



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 6, 2018

Mr. James Brennan, Senior Vice President  
Quality, Safety and Performance Improvement  
and Chief Quality Officer  
Westinghouse Electric Company  
1000 Westinghouse Drive  
Cranberry Township, PA 16066

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION OF  
WESTINGHOUSE ELECTRIC COMPANY LLC, CRANBERRY TOWNSHIP,  
REPORT NO. 99900404/2018-201

Dear Mr. Brennan

On May 21 through May 25, 2018, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Westinghouse Electric Company (here-after referred to as WEC) facility in Cranberry Township, PA. The purpose of this limited-scope inspection was to assess WEC's compliance with the provisions of selected portions of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 21, "Reporting of Defects and Noncompliance."

This technically focused inspection specifically evaluated WEC's implementation of quality activities associated with design control, oversight of suppliers, internal audits, and corrective actions. Specifically, the scope of the quality activities inspected included implementation of the AP1000 Initial Test Program, review of WEC's corrective actions to the September 2016 quality assurance (QA) vendor inspection (NRC Inspection Report No. 99900404/2016-204, dated November 14, 2016) and review of WEC's corrective actions to the January 2015 QA vendor inspection (NRC Inspection Report No. 99900404/2015-202, dated April 24, 2015), and review of WEC's corrective actions to the September 2011 QA vendor inspection (NRC Inspection Report No. 999011409/2011-201-3, dated November 3, 2011). The enclosed report presents the results of the inspection. This NRC inspection report does not constitute NRC endorsement of WEC's overall QA or 10 CFR Part 21 programs.

Based on the results of this inspection, the NRC inspection team found the implementation of your QA program met the requirements imposed on you by your customers or NRC licensees. No findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response will be made available electronically for public inspection in the

NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

***/RA/ TJackson for***

Kerri A. Kavanagh, Chief  
Quality Assurance Vendor Inspection Branch-2  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

Docket No.: 99900404

Enclosure:  
Inspection Report No. 99900404/2018-201  
and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION OF  
WESTINGHOUSE ELECTRIC COMPANY LLC, CRANBERRY TOWNSHIP,  
REPORT NO. 99900404/2018-201 Dated: July 6, 2018

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**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NEW REACTORS  
DIVISION OF CONSTRUCTION INSPECTION & OPERATIONAL PROGRAMS  
VENDOR IMPLEMENTATION INSPECTION REPORT**

Docket No.: 99900404

Report No.: 99900404/2018-201

Vendor: Westinghouse Electric Company  
Cranberry Township, PA

Vendor Contact: Mr. Ronald Wessel  
[wesselrp@westinghouse.com](mailto:wesselrp@westinghouse.com)  
412-374-4023

Nuclear Industry Activity: Westinghouse Electric Company (WEC) designed the AP1000 nuclear power plant, including the detailed design and testing of safety-related components to be used in AP1000 plants. These qualification and functional tests are associated with and may directly affect closure of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) from Revision 19 of the certified AP1000 design. Currently, these ITAAC are incorporated into the combined licenses of Vogtle Units 3 and 4.

Inspection Dates: May 21-25, 2018

Inspectors: Jermaine Heath, Team Leader, NRO/DCIP/QVIB-1  
Jonathan Ortega-Luciano, NRO/DCIP/QVIB-2  
Greg Galletti, NRO/DCIP/QVIB-1  
Andrea Keim, NRO/DCIP/QVIB-2  
Edgardo Torres, NRO/DCIP/QVIB-1

Approved by: Kerri A. Kavanagh, Chief  
Quality Assurance Vendor Inspection Branch-2  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

Enclosure

## **EXECUTIVE SUMMARY**

### Westinghouse Electric Company Inspection Report No. 99900404/2018-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted an announced, routine inspection at Westinghouse Electric Company (here-after referred to as WEC), in Cranberry, Township, PA, from May 21 through 25, 2018. The purpose of the inspection was to review the implementation of the WEC Quality Assurance (QA) program pursuant to Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 21, "Reporting of Defects and Noncompliance."

This technically focused inspection evaluated WEC's implementation of quality activities associated with safety-related systems, structures, and components to determine if those activities were being effectively implemented. This technically focused inspection evaluated WEC's implementation of quality activities associated with design control, oversight of suppliers, internal audits, and corrective actions. Specifically, the scope of the quality activities inspected included implementation of WEC's initial test program activities associated with the AP1000 plant design, review of WEC's corrective actions to the September 2016 quality assurance (QA) vendor inspection (NRC Inspection Report No. 99900404/2016-204 dated November 14, 2016), and review of WEC's corrective actions to the January 2015 QA vendor inspection (NRC Inspection Report No. 99900404/2015-202 dated April 24, 2015).

The following regulations serve as the bases for the NRC inspection:

- Appendix B to 10 CFR Part 50
- 10 CFR Part 21

During conduct of this inspection, the NRC inspection team implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," supplemented by IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," and IP 43004, "Inspection of Commercial-Grade Dedication Programs."

The results of the inspection are summarized as follows:

#### **Corrective Action**

The NRC inspection team reviewed WEC's corrective actions in response to Notice of Nonconformance (NON) 99900404/2016-204-01 and NON 99900404/2016-204-02 related to the design for inspectability of AP1000 safety-related valves, which was identified during a 2016 quality assurance vendor inspection of Westinghouse. These NONs were associated with NRC Inspection Report 99900404/2016-204, dated November 14, 2016 (ADAMS Accession Number ML16307A159). The NRC inspection team determined the corrective actions implemented to address NON 99900404/2016-204-01 were adequate. However, at the time of the inspection, corrective actions related to NON 99900404/2016-204-02 were still outstanding. Consequently, the NRC inspection team cannot adequately evaluate and close NON 99900404/2016-204-02 until WEC completes all corrective actions related to that issue. Therefore, based on the NRC inspectors' review, NON 99900404/2016-204-01 is CLOSED; NON 99900404/2016-204-02 will remain OPEN and may be reviewed for closure at a future NRC inspection.

