- On February 2, 2015, functionality assessment of motor driven fire pump
- On February 11, 2015, operability determination of emergency feedwater pump B
- On February 18, 2015, operability determination of seismic supports in main steam isolation valve room B
- On February 20, 2015, operability determination of pressurizer level channel Y

The inspectors reviewed the timeliness and technical adequacy of the licensee's evaluations. Where the licensee determined the degraded SSC to be operable or functional, the inspectors verified that the licensee's compensatory measures were appropriate to provide reasonable assurance of operability or functionality. The inspectors verified that the licensee had considered the effect of other degraded conditions on the operability or functionality of the degraded SSC.

These activities constitute completion of five operability and functionality review samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

Permanent Modifications

a. Inspection Scope

On February 5, 2015, the inspector reviewed a permanent modification which included the plugging of tubes in dry cooling tower A.

The inspectors reviewed the design and implementation of the modification. The inspector verified that work activities involved in implementing the modification did not adversely impact operator actions that may be required in response to an emergency or other unplanned event. The inspector verified that post-modification testing was adequate to establish the operability of the SSC as modified.

These activities constitute completion of one sample of permanent modifications, as defined in Inspection Procedure 71111.18.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed five post-maintenance testing activities that affected risk-significant structures, systems, or components SSCs:

- On January 14, 2015, containment fan coolers train A temperature control valve
- On January 20, 2015, nitrogen accumulator #2 outlet pressure control
- On January 27, 2015, component cooling water temperature control card
- On February 10, 2015, wet cooling tower B fan 4
- On March 4, 2015, emergency diesel generator A following emergent maintenance

The inspectors reviewed licensing- and design-basis documents for the SSCs and the maintenance and post-maintenance test procedures. The inspectors observed the performance of the post-maintenance tests to verify that the licensee performed the tests in accordance with approved procedures, satisfied the established acceptance criteria, and restored the operability of the affected SSCs.

These activities constitute completion of five post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed six risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the structures, systems, and components SSCs were capable of performing their safety functions:

In-service tests:

- On March 11, 2013, chilled water system train B

Reactor coolant system leak detection tests:

- On February 23, 2015, reactor coolant system leak detection

Other surveillance tests:

- On January 26, 2015, surveillance testing of the auxiliary component cooling water A component cooling water shell side relief valve ACC-121A
- On February 11, 2015, auxiliary component cooling water pump B
- On February 24, 2015, low pressure safety injection pump A
- On March 18, 2015, reactor trip circuit breaker testing

The inspectors verified that these tests met technical specification requirements, that the licensee performed the tests in accordance with their procedures, and that the results of the test satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected SSCs following testing.

These activities constitute completion of six surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Public Radiation Safety and Occupational Radiation Safety

2RS5 Radiation Monitoring Instrumentation (71124.05)

a. Inspection Scope

The inspectors evaluated the accuracy and operability of the radiation monitoring equipment used by the licensee (1) to monitor areas, materials, and workers to ensure a radiologically safe work environment, and (2) to detect and quantify radioactive process streams and effluent releases. The inspectors interviewed licensee personnel, walked down various portions of the plant, and reviewed licensee performance in the following areas:

- Selected plant configurations and alignments of process, post-accident, and effluent monitors with descriptions in the Final Safety Analysis Report and the offsite dose calculation manual

- Selected instrumentation, including effluent monitoring instrument, portable survey instruments, area radiation monitors, continuous air monitors, personnel contamination monitors, portal monitors, and small article monitors to examine their configurations and source checks

- Calibration and testing of process and effluent monitors, laboratory instrumentation, whole body counters, post-accident monitoring instrumentation, portal monitors, personnel contamination monitors, small article monitors, portable survey instruments, area radiation monitors, electronic dosimetry, air samplers, and continuous air monitors

- Audits, self-assessments, and corrective action documents related to radiation monitoring instrumentation since the last inspection

These activities constitute completion of one sample of radiation monitoring instrumentation as defined in Inspection Procedure 71124.05-05.

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

a. Inspection Scope

The inspectors evaluated whether the licensee maintained gaseous and liquid effluent processing systems and properly mitigated, monitored, and evaluated radiological discharges with respect to public exposure. The inspectors verified that abnormal radioactive gaseous or liquid discharges and conditions, when effluent radiation monitors are out-of-service, were controlled in accordance with the applicable regulatory requirements and licensee procedures. The inspectors verified that the licensee's quality control program ensured radioactive effluent sampling and analysis adequately quantified and evaluated discharges of radioactive materials. The inspectors verified the adequacy of public dose projections resulting from radioactive effluent discharges. The inspectors interviewed licensee personnel and reviewed or observed the following items:

- Radiological effluent release reports since the previous inspection and reports related to the effluent program issued since the previous inspection

- Effluent program implementing procedures, including sampling, monitor setpoint determinations, and dose calculations

- Equipment configuration and flow paths of selected gaseous and liquid discharge system components, filtered ventilation system material condition, and significant changes to their effluent release points, if any, and associated 10 CFR 50.59 reviews

- Selected portions of the routine processing and discharge of radioactive gaseous and liquid effluents (including sample collection and analysis)

- Controls used to ensure representative sampling and appropriate compensatory sampling

- Results of the inter-laboratory comparison program

- Effluent stack flow rates

- Surveillance test results of technical specification-required ventilation effluent discharge systems since the previous inspection

- Significant changes in reported dose values

- A selection of radioactive liquid and gaseous waste discharge permits

- Part 61 analyses and methods used to determine which isotopes are included in the source term

- Offsite dose calculation manual changes

- Meteorological dispersion and deposition factors

- Latest land use census

- Records of abnormal gaseous or liquid tank discharges

- Groundwater monitoring results

- Changes to the licensee's written program for identifying and controlling contaminated spills/leaks to groundwater

- Identified leakage or spill events and entries made into 10 CFR 50.75(g) records, if any, and associated evaluations of the extent of the contamination and the radiological source term

- Offsite notifications and reports of events associated with spills, leaks, and groundwater monitoring results

- Audits, self-assessments, reports, and corrective action documents related to radioactive gaseous and liquid effluent treatment since the last inspection

These activities constitute completion of one sample of radioactive gaseous and liquid effluent treatment, as defined in Inspection Procedure 71124.06-05.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (71124.07)

a. Inspection Scope

The inspectors evaluated whether the licensee's radiological environmental monitoring program quantified the impact of radioactive effluent releases to the environment and sufficiently validated the integrity of the radioactive gaseous and liquid effluent release program. The inspectors verified that the radiological environmental monitoring program was implemented consistent with the licensee's technical specifications and offsite dose calculation manual, and that the radioactive effluent release program met the design objective in Appendix I to 10 CFR Part 50. The inspectors verified that the licensee's radiological environmental monitoring program monitored non-effluent exposure pathways, was based on sound principles and assumptions, and validated that doses to members of the public were within regulatory dose limits. The inspectors reviewed or observed the following items:

- Annual environmental monitoring reports and offsite dose calculation manual
- Selected air sampling and dosimeter monitoring stations
- Collection and preparation of environmental samples
- Operability, calibration, and maintenance of meteorological instruments
- Selected events documented in the annual environmental monitoring report which involved a missed sample, inoperable sampler, lost dosimeter, or anomalous measurement
- Selected structures, systems, or components that may contain licensed material and has a credible mechanism for licensed material to reach ground water
- Records required by 10 CFR 50.75(g)
- Significant changes made by the licensee to the offsite dose calculation manual as the result of changes to the land census or sampler station modifications since the last inspection
- Calibration and maintenance records for selected air samplers, composite water samplers, and environmental sample radiation measurement instrumentation

- Inter-laboratory comparison program results

- Audits, self-assessments, reports, and corrective action documents related to the radiological environmental monitoring program since the last inspection

These activities constitute completion of one sample of radiological environmental monitoring program as defined in Inspection Procedure 71124.07-05.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

a. Inspection Scope

The inspectors evaluated the effectiveness of the licensee's programs for processing, handling, storage, and transportation of radioactive material. The inspectors interviewed licensee personnel and reviewed the following items:

- The solid radioactive waste system description, process control program, and the scope of the licensee's audit program

- Control of radioactive waste storage areas including container labeling/marking and monitoring containers for deformation or signs of waste decomposition

- Changes to the liquid and solid waste processing system configuration, including a review of waste processing equipment that is not operational or abandoned in place

- Radio-chemical sample analysis results for radioactive waste streams and use of scaling factors and calculations to account for difficult-to-measure radionuclides

- Processes for waste classification, including use of scaling factors and 10 CFR Part 61 analysis

- Shipment packaging, surveying, labeling, marking, placarding, vehicle checking, driver instructing, and preparation of the disposal manifest

- Audits, self-assessments, reports, and corrective action reports radioactive solid waste processing, and radioactive material handling, storage, and transportation performed since the last inspection

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

These activities constitute completion of one sample of radioactive solid waste processing, and radioactive material handling, storage, and transportation as defined in Inspection Procedure 71124.08-05.

