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

July 24, 2014

EA-12-198
EA-12-257

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 PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000382/2014008

Dear Mr. Chisum:

On June 6, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed a problem identification and resolution biennial inspection at your Waterford Steam Electric Station, Unit 3. The NRC inspection team discussed the results of this inspection with Mr. C. Rich, acting Site Vice President, and other members of your staff. The inspection team documented the results of this inspection in the enclosed inspection report.

Based on the inspection sample, the inspection team determined that Waterford 3's corrective action program, and your staff's implementation of the corrective action program, supported nuclear safety.

In reviewing your corrective action program, the team assessed how well your staff identified problems at a low threshold, your staff's implementation of the station's process for prioritizing and evaluating these problems, and the effectiveness of corrective actions taken by the station to resolve these problems. The team also evaluated other processes your staff used to identify issues for resolution. These included your use of audits and self-assessments to identify latent problems and your incorporation of lessons learned from industry operating experience into station programs, processes, and procedures. Despite some weaknesses noted in the enclosed report, the team determined that your station's performance in each of these areas supported nuclear safety.

Finally, the team identified no challenges to Waterford 3's safety-conscious work environment. All individuals interviewed expressed willingness to raise nuclear safety concerns through at least one of the several means available.

NRC inspectors documented five findings of very low safety significance (Green) in this report. Four of these findings involved violations of NRC requirements. The NRC is treating these

four violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violations or the 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 Waterford 3.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV; and the NRC resident inspector at Waterford 3.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Agency Rules of Practice and Procedure," 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's 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/

Geoffrey B. Miller, Branch Chief
Technical Support Branch
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000382/2014008
w/Attachments:
1. Supplemental Information
2. Information Request
3. Supplemental Information

cc w/encl:
Electronic Distribution to Waterford Steam Electric Station, Unit 3

four violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violations or the 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 Waterford 3.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV; and the NRC resident inspector at Waterford 3.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Agency Rules of Practice and Procedure," 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's 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/

Geoffrey B. Miller, Branch Chief
Technical Support Branch
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000382/2014008
w/Attachments:
1. Supplemental Information
2. Information Request
3. Supplemental Information

cc w/encl:
Electronic Distribution to Waterford Steam Electric Station, Unit 3

DISTRIBUTION:
See next page

DOCUMENT NAME: R:_REACTORS\WAT\2014\WAT 2014008 RP-EAR 140724 pdf
ADAMS ACCESSION NUMBER: ML14206A858

☒ SUNSI Review By: GBM		ADAMS ☒ Yes ☐ No	☒ Publicly Available ☐ Non-Publicly Available		☒ Non-Sensitive ☐ Sensitive		Keyword: NRC-002
OFFICE	DRS/PSB2	DRP/PBB	DRP/PBE	R4: ACES	C:DRP/PBE	DRS/TSB	C:DRS/TSB
NAME	PJayroe:PBH	ASanchez	CSpeer	VCampbell	GWerner	ERuesch	GMiller
SIGNATURE	/RA/	/RA/E	/RA/E	/RA/RBrowder for		/RA/E	/RA/
DATE	7/23/14	7/24/14	7/23/14	07/22/14		07/24/14	07/24/14

OFFICIAL RECORD COPY **E=Email**

Letter to Michael R. Chisum from Geoffrey B. Miller dated July 24, 2014

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – NRC PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000382/2014008

Distribution for FINAL Reactor Escalated Enforcement Actions

Distribution

ADAMS (PARS)
RidsSecyMailCenter Resource;
RidsEdoMailCenter Resource;
RidsOiMailCenter Resource;
RidsRgn2MailCenter Resource;
RidsNrrDirsEnforcement Resource
Marc.Dapas@nrc.gov;
Kriss.Kennedy @nrc.gov;
Anton.Vegel@Nrc.gov;
Troy.Pruett@nrc.gov;
Vivian.Campbell@nrc.gov;
Christi.Maier@nrc.gov;
Marisa.Herrera@nrc.gov;
R4Enforcement@nrc.gov
Geoffrey.Miller@nrc.gov

Francis.Rameriz@nrc.gov
Peter.Jayroe@nrc.gov
Jenny.Weil@nrc.gov
Cale.Young@nrc.gov

RidsOeMailCenter Resource;
RidsOcaMailCenter Resource;
EDO_Managers
RidsRgn1MailCenter Resource;
RidsRgn3MailCenter Resource;
RidsOpaMail Resource; **(if public)**
Karla.Fuller@nrc.gov;
Bill.Maier@nrc.gov;
Jeff.Clark@nrc.gov ;
Michael.Hay@nrc.gov
Rachel.Browder@nrc.gov;
Victor.Dricks@nrc.gov;
Lara.Uselding@nrc.gov;
Greg.Werner@nrc.gov
Michael.Orenak@nrc.gov
Carleen.Sanders@nrc.gov;
Chris.Speer@nrc.gov
Eric.Ruesch@nrc.gov
Jim.Melfi@nrc.gov

OEWEB Resource; (if public)
RidsOgcMailCenter Resource;
RidsOigMailCenter Resource;
RidsOcfoMailCenter Resource;
NRREnforcement.Resource
Patricia.Holahan@nrc.gov;
Nick.Hilton@nrc.gov;
John.Wray@nrc.gov;
David.Furst@nrc.gov;
Gerald.Gulla@nrc.gov;
Robert.Carpenter@nrc.gov;
Robert.Fretz@nrc.gov;
Kyle.Hanley@nrc.gov;
Linda.Dufrene@nrc.govRR
Lauren.Casey@nrc.gov
Loretta.Williams@nrc.gov
Alfred.Sanchez@nrc.gov

RIV/ETA: (Anthony.Bowers@nrc.gov)

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket(s):	50-382
License:	NPF-38
Report:	05000382/2014008
Licensee:	Entergy Operations, Inc.
Facility:	Waterford Steam Electric Station, Unit 3
Location:	Hwy. 18 Killona, Louisiana
Dates:	May 19, 2014, through June 6, 2014
Team Lead:	E. Ruesch, Senior Reactor Inspector
Inspectors:	P. Jayroe, Reactor Inspector A. Sanchez, Senior Resident Inspector C. Speer, Resident Inspector
Accompanying Personnel:	S. Crane, Reactor Operations Engineer
Approved By:	G. Miller, Chief Technical Support Branch Division of Reactor Safety

Enclosure

SUMMARY

IR 05000382/2014008; 5/19/2014-6/6/2014; Waterford Steam Electric Station Unit 3; Problem Identification and Resolution (Biennial)

The inspection activities described in this report were performed between May 19 and June 6, 2014, by two inspectors from the NRC's Region IV office, an NRC senior resident inspector from another facility, and the resident inspector at Waterford 3. The report documents five findings of very low safety significance (Green). Four 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, "Components 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."

Assessment of Problem Identification and Resolution

Based on its inspection sample, the team concluded that the licensee maintained a corrective action program in which individuals generally identified issues at an appropriately low threshold. Once entered into the corrective action program, the licensee generally evaluated and addressed these issues appropriately and timely, commensurate with their safety significance. Though the team identified some issues with the licensee's resolution of some problems, corrective actions were generally effective, addressing the causes and extents of condition of problems.

The licensee appropriately evaluated industry operating experience for relevance to the facility. However, items applicable to Waterford 3 were not always entered in the corrective action program for resolution. When appropriately evaluated, the licensee incorporated industry and internal operating experience in its root cause and apparent cause evaluations. The licensee performed effective and self-critical nuclear oversight audits and self-assessments. The licensee maintained an effective process to ensure significant findings from these audits and self-assessments were addressed.

The team identified no challenges to the licensee's establishment and maintenance of a safety-conscious work environment in which personnel were willing to raise nuclear safety concerns without fear of retaliation. The licensee maintained a strong and proactive employee concerns program at Waterford 3.

Cornerstone: Initiating Events

- Green. The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for a failure to identify a cause and take corrective actions to prevent recurrence. Specifically, the licensee did not identify a cause or corrective actions to prevent recurrence for a plant trip and equipment failures caused by elevated main feed system vibrations. The licensee replaced the steam generators at Waterford 3 during refueling outage 18 in late 2012. Upon returning to power operations the licensee

experienced elevated vibration levels and related equipment failures on the main feedwater system and emergency feedwater system. The most significant of these failures included a plant trip after a loss of instrument air to the feedwater regulating valve actuator. The licensee determined that the plant trip was a significant event, and initiated a root cause evaluation through its corrective action process. This root cause determination identified a possible cause, which by the licensee's program required additional information to confirm or refute. The licensee initiated a proposal to perform modeling of the steam generator flows to provide this information, but later canceled the action. No corrective actions to prevent recurrence were implemented by the licensee. Actions taken to date by the licensee appear to have been effective in mitigating known effects of the vibrations. The licensee documented its failure to determine and document the cause of these vibrations in Condition Report CR-WF3-2014-03238.

The failure to identify the cause of the feedwater vibration-induced problems and to take corrective actions to prevent recurrence as required by 10 CFR Part 50, Appendix B, Criterion XVI is a performance deficiency. The performance deficiency is more than minor because if left uncorrected, it could lead to a more significant safety concern. Specifically, though individual actions were taken to address failures caused by vibrations, no actions were taken to reduce or eliminate the vibrations themselves. Actions that were taken were not treated as corrective actions to prevent recurrence. A lack of corrective actions to prevent recurrence could leave main feedwater components and other components physically connected to the system such as emergency feedwater susceptible to future failures. Using Inspection Manual Chapter 0609, Appendix A, the team determined the issue to have very low safety significance (Green) because the performance deficiency, which affected the initiating events cornerstone, did not result in a reactor trip and the loss of mitigating equipment needed to transition the plant from the onset of the trip to a stable shutdown condition.

This finding has a resources cross-cutting aspect in the human performance area because leaders did not ensure that procedures used at the time the root cause assessment was performed were adequate to support nuclear safety (H.1). The procedure used by the licensee allowed a root cause assessment to have an indeterminate root cause and thus no corrective actions to prevent recurrence. (Section 4OA2.5.c)

- Green. The team identified a finding for the licensee's failure to evaluate industry operating experience as directed in the station operating experience program procedure. Specifically, a vendor supplied Technical Bulletin TB-13-1 "Steam Generator and Pressurizer Closure Gasket Replacement Frequency," which recommended that all Westinghouse-designed steam generator and pressurizer closure gaskets be replaced at a prescribed frequency, was not evaluated in accordance with station procedures. This resulted in the licensee failing to take action to periodically replace affected gaskets to preclude degradation of the pressure boundary. The licensee documented this performance deficiency in Condition Report CR-WF3-2014-03229 to determine what further actions were needed.

  The failure to evaluate operating experience information as required by licensee procedure EN-OP-100, "Operating Experience Program," Revision 20, was a performance deficiency. The performance deficiency is more than minor because if left uncorrected it would have the potential to lead to a more safety-significant concern. Specifically, the

failure of the licensee to take any action with regard to the technical bulletin recommendation to replace the steam generator gaskets would allow the gaskets to be installed longer than their useful life. The deterioration of gasket material could result in unplanned transients or shutdowns. The finding is therefore associated with the initiating events cornerstone. Using Inspection Manual Chapter 0609, Appendix A, the inspectors determined that the finding was of very low safety significance (Green) because it was not an actual degradation that could have resulted in exceeding a reactor system leak rate for a small LOCA; could not have affected other systems used to mitigate a LOCA; did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant to a stable shutdown condition; and did not involve a complete or partial loss of a support system that contributes to the likelihood of, or causes, an initiating event and affected mitigation equipment.