The NRC inspection team reviewed corrective actions in response to NON 99901416/2016-201-01, which was issued in relation to inadequate corrective actions identified during a 2016 NRC quality assurance vendor inspection of Mangiarotti S.p.A. The NON is associated with NRC Inspection Report 99901476/2016-201, dated June 8, 2017 (ADAMS Accession Number ML17156A386). The NRC inspection team determined the corrective actions implemented were adequate to address the NON. Based on the NRC inspectors' review, NON 99901416/2016-201-01 is CLOSED.

The NRC inspection team reviewed corrective actions in response to NON 99900404/2015-202-01, NON 99900404/2015-202-02, and NON 99900404/2015-202-03 issued in relation to inadequate supplier oversight and identified during a 2015 NRC quality assurance vendor inspection of Westinghouse. These NONs were associated with NRC Inspection Report 99900404/2015-202, dated April 14, 2015 (ADAMS Accession Number ML15070A213). The NRC inspection team determined the corrective actions implemented were adequate to address the NONs. Based on the NRC inspectors' review, 99900404/2015-202-01, NON 99900404/2015-202-02, and NON 99900404/2015-202-03 are CLOSED.

#### Other inspection areas

The NRC inspection team determined that WEC is implementing its programs for design control associated with the AP1000 initial test program, oversight of suppliers, and internal audits in accordance with the applicable regulatory requirements of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and activities observed, the NRC inspection team also determined that WEC is implementing its policies and procedures associated with these programs. No findings of significance were identified.

## REPORT DETAILS

### 1. Design Control

#### a. Inspection Scope

The NRC inspection team reviewed Westinghouse Electric Company's (here-after referred to as WEC) policies and implementing procedures that govern the implementation of the design control program to verify their compliance with the regulatory requirements of Criterion III, "Design Control," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

#### AP1000 Initial Test Program Design Changes

The NRC inspection team reviewed aspects of WEC's design change control program as it applies to the US AP1000 initial test program. The AP1000 initial test program follows the guidance in Regulatory Guide 1.68, "Initial Test Programs for Water-Cooled Nuclear Power Plants," Revision 3. The team evaluated WEC's design control and configuration management processes for the AP1000 Initial Test Program (ITP) to determine whether there were adequate processes in place for determining the impact of activities (e.g., design change, non-conformance, issuance of a new drawing, specification or procedure, etc.) on licensing basis documents for the domestic AP1000 design. The NRC inspection team reviewed the processes to ensure that any changes affecting the design were adequately implemented and formally captured and tracked to assure the changes will be incorporated into future revisions of the affected design.

The NRC inspection team reviewed WEC's configuration control processes (for specifications, drawings, data sheet reports, and calculations) for approving AP1000 design changes. Specifically, the NRC inspection team reviewed WEC Procedure APP-GW-GAP-420, "Engineering and Design Coordination Reports (E&DCRs)," (GAP-420) which governs the control of design changes, to confirm safety-related design activities were implemented consistent with those described in the Nuclear Quality Assurance Program Description (QAPD). GAP-420 describes the process for documenting the proposed change descriptions, including the reasons for the changes, technical justifications for the changes, impact assessment on the documentation governing testing including the System Specification Description (SSD), test specification and test procedures. Additionally the process requires identification of individuals responsible for implementation of the E&DCR proposed changes, mark-ups of the affected design, and testing documents containing information necessary to affect the E&DCR changes.

WEC is developing pre-operational test specifications and procedures for Vogtle Units 3 & 4, based on the implementation of the ITP for China-based Sanmen and Haiyang customer. The NRC inspection team selected a sample E&DCRs associated with AP1000 China preoperational testing along with WEC administrative procedures governing design control to confirm the E&DCRs were implemented appropriately and contained appropriate technical bases for the changes identified. The NRC inspection team verified that process requirements including documentation of responsibilities, requirements, E&DCR processing steps, categorization, distribution, incorporation, and tracking were adequately documented and implemented in the sample E&DCRs

reviewed and further verified through discussions with cognizant WEC personnel responsible for the implementation of the processes. Additionally, the NRC inspection team reviewed current versions of test specifications, test procedures, and SSDs, and confirmed the proposed redline changes in the E&DCRs were adequately incorporated into the latest revision of the SSD and other design documentation, or were appropriately identified and tracked for revision within the formal configuration management program, to assure such changes will be incorporated into future revisions of the affected design or testing documentation.

#### AP1000 ITP Test Acceptance Criteria

The NRC inspection team selected a sample of pre-operational tests completed as part of the Sanmen and Haiyang AP1000 ITP. WEC is developing pre-operational test specifications and procedures for Vogtle Units 3 & 4, based on the implementation of the ITP for Sanmen and Haiyang. The NRC inspection team confirmed that test procedures contained adequate acceptance criteria that were consistent with the guidance contained in Regulatory Guide 1.68.

The NRC inspection team also reviewed a sample of test acceptance criteria where, by design, the performance results could not be directly measured, and a calculation or post-test evaluation was required by procedure. The NRC inspection team examined the test procedures to ascertain whether the procedures required documentation of sufficient information to permit adequate evaluation of the test results for those cases where a calculation or post-test evaluation is required to demonstrate that the test objective was met. The NRC inspection team confirmed the data-use was appropriate for the analysis, and the analysis results supported the determination that test acceptance criteria were met. The NRC inspection team reviewed WEC's process for collecting and distributing test data from testing conducted at the Sanmen and Haiyang plant sites back to the WEC Engineering offices for analysis of the results.