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR 71.5, "Transportation of Licensed Material," and 49 CFR 172, Subpart I, "Safety and Security Plans." Specifically, licensee personnel failed to adequately develop their transportation security plan. This resulted in all three Category 2 shipments, sent in 2013 and 2014, being transported on public highways without the licensee being able to demonstrate that security risk assessments were performed.

Description. Title 10, CFR 71.5, requires licensees to comply with specific transportation regulations which are located in Title 49 of the Code of Federal Regulations. The requirement for a transportation security plan for hazardous material is detailed in 49 CFR 172, Subpart I, "Safety and Security Plans," which includes the transport of Category 1 and Category 2 radioactive material. The required components of a security plan are specified in 49 CFR 172.802, "Components of a Security Plan." The licensee uses Procedure EN-RW-106, "Integrated Transportation Security Plan," to implement the requirements of 49 CFR 172.802. The inspectors reviewed this procedure and determined that the licensee's transportation security plan (TSP) did not contain instructions for the assessment of transportation security risks for shipments. Instead, EN-RW-106, Section 5.3, "Risk Assessment," puts the onus for a transportation security plan on the carrier. Further, Section 5.4, "Carrier TSP and Contracts Management," states that "it is not necessary to review and approve each carrier's TSP prior to implementation by carrier." The inspectors concluded that it was the licensee's responsibility to assess and address transportation security events that could occur with shipments en-route, contrary to their stated reliance on unapproved carrier TSPs.

The licensee's transportation security plan also details the responsibilities of specific licensee personnel, none of which were met. Section 4.0, "Responsibilities," of Procedure EN-RW-106, states, in part:

- Security Director/Designee is responsible for the following key elements of the TSP-RA [transportation security plan – risk assessment] by ensuring Security personnel are trained on the applicable requirements of: Personnel Security, Unauthorized Access, and En-route Security.

- Training Manager is responsible for the key elements of the procedure to ensure that Hazardous Material (HAZMAT) training requirements outlined in Section 5.0 of this procedure are developed and implemented.

- Plant Security Superintendent is responsible for ensuring Security personnel receive appropriate training, including security awareness training, in accordance with this procedure.

At the time of this inspection, Security personnel had not received training with respect to 49 CFR 172.802, including their responsibility for performing en-route security risk assessments.

Analysis. The licensee's failure to adequately develop its transportation security plan is a performance deficiency. Licensee Procedure EN-RW-106, "Integrated Transportation Security Plan," did not include all the components required by 49 CFR 172.802, "Components of a Security Plan." As a result, over the past two years, three Category 2 shipments of radioactive material were transported on public highways without the licensee being able to demonstrate that security risk assessments were performed. The performance deficiency is more than minor because it is associated with the program and process attribute of the Public Radiation Safety cornerstone. It adversely affects the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain. In accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," and Appendix D, "Public Radiation Safety Significance Determination Process," dated February 12, 2008, the inspectors determined the finding has very low safety significance (Green) because Waterford had an issue involving transportation of radioactive waste, but it did not involve: (1) a radiation limit being exceeded, (2) a breach of package during transport, (3) a certificate of compliance issue, (4) a low level burial ground nonconformance, or (5) a failure to make notifications or provide emergency information. The finding has a resources cross-cutting aspect in the human performance cross-cutting area because licensee management did not ensure that personnel, equipment, procedures, and other resources were available and adequate to support nuclear safety (H.1).

Enforcement. Title 10 CFR 71.5, "Transportation of Licensed Material," states, in part, each licensee who transports licensed material outside the site of usage shall comply with the applicable requirements of the DOT regulations in 49 CFR Parts 171 through 180. Title 49 CFR 172.800(b) requires, in part, that each person who offers for transportation IAEA Code of Conduct Category 1 and 2 materials must develop and adhere to a transportation security plan. Title 49 CFR 172.802(a) requires an assessment of transportation security risks for shipments of the hazardous materials listed in § 172.800 and appropriate measures to address the assessed risks.

Contrary to the above, as of October 1, 2010, the licensee failed to include an assessment of transportation security risks for shipments of the hazardous materials listed in § 172.800, or appropriate measures to address the assessed risks in its transportation security plan. Specifically, Procedure EN-RW-106, "Integrated Transportation Security Plan," Revisions 2 and 3, were not adequately developed to include assessments of security risks of shipments or measures to address those risks.

The planned corrective actions were still being evaluated. The inspectors determined that no immediate safety concern existed because the shipments that had been made were received with no issues and the licensee had no pending Category 2 or higher shipments. The licensee documented this issue in the corrective action program as Condition Report CR-W3-2015-00506. The violation was of very low safety significance and is being treated as a non-cited violation, consistent with Section 2.3.2.a. of the

Enforcement Policy: NCV 05000382/2015001-03; "Failure to Develop the Transportation Security Plan."

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours (IE01)

a. Inspection Scope

The inspectors reviewed licensee event reports (LERs) for the period of January 1, 2014, through December 31, 2014, to determine the number of scrams that occurred. The inspectors compared the number of scrams reported in these LERs to the number reported for the performance indicator. Additionally, the inspectors sampled monthly operating logs to verify the number of critical hours during the period. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams per 7000 critical hours performance indicator for Unit 3, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Unplanned Power Changes per 7000 Critical Hours (IE03)

a. Inspection Scope

The inspectors reviewed operating logs and corrective action program records for the period of January 1, 2014, through December 31, 2014, to determine the number of unplanned power changes that occurred. The inspectors compared the number of unplanned power changes documented to the number reported for the performance indicator. Additionally, the inspectors sampled operating logs to verify the number of critical hours during the period. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned power outages per 7000 critical hours performance indicator for Unit 3, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Unplanned Scrams with Complications (IE04)

a. Inspection Scope

The inspectors reviewed the licensee's basis for including or excluding in this performance indicator each scram that occurred between January 1, 2014, through December 31, 2014. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams with complications performance indicator for Unit 3, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

.1 Routine Review

a. Inspection Scope

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee's corrective action program and periodically attended the licensee's condition report screening meetings. The inspectors verified that licensee personnel were identifying problems at an appropriate threshold and entering these problems into the corrective action program for resolution. The inspectors verified that the licensee developed and implemented corrective actions commensurate with the significance of the problems identified. The inspectors also reviewed the licensee's problem identification and resolution activities during the performance of the other inspection activities documented in this report.

b. Findings

No findings were identified.

4OA3 Follow-up of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report (LER) 05000382/2014-003-00, Unexpected Loss of Wet Cooling Tower Fan Results in Both Trains of Ultimate Heat Sink Inoperable

a. Inspection Scope

On August 8, 2014, there was an unexpected trip of a train A wet cooling tower fan, rendering ultimate heat sink train A inoperable. At the time, ultimate heat sink train B was already inoperable due to a planned system maintenance outage. The licensee entered Technical Specification 3.7.4 Action (b), which required restoring one train of ultimate heat sink to an operable status or be in hot shutdown within the following 6 hours and cold shutdown within the following 30 hours. The licensee restored train B to an operable status approximately 83 minutes after the trip of the train A wet cooling tower fan and exited Technical Specification 3.7.4 Action (b). After restoring the tripped fan to service, the licensee performed an apparent cause analysis and determined that the trip was due to an insufficiently tightened thermal overload connection. The inspectors' review of this event resulted in a non-cited violation documented below. This licensee event report is closed.

These activities constitute completion of one event follow-up sample, as defined in Inspection Procedure 71153.

b. Findings

Inadequate Procedure for Tightening Thermal Overload Connections for Safety-Related Components

Introduction. The inspectors reviewed a self-revealing, Green, non-cited violation of Technical Specification 6.8.1.a and Regulatory Guide 1.33, Revision 2, Appendix A, for the failure to perform maintenance that could affect the performance of safety-related equipment in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Specifically, until December 17, 2014, the licensee used a procedure that did not contain sufficient detail for tightening a thermal overload connection that resulted in a loose connection in the motor starter, which led ultimately to a trip of a wet cooling tower (WCT) fan.

Description. On August 18, 2014, at 8:53 a.m., Operations received annunciator B0509, "Wet Cooling Tower 'A' Power Lost." The plant monitoring computer indicated that WCT fan 6A was secured and all other train A WCT fans were running. Due to this indication, ultimate heat sink train A was declared inoperable.

At the time, component cooling water (CCW) train B was inoperable for planned maintenance. The inoperability of CCW train B also rendered train B ultimate heat sink inoperable. As a result, both trains of the ultimate heat sink were inoperable. The licensee entered Technical Specification 3.7.4 Action (b), which required restoring one train of ultimate heat sink to an operable status or be in hot shutdown within the following 6 hours and cold shutdown within the following 30 hours.