This finding has a conservative bias cross-cutting aspect in the human performance area (H.14). Specifically, the licensee assumed that the technical bulletin was not based on actual failures and because steam generators had just been replaced, opted not to take further actions to evaluate or initiate any preventative maintenance to replace gaskets. (Section 4OA5.5.d)

Cornerstone: Mitigating Systems

- Green. A self-revealing non-cited violation of 10 CFR Part 50, Appendix B, Criterion III occurred when the licensee did not assure that design basis information was translated into specifications, drawings, procedures, and instructions. Specifically, after a failure revealed new design basis information regarding the need to place a train of dry cooling tower fan controllers to the "off" position prior to de-energizing the associated control cabinet, the licensee failed to incorporate this information into procedures. As a result, the failure recurred. The licensee entered this condition into its corrective action program as Condition Reports CR-WF3-2012-05680 and -06908 and updated procedure OP-006-005, "Inverters and Distribution," to incorporate the new design basis information into procedures. The licensee documented its failure to timely update design basis information in Condition Report CR-WF3-2014-02981.

  The failure to assure that design basis information was translated into specifications, drawings, procedures, and instructions as required by 10 CFR Part 50, Appendix B, Criterion III was a performance deficiency. 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 incorporate design basis information regarding the need to place the dry cooling tower fan controllers to the "off" position prior to de-energizing the associated control cabinet into specifications, drawings, procedures, and instructions impacted the capability, availability, and reliability of both trains of dry cooling towers. Using NRC Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," the inspectors determined the finding to be of very low safety significance (Green) because the required number of dry cooling towers in the protected train maintained their operability.

This finding has a resolution cross-cutting aspect in the problem identification and resolution cross-cutting area because the licensee had not taken effective corrective actions to address an issue in a timely manner commensurate with its safety significance (P.3). (Section 4OA2.5.a)

- Green. The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for the licensee's failure to identify and correct a condition adverse to quality. On May 19, 2014, the team identified a significant amount of debris on the floor of one of the main steam isolation valve areas. In a probable maximum precipitation event, this debris could have prevented sufficient water removal by the floor drains to meet design basis assumptions. Following identification, the licensee entered this condition into its corrective action program as Condition Report CR-WF3-2014-03037 and removed the debris from the area.

  Excessive debris in the main steam isolation valve A area that could challenge the water-removal capability of safety-related drain systems was a condition adverse to quality. The licensee's failure to promptly identify and correct this condition adverse to quality as required by 10 CFR Part 50, Appendix B, Criterion XVI was a performance deficiency. This performance deficiency was more than minor because if left uncorrected, it had the potential to lead to a more significant safety concern. The lead inspector performed the initial significance determination for performance deficiency using NRC Inspection Manual 0609, Appendix A, Exhibit 4, "External Events Screening Questions," dated July 1, 2012. The finding required a detailed risk evaluation because it involved the degradation of equipment specifically designed to mitigate a flooding event. Therefore, a Region IV senior reactor analyst performed a bounding detailed risk evaluation. The bounding change to the core damage frequency was 4.7×10^{-8} per year (Green). The dominant core damage sequences included extremely heavy rainfall, a loss of offsite power initiating event, failure of the train B 4.16kV bus, and failure of the pressurizer safety relief valves to close. The low initiating event frequency reduced the risk significance.

  This finding has a resolution cross-cutting aspect in the problem identification and resolution cross-cutting area because the licensee failed to take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, the licensee's corrective actions from the previous non-cited violation did not fully address the issue (P.3). (Section 4OA2.5.b)

- Green. The inspectors identified multiple instances of the licensee's failure to promptly correct degraded or nonconforming conditions as required by 10 CFR Part 50, Appendix B, Criterion XVI. At the conclusion of the inspection, the licensee had one structure, system or component that had been degraded since November 2008, requiring compensatory measures to provide reasonable assurance of operability; the licensee had another degraded condition that had existed since April 2011 with no compensatory measures in place. Following the team's identification of this issue, the licensee documented this issue in Condition Report CR-WF3-2014-03250 to evaluate the timeliness of its corrective actions.

  The failure to promptly correct conditions adverse to quality as required by 10 CFR 50, Appendix B, Criterion XVI was a performance deficiency. This performance deficiency is more than minor because it was associated with the design control attribute of the mitigating

systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Appendix A, the team determined this finding to be of very low safety significance (Green) because it did not represent the actual loss of function of a safety-related system or train.

This finding has an evaluation cross-cutting aspect in the problem identification and resolution cross-cutting area because the licensee failed to thoroughly evaluate the issues to ensure that the resolutions addressed causes and extents of condition commensurate with the issues' safety significance (P.2). (Section 4OA2.5.e)

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution (71152)

The team based the following conclusions on a sample of corrective action documents that were open during the assessment period, which ranged from August 2, 2012, to the end of the on-site portion of this inspection on June 6, 2014.

.1 Assessment of the Corrective Action Program Effectiveness

a. Inspection Scope

The team reviewed approximately 220 Condition Reports (CRs), including associated root cause analyses and apparent cause evaluations, from approximately 13,500 that the licensee had initiated or closed between August 2, 2012, and June 6, 2014. The majority of these (approximately 9,500) were lower-level condition reports that did not specifically require evaluations. The inspection sample focused on higher-significance condition reports for which the licensee evaluated and took actions to address the cause of the condition. In performing its review, the team evaluated whether the licensee had properly identified, characterized, and entered issues into the corrective action program, and whether the licensee had appropriately evaluated and resolved the issues in accordance with established programs, processes, and procedures. The team also reviewed these programs, processes, and procedures to determine if any issues existed that may impair their effectiveness.

The team reviewed a sample of operability determinations, self-assessments, trending reports and metrics, and various other documents related to the licensee's corrective action program. The team evaluated the licensee's efforts in determining the scope of problems by reviewing selected logs, work orders, self-assessment results, audits, and results from surveillance tests and preventive maintenance tasks. The team reviewed daily CRs and attended the licensee's operational focus, condition review group, operating experience screening, and corrective action review board meetings to assess the reporting threshold and prioritization efforts, and to observe the corrective action program's interfaces with the operability assessment and work control processes. The team's review included an evaluation of whether the licensee considered the full extent of cause and extent of condition for problems, as well as a review of how the licensee assessed generic implications and previous occurrences of issues. The team assessed the timeliness and effectiveness of corrective actions, completed or planned, and looked for additional examples of problems similar to those the licensee had previously addressed. The team conducted interviews with plant personnel to identify other processes that may exist where problems may be identified and addressed outside the corrective action program.

The team reviewed corrective action documents that addressed past NRC-identified violations to evaluate whether corrective actions addressed the issues described in the inspection reports. The team reviewed a sample of corrective actions closed to other

corrective action documents to ensure that the ultimate corrective actions remained appropriate and timely.

The team considered risk insights from both the NRC's and Waterford 3's risk models to focus the sample selection and plant tours on risk-significant systems and components. The team focused a portion of its sample on the 480-volt electrical distribution system, which the team selected for a five-year in-depth review. The team conducted walk-downs of this system and other plant areas to assess whether licensee personnel identified problems at a low threshold and entered them into the corrective action program.

Attachment 1 includes a list of documents the team reviewed in performing its assessment.

b. Assessments

1. Effectiveness of Problem Identification

During the 22-month inspection period, licensee staff generated approximately 13,500 condition reports. The team determined that most conditions that required generation of a condition report by the applicable revisions of procedure EN-LI-102, "Corrective Action Process," had been appropriately entered into the station's corrective action program. However, the team noted examples where the licensee had failed to properly identify conditions in accordance with procedures:

- During maintenance on dry cooling tower fans in October 2012, circuit breakers associated with the fans catastrophically failed. The licensee determined that the failure was caused by a previously unknown failure mode. However, the licensee failed to take corrective action until the condition recurred in November 2012. This issue is documented as a non-cited violation in Section 4OA2.5.a below.

- On May 22, 2014, while reviewing corrective actions from a previous non-cited violation, the team identified excessive debris on the floor of the reactor auxiliary building roof areas. The amount of debris was sufficient to prevent floor drains in the area from performing their credited water removal function during a significant rainfall event. The licensee had failed to identify this vulnerability during its follow-up to the previous violation. This failure is documented as a non-cited violation in Section 4OA2.5.b below.

- Design drawing B288 Sheet 4 provides guidelines for cracked flexible electrical conduits located outdoors: "The jacket should be repaired by double lapping jacketing tape over the damaged section. Alternative [*sic*] the conduit may be repaired or replaced with flexible metal conduit." The team identified a significant number of examples of flexible conduit that was damaged or broken in the main steam isolation valve areas on the reactor auxiliary building roof and in the dry cooling tower fan areas. Because cable in the conduits is rated for submergence and because internal seals in most

of the flex conduit would prevent transportation of any water that may intrude, the team determined that this performance deficiency was unlikely to lead to a more significant safety concern and was therefore minor. Although this issue should be corrected, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section 2 of the Enforcement Policy. The licensee documented this issue in Condition Reports CR-WF3-2014-03220, -2953, -2952, and -2951.

The team identified a vulnerability in the licensee's program to identify and evaluate adverse trends through the corrective action program as required by procedure EN LI-121, "Trending and Performance Review Process," revisions 12 through 15. When formal statistical trending indicates an adverse trend exists the licensee evaluates the condition using informal "cognitive" trending. If the result of the cognitive trending results in a judgment that no adverse trend exists, the licensee does not initiate a condition report to identify, evaluate, and track the resolution of the statistically-identified trend.

Procedure EN-LI-121 states that statistical trending identifies subtle changes in performance that may not be apparent to the day-to-day participants in station activities. The inspectors determined that the use of cognitive trending by day-to-day participants in station activities to dismiss trends identified using formal statistical analysis represented a potential weakness in the trending process in that cognitive trending relies heavily on experience, judgment, and memory of the individuals performing the analysis.

Despite these issues, the team concluded that the licensee generally maintained a low threshold for the formal identification of problems and entry into the corrective action program for evaluation. Licensee personnel initiated over 600 CRs per month during the inspection period. All of the personnel interviewed by the team expressed a willingness to enter newly identified issues into the corrective action program at a very low threshold or to have their supervisor do it for them.

2. Effectiveness of Prioritization and Evaluation of Issues

The sample of CRs reviewed by the team focused primarily on issues screened by the licensee as having higher-level significance, including those that received cause evaluations, those classified as significant conditions adverse to quality, and those that required engineering evaluations. The team also reviewed a number of condition reports that included or should have included immediate operability determinations to assess the quality, timeliness, and prioritization of these determinations.

The team identified several examples where the licensee failed to properly address new information obtained after the initial screening was complete. For example, during refueling outage 18 in late 2012, the licensee replaced the steam generators at Waterford 3. After restart from this outage, the licensee experienced elevated vibration levels on feed system piping and a corresponding increase in feedwater equipment failures. The licensee initiated a condition report and performed a root

cause analysis to evaluate these vibrations and some of the associated failures. However, the licensee failed to determine and document a cause of the vibrations or to take corrective actions to preclude recurrence of vibration-induced equipment failures. This failure is documented as a non-cited violation in Section 4OA2.5.c below.

Additionally, the team identified that the licensee failed to prioritize corrective actions for some long-standing degraded or nonconforming conditions associated with safety-related structures, systems, and components. In one case, a nonconforming issue that could affect the ability of the emergency diesel generators to perform their design function had existed for over 2000 days. The licensee had implemented compensatory actions, but had taken no permanent corrective actions. In another case, a nonconformance in the power supply for technical-specification-required pressurizer heaters had existed for over 1100 days. In this case, the licensee had implemented no compensatory measures and taken no permanent corrective actions. These issues are further documented as a non-cited violation in Section 4OA2.5.e below.