The NRC inspection team performed a traceability review of the SSDs, test specifications, and test procedures to confirm the test acceptance criteria were adequately translated from the design information into the test specifications and test procedures. In addition, the NRC inspectors reviewed the methods of testing, data acquisition, and reference to performance of either calculations or analysis credited for meeting the acceptance criteria to confirm they were consistent with the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) descriptions in the US AP1000 design.

The attachment to this inspection report lists the individuals interviewed and documents reviewed by the NRC inspection team.

#### b. Observations and Findings

No findings of significance were identified.



c. Conclusions

The NRC inspection team concluded that WEC's implementation of their policy and procedures for control of design changes satisfy the regulatory requirements set forth in Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

2. Supplier Oversight

a. Inspection Scope

The NRC inspection team reviewed WEC's policies and implementing procedures that govern the implementation of its supplier oversight programs to verify compliance with the requirements of Criterion IV, "Procurement Document Control" and Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50.

The NRC inspection team used information from WEC's Qualified Supplier List (QSL) to review a sample of external audits to verify compliance with the applicable regulatory and technical requirements. WEC is a member of the Nuclear Industry Assessment Committee (NIAC), which consists of companies that supply goods and services to the nuclear industry based on a quality program that meets the requirements of Appendix B to 10 CFR Part 50 and American Society of Mechanical Engineers (ASME) NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications," and accept 10 CFR Part 21. As a participating member, WEC can use NIAC audits to support the qualification and maintenance of its suppliers. Once a NIAC audit is received, WEC evaluates the audit report in accordance with its QA program and approves the audit report as the basis for including the vendor on the QSL subject to that review. For the sample of external audits reviewed, the NRC inspection team verified the audit reports included an audit plan, addressed any findings identified, adequately documented objective evidence of compliance with the applicable requirements, and was reviewed by WEC's management. In addition, the NRC inspection team also verified that the external audits were performed by qualified auditors. The NRC inspection team reviewed a sample of training and qualification records of WEC's lead auditors and confirmed that auditing personnel completed required training and maintained the applicable qualification and certification in accordance with WEC's policies and procedures.

The NRC inspection team also discussed the supplier oversight program with WEC's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team concluded that WEC established its supplier oversight program in accordance with the regulatory requirements of Criterion IV and Criterion VII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that WEC is implementing its policies and procedures associated with the supplier oversight program. No findings of significance were identified.

3. Corrective Action

a. Inspection Scope

The NRC inspection team reviewed WEC's policies and implementing procedures that govern the corrective action program to verify compliance with the requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Specifically, the NRC inspection team evaluated the following items:

- WEC's corrective actions for two Notices of Nonconformance (NONs) associated with NRC Inspection Report 99900404/2016-204, dated November 14, 2016 (ADAMS Accession Number ML 16307A159), to verify that actions described in WEC's response to the NONs (ADAMS Accession Number ML16350A111) adequately addressed the findings.
- WEC's corrective actions for an NON associated with NRC Inspection Report 99901476/2016-201, dated June 8, 2017 (ADAMS Accession Number ML17156A386), to verify that actions described in WEC's response to the NONs (ADAMS Accession Number ML17201A067) adequately addressed the findings.
- WEC's corrective actions for three NONs associated with NRC Inspection Report 99900404/2015-202, dated April 14, 2015 (ADAMS Accession Number ML15070A213), to verify that actions described in WEC's response to the NONs (ADAMS Accession Number ML15146A097 and ML15201A128) adequately addressed the findings.

The attachment to this inspection report lists the individuals interviewed and documents reviewed by the NRC inspection team.

b. Observations and Findings

I. Corrective Actions Associated with NON 99900404/2016-204-01

The NRC issued NON 99900404/2016-204-01 for the failure to identify and correct a condition adverse to quality. Specifically, WEC failed to evaluate, in its corrective action program (CAP), the use of cast austenitic stainless steel material for AP1000 safety-related valves and the impact on nondestructive examination (NDE) for valve-to-body pipe welds as required by the ASME Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." WEC was aware of this issue as early as January 2011.

In response to the NON, WEC conducted an apparent cause analysis (ACA) to determine the cause and assign corrective actions. Corrective actions identified included: (1) Conducting a training session with engineering organizations to discuss the importance to enter known licensing and code issues into the CAP; (2) Establishment of a process for correspondence between the licensee and Westinghouse for requesting alternative and relief requests related to ASME Section III, "Rules for Construction of Nuclear Facility Components," and Section XI requirements; and (3) Addressing WEC nuclear safety culture issues that contributed to the failure to enter this issue into the CAP in a timely manner.

The NRC inspection team reviewed Corrective Action Prevention and Learning (CAPAL) 100412765, "PSI/ISI Valve Inspectability – Criterion XVI," and the associated ACA; CAPAL 100376365, "Domestic PSI Programs Plans;" and CAPAL 100377138, "Potential ASME Code Calculation Errors (RPV & PZR)," effectiveness review for corrective actions addressing WEC's nuclear safety culture issues. Based on the review of the objective evidence for all corrective actions assigned, the NRC inspection team determined the corrective actions were adequate to address the identified NON. Therefore, NON 99900404/2016-204-01 is closed.