The licensee immediately ceased maintenance and began the restoration of CCW train B to an operable status. At 10:16 a.m., CCW train B was declared operable and Technical Specification 3.7.4 Action (b) was exited.

The licensee's troubleshooting process revealed that the trip of WCT fan 6A was due to localized heating associated with the thermal overload for the motor starter, in that a loose mechanical connection at one of the three connections at the motor termination caused excessive heating. The licensee discovered galling of the threads that prevented adequate tightening of the connection for fan 6A. As part of their extent-of-condition work, the licensee found four additional loose connections between the thermal overloads and motor starters on four separate motors, none of which showed evidence of galling.

The licensee's apparent-cause evaluation concluded that the galled threads prevented adequate tightening of the thermal overload connection, which in turn caused the trip of WCT fan 6A. The licensee also determined that ME-004-151, "480-VAC Motor Control Center (MCC)," Revision 304, which they used for performing maintenance on 480 VAC motor control centers and their starters, did not contain enough information to ensure the subject connections were tight. Specifically, step 9.2.13 directed personnel performing maintenance on the motors only to "ensure all visible MCC bus/wire connection are tight," and did not provide any additional detail regarding how to ensure tightness. In response to this finding, the licensee revised ME-004-151 to include a positive check of the wire after tightening the connections to verify adequate tightness.

Since 2011, the licensee has identified six other loose connections. The inspectors determined that the licensee had appropriately categorized and dispositioned those other loose connections within its corrective action program.

The inspectors determined that the finding did not have a cross-cutting aspect because the most significant contributor to the performance deficiency occurred more than two years ago and did not reflect current licensee performance.

Analysis. The failure to perform maintenance that could affect the performance of safety-related equipment in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances was a performance

deficiency. The inspectors concluded that the performance deficiency was more than minor and therefore was a finding because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to ensure successful tightening of the thermal overload connections for the WCT fans adversely affected the capability of the plant's ultimate heat sink.

The inspectors used NRC IMC 0609, Attachment 4, "Initial Characterization of Findings," to evaluate this issue for its impact on the Mitigating Systems Cornerstone. The initial screening directed the inspectors to use Appendix A, "The Significance Determination Process (SDP) for Findings at-Power," Exhibit 2, "Mitigating Systems Screening Questions," to evaluate this issue. The inspectors determined the finding was of very low safety significance (Green) because it affected one train for less than the allowed outage time, as the train B planned outage was unrelated to the performance deficiency. The finding did not affect the design or qualification of the system, did not represent the loss of a safety system or function, did not represent the loss of function of at least a single train for greater than its Technical Specification allowed outage time, and did not represent an actual loss of function of one or more non-Technical Specification trains of equipment.

The inspectors determined that the finding did not have a cross-cutting aspect because the most significant contributor to the performance deficiency occurred more than two years ago and did not reflect current licensee performance.

Enforcement. Technical Specification 6.8.1.a, requires, in part, that procedures shall be established, implemented and maintained covering "the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2." Section 9.a of Regulatory Guide 1.33, Revision 2, Appendix A, requires, in part, that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. The licensee established procedure ME-004-151, "480-VAC Motor Control Center (MCC)," Revision 304, to meet this requirement when performing maintenance on 480 VAC motor control centers and their starters. Specifically, step 9.2.13 provided direction to verify tightness of connections.

Contrary to the above, prior to December 17, 2014, the licensee did not ensure that maintenance that could affect the performance of safety-related equipment was performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Specifically, step 9.2.13 of ME-004-151 was not appropriate to the circumstances because it did not contain appropriate detail to ensure that the wire connections between the thermal overloads and motor starters of the WCT fans were tight. As a result, WCT fan 6A tripped, which resulted in the inoperability of the ultimate heat sink train A. The licensee entered this condition into their corrective action program as Condition Report CR-WF3-2014-04430. The immediate corrective action taken was to restore WCT fan 6A to service. The long-term corrective action was to add additional detail to ME-004-151 to ensure thermal overload connections are verified secure after their mechanical connections are tightened.

Because this violation was of very low safety significance and the licensee entered the issue into their corrective action program, this violation was treated as a non-cited violation, consistent with Section 2.3.2.a. of the Enforcement Policy:
NCV 05000382/2015001-04, "Inadequate Procedure for Tightening Thermal Overload Connections for Safety-Related Components."

4OA5 Other Activities

Failure to Identify and Correct Through-Wall Corrosion on Emergency Diesel Generator A and B Day Tank Vents

a. Inspection Scope

This finding was documented in NRC Inspection Report 05000382/2014007 (AV 05000382/2014007-05, Section 1R21.2.12.3) as an apparent violation with potential Greater than Green significance. The team reviewed the licensee's corrective action documents, temporary modifications, and design calculations associated with the scupper drain and water contamination of the emergency diesel generator A and B day tanks. In addition, the team observed the licensee's testing of a similar Cooper Bessemer diesel engine, and of the emergency diesel generator day tank scupper roof drain. The team reviewed the licensee's procedures, methodology, actual testing, compare and contrast analysis, and testing results and conclusions to better inform the risk evaluation of the emergency diesel generators tolerance to water contamination in the diesel fuel oil supply.

b. Findings

Introduction. The team identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to identify and correct a condition adverse to quality. Specifically, the licensee failed to identify and correct through-wall corrosion on the emergency diesel generator A and B day tank vents.

Description. On October 22, 2014, the team observed that the emergency diesel generator A and B day tank vent pipes were significantly corroded. Prior to discovery by the team, the licensee had not identified or evaluated the vent pipe corrosion. The team determined that the licensee failed to follow Procedure EN-LI-102, "Corrective Action Program," Revision 24, which requires for conditions adverse to quality that a condition report be initiated promptly/timely, and that operability, functionality, and immediate reportability be reviewed for the condition. Attachment 9.2, Section 4, "Design and Licensing Basis Issues," specifically provides examples of adverse conditions as they concern design basis issues; corrosion is a specific example cited.

To determine the risk significance of this finding, the risk-important sequences considered by the NRC risk analyst included heavy-rain-induced losses of offsite power with the consequential failure of both emergency diesel generators. These sequences were dominated by significant uncertainty in the conditional probability of a loss of offsite

power given a rain event of varying intensity and the tolerance of the Cooper Bessemer diesel generators to water in the fuel oil supply.

To address both of these uncertainties, the licensee performed testing on the emergency diesel generator day tank roof scupper drain and on a similar Cooper Bessemer diesel engine. The licensee determined that the scupper drain allowed water to flow more easily than modeled and resulted in the amount of ponding on the roof being less than predicted. This resulted in a higher rain intensity being required to cause both diesel generators to be impacted. The licensee also determined that the Cooper Bessemer diesel engine was able to adequately perform, start and run, with water in the fuel oil supply. The licensee tested several different water amounts, all of which were significantly higher than the Cooper Bessemer documentation that specifies fuel oil is limited to less than 0.1 percent water/sediment content. See Attachment 2, "Final Detailed Risk Evaluation," for more information.

The licensee's immediate operability determination concluded that the emergency diesel generators were operable since there was no severe weather in the forecast for the immediate future. Other corrective actions that the licensee performed included removing the foreign material from the roof, installing a rubber wrap around the vent pipes to cover the open holes, and creating small concrete berms immediately around the vent pipes to direct water away from the vent pipes. These corrective actions addressed the team's immediate operability concerns.

The team determined that had system engineering been performing walkdowns as required by EN-DC-178, "System Walkdowns," Revision 7, the licensee would likely have identified the corrosion. The procedure specifically requires walking down all accessible areas of the system; it provides specific instructions for using permanently installed ladders, coordinating with other organizations, etc., to walk down accessible areas that are not normally accessed. In addition, the procedure specifically requires inspection for corrosion. The team determined that system engineering failed to follow the procedure or did not adequately implement the procedure. The licensee documented these concerns in Condition Report CR-WF3-2014-05413 and CR-WF3-2014-05529.

Analysis. The failure to identify and correct through-wall corrosion on the emergency diesel generator A and B day tank vents was a performance deficiency. This performance deficiency was more than minor because it was associated with the design control and equipment performance attributes of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to events to prevent undesirable consequences. Specifically, the licensee failed to identify, evaluate, and correct through-wall corrosion on the emergency diesel generator A and B day tank vents. In accordance with IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the finding screened to Exhibit 4, "External Events Screening Questions," because it screened as potentially risk-significant due to seismic, flooding, or severe weather. Per Exhibit 4, the finding screened to a detailed risk evaluation because if the safety functions of emergency diesel generators A and B were assumed completely lost, it

would degrade two trains of a multi-train system and it would degrade one or more trains of a system that supports a risk-significant system.

A Region IV senior reactor analyst performed a final detailed risk evaluation. The finding was of very low safety significance (Green). The change to the core damage frequency was approximately $4x10^{-7}$/year. The risk-important sequences included a heavy rain event greater than or equal to 6 inches per hour followed by a random loss of offsite power within the next two weeks. The risk significance was mitigated by the tolerance of the diesel generators to water in the fuel oil and the operators' ability to restore offsite power within 4 hours of the loss of offsite power.