Overall, the team determined that the licensee's process for screening and prioritizing issues that had been entered into the corrective action program supported nuclear safety. The licensee's operability determinations were consistent, accurately documented, and completed in accordance with procedures.

3. Effectiveness of Corrective Actions

In general, the corrective actions identified by the licensee to address adverse conditions were effective. The team noted a number of instances in which corrective actions had been untimely or incompletely accomplished:

- In 2005, the licensee identified nitrogen line vibrations on the main feedwater isolation valve actuators and documented the condition in CR-WF3-2005-03188. This CR was closed to actions in work order 73972 prior to the actions being completed. This work order remained "in process" (i.e. not completed) as of June 2014, though the tubing had been replaced in 2013. The licensee has since changed its procedural guidance to limit the closure of condition reports to work orders with actions incomplete.

- As mentioned in Section 4OA2.1.b.3 above, as of the completion of the inspection, the licensee had six degraded or nonconforming conditions affecting safety-related structures, systems, or components that had existed for greater than 90 days. Four of these were being maintained operable using compensatory measures. The oldest of these conditions had existed since November 2008; the licensee had taken no significant actions to correct the condition. The licensee's failure to correct these longstanding degraded or nonconforming conditions is further discussed as a non-cited violation in Section 4OA2.5.e below.

- To identify control room instrumentation that may provide inaccurate indication during maintenance, licensee operators affix white tags to the control board, indicating that work is in progress. The team identified that these tags are not subject to administrative controls—there is no mechanism to ensure they are removed upon the completion of work. On May 22, 2014, the team identified that seven of the 28 tags then hanging were related to work that had already been completed. The team determined that these tags could provide the operators with incorrect information about the status of plant equipment. The failure to ensure the work management process includes provisions for removing obsolete control tags was a minor performance deficiency because after a review of the condition, the team determined that the incorrect tags would not have caused an operator to improperly manipulate plant components. The licensee documented this issue in CR-WF3-2014-03084.

Overall, the team concluded that the licensee generally identified effective corrective actions for the problems evaluated in the corrective action program. The licensee generally implemented these corrective actions in a timely manner, commensurate with their safety significance, and reviewed the effectiveness of the corrective actions appropriately.

.2 Assessment of the Use of Operating Experience

a. Inspection Scope

The team examined the licensee's program for reviewing industry operating experience, including reviewing the governing procedures. The team reviewed a sample of industry operating experience communications and the associated site evaluations to assess whether the licensee had appropriately assessed the communications for relevance to the facility. The team also reviewed assigned actions to determine whether they were appropriate. Attachment 1 includes a list of documents the team reviewed in performing its assessment.

b. Assessment

Overall, the team determined that the licensee appropriately evaluated industry operating experience for its relevance to the facility. However, once determined to be relevant, this operating experience information was not always incorporated into plant procedures and processes. The team identified two specific instances where operating experience information had been incompletely incorporated:

- In January 2013, a vendor issued a technical bulletin recommending periodic inspection and replacement of certain gasket material used in bolted closures on the pressurizer and steam generators. The licensee determined this to be applicable to the station, but closed the action to incorporate the information into station processes without implementing any permanent actions. This failure to comply with the stations operating experience procedure is documented as a finding in Section 4OA2.5.d below.

- Similarly, industry operating experience issued in September 2013 identified potential corrosion product blockage in fire water piping due to partially filled pipes. The licensee determined that the issue was applicable to Waterford 3, but as of June 2014 had not taken action to incorporate the operating experience into its procedures. The licensee documented this issue in its corrective action program as CR-WF3-2014-03202.

In each of these cases, the licensee documented the operating experience item as one of over 100 actions being processed in a single work-tracking document (WT) in its action-tracking database. The licensee had not generated a condition report for either condition.

The team noted that the licensee appropriately evaluated industry operating experience when performing root cause analysis and apparent cause evaluations. The licensee appropriately incorporated both internal and external operating experience into lessons learned for training and pre-job briefs.

Overall, the licensee's process for handling operating experience information had improved since the previous problem identification and resolution inspection in 2012. Included in these improvements was the elimination of a process vulnerability that had led to non-cited violation 05000382/2012008-01. Additionally, Entergy initiated weekly phone calls among its reactor sites to screen operating experience items for applicability to each facility.

.3 Assessment of Self-Assessments and Audits

a. Inspection Scope

The team reviewed a sample of licensee self-assessments and audits to assess whether the licensee was regularly identifying performance trends and effectively addressing them. The team also reviewed audit reports to assess the effectiveness of assessments in specific areas. Attachment 1 includes a list of documents the team reviewed in performing its assessment.

b. Assessment

Overall, the team concluded that the licensee had an effective self-assessment and audit process. The team determined that self-assessments were self-critical and thorough enough to identify deficiencies.

.4 Assessment of Safety-Conscious Work Environment

a. Inspection Scope

The team interviewed 42 individuals in 5 focus groups. The purpose of these interviews was (1) to evaluate the willingness of licensee staff to raise nuclear safety issues, either by initiating a condition report or by another method, (2) to evaluate the perceived

effectiveness of the corrective action program at resolving identified problems, and (3) to evaluate the licensee's safety-conscious work environment (SCWE). The focus group participants included personnel from Security, Radiation Protection, Health Physics, Chemistry, Operations, Planning, and multiple maintenance and engineering groups. At the team's request, the licensee's regulatory affairs staff selected the participants blindly from these work groups, based partially on availability. To supplement these focus group discussions, the team interviewed the Employee Concerns Program coordinator to assess her perception of the site employees' willingness to raise nuclear safety concerns. The team reviewed the Employee Concerns Program case log and select case files, including 100 percent of those classified as "concerns" and 35 percent of those classified as "rapid resolution." The team also reviewed the minutes from the licensee's most recent safety culture monitoring panel meetings, the 2013 employee concerns program self-assessment, and the 2012 nuclear safety culture assessment and associated corrective actions.

Attachment 1 includes a list of documents the team reviewed in performing its assessment.

b. Assessment

1. Willingness to Raise Nuclear Safety Issues

All individuals interviewed indicated that they would raise nuclear safety concerns. All felt that their management was receptive to nuclear safety concerns and was willing to address them promptly. All of the interviewees further stated that if they were not satisfied with the response from their immediate supervisor, they had the ability to escalate the concern to a higher organizational level. Most expressed positive experiences after raising issues to their supervisors.

The 2012 Synergy Nuclear Safety Culture Assessment determined that Waterford 3 had a healthy culture for raising concerns. The team determined that the corrective actions identified in LO-WLO-2012-00101 appeared to have been effective in addressing the results of the survey.

2. Employee Concerns Program

Based on the inspection sample, the team concluded that Waterford 3 had a very strong Employee Concerns Program (ECP). All interviewees were aware of the ECP. All explained that management publicized the program through various means, such as posters, training, presentations, discussion by supervisors or management at meetings, newsletters, updates, displays on site-wide monitors, and the ECP coordinator's presence in work spaces. All interviewees stated that they would use the ECP if they felt it was necessary, that the ECP coordinator was approachable, and that they felt comfortable talking to her.

While some interviewees identified concerns with the confidentiality of the program, all responded that they would still use the ECP. Many of these comments were related to instances in which the concerned individual had already raised the same

issue with their management or through the corrective action program and in which their identity was already known.

3. Preventing or Mitigating Perceptions of Retaliation

When asked if there have been any instances where individuals experienced retaliation or other negative reaction for raising issues, all individuals interviewed stated that they had neither experienced nor heard of an instance of retaliation, harassment, intimidation, or discrimination at the site. The team noted that management appeared to be successfully implementing the organization's processes to mitigate any such issues.

Four of the five interview groups were familiar with the site's safety-conscious work environment policy. The fifth was not familiar with the policy, nor could the participants recall any communications specifically addressing the freedom to raise safety concerns without fear of retaliation. However, no interviewees from any group expressed any hesitation to raise nuclear safety concerns.

.5 Findings

a. Inadequate Procedures for Securing Dry Cooling Tower Fans

Introduction. A self-revealing, Green, non-cited violation of 10 CFR 50, Appendix B, Criterion III occurred when the licensee did not assure that design basis information was translated into specifications, drawings, procedures, and instructions. Specifically, after a failure revealed new design basis information regarding the need to place a train of dry cooling tower (DCT) fan controllers to the "off" position prior to de-energizing the associated control cabinet (CP), the licensee failed to incorporate this information into procedures. As a result, the failure recurred.

Description. Design calculation ECM-98-067, "Limiting Single Failure Thermal-Hydraulic Analysis of Waterford 3 Spent Fuel Pool," Revision 1, requires all 15 DCT fans in each DCT train be operable in Modes 5 and 6 unless a condition-specific engineering change calculation has been completed to ensure that fewer fans are sufficient for the ultimate heat sink heat removal requirements. During refueling outage 18 in late 2012, the licensee performed engineering changes EC 39258 and EC 41203, which determined that all 15 DCT fans were needed until November 20, 2012, after which 9 fans were required.

On October 24, 2012, while in Mode 6, the licensee secured power to CP-49 to perform maintenance. Shortly after securing power a trouble alarm associated with DCT train B annunciated and multiple DCT B fans cycled on and secured. Troubleshooting revealed that the breaker associated with DCT Fan 5B was tripped, and the slow-speed phase A to C bimetallic heater elements were melted, and there were indications of electrical arcing on the fast-speed contacts for phases A to C. Further investigation by the licensee revealed that when power was secured to CP-49, then the associated process analog control system (PAC) sent nearly simultaneous fast speed and slow speed start signals to all of the DCT B fans. The nearly simultaneous start signals resulted in a

phase-to-phase fault in the breaker associated with DCT Fan 5B. This failure mode was applicable to all DCT fan breakers and could happen anytime the CP associated with the DCT fans in a train was de-energized. It was also determined that placing the controller for the fans in the "off" position prior to de-energizing the associated CP would prevent the fault from damaging the DCT fan breakers. At the time of the failure, DCT train A was protected with no maintenance being performed.

The outage control center and the work management center were notified through e-mail of the newly identified failure mode for the DCT fans. The licensee did not take any action to incorporate the new design information into procedures or instructions for operations personnel.

On November 21, 2012, while in Mode 6, the licensee secured power to CP-48. Shortly after securing power, a trouble alarm associated with DCT train A annunciated and multiple DCT A fans cycled on and secured. Troubleshooting revealed that the breaker associated with DCT Fan 4A had tripped, with the slow speed thermal overloads severely damaged. When power had been secured to CP-48, the PAC sent nearly simultaneous fast-speed and slow-speed start signals to all of the DCT A fans. The simultaneous start signals resulted in a phase-to-phase fault in the breaker associated with DCT Fan 4A. At the time of the failure, DCT train B was protected with no maintenance being performed.

The licensee initiated a corrective action to update procedure OP-006-005, "Inverters and Distribution," to incorporate into procedures the need to take the dry cooling tower fan controllers to the "off" position prior to securing the associated CP. This action was not completed until March 19, 2013. Prior to March 19, 2013, the licensee had not translated the requirement to change the controlling setting of a train of DCT fans prior to deenergizing the associated CP into formal specifications, drawings, procedures, or instructions.