II. Corrective Actions Associated with NON 99900404/2016-204-02

The NRC issued NON 99900404/2016-204-02 for failure to apply adequate design control measures to ensure that accessibility for inservice inspection was provided for AP1000 safety-related cast austenitic stainless steel valves to meet the examination requirements of ASME Section XI. The NRC inspection team reviewed CAPAL 100361717, "PSI/ISI Inspectability for AP1000 Components." However, the NRC inspection team noted that CAPAL 100361717 was in an "open" status pending completion of outstanding corrective actions. Based on this information, NON 99900404/2016-204-02 will remain open and may be evaluated for closure by the NRC at a later date.

III. Corrective Actions Associated with NON 99901416/2016-201-01

The NRC issued NON 99901416/2016-201-01 for the failure to promptly correct a significant condition adverse to quality (SCAQ). Specifically, WEC's Mangiarotti S.p.A (Mangiarotti) facility at Monfalcone, Italy, opened CAPAL 100391094, "Material Identification and Traceability," due to the incorrect use of material for the manufacturing of the safety-related lower support stiffener for the AP1000 Passive Residual Heat Removal system heat exchanger. At the time the NRC identified the issue, the CAPAL had remained opened for greater than 180 days; the maximum allowed time period for closure of Significant Level 1 CAPALS.

In response to the NON, WEC completed a root cause analysis (RCA) for CAPAL 100391094 on June 15, 2017. In addition, WEC opened CAPAL 100477030, "Failure to Address a Significant Condition Adverse to Quality (CAPAL 100391094)," and performed an ACA to determine the cause and assign corrective actions. Corrective actions as a result of CAPAL 100391094 RCA included: (1) Revision to design change procedures to ensure double checks are conducted through the E&DCR process; (2) Improvement of storage controls of safety-related materials; (3) Improvement of identification controls of safety-related materials; (4) Development of a process for the evaluation of human performance tools; and

(5) Development of a monthly trending protocol for CAPALs and nonconformance reports (NCRs) to reduce the frequency of recurring issues. Corrective actions as a result of CAPAL 100477030 ACA included: (1) Development of a corrective action maintenance plan and metric as part of RCA 100391094; (2) Conducting a corrective action RCA process training workshop for issue owners, corrective action review board members and issue review committee members; (3) Establishment of a mandatory independent review path to Nuclear Fuels (NF) and Global Component Manufacturing (GCM), Quality & Performance Improvement staff; (4) Development of a corrective action program improvement bulletin; (5) Development of a metric plan for CAPAL health; (6) Monthly review of on-going ACA status to ensure timely closure; (7) Conducting training of selected managers at Mangiarotti; and (8) Designating and training Root Cause Team leads at Mangiarotti.

The inspectors reviewed CAPALs 10039104, CAPAL 100477030, and their associated causal analyses. Based on the review of the objective evidence for all corrective actions assigned, the inspectors determined the corrective actions were adequate to address the identified NON. Therefore, NON 99901416/2016-201-01 is closed.

IV. Corrective Actions Associated with NON 99900404/2015-202-01

NON 99900404/2015-202-01 (NON-1) was issued for WEC's failure to ensure that portions of the QA program were effectively executed and verify that activities affecting safety-related functions have been correctly performed. Specifically, WEC failed to take timely and effective corrective actions to address SCAQs relating to oversight of suppliers and the proper use of the QSL. Additionally, WEC failed to verify that its suppliers had measures in place to assure that purchased material, equipment, and services conformed to the procurement documents. These examples occurred dating back to January 2010, which indicated WEC did not effectively implement portions of their NRC-approved QA program.

The NRC inspection team verified that WEC had effectively completed the actions described in the CAPALs for the two examples cited in NON-1. The documents reviewed included the 2017 self-assessment of WEC's organization, effective implementation of the evaluation of the quality improvement projects (initiated by WEC's management as a result of the corrective actions), requalification of personnel, revision and consolidation of procedures, and the institution of the WEC's Nuclear Safety Review Board. Based on the review, the NRC inspection team determined the corrective actions implemented were adequate to address the identified nonconformance. Therefore, NON 99900404/2015-202-01 is closed.

V. Corrective Actions Associated with NON 99900404/2015-202-02

NON 99900404/2015-202-02 (NON-2) was issued for WEC's failure to establish measures to assure that conditions adverse to quality (CAQ) were promptly corrected, and that SCAQ corrective actions were taken to preclude repetition. During the 2016 inspection (NRC Inspection Report 99900404/2016-204, dated November 14, 2016) (ADAMS Accession Number ML16307A159), the NRC inspection team verified that WEC adequately addressed examples one, two, and four of NON-2. Based on the documents reviewed during the 2016 inspection the NRC inspection team did not identify any issues of significance associated with

WEC's corrective actions associated to these examples. However, because corrective actions addressing example three of NON-2 were incomplete at the time of the 2016 inspection, the NRC inspection team did not close the NON at that time.

During the week of this inspection, the NRC inspection team evaluated example three of NON-2. Example three was associated with WEC's failure to correct and prevent recurrence of a SCAQ associated with the internal audit program. As part of the review, the NRC inspection team verified the corrective actions were completed and evaluated the effectiveness reviews performed by WEC for all four previously identified examples. To verify implementation of these corrective actions, the NRC inspection team selected a sample of five audits to verify that the changes made to the policies and procedures, along with the training provided were effective and properly implemented by WEC. Based on the review, the NRC inspection team determined that the corrective actions implemented were adequate to address NON-2. Therefore, NON 99900404/2015-202-02 is closed.