This finding had a cross-cutting aspect in the area of human performance associated with procedure adherence because the licensee failed to ensure that individuals follow process, procedures, and work instructions. [H.8]

Enforcement. Title 10 CFR 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 nonconformance are promptly identified and corrected. The licensee's measures are established by Procedures EN-DC-178, "System Walkdowns," which requires inspection for corrosion, and EN-LI-102 "Corrective Action Program," which requires that a condition report be initiated promptly/timely for a condition adverse to quality, and that operability, functionality, and immediate reportability be reviewed. Attachment 9.2 of EN-LI-102, Section 4, "Design and Licensing Basis Issues," specifically provides examples of adverse conditions as they concern design basis issues, corrosion is a specific example cited. Contrary to the above, as of October 22, 2014, the licensee failed to identify and correct a condition adverse to quality. Specifically, the licensee failed to identify and correct through-wall corrosion on the emergency diesel generator A and B day tank vents. In response to this issue, the licensee performed an immediate operability determination based on severe weather in the area, installed a temporary repair using a rubber wrap, and installed a small concrete berm to minimize the potential amount of water in the immediate area. This finding was entered into the licensee's corrective action program as Condition Reports CR-WF3-2014-05413 and CR-WF3-2014-05529. Because this finding was of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a. of the NRC Enforcement Policy: NCV 05000382/2014007-05, "Failure to Identify and Correct Through Wall Corrosion on Emergency Diesel Generator A and B Day Tank Vents."

4OA6 Meetings, Including Exit

Exit Meeting Summary

On January 16, 2015, the radiation protection inspectors presented the inspection results to Mr. M. Chisum, Site Vice President, and other members of the licensee's staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On April 16, 2015, the resident inspectors presented the inspection results to Mr. M. Chisum and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On April 16, 2015, the component design basis inspection team conducted a telephonic exit to present the inspection results of the emergency diesel generator day tank final significance determination to Mr. M. Chisum and other members of the licensee staff. The licensee acknowledged the issue presented. The licensee confirmed that any proprietary information reviewed by the team had been returned or destroyed.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Chisum, Site Vice President, Operations
M. Richey, General Manager, Plant Operations
J. Battaglia, Supervisor, Chemistry
B. Blount, Technician, Chemistry
J. Brawley, Supervisor, Radiation Protection
D. Breaud, Radiological Effluents Specialist, Chemistry
J. Briggs, Manager, Maintenance
L. Brown, Specialist, Regulatory Assurance
J. Cary, Supervisor, Operations
M. Chaisson, Supervisor, Radiation Protection
M. Chase, Acting Director, Regulatory & Performance Improvement
R. Creel, Superintendent, Security
K. Crissman, Senior Manager, Maintenance
D. Frey, Manager, Radiation Protection
R. Gilmore, Manager, Systems and Components
M. Haydel, Manager, Design & Program Engineering
P. Hernandez, Supervisor, Reactor Engineering
A. James, Manager, Security
J. Jarrell, Manager, Regulatory Assurance
N. Justice, Technician, Radiation Protection
M. Kingham, Superintendent, I & C Maintenance
H. Landeche, Senior Technician, Instruments and Controls
S. Landry, Radiation Protection Specialist
B. Lanka, Director, Engineering
N. Lawless Manager, Chemistry
B. Lee, Engineer, Systems and Components
B. Lindsey, Senior Manager, Operations
W. McKinney, Manager, Training
S. Meiklejohn, Senior Licensing Specialist
D. Miller, Radiation Control Supervisor, Radiation Protection
M. Mills, Manager, Nuclear Oversight
L. Milster, Licensing Engineer, Regulatory Assurance
R. Osborne, Manager, Performance Improvement
B. Pellegrin, Senior Manager, Production
N. Petit, Supervisor, Design Engineering
R. Porter, Manager, Design & Program Engineering
D. Reider, Supervisor, Quality Assurance
C. Rich, Jr., Director, Regulatory & Performance Improvement
D. Santineau, Supervisor, Instruments and Co
R. Simpson, Superintendent, Operator Training
J. Vollmer, Specialist, Radiation Protection
R. Wall, Engineer, Reactor Engineering
J. Wilburn, HVAC Systems Technician, Engineering

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000382-2015-01	NCV	Failure to Identify and Perform Testing of Safety-Related Dry Cooling Tower Tube Bundle Isolation Valves (Section 1R04)
05000382-2015-02	NCV	Failure to Identify and Correct a Condition Adverse to Fire Protection (Section 1R05)
05000382-2015-03	NCV	Failure to Develop the Transportation Security Plan (Section 2RS8)
05000382-2015-04	NCV	Inadequate Procedure for Tightening Thermal Overload Connections for Safety-Related Components (Section 4OA3)

Closed

05000382/2014-003-00	LER	Unexpected Loss of Wet Cooling Tower Fan Results in Both Trains of Ultimate Heat Sink Inoperable (Section 4OA3)
05000382/2014-007-05	NCV	Failure to Identify and Correct Through Wall Corrosion on Emergency Diesel Generator A and B Day Tank Vents (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures/Documents

Number	Title	Revision
OP-002-007	Freeze Protection and Temperature Maintenance	20

Section 1R04: Equipment Alignment

Procedures/Documents

Number	Title	Revision
CEP-IST-4	Standard on IST	308
EC 53118	Prodive Input Regarding Operability of Ultimate Heat Sink With Isolated Cooling Tower Tube Bundle for Maintenance	0
ECM97-006	Design Basis for CCW Makeup	1

Procedures/Documents

Number	Title	Revision
EP-002-100	Technical Support Center (TSC) Activation, Operation, and Deactivation	42
MNQ-9-17	Tornado Multiple Missile Protection of Cooling Towers	3
MNQ-9-62	CCW Water Loss Due to a Tornado Missile Penetrating a Dry Cooling Tower	1
OP-002-003	Component Cooling Water	313
OP-009-001	Containment Spray	306
OP-009-008	Safety Injection System	35
SEP-WF3-IST-1	WF3 IST Basis Document	1
SEP-WF3-IST-2	WF3 IST Plan	1

Condition Reports

CR-WF3-2015-00226	CR-WF3-2015-01482	CR-WF3-2015-00688	CR-WF3-1996-01652
CR-WF3-2015-00828	CR-WF3-1996-01686		

Work Orders

WO 00346852	WO 52501143	WO 00362396

Section 1R05: Fire Protection

Procedures/Documents

Number	Title	Revision
NS-CP-001	Waterford-3 S.E.S Prefire Strategy Condensate Polisher Building – 1st Floor, including condensate Polisher Control Room, 480V Switchgear, Treated Effluent Storage Tank, Backwash & Storage Tank, Saddle Tank, Pump Floor, Sumps #1 and #2	2
OP-903-053	Fire Protection System Pump Operability Test	20
RAB 17-001	Waterford-3 S.E.S Prefire Strategy – CCW Heat Exchanger	8
RAB 21-001	Waterford-3 S.E.S Prefire Strategy – CCW Pump	7
RAB 33-001	Waterford-3 S.E.S Prefire Strategy Shutdown Cooling Heat Exchanger Rooms “A” and “B”	10

Procedures/Documents

Number	Title	Revision
RAB 8A-001	Waterford-3 S.E.S Prefire Strategy Switchgear Room “A”	10
UNT-003-013	Fire Protection Program	12

Condition Reports

CR-WF3-2015-00132 CR-WF3-2015-01023

Section 1R06: Flood Protection Measures

Procedures/Documents

Number	Title	Revision
MNQ3-5	Flooding Analysis Outside Containment	4

Section 1R07: Heat Sink Performance

Procedures/Documents

Number	Title	Revision
SEP-HX-WF3-001	Generic Letter 89-13 Heat Exchanger Test Basis	0
PE-004-021	CCW Heat Exchanger Performance Test	4

Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance

Procedures/Documents

Number	Title	Revision
	Simulator Exercise Guide Scenario E-160	1
EN-OP-115	Conduct of Operations	15
EP-001-001	Recognition & Classification of Emergency Conditions	30
EP-001-020	Alert	308
OP-009-002	Emergency Diesel Generator	324
OP-901-130	Reactor Coolant Pump Malfunction	8
OP-901-221	Secondary System Transient	1
OP-902-000	Standard Post Trip Actions	15

Procedures/Documents

Number	Title	Revision
OP-902-006	Loss of Main Feedwater Recovery Procedure	16
OP-902-009	Standard Appendices	310
OP-903-066	Electrical Breaker Alignment Check	302
OP-903-068	Emergency Diesel Generator and Subgroup Relay Operability Verification	311

Section 1R12: Maintenance Effectiveness

Procedures/Documents

Number	Title	Revision
	Waterford Systems Function Failures for 36 months	February 24, 2015
	System Health Report – Component Cooling Water	March 18, 2015
	Maintenance Rule Data – Component Cooling Water	March 2015
EN-DC-205	Maintenance Rule Monitoring	5