Analysis. The failure to assure that design basis information was translated into specifications, drawings, procedures, and instructions as required by 10 CFR 50, Appendix B, Criterion III was a performance deficiency. 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 incorporate design basis information regarding the need to place the DCT fan controllers to the "off" position prior to de-energizing the associated CP into specifications, drawings, procedures, and instructions impacted the capability, availability, and reliability of both trains of dry cooling towers. Using NRC Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," the inspectors determined the finding to be of very low safety significance (Green) because the required number of dry cooling towers in the protected train maintained their operability.

This finding has a resolution cross-cutting aspect in the problem identification and resolution cross-cutting area because the licensee had not taken effective corrective actions to address an issue in a timely manner commensurate with its safety

significance (P.3).

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, requires that "measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in § 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions."

Contrary to the above, from October 24, 2012, to March 19, 2013, the licensee failed to establish measures to assure that applicable regulatory requirements and the design basis, as defined in § 50.2 and as specified in the license application, for those structures, systems, and components to which Appendix B applies were correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee did not incorporate design basis information regarding the need to place the DCT fan controllers in a train to the "off" position prior to de-energizing the associated CP into specifications, drawings, procedures, and instructions. The licensee entered this condition into its corrective action program as Condition Reports CR-WF3-2012-05680 and -06908 and updated procedure OP-006-005 to incorporate the new design basis information into procedures. The licensee documented its failure to timely update design basis information in CR-WF3-2014-02981. Because this violation was of very low safety significance and the licensee entered the issue into their corrective action program, this violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the Enforcement Policy: NCV 05000382/2014008-01, "Inadequate Procedures for Securing Dry Cooling Tower Fans."

b. Failure to Identify and Correct Condition Adversely Affecting Flooding Mitigation Design

Introduction. The team identified a Green non-cited violation for the licensee's failure to identify and correct a condition adverse to quality. On May 19, 2014, the team identified a significant amount of debris on the floor of one of the main steam isolation valve (MSIV) areas. In a probable maximum precipitation event, this debris could have prevented sufficient water removal by the floor drains to meet design basis assumptions.

Description. On August 13, 2013, the NRC documented a non-cited violation of 10 CFR 50, Appendix B, Criterion III, for Entergy's failure to provide design control measures for ensuring the adequacy of features designed to mitigate the effects of a probable maximum precipitation (PMP) event affecting Waterford 3's reactor auxiliary building (RAB) roof areas (NCV 05000382/2013003-01). The RAB roof areas contain the main steam isolation valves, main steam safety valves, feedwater isolation valves, emergency feedwater valves, and containment penetrations associated with the secondary plant. The RAB roof areas, also referred to as MSIV wing areas, are approximately 4000 square feet each. They have approximately 20-foot-high missile walls on three sides and the containment building on the fourth; they are open to the weather above. Non-cited violation NCV 2013003-01 involved the licensee's failure to ensure that the floor drain system in these RAB roof areas had adequate water removal capability to mitigate design-basis rainfall without causing a plant transient or challenging safety-related structures, systems, and components. To restore compliance

following the documentation of this violation, the licensee developed design-basis calculation ECM13 001, “MSIV Area Flooding analysis” dated, September 18, 2013.

The team reviewed the licensee’s corrective actions for NCV 2013003-01. This review included an evaluation of calculation ECM13-001 and a walk-down of the RAB roof areas. During its walk-down, the team observed a significant amount of debris on the floor of MSIV wing area A. The drain system in MSIV wing area A consists of two five-inch floor drains draining into a common six-inch header. One of these drains has a grating several inches below floor level, the other has a hemispherical grate at the floor elevation. The amount of debris observed by the team was adequate to substantially block one or both of the floor drains if it were transported to those drains by rainwater during heavy rainfall.

The team also noted that the doors to the MSIV wing areas were not watertight. These doors had thresholds approximately six inches above the floor elevation. If water were to accumulate to a greater-than-six-inch depth in the MSIV wing areas and flow through the door, it could cascade down a nearby stairwell and affect the train B 4.16kV switchgear, which is behind another non-watertight door at the lowest elevation of that stairwell. The PMP rainfall of 30.72 inches over 6 hours, with 11.67 inches falling during the fourth hour, could result in a water depth of greater than 6 inches in the MSIV wing areas if drains were to become blocked.

The team noted two additional deficiencies with the licensee’s analysis of the drains’ rainwater removal capabilities:

- The licensee’s calculation concludes that the water removal capability of the RAB roof area drain system exceeds what would fall in the area during the assumed PMP event. Based on this conclusion, the drain system would remove any rainwater from the room without any significant accumulation. However, the original violation was documented after the resident inspectors observed ankle-deep water on the floor of the MSIV wing area during a rainfall event.

- The licensee’s calculation only considers horizontal surface area of the RAB roof and surrounding structures. It provides for 20 percent of the water landing on the roof of the containment building cascading into each MSIV area, with no engineering margin added. It does not account for the potential of wind-driven rain reflecting off the side of the containment building into the RAB roof area.

Finally, the team noted that the licensee had no periodic maintenance to ensure that the floor drain systems for the MSIV areas were clear of debris and were capable of providing design-basis flow.

Analysis. Excessive debris in the A MSIV area that could challenge the water-removal capability of safety-related drain systems was a condition adverse to quality. The licensee’s failure to promptly identify and correct this condition adverse to quality as required by 10 CFR 50, Appendix B, Criterion XVI was a performance deficiency. This performance deficiency was more than minor because if left uncorrected, it had the potential to lead to a more significant safety concern. Specifically, if the debris were to

foul the drains during a heavy rainfall, the collecting water could adversely impact safety-related structures, systems, or components. Using Inspection Manual Chapter 0609, Appendix A, the team determined that the finding required a detailed risk evaluation because it involved the degradation of equipment specifically designed to mitigate a flooding event. Therefore, a Region IV senior reactor analyst performed a bounding detailed risk evaluation.

ASSUMPTIONS

The analyst made the following influential assumptions:

- The probable maximum precipitation is the bounding short duration rainfall that could occur at a specific location. NUREG 1407, "Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for severe accident Vulnerabilities," states that "the probable maximum flood [from the probable maximum precipitation event] has a 1E-5/year or less frequency."

  The team stated that rainfall amounts near the probable maximum precipitation event would likely be necessary to transport the debris found in the room and cause substantial drain blockage. To account for rainfall amounts that are slightly below the probable maximum precipitation level, but still near enough to cause flooding, the analyst lowered this initiating event frequency by one order of magnitude to $1x10^{-4}$ per year.

- Circuits for two emergency feedwater injection valves to the train A steam generator were in a portion of the flood area. While it was possible for these two valves to spuriously close, a parallel flow path to the steam generator is provided via valves not in the flood area. Additionally, these valves are designed to fail open on loss of power. Therefore, the risk increase associated with the two affected valves was negligible.

- Because the performance deficiency involved blocking certain water drainage pathways, during a probable maximum precipitation event water could cascade down a nearby stairwell and affect the functionality of the train B 4.16kV switchgear. The analyst conservatively assumed that this would defeat the switchgear with a probability of 1.0.

- The analyst assumed a bounding one-month exposure period. The plant had been at power for approximately one week when the team identified the finding. The inspectors determined that the debris had been placed in the vicinity of the drains during the outage.

- The analyst addressed the sequences that could be affected by the flooding event. Those included transients (scrams) as well as weather related losses of offsite power. The initiating event frequency of $1x10^{-4}$ per year would normally be spread among the two events. Since the actual split fraction for the events was not

known, the analyst conservatively assumed that each initiating event frequency was $1x10^{-4}$ per year.

- The analyst noted that the NRC had previously identified that the licensee failed to demonstrate that the alternate room cooling operator action was feasible. The analyst set this basic event to a failure probability of 1.0. This was true for the nominal and current case calculation runs.

QUANTIFICATION

The analyst used the Waterford 3 Standardized Plant Analysis Risk model, Revision 8.16, with a truncation limit of $1x10^{-11}$ to quantify the increase in the core damage frequency.

Loss of Offsite Power (LOOP) Sequences: The analyst solved only the loss of offsite power sequences. The conditional core damage probability given a loss of offsite power initiating event frequency of 1E-4 per year and failure of the train B 4.16kV switchgear was $5.5x10^{-7}$ per year. Considering a one month exposure period, the resultant change to the core damage frequency (ΔCDF) was:

$$\Delta CDF_{LOOP} = 5.5x10^{-7} \times 1/12 = 4.6x10^{-8}/year$$

Transients (SCRAMS): The analyst solved only the transient sequences. The conditional core damage probability given a transient initiating event frequency of $1x10^{-4}$ per year and failure of the train B 4.16kV switchgear was $7.8x10^{-9}$. Considering a one month exposure period, the resultant change to the core damage frequency (ΔCDF) was:

$$\Delta CDF_{transients} = 7.8x10^{-9} \times 1/12 = 6.5x10^{-10}/year$$

Total Delta-CDF: The total bounding change to the core damage frequency associated with this performance deficiency was the sum of the two calculated components.

$$\Delta CDF_{total} = 4.6x10^{-8}/year + 6.5x10^{-10}/year = 4.7x10^{-8}/year$$

Since the calculated change in core damage frequency was less than $1x10^{-6}$, the finding was of very low safety significance (Green) for core damage.

The dominant core damage sequences included: extremely heavy rain fall, a loss of offsite power initiating event, failure of the train B 4.16kV bus, and failure of the pressurizer safety relief valves to close. The low initiating event frequency helped to minimize the risk significance.

Large Early Release Frequency: Since the bounding ΔCDF was less than $1x10^{-7}$ per year, no estimate of the change to the large early release frequency was required.

This finding has a resolution cross-cutting aspect in the problem identification and resolution cross-cutting area because the licensee failed to take effective corrective

actions to address issues in a timely manner commensurate with their safety significance. Specifically, the licensee's corrective actions from the previous non-cited violation did not fully address the issue (P.3).

Enforcement. Title 10 CFR 50, Appendix B, Criterion XVI requires, in part, that the licensee shall establish measures to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, from May 14 until May 19, 2014, the licensee failed to establish measures to assure that a condition adverse to quality was promptly identified and corrected. Specifically, the licensee failed to identify an excessive amount of debris on the floor of the A main steam isolation valve area that could have prevented floor drains from performing their credited safety function during a probable maximum precipitation event. The licensee entered this condition into its corrective action program as CR-WF3-2014-03037 and removed the debris from the area. Because this violation was of very low safety significance (Green) and was entered into the licensee's corrective action program, it is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy:
NCV 05000382/2014008-02, "Failure to Identify and Correct Condition Adversely Affecting Flooding Mitigation Design."

c. Failure to Identify a Cause and Implement Corrective Actions to Prevent Recurrence for a Significant Condition Adverse to Quality

Introduction. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for a failure to identify a cause and take corrective actions to prevent recurrence for a significant condition adverse to quality. Specifically, the licensee did not identify a definitive cause, or implement actions to prevent recurrence for elevated main feedwater system vibration.

Description. The licensee replaced the steam generators at Waterford 3 during refueling outage 18 in late 2012. Upon returning to power operations, the plant experienced elevated vibration levels and related equipment failures on the main feedwater system and emergency feedwater system. The most significant of these failures included a plant trip after the loss of instrument air to the feedwater regulating valve actuator. The licensee classified the plant trip "significant" in accordance with its corrective action process and performed a root cause evaluation under CR-WF3-2013-0445. The licensee incorporated a total of 21 condition reports documenting various vibration related issues into the root cause evaluation. These failures included multiple instrument air leaks affecting the feedwater regulating valves and main feedwater isolation valves, a plant downpower after elevated vibrations required further evaluation of affected components, multiple instances of vibrations exceeding velocity thresholds at various monitoring points, and damaged supports. Other component failures attributed to elevated main feedwater vibrations, which were evaluated separately, included a loss of operability of emergency feedwater valve 229A causing technical specification entry for a loss of an emergency feedwater flow path (Technical Specification 3.7.2.d) and loss of a containment isolation valve (Technical Specification 3.6.3). The licensee's root cause assessment was completed in November 2013 and identified a possible cause, but did not identify a root cause.