VI. Corrective Actions Associated with NON 99900404/2015-202-03

NON 99900404/2015-202-03 (NON-3) was issued for WEC's failure to verify that its suppliers had measures in place to assure that purchased material, equipment, and services conform to the procurement documents. During the 2016 NRC inspection (NRC Inspection Report 99900404/2016-204, dated November 14, 2016) (ADAMS Accession Number ML16307A159), the NRC inspection team was not able to close NON-3 because WEC was in the process of performing an effectiveness review of the corrective actions in response to the NON.

The NRC inspection team also reviewed several CAPALs that were opened to address NON-1 and NON-2 because there were overlapping aspects relating to selection of suppliers. The NRC inspection team verified that WEC had effectively completed the actions described in the CAPALs. The documents reviewed included a self-assessment of the procurement process, re-qualification of personnel, verification of current status as approved suppliers for both safety-related and commercial, extent of condition for previously procured services, revision to procedures, and external audits used to qualify or dedicate suppliers' services. Specifically, the NRC inspection team evaluated the results of the extent of condition reviews performed by WEC. During the extent of condition review, WEC identified that some of its proposed corrective actions failed to prevent recurrence of the underlying issue, and were thereby ineffective. As a result, WEC's management developed several strategies to address the ineffectiveness identified during the effectiveness reviews. The NRC inspection team verified that all corrective actions were completed, and that WEC's latest effectiveness review concluded that the corrective actions were effective. Based on the review, the NRC inspection team determined the corrective actions implemented were adequate to address the identified nonconformance. Therefore, NON 99900404/2015-202-03 is closed.

c. Conclusions

The NRC inspection team determined the corrective actions implemented to address NON 99900404/2016-204-01 were adequate. However, at the time of the inspection, corrective actions related to these NON 99900404/2016-204-02 were still outstanding. Consequently, the NRC inspection team could not adequately evaluate and close the

NON until WEC completes all corrective actions relating to the issue. Therefore, based on the NRC inspectors' review, NON 99900404/2016-204-01 is closed; NON 99900404/2016-204-02 will remain open and may be reviewed for closure at a future NRC inspection.

The NRC inspection team determined the corrective actions implemented to address NON 99901416/2016-201-01 were adequate. Based on the NRC inspectors' review, NON 99901416/2016-201-01 is closed.

The NRC inspection team determined that corrective actions implemented to address NON 99900404/2015-202-01, NON 99900404/2015-202-02, and NON 99900404/2015-202-03 were adequate. Based on the NRC inspectors' review, 99900404/2015-202-01, NON 99900404/2015-202-02, and NON 99900404/2015-202-03 are closed.

#### 4. Internal Audits

##### a. Inspection Scope

The NRC inspection team reviewed Westinghouse's policies and procedures that govern internal audits to verify compliance with the requirements of Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50.

The NRC inspection team reviewed a sample of internal audit reports from 2017 through the spring of 2018. The NRC inspection team verified that internal audits were performed by qualified auditors. The NRC inspection team verified that lead auditors prepared and approved plans that identified the audit scope and checklist criteria prior to the audit. The NRC inspection team verified the internal audits contained adequate documented evidence and that audits were performed by personnel not having direct responsibilities in the areas being audited. In addition, the NRC inspection team confirmed that audit findings were dispositioned and corrective actions were implemented to correct the issues identified in a timely manner. The NRC inspection team also reviewed a sample of training records of WEC auditors and confirmed that auditing personnel had the required training and maintained their qualification in accordance with WEC policies and procedures.

##### b. Observation and Findings

No findings of significance were identified.

##### c. Conclusions

The NRC inspection team concluded that Westinghouse conducted its internal audits in accordance with the regulatory requirements of Criterion XVIII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and interviews conducted, the NRC inspection team determined that Westinghouse is adequately implementing its policies and procedures associated with internal audits. No findings of significance were identified.

## 5. Entrance and Exit Meeting

On May 21, 2018, the NRC inspection team presented the inspection scope during an entrance meeting with Mr. Steve Brennan, Senior Vice President of Quality, Safety, and Performance Improvement; and Westinghouse staff. On May 25, 2018, the NRC inspection team presented the inspection results and observations during an exit meeting with Mr. Steve Brennan, Senior Vice President of Quality, Safety, and Performance Improvement; and Westinghouse staff. The attachment to this report lists the participants of the entrance and exit meeting attendees and those personnel interviewed by the NRC inspection team.

## ATTACHMENT

### 1. ENTRANCE/EXIT MEETING ATTENDEES AND KEY POINTS OF CONTACT

Name	Title	Affiliation	Entrance	Exit	Interviewed
Jermaine Heath	Reactor Operations Engineer	NRC	x	x	
Edgar Torres	Reactor Operations Engineer	NRC	x	x	
Andrea Keim	Reactor Operations Engineer	NRC	x	x	
Greg Galletti	Reactor Operations Engineer	NRC	x	x	
Jonathan Ortega-Luciano	Reactor Operations Engineer	NRC	x	x	
Kerri Kavanagh	Branch Chief	NRC		x	
Jim Brennan	Sr. VP QSPI	WEC	x	x	
Korey Hosack	Manager	WEC	x	x	
Edward Perlowitz	Sourcing Lead	WEC	x		
Doug Ezar	Acting Manager	WEC	x	x	x
Angela Zubroski	Principal Quality Engineer	WEC	x	x	x
Randy Ivey	Director – Supplier Quality	WEC	x		
Michael Miller	Director – AP1000 Mechanical	WEC	x		x
Luke Mulhollem	Engineer	WEC	x	x	
Jim Martinoski	Director – AP1000 Civil	WEC	x		
Sarah DiTommaso	Mgr – New Plant Development	WEC	x	x	x
Jonathan Golnoski	Director-Quality & Performance Improvement	WEC	x		
Michael Corletti	Director – New Plant Technologies & Licensing	WEC	x	x	
Jill Monahan	Mgr, Licensing Inspections & Special Programs	WEC	x	x	x
Amanda Miller	Engineer	WEC	x	x	x
Brian Schleger	Licensing Engineer	WEC	x	x	x
Mike Patterson	Principal Engineer	WEC	x		x
Jason Eisenhauer	Manager	WEC	x		x
Richard Easterling	VP – Global Quality Programs	WEC	x	x	x