Condition Reports

CR-WF3-2014-04688	CR-WF3-2014-04689	CR-WF3-2013-02375	CR-WF3-2014-04430
CR-WF3-2011-00679	CR-WF3-2012-01094		

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures/Documents

Number	Title	Revision
EN-WM-104	On Line Risk Assessment	9
OI-037-000	Operations' Risk Assessment Guideline	306
OP-901-524	Fire in Areas Affecting Safe Shutdown	13
OP-903-006	Reactor Trip Circuit Breaker Test	10
SD-4KV	Electrical Distribution – 4KV	6

Condition Reports

CR-WF3-2015-00522	CR-WF3-2015-00524	CR-WF3-2015-00622	CR-WF3-2015-01170
CR-WF3-2015-00523	CR-WF3-2015-00525	CR-WF3-2015-1664	CR-WF3-2015-01690
CR-WF3-2015-01664			

Work Orders

WO 52592423 WO 00404178

Section 1R15: Operability Determinations and Functionality Assessments

Procedures/Documents

Number	Title	Revision
EC 55536	Operability Input for Corroded Box B30201-SB Support, Corroded Conduit 32598E-SB Support, Corroded Support FWRR-296, and Steel Angle Column Support for EFW 228B Air Supply Line.	
EN-OP-104	Operability Determination Process	7
OP-009-003	Emergency Feedwater	306
OP-903-056	Fire Protection Functional Test	309
SD-EFW	Emergency Feedwater	12

Condition Reports

CR-WF3-2015-00353	CR-WF3-2015-00463	CR-WF3-2015-00612	CR-WF3-2015-00368
CR-WF3-2015-00368	CR-WF3-2015-00457	CR-WF3-2015-00421	CR-WF3-2015-00766
CR-WF3-2015-00995	CR-WF3-2015-00900	CR-WF3-2015-00172	CR-WF3-2015-00878
CR-WF3-2015-00744			

Section 1R18: Plant Modifications

Procedures/Documents

Number	Title	Revision
EC 53084	Dry Cooling Tower Tube Plug	0
EC 53834	DCT B Tube Plug Vendor Telephone Documentation	0
EC 55237	Input for CR-WF3-2015-0574 Dry Cooling Tower A Tube Bundle 2B Tube Leaks	0
EC 55304	Evaluate Potential Plugging of Dry Cooling Tower Tubes	0
EN-LI-100	Process Applicability Determination	16

Condition Reports

CR-WF3-2015-00574	CR-WF3-2015-00597	CR-WF3-2015-00688

Work Order

WO 00396520

Section 1R19: Post-Maintenance Testing

Procedures/Documents

Number	Title	Revision
ER-W3-01-0096	Evaluation of Temporary Emergency Diesel at Power Ops Condition	January 29, 2001
ME-007-006	480 VAC and Less Squirrel Cage Induction Motors	16
MI-004-398	Guideline for Air Operated Valve (AOV) Diagnostics	304
MI-005-211	Calibration of Control Valves and Accessories	10
MI-005-563	Component Cooling Water Temperature Control Loop Calibration CC IT7075 A and CC IT7076 A or CC IT7075 B and CC IT7076 B	305
MM-003-015	4.5 Year Emergency Diesel Engine Inspection	303
OP-009-002	Emergency Diesel Generator	324
OP-903-119	Secondary Auxiliaries Quarterly IST Valve Tests	19
OP-TEM-008	Emergency Diesel Generator A(B) Backup Diesel Generators	10
W3-DBD-002	Emergency Diesel Generator & Automatic Load Sequencer	303

Condition Reports

CR-WF3-2015-01307 CR-WF3-2015-01170

Work Orders

WO 52492926	WO 52478863	WO 00384215	WO 52509625
WO 40769701	WO 52588635	WO 52520830	

Section 1R22: Surveillance Testing

Procedures/Documents

Number	Title	Revision
MM-007-033	Testing Requirements for IST Valves	312
OI-040-000	Reactor Coolant System Leakage Monitoring	14
OP-903-006	Reactor Trip Circuit Breaker Test	10

Procedures/Documents

Number	Title	Revision
OP-903-024	Reactor Coolant System Water Inventory Balance	22
OP-903-030	Safety Injection Pump Operability Verification	21
OP-903-050	Component Cooling Water and Auxiliary Component Cooling Water Pump and Valve Operability Test	30
SEP-WF3-IST-1	WF3 IST Basis Document	1
W3-DBD-4	Component Cooling Water Auxiliary Component Cooling Water	303

Condition Reports

CR-WF2-2014-04748	CR-WF2-2014-06236	CR-WF2-2015-00045	CR-WF2-2015-00993
CR-WF3-2015-00768	CR-WF3-2015-00769	CR-WF3-2015-00770	CR-WF3-2015-00544
CR-WF3-2015-00526			

Work Orders

WO 52595060	WO 52597539	WO 52509990	WO 00403959
WO 00395537			

2RS5 Radiation Monitoring Instrumentation (71124.05)

Procedures/Documents

Number	Title	Revision
EN-CY-102	Laboratory Analytical Quality Control	5
EN-CY-110	Chemistry Gamma Spectroscopy System Operation	2
EN-RP-301	Radiation Protection Instrument Control	7
EN-RP-303	Source Checking of Radiation Protection Instrumentation	4
EN-RP-308	Operation and Calibration of Gamma Scintillation Tool Monitors	7
HP-002-356	Operation of the Canberra Fast Scan Whole Body Counter	003
HP-002-516	Confirmation of J.L. Shepherd Model 78-2M	301

Self-Assessment

Number	Title	Date
LO-WLO-2014-0038	Pre-NRC Focused Assessment	September 9, 2014

Condition Reports

CR-W3-2013-04674	CR-W3-2013-05401	CR-W3-2014-00016	CR-W3-2014-00264
CR-W3-2014-02121	CR-W3-2014-03089	CR-W3-2014-03299	CR-W3-2014-03907
CR-W3-2014-04312	CR-W3-2014-04844	CR-W3-2014-04960	CR-W3-2014-05109
CR-W3-2014-05562	CR-W3-2014-06277		

Portable Instrument Calibration Records

Number	Title	Date
ENV-FT-014	Flow Totalizer	July 14, 2014
CHP-MF-126	ASP-1 (NRD) - Remball	September 10, 2014
ASP-023	ASP-1 (HP-270)	November 13, 2014
HP-DR-419	RSO -50E	February 5, 2014
2986	RO-7	November 13, 2014
HP-AS-106	RAS-1 (Air Sample Pump)	September 8, 2014
HP-DR-557	Model 9-3	March 25, 2014
CHP-TEL010	WR Telepole	November 13, 2014
CHP-CR-144	LM-177	March 3, 2014

Stationary Instrument Calibration Records

Procedures/Documents

Number	Title	Date
FastScan	2014 Recalibration of the “FastScan” Counting System	July 15, 2014
FastScan West	2014 Recalibration of the “FastScan West” Counting System	July 16, 2014
HP-DS-055	PM-7 Calibration Data Sheet	July 31, 2014
HP-DS-067	PM-7 Calibration Data Sheet	August 6, 2014
HP-DS-068	STM Calibration Data Sheet	April 4, 2014

Stationary Instrument Calibration Records

Procedures/Documents

Number	Title	Date
HP-DS-079	Canberra GEM-5 Calibration Data Sheet	August 4, 2014
HP-DS-089	ARGOS-5AB Calinration Data Sheet	March 13, 2014

Installed Radiation Monitor Calibration Records

Procedures/Documents

Number	Title	Date
52367249	PRM-IR-0648, Calibrate Gaseous Waste System Noble Gas Monitor Loop	June 27, 2013
52432534	PRM-IR-1002S, Calibrate Plant Vent Stack Radiation Monitor Loop	May 30, 2014
52438941	PRM-IR-0002 – Calibrate Electronics Portion of Condenser Vacuum Pump Discharge Wide Range Gas Monitor	February 13, 2014
52444536	PRM-IR-0110 – Calibrate Electronics Portion of Plant Stack Vent Wide Range Gas Monitor Loop	March 29, 2014
52449361	PRM-IR-0002 - Calibrate Flow Portion of Condenser Vacuum Pump Discharge Wide Range Gas Monitor	August 12, 2014
52472636	PRM-IR-0110 – Calibrate Flow Portion of Plant Stack Vent Wide Range Gas Monitor Loop	October 23, 2014
52475502	PRM-IR-0647, Calibrate Waste Condensate and Laundry Waste Discharge Liquid Effluent Monitor	November 26, 2014
52496894	PRM-IR-7050B, Calibrate Component Cooling Water System B Radiation Monitor	December 16, 2014
52474281	ARM-IR-5400 A, Calibrate Containment Area Radiation Monitor High Range Safety Channel A	April 24, 2014