The licensee evaluated main feedwater pressure drops and pulsations across the system and eliminated possible causes such as feed pump speed differentials and feedwater regulating valve position differences. The licensee determined that the most likely cause of increased feedwater vibrations were pressure pulsations originating in the inlet section of the steam generator feedwater ring header due to changes in ring header geometry and increased flow velocities. In accordance with the procedure in place at the time, the licensee determined that this was a possible cause and initiated a proposal to perform modeling of the steam generator flows to confirm or refute this conclusion. The licensee subsequently canceled this proposal, and therefore did not validate the possible cause associated with steam generator design changes as required by procedure. As a result, no corrective actions to prevent recurrence of the elevated vibrations were implemented.

The licensee took a number of other corrective actions, including repairing broken components, performing walk-downs of the feedwater lines to identify additional vibration concerns, implementing various engineering changes and plant modifications to harden (i.e. mitigate but not reduce) select locations to the impact of elevated vibrations, providing guidance to operations concerning actions in the event of exceeding monitoring thresholds, performing secondary and primary side inspections of the replacement steam generators during refueling outage 19, modifying vent and drain lines inside containment, and implementing snubber modifications. Although these efforts were extensive, no definitive root cause was identified, and no corrective actions to prevent recurrence (as defined in the licensee's corrective action program) were taken. The licensee initiated Condition Report CR-WF3-2014-03238 to evaluate the failure to identify the cause of the feedwater system vibrations.

Analysis. The failure to identify the cause of the feedwater vibration-induced problems and to take corrective actions to prevent recurrence as required by 10 CFR Part 50, Appendix B, Criterion XVI is a performance deficiency. The performance deficiency is more than minor because if left uncorrected, it could lead to a more significant safety concern. Specifically, though individual actions were taken to address failures caused by vibrations, no actions were taken to reduce or eliminate the vibrations themselves to prevent recurrence. The lack of corrective actions to prevent recurrence could leave main feedwater components and other components physically connected to the system (such as emergency feedwater) susceptible to future failures. Using Inspection Manual Chapter 0609, Appendix A, the team determined the issue to have very low safety significance (Green) because the performance deficiency, which affected the initiating events cornerstone, did not result in a reactor trip and the loss of mitigating equipment needed to transition the plant from the onset of the trip to a stable shutdown condition.

This finding has a resources cross-cutting aspect in the human performance area because leaders did not ensure that procedures used at the time the root cause assessment was performed were adequate to support nuclear safety (H.1). The procedure used by the licensee allowed a root cause assessment to have no corrective actions to prevent recurrence.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that for significant conditions adverse to quality, measures shall be

established to assure that the cause of the condition is determined and corrective action taken to preclude repetition. The licensee classified the condition described in Condition Report CR-WF3-2013-0445 as a significant condition adverse to quality. Contrary to the above, between January 2013 and June 2014 the licensee failed to assure that the cause of a significant condition adverse to quality was determined and failed to implement corrective actions to preclude repetition. Specifically, the licensee determined that the vibration-induced plant trip and other issues were significant but failed to identify a definitive cause for the vibrations and failed to take corrective actions to prevent recurrence of vibration related failures. Actions taken to date by the licensee appear to have been effective in mitigating known effects of the vibrations; but vibration levels remain elevated. The licensee initiated Condition Report CR-WF3-2014-03238 to evaluate the failure to determine the cause of the feedwater system vibrations. Because this violation was of very low safety significance and was entered into the licensee's corrective action program, it is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000382/2014008-03, "Failure to Identify a Cause and Implement Corrective Actions to Prevent Recurrence for a Significant Condition Adverse to Quality."

d. Failure to Evaluate Operating Experience as Directed in Station Procedure

Introduction. The team identified a Green finding for the licensee's failure to evaluate industry operating experience as directed in the station operating experience program procedure. Specifically, a vendor supplied Technical Bulletin TB-13-1 "Steam Generator and Pressurizer Closure Gasket Replacement Frequency," which recommended that all Westinghouse-designed steam generator and pressurizer closure gaskets be replaced at a prescribed frequency, was not evaluated in accordance with station procedures. This resulted in the licensee failing to take action to periodically replace affected gaskets to preclude degradation of the pressure boundary.

Description. The team reviewed the licensee evaluation and response to a Westinghouse Technical Bulletin TB-13-1, "Steam Generator and Pressurizer Closure Gasket Replacement Frequency," dated January 24, 2013. The technical bulletin discusses the industry's use of the Flexitallic and Flexicarb gaskets, a series of spiral wound gaskets fabricated of Alloy 600 metal windings and a continuous flexible asbestos or graphite ribbon, in bolted closures of Westinghouse-designed pressurizers and steam generators. Industry experience has shown that failure to periodically replace the pressurizer and steam generator closure gaskets results in gasket aging and subsequent deterioration. The bulletin further stated that deterioration of these gaskets has been suspected of causing leaking fuel rods through the generation of metallic foreign material. The bulletin recommends that these gaskets be replaced every 6 years and that no gasket in-service period should exceed 7.5 years.

The operating experience was screened by the licensee's operating experience group and assigned to engineering to perform an evaluation because it was an operating experience with potential plant impact. The evaluation performed by engineering determined that actions were necessary to develop a preventive maintenance schedule since the new steam generators have significantly more bolted hand-hole closures in various locations on the secondary side of the steam generator that are not subject to

any regularly scheduled inspection, opening, and replacement. The licensee initiated a work tracking action, WT-WTWF3-2013-0025, corrective action number 95, on May 21, 2013, to develop a method to ensure the steam generator bolted closures which are not regularly removed either have their gaskets replaced every six years or are visually inspected. On February 27, 2014, the corrective action associated with the work tracking item was closed with the development of a spreadsheet to track when the gaskets are replaced.

The inspectors interviewed the steam generator program owner to discuss the actions and review the spreadsheet. The inspectors determined that the spreadsheet was incomplete since not all the bolted closures were included. Waterford 3 replaced the steam generators during the previous refueling outage in late 2012. These replacement steam generators have many more bolted closures than the previous steam generators; these had not been accounted for in the spreadsheet. Further, the spreadsheet had been developed only to monitor when the gaskets were replaced and failed to ensure that the gaskets would be replaced or inspected at a specified interval. The inspectors concluded the program developed to inspect and monitor the gaskets for replacement was not adequate to prevent gasket failures.

The inspectors identified that there were no open actions in the corrective action program, or any other tracking program, that would evaluate or implement any plan to replace the gaskets according to the recommendation in the technical bulletin. The inspectors concluded that the evaluation of the operating experience information was not performed in accordance with station Procedure EN-OP-100, "Operating Experience Program," revision 20, Section 5.2[4](f), which stated, "Some industry OE, such as…NSSS Technical Bulletins identify generic issues that are supported by several examples of industry events. The evaluation… should ensure that the generic issue (i.e., such as generic material issues) [*sic*] is fully addressed." The licensee documented this performance deficiency in Condition Report CR-WF3-2014-03229 to determine what further actions were needed.

Analysis. The failure to evaluate operating experience information as required by procedure EN OP-100 was a performance deficiency. The performance deficiency is more than minor because if left uncorrected it would have the potential to lead to a more safety-significant concern. Specifically, the failure of the licensee to take the all the recommended actions with regard to the technical bulletin recommendation to replace the steam generator gaskets would allow the gaskets to be installed longer than their useful life. The deterioration of gasket material could result in unplanned transients or shutdowns. The finding is therefore associated with the initiating events cornerstone. Using Inspection Manual Chapter 0609, Appendix A, the inspectors determined that the finding was of very low safety significance (Green) because it was not an actual degradation that could have resulted in exceeding a reactor system leak rate for a small loss of coolant accident; could not have affected other systems used to mitigate a loss of coolant accident; did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant to a stable shutdown condition; and did not involve a complete or partial loss of a support system that contributes to the likelihood of, or cause, an initiating event and affected mitigation equipment.

This finding has a conservative bias cross-cutting aspect in the human performance area (H.14). Specifically, the licensee assumed that the technical bulletin was not based on actual failures and because steam generators had just been replaced, opted not to take further actions to evaluate or initiate any preventative maintenance to replace gaskets.

Enforcement. This finding does not involve enforcement action because no violation of a regulatory requirement was identified. Because this finding does not involve a violation and is of very low safety significance (Green), it is identified as FIN 05000382/2014008-04, "Failure to Evaluate Operating Experience as Directed in Station Procedure."

e. Failure to Promptly Correct Multiple Degraded or Nonconforming Conditions

Introduction. The inspectors identified multiple instances of the licensee's failure to promptly correct degraded or nonconforming conditions as required by 10 CFR Part 50, Appendix B, Criterion XVI. At the conclusion of the inspection, the licensee had one structure, system or component (SSC) degraded since November 2008 requiring compensatory measures to provide reasonable assurance of operability; the licensee had another degraded condition that had existed since April 2011 with no compensatory measures in place.

Description. The team reviewed the licensee's oldest condition reports documenting degraded or nonconforming structures, systems, and components (SSCs). As of June 5, 2014, the licensee had eight open condition reports documenting degraded or nonconforming conditions that had existed for greater than 90 days. Four of the eight conditions had existed for greater than one operating cycle. The licensee failed to consistently screen these conditions for applicability of 10 CFR 50.59.

Condition Report CR-WF3-2008-05183, dated November 2008, documented inadequate fuel oil capacity in the fuel oil storage tanks to meet the required seven-day inventory if the emergency diesel generator (EDGs) were operated at a frequency greater than 60.17 Hz. Technical specification surveillance requirement 4.8.1.1.2 allows for the EDGs to be demonstrated operable by maintaining a steady-state frequency as high as 61.2 Hz. The licensee is maintaining reasonable assurance of operability for the EDGs by administratively modifying acceptance criteria in surveillance procedure OP-903-115 [-116], "Train A [B] Integrated Emergency Diesel Generator/Engineering Safety Features Test." No modifications have been made to the technical specifications or to the EDG operating instructions. The licensee implemented these compensatory measures in April 2010. At the conclusion of this inspection, this condition was 2038 days old with compensatory measures in place for greater than four years. The licensee had made no updates to the plant's design or licensing basis.

In April 2011, the licensee documented in Condition Report CR-WF3-2011-02745 that a single power source powers both redundant trains of feeder interlock relays for the emergency power supply to pressurizer heaters. This single power source prevents the technical-specification-required and Final Safety Analysis Report (FSAR)-credited pressurizer heater function from meeting the single-failure criterion of 10 CFR Part 50

Appendix A. Section 1.9.26 of the licensee's FSAR[1] states, "the Waterford 3 pressurizer heater power supply design provides the capability to supply . . . a redundant group of pressurizer proportional heaters and associated controls necessary to establish and maintain natural circulation at hot standby conditions. Each group of heaters has access to only one Class IE division power supply." The FSAR further states that emergency operating procedures (EOPs) "provide information to the operator to ensure that . . . pressurizer heaters are available for pressure control to provide maintenance of natural circulation." Despite the failures to conform to its licensing basis, the licensee has determined that it has reasonable assurance that the pressurizer heaters will perform their safety function as required by Technical Specification 3.4.3.1. This reasonable assurance is based on a Westinghouse analysis that concluded, "a total loss of pressurizer heater capacity following a LOOP will have no impact during the Natural Circulation Cooldown events and/or FSAR Chapter 15 events at Waterford 3." Based on this analysis, the licensee considers this an operable but degraded condition. At the conclusion of this inspection, this condition was 1142 days old with no compensatory measures in place.