<b>Name</b>	<b>Title</b>	<b>Affiliation</b>	<b>Entrance</b>	<b>Exit</b>	<b>Interviewed</b>
Bobby Pinkston	Engineer	WEC	x		
John Kurtik	Principal Quality Engineer	WEC	x	x	
Edward Plains	Mgr- Codes & Stds.	WEC	x	x	x
Paul Smith	Engineer	WEC	x		
Kevin Kilmer	Mgr, Global Inventory	WEC	x	x	x
Ben Solich	Director – Supplier Pefromance	WEC	x	x	
Ed Renaud	Consultant - CGD	WEC	x		x
Stewart Long	Fellow Engineer	WEC	x	x	x
Mark Urso	Manager	WEC	x		x
Michael Morgan	VP, QSPI	WEC	x	x	
Michael Stefanchik	Mgr, QSPI	WEC	x	x	x
Tara Werner	Director - Quality Program and Assessments	WEC	x	x	x
Catherine Swope	Director – Global CAP	WEC	x	x	x
Kurt Nestlerode	ASL Lead	WEC	x	x	
Ryan Russell	Mangiarotti	WEC	x		x
Lori Lubic	Mgr – Quality Ops	WEC	x		x
Bernie Copsey	Director – Quality Mgt	WEC	x		
Zach Kurtik	Quality Engineer	WEC	x		
Patrick Cilli	Manager	WEC	x		
Ron Wessel	Engineer – Global Quality	WEC	x	x	x
Ray Theodori	Mgr – Supplier Performance	WEC		x	
Michael Yox	Director – Reg. Affairs	Southern		x	
Bernie Copsey	Director - Mangiarotti	WEC			x
Russ Bastyr	VP Nuclear Fuel & Global Components Manufacturing	WEC			x
Alex Marzoni	Quality Control Insp. Coordinator	WEC			x
Luke McIhollem	Engineer	WEC			x
Paul Gionta	Project Engineer	WEC			x

<b>Name</b>	<b>Title</b>	<b>Affiliation</b>	<b>Entrance</b>	<b>Exit</b>	<b>Interviewed</b>
John Papai	Principal Quality Engineer	WEC			x
Christopher Susini	Mgr, AP1000 Concrete and Rebar Functional Group	WEC			x
Venki Prabhu	PEM, Commissioning Engineering	WEC			x
Jim Hennen	PXS System Engineer	WEC			x
John Boufford	Principle Engineer	WEC			x
Selena Willoughby	Senior Engineer	WEC			x

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Status</u>	<u>Type</u>	<u>Description</u>
99900404/2016-204-01	Closed	NON	Criterion XVI
99900404/2016-204-02	Open	NON	Criterion III
99901416/2016-201-01	Closed	NON	Criterion XVI
99900404/2015-202-01	Closed	NON	Criterion I
99900404/2015-202-02	Closed	NON	Criterion XVI
99900404/2015-202-03	Closed	NON	Criterion VII

3. NRC INSPECTION PROCEDURES USED

- Inspection Procedure (IP) 36100, "Inspection of 10 CFR Part 21 Programs for Reporting Defects and Noncompliance"
- IP 43002, "Routine Inspections of Nuclear Vendors"
- IP 43004, "Inspections of Commercial Grade Dedication Programs"

4. LIST OF DOCUMENTS REVIEWED

Corrective Actions

- CAPAL 100377138, Potential ASME Code Calculation Errors
- CAPAL 100376365, Domestic PSI Programs Plans
- CAPAL 100412765, PSI/ISI Valve Inspectability – Criterion XVI
- CAPAL 100361717, PSI/ISI Inspectability for AP1000 Component to Pipe Welds
- CAPAL 100391094, Material Identification and Traceability
- CAPAL 100477030, Failure to Promptly Correct a Significant Condition Adverse to Quality
- CAPAL 100420939, CMT & PRHR HX Highpoint Temperature Issue, dated October 12, 2016
- CAPAL 100492374, AP1000 PMS RITS closed improperly, dated September 6, 2018

- CAP Issue Report (IR) #11-259-M039, “NRC Results at Obayashi, dated September 16, 2011
- CAPs-RCA-11-259-M039, “Root Cause Analysis - Negative Results at Obayashi,” Revision 0, November 23, 2011
- CAPAL 100000085, “NRC Results at Obayashi,” dated September 16, 2011
- Issue ID: 100075362, “Program Provides Insufficient on Follow-up Audits-CRA-2014-111,” dated January 29, 2015
- Issue ID: 100075368, “Deficiencies found during an internal audit may not be tracked by Quality-CRA-2014-111,” dated January 29, 2015
- Issue ID: 100075385, “Insufficient oversight of IA corrective actions to ensure accomplished as scheduled – CRA-2014-111
- Issue ID: 100237332, “Inadequate Implementation Criterion I,” dated April 27, 2015
- Issue ID: 100016265, “Improvements to Internal Audit Program (WEC 18.1),” dated March 19, 2014
- Issue ID: 100052988, “#3 Internal Audit findings by NTD (WEC-14-123) (Internal Audits/Assessments),” dated October 17, 2014
- Issue ID: 100040208, “Deficiencies identified during independent management audit of Quality Programs,” dated August 26, 2014
- Issue ID: 100171257, “Revise WEC 18.1 (NIEP issue regarding ATL setting significance level of audit finding issues),” dated March 27, 2015
- Issue ID: 100000032, “Purchase Requisition/Purchase Order Processing Violates Numerous WEC-7.5 Requirements,” dated January 20, 2010
- Issue ID: 100000446, “Peerless Manufacturing Company qualification status,” dated May 9, 2013
- Issue ID: 100000472, “Purchase Requisition/Purchase Order Processing Violates Numerous WEC-7.5 Requirements, reference IR,” dated May 31, 2013
- Issue ID: 100077746, “Inadequate oversight of suppliers CRA-2014-111,” dated February 12, 2015
- Issue ID: 100312448, “Peerless Manufacturing Company - Additional SR POs,” dated July 9, 2015
- IR-2018-8438, “Items of Note from Final ER of CAPAL 100000472,” dated April 10, 2018