Laboratory Instrument Calibration Records

Title	Date
Beckman LS6500 LSC Calibration	October 24, 2012
Detector 5 Calibration of 47 mm Filter	October 29, 2013
Detector 5 Calibration of F&J Charcoal Cartridge	October 30, 2013
Detector 5 Calibration of 1 Liter Liquid Marinelli	December 30, 2013

Miscellaneous Documents

Title	Date
Source Checking of Radiation Protection Instrumentation – Weekly List	August 11, 2014
System Health Report	December 11, 2014
Confirmation of J.L. Shepherd Model 78-2M	April 30, 2014

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

Procedures/Documents

Number	Title	Revision
CE-001-004	Periodic Analysis Scheduling Program	314
CE-001-005	Test Stand Calibration Scheduling Program	303
CE-003-509	Routine Filter Replacement and Grab Sampling on PIG Monitors and WRGMS	304
CE-003-512	Liquid Radioactive Waste Release Permit (Manual)	001
CE-003-513	Gaseous Radioactive Waste Release Permit (Manual)	303
CE-003-514	Liquid Radioactive Waste Release Permit (Computer)	301
CE-003-515	Gaseous Radioactive Waste Release Permit (Computer)	303
CE-003-541	Compositing Effluent Samples	301
CE-003-700	General Grab Sampling Techniques	307
EN-CY-110	Chemistry Gamma Spectroscopy System Operation	002
EN-CY-111	Radiological Groundwater Monitoring Program	006
MM-003-044	Shield Building Ventilation System Surveillance	301
MM-003-045	Control Room Air Conditioning Surveillance	304
MM-003-046	Controlled Ventilation Area System Surveillance (CVAS)	302
UNT-005-014	Offsite Dose Calculation Manual	305

Audits, Self-Assessments, and Surveillances

Number	Title	Date
QA-2/6-2013-W3-01	Quality Assurance Audit Report: Combined Chemistry, Effluents, and Environmental Monitoring	September 26, 2013

Audits, Self-Assessments, and Surveillances

Number	Title	Date
23484	NUPIC Joint Audit of Teledyne Brown Engineering – Environmental Services	March 10, 2014
LO-WF3-2014-0087	Pre-NRC Inspection Focused Assessment	September 25, 2014

Condition Reports

CR-HQN-2014-00371 CR-WF3-2013-03017 CR-WF3-2013-04138 CR-WF3-2013-4370
CR-WF3-2013-04449 CR-WF3-2013-04547 CR-WF3-2013-05055 CR-WF3-2013-5060
CR-WF3-2014-02141 CR-WF3-2014-02849 CR-WF3-2014-03484 CR-WF3-2014-03978
LO-WF3-2014-00087

10 CFR 50.75(g) Condition Reports

CR-WF3-2013-00285 CR-WF3-2013-04985

Effluent Release Permits

Permit Number	Type	Release System	Date
W3LB2013-263	Liquid	Boric Acid Condensate Tank B (BWM)	December 18, 2013
W3LC2014-042	Liquid	Dry Cooling Tower Sump 1 (DTCS 1)	February 28, 2014
W3LC2014-190	Liquid	Turbine Building Industrial Waste Tank (TBIWS)	July 31, 2014
W3GB2014-017	Gaseous	Containment	February 21, 2014
W3GB2014-049	Gaseous	Gas Decay Tank B	April 18, 2014
W3GC2014-093	Gaseous	Fuel Handling Building	August 5, 2014

In-Place Filter Testing Records

Work Order	System	Train	Test	Date
52434436	Shield Building Ventilation	B	Charcoal Adsorber	December 28, 2012
52375031	Controlled Ventilation Area	B	Charcoal Adsorber	June 24, 2013
52399839	Shield building Ventilation	A	HEPA Filter	August 29, 2013
52469162	Control Room Emergency Filtration Unit	A	HEPA Filter	August 6, 2014
52482444	Control Room Emergency Filtration Unit	B	Charcoal Adsorber	October 21, 2014

Miscellaneous Documents

Number	Title	Revision/Date
	2013 Annual Radioactive Effluent Release Report	April 28, 2014
	Intra-Laboratory Comparison Results	2013, 2014
72-075	10 CFR 72.212 Evaluation Report for ISFSI	January 9, 2014
	WSES Updated Final Safety Analysis Report: Chapter 11	12

2RS7 Radiological Environmental Monitoring Program (71124.07)

Procedures/Documents

Number	Title	Revision
UNT-005-014	Offsite Dose Calculation Manual	305
EN-CY-108	Monitoring of Nonradioactive Systems	6
EN-CY-111	Radiological Groundwater Monitoring Program	5
CE-003-522	Meteorological Data Collection and Processing	4
CE-003-523	Meteorological Monitoring Program	1
CE-003-525	REMP Evaluations and Reports	301
CE-003-526	Collection and Preparation of REMP Liquid Samples	302
CE-003-527	Collection of Milk Samples	2
CE-003-528	Collection of Sediment Samples	1
CE-003-529	Collection of Vegetation Samples	1
CE-003-530	Collection and Preparation of Fish Samples	1
CE-003-531	Collection and Preparation of REMP Air Samp	1
CE-003-532	Preparation and Distribution of REMP Thermoluminescent Dosimeters	301
CE-003-533	REMP Shipping	1
CE-003-534	Land Use Census	2
UNT-005-014	Offsite Dose Calculation Manual	303
EN-QV-108	QA Surveillance Process	9
EN-QV-109	Audit Process	27

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

Procedures/Documents

Number	Title	Revision
EN-HU-101	Human Performance Program	15
EN-LI-118	Cause Evaluation Program	21
EN-RP-121	Radioactive Material Control	9
EN-RW-101	Radioactive Waste Management	3
EN-RW-102	Radioactive Shipping Procedure	11
EN-RW-104	Scaling Factors	10
EN-RW-105	Process Control Program	4
EN-RW-106	Integrated Transportation Security Plan	3
EN-RW-108	Radioactive Shipment Accident Response	1
RW-002-310	Storage of Radioactive Waste and Radioactive Materials	9

Audits, Self-Assessments, and Surveillances

Number	Title	Revision/Date
	Annual Radioactive Effluent Release Report	2013
WLO-2014-0038	Focused Self-Assessment Plan and Report	September 9, 2014
UNT-005-014	Offsite Dose Calculation Manual	305

Condition Reports

LO-WLO-2014-0086	CR-WF3-2014-05098	CR-WF3-2014-3346	CR-WF3-2014-03431
CR-WF3-2014-03435	CR-WF3-2014-03619	CR-WF3-2014-03874	CR-WF3-2014-03916
CR-WF3-2014-05430	CR-WF3-2014-06084		

Radioactive Material and Waste Shipments

Number	Title	Date
14-1010	Class B Resin, Erwin, TN	August 18, 2014
14-1009	Class B Resin, Erwin, TN	August 6, 2014
13-1024	PZR Heaters and Dry Active Waste	June 27, 2013
13-023	Dewatered Bead Resin	May 1, 2013
14-3071	Core Coupons and Equipment	September 17, 2014

Miscellaneous Documents

Number	Title	Revision
FSAR Chapter 11	WSES Updated Final Safety Analysis Report	14
FSAR Chapter 12	WSES Updated Final Safety Analysis Report	14

Section 4OA1: Performance Indicator Verification

Procedures/Documents

Number	Title	Revision
	NRC Performance Indicator Technique/Data Sheet 1st Quarter 2014	
	NRC Performance Indicator Technique/Data Sheet 2nd Quarter 2014	
	NRC Performance Indicator Technique/Data Sheet 3rd Quarter 2014	
	NRC Performance Indicator Technique/Data Sheet 4th Quarter 2014	
EN-LI-114	Performance Indicator Process	6

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures/Documents

Number	Title	Revision
CEP-PdM-001	Predictive Maintenance (PdM) Program Plan	2
EN-DC-310	Predictive Maintenance Program	6
ME-004-151	480-VAC Motor-Control Center (MCC)	304

Procedures/Documents

Number	Title	Revision
ME-004-151	480-VAC Motor-Control Center (MCC)	305
SEP-THERM-WF3-001	Waterford 3 Thermography Program Implementation	0
W3F1-2014-0060	Licensee Event Report (LER) 2014-003-00	0

Condition Reports

CR-WF3-2014-04430 CR-WF3-2014-05409

Work Orders

WO 52370262 WO 00392074 WO 52530534

The following items are requested for the
Occupational & Public Radiation Safety Inspection
at Waterford-3
January 12-16, 2015
Integrated Report 2015-001

Inspection areas are listed in the attachments below.

Please provide the requested information on or before **December 23, 2015**.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.0**5** should be in a file/folder titled "**1**- A," applicable organization charts in file/folder "**1**- B," etc.

If information is placed on *ims.certrec.com*, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.