Two additional conditions, documented in Condition Report CR-WF3-2012-02332 in May 2012 and Condition Report CR WF3-2012-03280 in July 2012, had been degraded or nonconforming for greater than one full operational cycle. The licensee was maintaining operability of the affected SSCs using compensatory measures.

Analysis. The failure to promptly correct conditions adverse to quality as required by 10 CFR Part 50, Appendix B, Criterion XVI was a performance deficiency. This performance deficiency is more than minor because it was associated with the design control attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Appendix A, the team determined this finding to be of very low safety significance (Green) because it did not represent the actual loss of function of a safety-related system or train.

This finding has an evaluation cross-cutting aspect in the problem identification and resolution cross-cutting area because the licensee failed to thoroughly evaluate the issues to ensure that the resolutions addressed causes and extents of condition commensurate with the issues' safety significance (P.2).

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion XVI, requires, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to this requirement, from November 2008 through June 2014, the licensee failed to establish measures to assure that conditions adverse to quality were promptly identified and corrected. Specifically, the licensee

[1] This section of the licensee's UFSAR responds to position II.E.3.1 of NUREG-0737, "Clarification of TMI Action Plan Requirements": "The pressurizer heater power supply design shall provide the capability to supply . . . a predetermined number of pressurizer heaters and associated controls necessary to establish and maintain natural circulation at hot standby conditions. The required heaters and their controls shall be connected to the emergency buses in a manner that will provide redundant power supply capability."

failed to resolve several degraded or nonconforming conditions at the first available opportunity or to justify a longer completion schedule. The licensee documented this issue in Condition Report CR-WF3-2014-03250 to evaluate the timeliness of its corrective actions. Because this violation was of very low safety significance and was documented in the licensee's corrective action program, it is being treated as a non-cited violation in accordance with Section 2.3.2.a of the NRC Enforcement Manual: NCV 05000382/2014008-05, "Failure to Promptly Correct Multiple Degraded or Nonconforming Conditions."

f. Feedwater Piping Vibrations

Introduction. The inspectors identified an unresolved item concerning the design control aspect of main feedwater vibrations that began after steam generator replacement during refueling outage 18. Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control" requires, in part, that design control measures shall be established to provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods or by the performance of a suitable testing program.

Description. The licensee experienced elevated main feedwater vibrations after installing replacement steam generators during refueling outage 18 in 2012. In its cause analyses, the licensee determined that these vibrations caused or contributed to several equipment failures. The licensee determined vibrations to be:

- the possible cause of unintended feedwater regulating valve closure and subsequent plant trip (CR-WF3-2013-00445),
- a contributing cause to a loss of operability of emergency feedwater isolation valve (twice in one month) (CR-WF3-2013-04433 and -04670),
- the apparent cause of a loss of operability of emergency feedwater containment isolation and backup flow control valve EFW-229A (CR-WF3-2013-00883), and
- the apparent cause of damage to several main feedwater pipe supports both inside and outside of containment (CR-WF3-2014-02135).

Damaged component supports included degraded feedwater hangers inside of containment, a completely failed constant support hanger rod inside of containment, a cracked weld on a snubber trunnion support, several snubber bench test failures due to high drag loads, and a completely locked snubber inside of containment. During refueling outage 19 in early 2014, the licensee repaired vibration-damaged components and supports and hardened the main feed system such that it is less susceptible to vibration-induced failure. The licensee evaluated the component support failures in Condition Report CR WF3-2014-2135. The licensee performed an analysis to demonstrate the structural integrity of the main feedwater piping over the past operating cycle. It is indeterminate whether the vibration-induced failures were the result of inadequate design review practices. Therefore, the team was unable to determine

whether a performance deficiency exists. This issue is unresolved pending further NRC review: URI 05000382/2014008-06, "Feedwater System Vibrations."

4OA5 Other Activities

a. (Discussed) VIO 05000382/2013004-01 (EA-12-257), "Failure to Make a Report Required by 10 CFR 21.21"

On November 20, 2013, the NRC issued a Notice of Violation to Entergy Operations, Inc., citing the licensee's failure to complete an evaluation of a deviation in a basic component within 60 days of discovery at Waterford 3, as required by 10 CFR 21.21. This Notice of Violation closed unresolved item URI 05000382/2009010-01, documented on November 5, 2009 (ML093100238). In its documentation of the URI, the NRC noted that the licensee's procedures did not incorporate applicable NRC guidance on 10 CFR Part 21 reporting:

- the licensee did not include consideration of single failures in addition to the condition being evaluated, and

- the licensee's procedure only directed the evaluation of whether a deviation had in fact created a substantial safety hazard, not whether it could have created one.

Part 21 requires that licensees adopt appropriate procedures for evaluation of deviations and failures to comply to identify reportable conditions (10 CFR 21.21(a)). In its December 18, 2013, response to the Notice of Violation (ML13361A157), the licensee stated that the apparent cause of the violation was that "Waterford 3 did not implement an effective process to meet its responsibility and obligation under Part 21 to complete an evaluation to identify a reportable condition." To resolve this problem, the licensee developed Entergy fleet procedure EN-LI-108-01, "10 CFR 21 Evaluation and Reporting," to replace the site-specific procedures in effect at the time of the violation.

After reviewing procedure EN-LI-108-01, Revision 4, the team determined that the procedure contained inaccurate interpretations of regulations and regulatory guidance that are likely to result in the licensee's continuing failure to perform required evaluations or to make timely required reports:

- The procedure incorrectly states that the term "basic component" is synonymous with "safety-related," as defined in 10 CFR 50.2. Unless the basic component has been "accepted for use as safety-related," the procedure directs that the evaluator discontinue the evaluation and that no report be made.

  However, the term "basic component" encompasses substantially more than does the term "safety-related structures, systems, and components" (SSCs). Safety-related SSCs are defined in § 50.2 as those SSCs "that are relied upon to remain functional during and following design basis events." Basic components are defined in § 21.3 as "a [SSC] or part thereof that affects its safety function." Further, § 21.3 provides that the definition of "basic component includes safety-

related design, analysis, inspection, testing, fabrication, replacement of parts, or consulting services that are associated with the component hardware."

- The procedure directs that a reviewer performing a substantial safety hazard determination must "provide a clear statement of why there is (or is not) a substantial safety hazard." Though the attached worksheet addresses the potential for creating a substantial safety hazard, the procedure asks only whether one actually exists. The procedure directs the reviewer to an attachment that incorrectly interprets this requirement, stating that a single-failure analysis need not be applied in a Part 21 evaluation.

  The statements of consideration for the 1991 amendments to 10 CFR Part 21 (56 FR 36081) note that a defect requiring a report under Part 21 is any "deviation in a basic component [that] under reasonably expected operational circumstances, including expected normal operation, transients, and design basis accidents, could create a substantial safety hazard" (56 FR at 36083). The statements of consideration cite NUREG-0302 in noting that included among several criteria for determining whether a substantial safety hazard could be created are (1) major degradation of essential safety-related equipment and (2) major deficiencies involving design, construction, inspection, test, or use. In each of these cases, an independent single failure is explicitly required to be considered.

- As noted above, the licensee continues to assert that it need not consider additional failures in performing substantial safety hazard analyses. The licensee claims that a requirement to assume an additional failure would "be contrary to the principles in the regulation and the regulatory record." The licensee's position goes on to incorrectly state that the reporting requirements of Part 21 and of §§ 50.72 and 50.73 are parallel, arguing that application of single-failure analysis would "set a threshold for reporting under 10 CFR 21 lower than 10 CFR 50.72 and 10 CFR 50.73"; and that such reporting "would be contrary to the principles in 10 CFR 21" and "would eliminate the parity between 10 CFR 21 and 10 CFR 50.72 / 10 CFR 50.73 and set a new threshold for reporting under 10 CFR 21."

  The regulations and guidance note the overlap between Part 21 and §§ 50.72 and 50.73 reporting requirements but acknowledge some disparities. The 1991 statements of consideration note that Part 21 requires evaluation of the deviation in conjunction with the worst operational transient or design basis accident whereas §§ 50.72 and 50.73 require evaluation for loss of safety function. Thus the requirements of Part 21 are "somewhat different" from, but "compatible" with, those of §§ 50.72 and 50.73. The statements of consideration further state that "if a basic component contains a defect, and the defect could occur in the functionally redundant component, then this second failure must be considered in the evaluation of reportability" (56 FR at 36083). Finally, the current version of NUREG-1022 provides that although single independent component failures are not reportable under § 50.73 if a redundant component

fulfilled or would have fulfilled the safety function, a report is still required if the failure has generic implications.

Inspection Report 05000382/2013004, which accompanied the Notice of Violation, noted that in February 2010, the licensee submitted licensee event report (LER) 2009-003-01. This LER satisfied the 10 CFR Part 21 requirements for content but was submitted 501 days after the latest date that may have been acceptable under the regulation. As discussed above, the licensee's other corrective actions, including its adoption of fleet procedure EN-LI-108-01, are inadequate to ensure future compliance with 10 CFR Part 21 reporting requirements. Entergy Operations, Inc. is not in compliance with the requirement of 10 CFR 21.21(a) that it "adopt appropriate procedures to . . . evaluate deviations and failures to comply . . . in order to identify a reportable defect or failures to comply that could create a substantial safety hazard."

VIO 05000382/2013004-01 and enforcement action EA-12-257 remain open.

b. (Closed) VIO 05000382/2012008-03 (EA-12-198), "Failure to Take Timely Corrective Action to Establish a Basis for Flood Control Measures"

On November 5, 2012, the NRC issued a Notice of Violation to Entergy Operations, Inc., citing the licensee's failure to establish a design basis for flood control measures at Waterford 3. This violation had previously been documented as non-cited violation NCV 05000382/2010006-02, but the licensee had failed to timely restore compliance.

The team reviewed the licensee's response to the Notice of Violation (ML12340A011) and its actions to restore compliance. The team verified that since the Notice of Violation was issued in November 2012, the licensee had established a design basis for flood control and had translated this design basis into appropriate instructions, procedures, and drawings. Specifically, after evaluating its flood control measures, the licensee established an action level when the Mississippi River reaches a level of +24 feet. At this level, the licensee will commence actions to secure all flood barriers prior to the river reaching the +27-foot flood level, at which time these barriers are required. The licensee's evaluation included an historical review of the rate of river level rise and an analysis of the worst-case length of time it would take to secure all flood barriers. The licensee incorporated the +24-foot action level into procedures OP-901-521, "Severe Weather and Flooding," Revision 311, and OP-903-064, "Mississippi River Level Monitoring," Revision 8.