#### AP1000 Initial Test Program

- APP-GW-GEE- 5464, Clarification of IRWST Heatup Pre-Op Test Acceptance Criteria, Revision. 0, dated July 7, 2017.
- APP-GW-GEE-5242, PV01 Data Sheet 131 Automatic Depressurization System Stage 1 Control Valve Stroke Time Requirements, dated May 2, 2016
- APP-PXS-M3-001, “Passive Core Cooling System Specification Document,” Revision 8
- APP-PXS-T1-501, “Passive Core Cooling System Preoperational Test Specification,” Revision 3, dated June 13, 2016
- HY2-PXS-T2C-002, “Containment Recirculation Line Resistance Tests – IRWST to Containment Sump,” Revision 0, dated December 27, 2017
- APP-RCS-T1-501, Reactor Coolant System Preoperational Test Specification, Revision 3, dated May 13, 2016.
- SM1-RCS-T1P-506, Reactor Coolant System RCP Cold and Hot Precore Hot Functional Test Preoperational Test Procedure, Revision 3
- SM1-BDS-T1P-502, Steam Generator Blowdown System Precore Hot Functional Test Preoperational Test Procedure, Revision 2, dated July 2016

- SM1-PXS-T1P-502, "Sanmen Unit 1: Passive Core Cooling System, Passive Core Cooling System Flow Preoperational Test," Revision 1
- SM1-VES-T1P-502, "Sanmen Unit 1: Main Control Room Emergency Habitability System Integrated Test Preoperational Test Procedure," Revision 1
- SM1-PXS-T1P-505, "Sanmen Unit 1: Passive Core Cooling System, Passive Core Cooling System Flow Preoperational Test," Revision 1
- SM1-VES-T2C-600, "Six Hour Main Control Room Heatup Acceptance Criteria for Sanmen Unit 1," Revision 0, dated June 5, 2017

#### Engineering and Design Coordination Reports (E&DCRs)

- APP-PXS-GEF-504, "CMT Recirculation Test Requirements," Revision 0, dated June 1, 2017
- APP-CVS-GEF-272, "Revised CVS Makeup Pump Trip Logic," Revision 0, dated July 22, 2016
- APP-RNS-GEF-192, "RNS Low Pressure Injection Flow Test Modifications for CLP and IRWST," Revision 0, dated April 22, 2016
- APP-PXS-GEF-466, "Changes to the PRHR and CMT Line Standby Temperature Test Acceptance Criteria" Revision 0.
- APP-PXS-GEF-483, "Changes to the ADS Blowdown Test"
- APP-PXS-GEF-491 Rev. 0, "PXS Gutter & Downspout Capacity Flow Test Clarification"
- APP-PXS-GEF-523, "Update to APP-PXS-T1-501 Acceptance Criteria, Revision 0, dated February 6, 2018
- CPP-PXS-GEF-100125: IRWST Heatup Pre-Op Test Acceptance Criteria Clarification
- SM1-CVAP-GEF-000023, SM1 Comprehensive Vibration Assessment Program (CVAP) Test Procedure Updates, dated May 11, 2016.

#### Procedures

- APP-GW-GAP-420, "Engineering and Design Coordination Reports (E&DCRs)," Revision 15, dated April 27, 2018
- APP-GW-GAP-147-1, "Licensing Impact Determination," Revision 2
- APP-GW-GAP-140, AP1000 Licensing Applicability Determination and 10 CFR 50.59 / 10 CFR Part 52 Appendix D Section VIII Screening, dated February 15, 2016
- APP-GW-GAP-341, "AP1000 Plant Program Design Change Control," Revision 5, dated April 25, 2018
- APP-GW-GAP-147, "AP1000 Current Licensing Basis Review," Revision 9, dated March 18, 2018
- W2-5.1-101, Westinghouse Corrective Action Program Procedure, Revision 5.1, dated January 29, 2018
- W2-5.1-103, Root Cause Analysis, Revision 3.1, dated January 29, 2018
- W2-5.1-104, Apparent Cause Analysis, Revision 2.0, dated January 29, 2018
- W2-9.4-101, "Control of Purchased Items and Services," Revision 6, dated December 27, 2017
- W2-4.2-101, "Internal Quality Assurance Audits," Revision 3.1, dated December 27, 2017
- APP-GW-GAP-147, AP1000 Current Licensing Basis Review, Revision 9, dated December 27, 2017

- APP-GW-GEH-028, AP1000 ASME Section III Program Design Plan, Revision 2, dated June 29, 2017
- APP-GW-GLY-105, ASME Section XI Preservice and Inservice Inspection Limitations, Revision 0, dated May 19, 2016
- 0001-ITF-12, Nuclear Items Labelling and Storage, Revision 0, September 9, 2017