In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

If more than one inspection procedure is to be conducted and the information requests appear to be redundant, there is no need to provide duplicate copies. Enter a note explaining in which file the information can be found.

If you have any questions or comments, please contact **Louis Carson** at **(817) 200-1221** or **Louis.Carson@nrc.gov.**

PAPERWORK REDUCTION ACT STATEMENT

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, control number 3150-0011.

1. Radiation Monitoring Instrumentation (71124.05)
Date of Last Inspection: **September 20. 2013**

A. List of contacts and telephone numbers for the following areas:
   1. Effluent monitor calibration
   2. Radiation protection instrument calibration
   3. Installed instrument calibrations
   4. Count room and Laboratory instrument calibrations

B. Applicable organization charts

C. Copies of audits, self-assessments, vendor or NUPIC audits for contractor support and LERs, written since date of last inspection, related to:
   1. Area radiation monitors, continuous air monitors, criticality monitors, portable survey instruments, electronic dosimeters, teledosimetry, personnel contamination monitors, or whole body counters
   2. Installed radiation monitors

D. Procedure index for:
   1. Calibration, use and operation of continuous air monitors, criticality monitors, portable survey instruments, temporary area radiation monitors, electronic dosimeters, teledosimetry, personnel contamination monitors, and whole body counters.
   2. Calibration of installed radiation monitors

E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
   1. Calibration of portable radiation detection instruments (for portable ion chambers)
   2. Whole body counter calibration
   3. Laboratory instrumentation quality control

F. A summary list of corrective action documents (including corporate and subtiered systems) written since date of last inspection, related to the following programs:
   1. Area radiation monitors, continuous air monitors, criticality monitors, portable survey instruments, electronic dosimeters, teledosimetry, personnel contamination monitors, whole body counters,
   2. Installed radiation monitors,
   3. Effluent radiation monitors
   4. Count room radiation instruments

   NOTE: The lists should indicate the <u>significance level</u> of each issue and the <u>search criteria</u> used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.

G. Offsite dose calculation manual, technical requirements manual, or licensee controlled specifications which lists the effluent monitors and calibration requirements.

H. Current calibration data for the whole body counter’s.

I. Primary to secondary source calibration correlation for effluent monitors.

J. A list of the point of discharge effluent monitors with the two most recent calibration dates and the work order numbers associated with the calibrations.

K. Radiation Monitoring System health report for the previous 12 months

2. Radioactive Gaseous and Liquid Effluent Treatment (71124.06)
Date of Last Inspection: **September 20. 2013**

A. List of contacts and telephone numbers for the following areas:
   1. Radiological effluent control
   2. Engineered safety feature air cleaning systems

B. Applicable organization charts

C. Audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection, related to:
   1. Radioactive effluents
   2. Engineered Safety Feature Air cleaning systems

D. Procedure indexes for the following areas
   1. Radioactive effluents
   2. Engineered Safety Feature Air cleaning systems

E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
   1. Sampling of radioactive effluents
   2. Sample analysis
   3. Generating radioactive effluent release permits
   4. Laboratory instrumentation quality control
   5. In-place testing of HEPA filters and charcoal adsorbers
   6. New or applicable procedures for effluent programs (e.g., including ground water monitoring programs)

F. List of corrective action documents (including corporate and subtiered systems) written since date of last inspection, associated with:
   1. Radioactive effluents
   2. Effluent radiation monitors
   3. Engineered Safety Feature Air cleaning systems

   NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.

G. Provide the 2013 Annual Radioactive Effluent Release Report, or the two most recent report.

H. Current Copy of the Offsite Dose Calculation Manual

I. Copy of the 2013 and 2014 interlaboratory comparison results for laboratory quality control performance of effluent sample analysis, or the two most recent results.

J. Effluent sampling schedule for the week of the inspection

K. New entries into 10 CFR 50.75(g) files since date of last inspection

L. Operations department (or other responsible dept) log records for effluent monitors removed from service or out of service

M. Listing or log of liquid and gaseous release permits since date of last inspection

N. A list of the technical specification-required air cleaning systems with the two most recent surveillance test dates of in-place filter testing (of HEPA filters and charcoal

adsorbers) and laboratory testing (of charcoal efficiency) and the work order numbers associated with the surveillances

O. System Health Report for radiation monitoring instrumentation. Also, please provide a specific list of all effluent radiation monitors that were considered inoperable for 7 days or more since **September 20. 2013**. If applicable, please provide the relative Special Report and condition report(s).

P. Provide list of all radiation monitors that are considered §50.65/Maintenance Rule equipment.

Q. A list of all significant changes made to the Gaseous and Liquid Effluent Process Monitoring System since the last inspection, **September 20. 2013**. If applicable, please provide the corresponding UFSAR section in which this change was documented.

R. A list of any occurrences in which a non-radioactive system was contaminated by a radioactive system. Please include any relative condition report(s).

3. Radiological Environmental Monitoring Program (71124.07)
Date of Last Inspection: **September 20. 2013**

A. List of contacts and telephone numbers for the following areas:
   1. Radiological environmental monitoring
   2. Meteorological monitoring

B. Applicable organization charts

C. Audits, self assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection, related to:
   1. Radiological environmental monitoring program (including contractor environmental laboratory audits, if used to perform environmental program functions)
   2. Environmental TLD processing facility
   3. Meteorological monitoring program

D. Procedure index for the following areas:
   1. Radiological environmental monitoring program
   2. Meteorological monitoring program

E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
   1. Environmental Program Description
   2. Sampling, collection and preparation of environmental samples
   3. Sample analysis (if applicable)
   4. Laboratory instrumentation quality control
   5. Procedures associated with the Offsite Dose Calculation Manual
   6. Appropriate QA Audit and program procedures, and/or sections of the station's QA manual (which pertain to the REMP)

F. A summary list of corrective action documents (including corporate and subtiered systems) written since date of last inspection, related to the following programs:
   1. Radiological environmental monitoring
   2. Meteorological monitoring

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.

G. Wind Rose data and evaluations used for establishing environmental sampling locations

H. Copies of the 2 most recent calibration packages for the meteorological tower instruments

I. Copy of the 2013 Annual Radiological Environmental Operating Report and Land Use Census, and current revision of the Offsite Dose Calculation Manual, or the two most recent reports.

J. Copy of the environmental laboratory's interlaboratory comparison program results for 2013 and 2014, or the two most recent results, if not included in the annual radiological environmental operating report

K. Data from the environmental laboratory documenting the analytical detection sensitivities for the various environmental sample media (i.e., air, water, soil, vegetation, and milk)

L. Quality Assurance audits (e.g., NUPIC) for contracted services

M. Current NEI Groundwater Initiative Plan and status

N. Technical requirements manual or licensee controlled specifications which lists the meteorological instruments calibration requirements

O. A list of Regulatory Guides and/or NUREGs that you are currently committed to relative to the *Radiological Environmental Monitoring Program*. Please include the revision and/or date for the committed item and where this can be located in your current licensing basis/UFSAR.

P. If applicable, per NEI 07-07, provide any reports that document any spills/leaks to groundwater since the last inspection

4. Radioactive Solid Waste Processing, and Radioactive Material Handling, Storage, and Transportation (71124.08)

Date of Last Inspection: **September 20. 2013**

A. List of contacts and telephone numbers for the following areas:
   1. Solid Radioactive waste processing
   2. Transportation of radioactive material/waste

B. Applicable organization charts (and list of personnel involved in solid radwaste processing, transferring, and transportation of radioactive waste/materials)

C. Copies of audits, department self-assessments, and LERs written since date of last inspection related to:
   1. Solid radioactive waste management
   2. Radioactive material/waste transportation program

D. Procedure index for the following areas:
   1. Solid radioactive waste management
   2. Radioactive material/waste transportation

E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
   1. Process control program
   2. Solid and liquid radioactive waste processing
   3. Radioactive material/waste shipping
   4. Methodology used for waste concentration averaging, if applicable
   5. Waste stream sampling and analysis

F. A summary list of corrective action documents (including corporate and subtiered systems) written since date of last inspection related to:
   1. Solid radioactive waste
   2. Transportation of radioactive material/waste

NOTE: The lists should indicate the <u>significance level</u> of each issue and the <u>search criteria</u> used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.

G. Copies of training lesson plans for 49CFR172 subpart H, for radwaste processing, packaging, and shipping.

H. A summary of radioactive material and radioactive waste shipments made from date of last inspection to present; **September 20. 2013**

I. Waste stream sample analyses results and resulting scaling factors for 2013 and 2014, or the two most recent results.

J. Waste classification reports if performed by vendors (such as for irradiated hardware)

K. A listing of all onsite radwaste storage facilities. Please include a summary *or* listing of the items stored in each facility, including the *total* amount of radioactivity and the *highest* general area dose rate.