VIO 05000382/2012008-03 and enforcement action EA-12-198 are closed.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On June 6, 2014, the inspectors presented the inspection results to Mr. C. Rich, acting Site Vice President, 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.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

L. Bergeron, Supervisor, Control Room
M. Carter, Supervisor, Control Room
A. Chester, Manager, Shift
J. Crews, Supervisor, Engineering
M. Grey, Sr. Lead Engineer
J. Hashim, Sr. Engineer
J. Jarrell, Manager, Regulatory Assurance
J. Kieff, Sr. Coordinator, Nuclear Support
K. Kunkel, Sr. Lead Engineer
B. Lanka, Director, Engineering
B. Lindsey, Sr. Manager, Operations
D. Litolff, Supervisor, Control Room
J. Manzella, Corrective Actions & Assessments Specialist
J. Maynard, Supervisor, Control Room
D. McElroy, Supervisor, Engineering
W. McKinney, Manager, Performance Improvement
R. O'Quinn, Sr. Staff Engineer (Steam Generator Program Owner)
R. Pollock, Sr. Licensing Specialist
R. Porter, Manager, Design & Program Engineering
D. Rieder, Supervisor (Acting), Quality Assurance
C. Talazac, Supervisor, Engineering
J. Wilbur, Supervisor (Acting), Engineering

NRC Personnel

M. Davis, Sr. Resident Inspector
G. Replogle, Sr. Reactor Analyst

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000382/2014008-01	NCV	Inadequate Procedures for Securing Dry Cooling Tower Fans (Section 4OA2.5.a)
05000382/2014008-02	NCV	Failure to Identify and Correct Condition Adversely Affecting Flooding Mitigation Design (Section 4OA2.5.b)
05000382/2014008-03	NCV	Failure to Identify a Cause and Implement Corrective Actions to Prevent Recurrence for a Significant Condition Adverse to Quality (Section 4OA2.5.c)
05000382/2014008-04	FIN	Failure to Evaluate Operating Experience as Directed in Station Procedure (Section 4OA2.5.d)

Opened and Closed

05000382/2014008-05	NCV	Failure to Promptly Correct Multiple Degraded or Nonconforming Conditions (Section 4OA2.5.e)

Opened

05000382/2012008-06	URI	Feedwater System Vibrations (Section 4OA2.5.f)

Closed

05000382/2012008-03	VIO	Failure to Take Timely Corrective Action to Establish a Basis for Flood Control Measures (Section 4OA5.b)

Discussed

05000382/2013004-01	VIO	Failure to Make a Report Required by 10 CFR 21.21 (Section 4OA5.a)

LIST OF DOCUMENTS REVIEWED

Condition Reports (CRs) (CR-WF3-20XX-XXXXX)

00-00500	11-04195	12-03752	12-04806	12-07350	13-01727	13-04433
05-03188	11-04935	12-03754	12-04808	12-07359	13-01731	13-04627
06-00059	11-06203	12-03758	12-04948	12-07520	13-02027	13-04644
08-05183	11-06308	12-03761	12-05016	12-07546	13-02128	13-04660
09-01555	11-06566	12-03769	12-05017	12-07566	13-02315	13-04670
09-04972	11-06677	12-03772	12-05114	12-07568	13-02316	13-04738
09-06634	11-06682	12-03815	12-05571	12-07570	13-02483	13-04760
09-07420	11-08140	12-03824	12-05680	12-07604	13-02491	13-04839
10-00084	12-00530	12-03825	12-05922	13-00092	13-02493	13-04883
10-00130	12-00599	12-03846	12-05991	13-00107	13-02530	13-04929
10-01330	12-00762	12-03899	12-06102	13-00443	13-02564	13-05190
10-01484	12-00860	12-03967	12-06288	13-00445	13-02836	13-05406
10-01713	12-00932	12-03974	12-06328	13-00446	13-02846	13-05642
10-02558	12-01185	12-03994	12-06331	13-00499	13-02962	13-05782
10-02584	12-01380	12-04036	12-06428	13-00687	13-03133	13-05810
10-03038	12-02332	12-04195	12-06431	13-00833	13-03161	13-05815
10-03232	12-02902	12-04228	12-06436	13-00895	13-03320	13-06020
10-03880	12-03280	12-04326	12-06532	13-00945	13-03436	13-06123
10-04863	12-03412	12-04418	12-06625	13-01069	13-03590	13-06135
11-02005	12-03413	12-04427	12-06703	13-01077	13-03666	13-06172
11-02546	12-03414	12-04489	12-06756	13-01185	13-03713	14-00021
11-02745	12-03476	12-04497	12-06758	13-01261	13-03986	14-00200
11-03371	12-03644	12-04549	12-06804	13-01284	13-03989	14-00244
11-03612	12-03730	12-04565	12-06904	13-01348	13-04023	14-00385
11-03895	12-03732	12-04643	12-07060	13-01590	13-04047	14-00439

14-00469	14-00989	14-01426	14-02874	14-02951	14-03037	14-03238
14-00483	14-01065	14-01562	14-02893	14-02952	14-03038	14-03250
14-00521	14-01176	14-01586	14-02921	14-02953	14-03075	14-04115
14-00606	14-01254	14-02414	14-02931	14-02976	14-03084	
14-00631	14-01418	14-02437	14-02932	14-02981	14-03166	
14-00757	14-01425	14-02872	14-02936	14-03033	14-03229	

Other Paperless Condition Reporting System Documents

CR-HQN-2013-00539	LO-WLO-2012-00061	LO-WLO-2013-00050
CR-HQN-2013-00595	LO-WLO-2012-00072	LO-WLO-2013-00059
LO-HQNLO-2010-00021	LO-WLO-2012-00073	LO-WLO-2013-00070
LO-HQNLO-2012-00086	LO-WLO-2012-00085	LO-WLO-2013-00102
LO-WLO-2012-00019	LO-WLO-2012-00101	LO-WLO-2013-00119
LO-WLO-2012-00031	LO-WLO-2013-00042	LO-WLO-2013-00121
LO-WLO-2012-00032	LO-WLO-2013-00046	LO-WLO-2013-00131
LO-WLO-2012-00041	LO-WLO-2013-00049	LO-WTWF3-2013-00025

Work Orders

336347	336357	345286	52549286
336351	336365	52538418	52554719

Procedures

Number	Title	Revision(s)
EN-DC-153	Preventive Maintenance Component Classification	9
EN-DC-206	Maintenance Rule (a)(1) Process	3
EN-DC-345	Equipment Reliability Clock	2
EN-EC-100	Guidelines for Implementation of the Employee Concerns Program	8
EN-FAP-EP-010	Severe Weather Response	1
EN-FAP-HR-006	Fleet Approach to Leadership Development & Organizational Effectiveness	0
EN-FAP-LI-003	Corrective Action Review Board (CARB) Process	13
EN-FAP-LI-006	Self-Assessment Review Board (SARB) Process	4-5
EN-FAP-OE-001	INPO Consolidated Entry System (ICES) Process	4
EN-FAP-OP-006	Operator Aggregate Impact Index Performance Indicator	2
EN-HU-101	Human Performance program	12
EN-HU-102	Human Performance Traps & Tools	13
EN-LI-102	Corrective Action Process	20-23

Procedures

Number	Title	Revision(s)
EN-LI-102-02	CR Closure Quality	8
EN-LI-104	Self-Assessment and Benchmark Process	8-10
EN-LI-108	Event Notification and Reporting	9
EN-LI-108-01	10 CFR 21 Evaluations and Reporting	4
EN-LI-118	Root Cause Evaluation Process	18
EN-LI-118	Cause Evaluation Process	20
EN-LI-119	Apparent Cause Evaluation (ACE) Process	16
EN-LI-121	Trending and Performance Review Process	12-15
EN-LI-121-02	Trend Analysis	0-1
EN-OE-100	Operating Experience Program	20
EN-OP-104	Operability Determination Process	7
EN-OP-111	Operational Decision-Making Issue (ODMI) Process	11
EN-OP-112		
EN-OP-115	Conduct of Operations	14
EN-OP-117	Operations Assessments	6
EN-OP-119	Protected Equipment Postings	4
EN-PL-187	Safety Conscious Work Environment (SCWE) Policy	1
EN-QV-100	Conduct of Nuclear Oversight	9
EN-QV-104	Quality Assurance Program Manual Control	4
EN-QV-108	QA Surveillance Process	9
EN-QV-109	Audit Process	26
EN-QV-134	Employee Survey Response Protocol	1
EN-QV-135	Nuclear Oversight Performance Assessments	7
ENS-EP-302	Severe Weather Response	11
EN-WM-105	Planning	12
HP-002-201	Radiological Survey Techniques and Frequencies	303-304
ME-003-301	480 VAC Overcurrent Protective Integrated Device Functional Test	6
ME-003-302	Emergency Diesel Generator Undervoltage Override and Sequencer Lockout Logic Circuit Testing	302

Procedures

Number	Title	Revision(s)
ME-003-303	Miscellaneous Sequencer Relay Contact Testing	4
ME-003-315	Molded Case Circuit Breakers	304
ME-003-330	480 Volt G.E. Switchgear Breakers	308
ME-005-076	G.E. Voltage Relay, Model 12IAV53D and 12IAV53N	301
MI-003-457	Steam Generator 1 and 2 Liquid Radiation Monitor Channel Calibration	11
MM-008-005	Delta 110 Seam Generator Secondary Side Cover Removal and Installation	1
OI-002-000	Annunciator and Control Room Instrumentation Status Control	301 304 307
OI-004-000	Operations Shift Logs	304
OI-030-000	Improving Operator Performance	30
OI-042-000	Watch Station Processes	32
OP-006-005	Inverters and Distribution	307-309
OP-500-003	Control Room Cabinet C	26
OP-901-521	Severe Weather and Flooding	307, 311
OP-903-064	Mississippi River Level Monitoring	8
PS-016-103	Vital Area Access during Periods of a Credible Insider Threat	0
UNT-005-013	Fire protection Program	12
UNT-007-060	Control of Loose Items	304

Quality Assurance Audit & Surveillance Reports

Number	Title	Date/Revision
QA-10-2012-W3-01	Maintenance Program Audit	August 16.2014
QA-12/18-2013-W3-01	Operations and Technical Specifications Audit	August 6, 2013
QA-13-2012-W3-01	Quality Assurance Audit	December 11, 2014
QA-14/15-2013-W3-01	Radiation Protection/Radwaste Audit	November 18, 2013
QA-19-2014-W3-01	Training Audit	March 31, 2014

QA-2/6-2013-W3-01	Combined Chemistry, Effluents and Environmental Monitoring	October 1, 2013
QA-20-2012-W3-01	ISFSI Audit	March 1, 2013
QA-3-2013-W3-01	Corrective Action Program Audit	July 19, 2013
QA-7-2013-W3-01	Emergency Plan Audit	June 6, 2013
QA-8-2013-W3-01	Engineering Program Audit	March 1, 2013
QA-9-2014-W3-01	Fire Protection Audit	March 14, 2014
QS-2012-W3-014	Quality Assurance Surveillance Report	1
QS-2012-W3-015	Quality Assurance Surveillance Report	1

Other Documents

Number	Title	Date(s)/Revision(s)
	List of Control Board Deficiencies	
	Self-Assessment Review Board (SARB) Packages	January 18, 2013 April 18, 2013 July 25, 2013 October 31, 2013
	Annunciator Audit Log	May 22, 2014
	Control Panel Instrumentation Status Log	May 22, 2014
	List of Control Room White Tags	May 22, 2014
	List of Operational Issues	May 22, 2014
	Operations Shift Turnover Report	May 22, 2014
	Outside Operator Watch Logs	May 22, 2014
	ODMI-Elevated Quench Tank In-Leakage	May 21, 2014
	eB OE Screening Sheets	September 25, 2013 November 6, 2013 February 12, 2014 April 9, 2014
	Waterford 3 Licensing Department Training and Knowledge Retention Manual	April 10, 2014
	ODMI-FWPT B Lube Oil High Water Content	August 14, 2013
	List of Control Board Caution Tags	June 2. 2014
	Night and Standing Order Log	June 2. 2014