#### Audit Report and Supplier Evaluation Forms

- W2-4.2-101, "Internal Quality Assurance Audits," Revision 3.1, dated December 27, 2017
- WEC-16-86, "Internal Audit Report: Supplier Quality Oversight," Revision 0, dated June 28, 2016
- WEC-17-107, "Internal Audit Report: Nuclear Regulatory Affairs – Regulatory Compliance Americas Region," Revision 0, dated April 21, 2017
- WEC-17-13, "Internal Audit Report: Engineering Center of Excellence: Systems and Equipment Engineering I," Revision 1, dated May 21, 2017
- WEC-17-131, "Internal Audit Report: ECoE: Architectural Engineering & Plant Design: Civil Structural & Architectural Engineering," Revision 0, dated April 14, 2017
- WEC-17-86, "Internal Audit Report: Supplier Quality Oversight," Revision 0, dated June 16, 2017
- WES-201-129-R, "Audit Report," dated September 21, 2017
- WES-201-129-C, "Closure Letter," dated January 9, 2018
- SAES ID 28637, "Supplier Audit Evaluation Summary," dated September 19, 2017
- SAES ID 29355, "Supplier Audit Evaluation Summary," dated January 10, 2018
- SQO-2018-005, "Supplier Oversight Surveillance Report," dated May 5, 2018
- P-PL02.05-TI-TX-0027, "Type "B" Inspection Report," dated March 3 29, 2018
- P-PL02.05-TI-TX-0029, "Type "B" Inspection Report," dated, April 11, 2018
- P-PL02.05-TI-TX-0033, "Type "B" Inspection Report," dated May 8, 2018
- WEC-16-28, "Internal Audit," dated August 28, 2016
- WEC-17-28 "Internal Audit," dated August 26, 2017
- WES-2017-023-R, "Audit Report," dated March 20, 2017
- WES-2018-031-R, "Audit Report," dated March 15, 2018
- WES-2018-031-C, "Closeout Letter," dated March 15, 2018
- SAES ID 28055, "Supplier Audit Evaluation Summary," dated June 8, 2017
- SAES ID 29754, "Supplier Audit Evaluation Summary." dated March 14, 2018
- SAES ID 30049, "Supplier Audit Evaluation Summary," dated April 17, 2018
- WES-2012-324, "Audit Plan," dated August 30, 2012
- WES-2012-324-R, "Audit Report," dated October 19, 2012
- WES-2012-091, "Closeout Letter," dated February 3, 2014
- WES-2015-091-P, "Audit Plan," dated July 2, 2015
- WES-2015-091-R, "Audit Report," dated August 21, 2015
- WES-2015-091-C, "Closeout Letter," dated December 18, 2015
- SAES ID 28457, "Supplier Audit Evaluation Summary," dated August 16, 2017
- SEAS ID 29410, "Supplier Audit Evaluation Summary," dated June 19, 2018
- WES-2014-111-R, "Audit Report," dated June 3-4, 2014
- WES-2014-186-R "Audit Report," dated October 3, 2014
- WES-2017-166, "Audit Report," dated November 2, 2017
- SAES ID 29414, "Supplier Audit Evaluation Summary," dated January 24, 2018
- SAES ID 29274 "Supplier Audit Evaluation Summary," dated December 19, 2017

- APP-GW-GAH-032, "AP1000 Obayashi Scope Project Quality Plan," Revision 0, dated November 16, 2011
- APP-GW-GAH-032,"AP1000 Plant Engineering Obayashi Scope Project Quality Plan," Revision 1, dated July 30, 2013
- APP-GW-GAH-032,"AP1000 Obayashi Scope Project Quality Plan," Revision 2, dated September 15, 2015 (Voided this document)

#### Miscellaneous

- Apparent Cause Analysis CAPAL 100412765, Pre-Service Inspection/In-Service Inspection (PSI/ISI)
- Effectiveness Review CAPAL 100377138 Root Cause Analysis, Potential ASME Code Calculation Errors (RPV & PZR)
- Apparent Cause Analysis CAPAL 100477030, Failure to promptly correct a significant condition adverse to quality (CAPAL 100391094)
- Root Cause Analysis CAPAL 100391094, Material Identification and traceability
- Root Cause Analysis CAPAL 100377388, QA Program Audit Results Render Some Indeterminate Quality
- 2017 Executive Management Review, Revision 1 dated March 26, 2018
- QEHS PI Strategic QIP Final Closeout Report dated March 31, 2015
- Corrective Action Program Improvements, dated May 21, 2018
- LTR-RC-16-50, "Westinghouse Nuclear Safety Review Board Charter," Revision 2, dated October 4, 2017
- Mangiarotti Consolidated Human Performance and Nuclear Safety Culture Plan Presentation
- Mangiarotti Issue Review Committee Corrective Action Program Level 1 Timeliness Expectations Training Presentation
- Mangiarotti Corrective Action Program Level 1 Issue Owner Training Presentation
- AP1000 ASME Section XI Weld Inspectability Issue Status Presentation
- Mangiarotti Root Cause Team Lead Qualified Roster
- AP1000 Regulatory Inspection Lessons Learned Review Presentation
- QA-2.8, "Qualification of Audit Personnel," Revision 1.0, dated December 13, 2016
- Lead Auditor Training Records for Bruce Albee dated Jan 17, 2017
- Lead Auditor Training Records for James Kiefer dated December 15, 2016

#### 5. Corrective Action Reports Generated during the NRC Inspection

- IR-2018-10308, Misclassification of a safety-related component
- IR-2018-10271, Clarifying Acceptance Criteria Requirements for ITP Specifications