<u>Although it is not necessary to compile the following information, the inspector will also review:</u>

L. Training, and qualifications records of personnel responsible for the conduct of radioactive waste processing, package preparation, and shipping

Final Detailed Risk Evaluation

The team leader performed the initial risk determination In accordance with Inspection Manual Chapter 0609, Appendix A, Exhibit 4, "External Events Screening Questions," dated June 19, 2012, to evaluate this finding. The finding required a detailed risk evaluation because, if the equipment or safety function is assumed to be completely failed or unavailable, two trains of a multi-train system would be degraded. A Region IV senior reactor analyst performed the detailed risk evaluation.

Background - Original Detailed Risk Evaluation: On January 22, 2015, the NRC issued a Preliminary Determination Letter to the licensee concerning their failure to promptly identify that the emergency diesel generator day tank vents had corroded to the point where through-wall holes existed in the piping (ML15022A637). The holes could allow rainwater to enter the day tanks during heavy rain events. The condition affected both emergency diesel generators.

As noted in the Preliminary Determination Letter, the NRC was concerned with two scenarios.

- **Scenario 1:** A heavy rain event occurs, which allows water to collect in the day tanks. A loss of offsite power (LOOP) does not coincidentally occur, but a random LOOP occurs during the next two weeks.

- **Scenario 2:** The heavy rain event causes a coincidental LOOP and water continues to trickle into the day tanks as the diesels start and load.

The analyst had completed a preliminary detailed risk evaluation in accordance with Manual Chapter 0609, Appendix A, "The Significance Determination Process for Findings for At-Power," dated June 19, 2012. The analyst also used Appendix M, "Significance Determination Process Using Qualitative Criteria," dated April 12, 2012. The use of Appendix M was necessary because of significant uncertainties in two areas.

- The conditional probability of a LOOP given a rain event of 5 inches/hour or more.

- The tolerance of the Cooper Bessemer diesel generators to water in the fuel stream.

However, since that time, the licensee performed testing of a similar diesel generator in Sumner, Iowa. In addition, the licensee performed water testing on the diesel generator building roof. The testing provided valuable insights into the water tolerance of the diesels as well as the characteristics of water ponding on the roof. This information was sufficient to eliminate the need to use Appendix M in this final risk evaluation.

To address the tolerance of the diesel generator to water in the fuel oil stream, the licensee demonstrated that the Waterford-3 emergency diesel generators could process a 7 gallon slug of water without failing and the diesel generators were tolerant of a steady stream of water up to 40 gallons per hour. The "trickle" test of 40 gallons per hour bounded the scenarios that included a heavy rain event with a coincidental loss of offsite power (Scenario 2).

Concerning the water testing on the diesel generator day tank roof, the licensee had applied a flow stream of 20 gallons per minute of water onto the roof. This corresponded to a 5 inch/hour rainfall event. While analytical methods had predicted that the water level at the A vent (the higher vent) should reach approximately ½ inch (compared to the local roof level), the actual

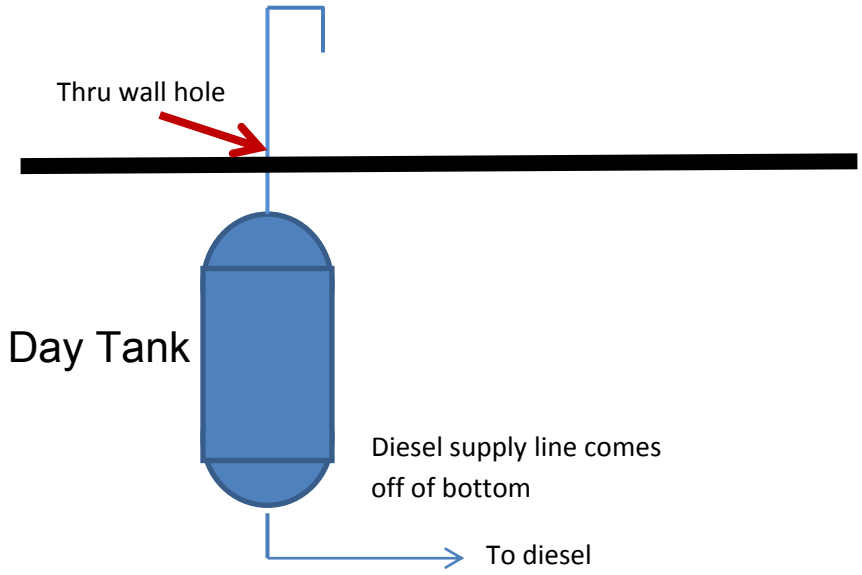
water level fell short of reaching the vent. Therefore, the licensee's analytical methods appeared overly-conservative. The revised detailed risk evaluation was adjusted to account for these test results.

Final Detailed Risk Evaluation:

Influential Assumptions

- The analyst used the Waterford-3 at-power Standardized Plant Analysis Risk (SPAR) model, Revision 8.16 for this analysis. In addition, Saphire Revision 8.1.2 was utilized. The analyst used a truncation limit of 10^{-11}. Only the LOOP events were affected. Therefore, the analyst only solved the LOOP sequences.

- The simplified drawing below was typical of both day tank configurations. The vents protruded through the diesel generator building roof and into the same drainage area.



- The equipment that could have been lost included the train A and B emergency diesel generators.

- The risk important events included the failure of both emergency diesel generators. The risk associated with the failure of only one diesel was small compared to the common cause failure of both diesel generators.

- The A vent hole was at a slightly higher elevation. Consequently, the B diesel generator would fail first. The failure of the A diesel was, therefore, the risk driver.

- The National Oceanic and Atmospheric Administration (NOAA) provided site specific tables for rain events (inches/hour) and the expected return period (years). For the Hahnville, Louisiana area, a 6 inch per hour rain event had a 200 year return period.

The frequency (λ_1) was 1/200 = $5x10^{-3}$/year. The applicable NOAA table is provided at the back of this risk evaluation.

- The analyst limited the rainfall events to those between 6 and 8 inches per hour. 6 inches per hour was the lower threshold for affecting the functionality of the train A diesel generator (based on the diesel generator building roof tests). The NOAA predicted frequencies only reached 8 inches per hour.

- For Scenario 1 (the water slug scenario), the analyst noted that a 5 inch per hour rainfall event would not result in water entering the A day tank vent. The analyst used a 6 inch per hour rainfall event as a conservative threshold for affecting diesel generator functionality. It's important to note that a 1 inch per hour increase in rain intensity would only result in a fraction of an inch change in the water level near the vent hole.

- As noted earlier, for Scenario 2 (a heavy rain event coincident with a loss of offsite power), the licensee's "trickle" testing was adequate to demonstrate that the emergency diesel generators would remain functional for these scenarios. 40 gallons per hour exceeded the most demanding day tank flooding associated with an 8 inch per hour rainfall event. For this scenario, the finding was considered to have no quantifiable impact to the core damage frequency.

- The analyst did not consider the licensee's probable maximum precipitation (PMP) event in this risk evaluation. The PMP, while over 11 inches per hour, was intended to be overly conservative and bounding. Accordingly, it's usage in detailed risk evaluations is very limited.

- Diesel recovery within the 24 hour diesel mission time was not feasible. Operators would not initially know why the diesel generators failed. In addition, dismantling the fuel injectors and flushing the lines to rid the system of water would be a time intensive task.

- The analyst allowed the offsite power recoveries to occur.

Quantification: The analyst calculated the change to the core damage frequency (ΔCDF) that was caused by the performance deficiency. The ΔCDF = λ_{rain} * Incremental Conditional Core Damage Probability (ICCDP) * exposure period.

The analyst assumed that a heavy rain event would occur with the frequency $\lambda_{rain} = 5\ x10^{-3}$/year. This is the frequency of exceedance for a 6 inch per hour rain event.

From the original detailed risk evaluation, the ICCDP was shown to be $4.2\ x10^{-3}$. This represented the failure of both emergency diesel generators given that the normal, random, LOOP frequencies occurred.

The analyst calculated the exposure period for this scenario. The licensee staggered their diesel generator surveillances such that one diesel (either A or B) would be tested every two weeks. The analyst assumed that the rain event would cause both diesels to become non-functional. Therefore, the maximum time that would elapse with the diesels being non-functional was two weeks. The average exposure would be T/2 = 1 week.
The ΔCDF was:

$\Delta CDF = \lambda_{rain} * ICCDP * exposure\ period$
$= 0.005/year * 4.2 \times 10^{-3} * 1/52 = 4 \times 10^{-7}/year$ (Green)

The risk-important sequences included a heavy rain event greater than or equal to 6 inches per hour followed by a random loss of offsite power within the next two weeks. The risk significance was mitigated by the ability of the diesel to remain functional with water in the fuel oil stream and the operators' ability to restore offsite power within 4 hours of the LOOP.

Large Early Release Frequency (LERF): This finding was not a significant contributor to the LERF. The analyst utilized the event trees and the corresponding LERF factors for the loss of offsite power sequences. None of the LERF factors were greater than zero. Therefore, the ΔLERF was less than 1×10^{-7}/year.