Other Documents

Number	Title	Date(s)/Revision(s)
	Temporary Modification Log	June 2. 2014
	Waterford Top Tem Equipment Reliability Issues	June 2. 2014
	Nuclear Oversight Status Report	August 28, 2013 April 29, 2014
	Assessment of Waterford 3 Station Employee Concerns Program	April 8-11, 2013
	Nuclear Safety Culture Assessment: Addressing Fleet Gaps	March 18, 2013
	OSRC Meeting Minutes	September 19, 2013
	2012 Nuclear Safety Assessment Survey	March 28, 2013
B288	Cable and Conduit List Installation Notes: Conduit Installation Notes & Underground Concrete Encased Conduits	18
E-6660E00	Replacement Steam Generator Waterford 3 Outline	2
E-6660E01	Replacement Steam Generator Waterford 3 General Arrangement	2
Ebasco Spec. 1208	Flexible Steel Conduit for Electrical Systems	November 3, 1978
EC 37263	Provide Engineering for New 315A(B) Breaker Cubicles CC EBKR315A &B 1F through 9M, 480VAC SR 1E, Seismic Two Speed, Bi-Metallic TOLS, Breaker Cubicles for Dry Tower Fans	0
EC 46635		0
EC 47175		0
EC-39741	Evaluation of Mississippi River Level Rate of Rise Based on Historic High River Levels Obtained from Usage	0
EC-41353	Determine a Conservative Response Time to Perform the Required Flood Protection Actions at the Site & Justify OP-901-521 Requirements are Conservative	0
ECE91-144	Load Study for PDP 3014AB	1
ECM00-004	EFW Turbine Steam Supply RELAP Model (EC-38912)	0

Other Documents

Number	Title	Date(s)/Revision(s)
ECM13-001	MSIV Area Flooding Analysis	000
EN-PL-187	Safety Conscious Work Environment (SCWE) Policy	1
NFPA-13	Standard for the Installation of Sprinkler Systems	1976
Non-Licensed Operator Training	Offsite Power Supply- Single Phase Fault IER-L2-12-14	
SD-4KV-03	Electrical Distribution	6
WLP-AOR-133TSS	Transformers and Switching Station	April 18, 2013
WLP-LOR-133PPO30	2013 Cycle 3 Loss of Safety Buses	April 18, 2013

Information Request
Biennial Problem Identification and Resolution Inspection
Waterford Steam Electric Station, Unit 3
April 1, 2014

Inspection Report: **50-382/2014008**
On-site Inspection Dates: **May 19-23 & June 2-6, 2014**

This inspection will cover the period from August 2, 2012, through June 6, 2014. All requested information is limited to this period or to the date of this request unless otherwise specified. To the extent possible, the requested information should be provided electronically in word-searchable Adobe PDF (preferred) or Microsoft Office format. Any sensitive information should be provided in hard copy during the team's first week on site; do not provide any sensitive or proprietary information electronically.

Lists of documents ("summary lists") should be provided in Microsoft Excel or a similar sortable format. Please be prepared to provide any significant updates to this information during the team's first week of on-site inspection. As used in this request, "corrective action documents" refers to condition reports, notifications, action requests, cause evaluations, and/or other similar documents, as applicable to Waterford 3.

Please provide the following information no later than May 2, 2014:

1. Document Lists
   Note: For these summary lists, please include the document/reference number, the document title, initiation date, current status, and long-text description of the issue.

   a. Summary list of all corrective action documents related to significant conditions adverse to quality that were opened, closed, or evaluated during the period

   b. Summary list of all corrective action documents related to conditions adverse to quality that were opened or closed during the period

   c. Summary lists of all corrective action documents that were upgraded or downgraded in priority/significance during the period (these may be limited to those downgraded from, or upgraded to, apparent-cause level or higher)

   d. Summary list of all corrective action documents initiated during the period that "roll up" multiple similar or related issues, or that identify a trend

   e. Summary lists of operator workarounds, operator burdens, temporary modifications, and control room deficiencies (1) currently open and (2) that were evaluated and/or closed during the period

   f. Summary list of safety system deficiencies that required prompt operability determinations (or other engineering evaluations) to provide reasonable assurance of operability

   g. Summary list of plant safety issues raised or addressed by the Employee Concerns Program (or equivalent) (sensitive information should be made available during the team's first week on site—do not provide electronically)

h. Summary list of all Apparent Cause Evaluations completed during the period

i. Summary list of all Root Cause Evaluations planned or in progress but not complete at the end of the period, with planned completion or due date

2. Full Documents with Attachments

a. Root Cause Evaluations completed during the period

b. Quality Assurance audits performed during the period

c. All audits/surveillances, performed during the period, of the Corrective Action Program, of individual corrective actions, and of cause evaluations

d. Functional area self-assessments and non-NRC third-party assessments (i.e., peer assessments performed as part of routine or focused station self- and independent assessment activities; do not include INPO assessments) that were performed or completed during the period; include a list of those that are currently in progress

e. Any assessments of the safety-conscious work environment at Waterford 3

f. Corrective action documents generated during the period associated with the following:

i. NRC findings and/or violations issued to Waterford 3

ii. Licensee Event Reports issued by Waterford 3

g. Corrective action documents generated for the following, if they were determined to be applicable to Waterford 3 (for those that were evaluated but determined not to be applicable, provide a summary list):

i. NRC Information Notices, Bulletins, and Generic Letters issued or evaluated during the period

ii. Part 21 reports issued or evaluated during the period

iii. Vendor safety information letters (or equivalent) issued or evaluated during the period

iv. Other external events and/or Operating Experience evaluated for applicability during the period

h. Corrective action documents generated for the following:

i. Emergency planning drills and tabletop exercises performed during the period

ii. Maintenance preventable functional failures which occurred or were evaluated during the period

iii. Adverse trends in equipment, processes, procedures, or programs that were evaluated during the period

iv. Action items generated or addressed by offsite review committees during the period

3. Logs and Reports

a. Corrective action performance trending/tracking information generated during the period and broken down by functional organization (if this information is fully included in item 3.c, it need not be provided separately)

b. Corrective action effectiveness review reports generated during the period

c. Current system health reports, Management Review Meeting package, or similar information; provide past reports as necessary to include ≥12 months of metric/trending data

d. Radiation protection event logs during the period

e. Security event logs and security incidents during the period (sensitive information should be made available during the team's first week on site—do not provide electronically)

f. Employee Concern Program (or equivalent) logs (sensitive information should be made available during the team's first week on site—do not provide electronically)

g. List of training deficiencies, requests for training improvements, and simulator deficiencies for the period

Note: For items 3.d–3.g, if there is no log or report maintained separate from the corrective action program, please provide a summary list of corrective action program items for the category described.

4. Procedures

Note: For these procedures, please include all revisions that were in effect at any time during the period.

a. Corrective action program procedures, to include initiation and evaluation procedures, operability determination procedures, apparent and root cause evaluation/determination procedures, and any other procedures that implement the corrective action program at Waterford 3

b. Quality Assurance program procedures (specific audit procedures are not necessary)

c. Employee Concerns Program (or equivalent) procedures

d. Procedures which implement/maintain a Safety Conscious Work Environment

5. Other

a. List of risk-significant components and systems, ranked by risk worth

b. Organization charts for plant staff and long-term/permanent contractors

c. Electronic copies of the UFSAR (or equivalent), technical specifications, and technical specification bases, if available

d. For each day the team is on site,

i. Planned work/maintenance schedule for the station

ii. Schedule of management or corrective action review meetings (e.g. operations focus meetings, CR screening meetings, CARBs, MRMs, challenge meetings for cause evaluations, etc.)

iii. Agendas for these meetings

Note: The items listed in 5.d may be provided on a weekly or daily basis after the team arrives on site.

All requested documents should be provided electronically where possible. Regardless of whether they are uploaded to an internet-based file library (e.g., Certrec's IMS), please provide copies on CD or DVD. One copy of the CD or DVD should be provided to the resident inspector at Waterford 3; three additional copies should be provided to the team lead, either during his inspection preparation visit to the site on or about April 28, 2014, or by mail, to arrive no later than May 2, 2014:

Eric A. Ruesch
U.S. NRC Region IV
1600 East Lamar Blvd.
Arlington, TX 76011-4511

PAPERWORK REDUCTION ACT STATEMENT

This request 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.

Supplemental Information Request
Biennial Problem Identification and Resolution Inspection
Waterford Steam Electric Station, Unit 3
May 14, 2014

Inspection Report: **50-382/2014008**
On-site Inspection Dates: **May 19-23 & June 2-6, 2014**

This request supplements the original information request. Where possible, the information should be available to the inspection team immediately following the entrance meeting. This inspection will cover the period from August 2, 2012, through June 6, 2014. The scope of the requested information is limited to this period.

Please provide the following:

1. As part of the inspection, the team will do a five-year in-depth review of issues and corrective actions related to the safety-related 480V electrical distribution system(s), including associated transformers and motor control centers. The following documents are to support this review:
    - Copies of all root and apparent cause evaluations performed on the safety-related 480V electrical distribution system(s) within the last 5 years, including root cause evaluations not already provided
    - List of all surveillances run on the safety-related 480V electrical distribution system(s) within the last five years, sortable by component if possible, and including acceptance criteria
    - List of all corrective maintenance work orders performed on the safety-related 480V electrical distribution system(s) within the last 5 years
    - List of maintenance rule functional failure assessments—regardless of the result—performed on the safety-related 480V electrical distribution system(s) within the last 5 years
    - System training manual(s) for the safety-related 480V electrical distribution system(s)
    - Engineering forms/logs (including the engineer's notes), if any, from the last two engineering walk-downs of the safety-related 480V electrical distribution system(s); if these logs and notes are not in controlled documents, please provide governing procedures and arrange an interview with the engineer(s)

2. Procedures (please provide hard copy and electronic):
    - Conduct of Operations procedure (or equivalent) and any other procedures governing control room conduct, operator burdens and workarounds, etc.; include EN-OP-115 and EN-FAP-OP-006
    - Operating Experience (OE) program procedures and any other procedures or guidance documents that describe the site's use of OE information; include EN-OP-104

3. All CRs and other corrective action documents written in response to comments and assessments documented in the 2012 PI&R inspection report (full documents with attachments). Include any CRs initiated to review the apparent OE weakness discussed in the 2012 PI&R report.

4. List of CRs and other corrective action documents generated during maintenance and/or post-maintenance test activities

5. List of structures, systems, and components and/or functions that were in maintenance rule (a)(1) status at any time during the inspection period; include dates and results of expert panel reviews and dates of status changes

6. The following condition reports (CR-WF3-):

2012-3732	2012-4565	2013-0050	2013-1752	2014-0048
2012-3751	2012-4634	2013-0107	2013-2027	2014-0170
2012-3752	2012-4894	2013-0440	2013-2128	2014-0469
2012-3754	2012-4912	2013-0443	2013-2254	2014-0606
2012-3761	2012-5051	2013-0445	2013-2322	2014-0703
2012-3769	2012-5991	2013-0451	2013-2946	2014-0958
2012-3772	2012-6371	2013-0499	2013-3320	2014-1031
2012-3839	2012-6431	2013-0665	2013-3518	2014-1065
2012-3846	2012-6625	2013-0833	2013-4324	2014-1328
2012-3853	2012-6703	2013-1161	2013-5190	
2012-4036	2012-6720	2013-1185	2013-5322	
2012-4461	2012-7359	2013-1327	2013-6172	

In addition to the list above, please provide any updates to the information previously provided in response to the April 1, 2014, information request.