

June 8, 2017

Mr. Russell Bastyr, Vice President  
NF&CM Quality and Performance Improvement  
Westinghouse Electric Company  
5801 Bluff Road  
Hopkins, SC 29601

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT OF  
MANGIAROTTI S.P.A NO. 99901416/2016-201, AND NOTICE OF  
NONCOMFORMANCE

Dear Mr. Bastyr:

On July 19-21 2016, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Mangiarotti S.p.A (hereafter referred to as Mangiarotti) facility in Monfalcone Italy. The purpose of this limited-scope routine inspection was to assess Mangiarotti's compliance with provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," and selected portions of Appendix B, "Quality Assurance Program Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." Mangiarotti was acquired by Westinghouse Electric Company (WEC) on September 23, 2014. During the acquisition process, WEC performed an audit of Mangiarotti. The results of the audit concluded that Mangiarotti had failed to adequately qualify its suppliers, thus resulting in the release of product of indeterminate quality. On April 24-27, 2017, the NRC staff continued the inspection of Mangiarotti at the WEC facility in Rockville, MD and extended the scope of the inspection to include the corrective actions taken by WEC to address the issues identified at the Monfalcone facility related to oversight of suppliers, and controls for the purchase of material and services.

This technically-focused inspection evaluated Mangiarotti's implementation of quality activities associated with the fabrication of safety-related structures, systems, and components (SSCs) for the WEC AP1000 reactor design. Additionally, this inspection evaluated the implementation of corrective actions taken by WEC to address the supplier oversight issues identified at Mangiarotti. This inspection report does not constitute NRC endorsement of Mangiarotti's or WEC's overall quality assurance (QA) programs.

The NRC inspection team found that the implementation of WEC's QA program did not meet certain regulatory requirements. Specifically, the NRC inspection team determined that WEC was not fully implementing its QA program in the area of corrective action associated with incorrect use of material for the Passive Residual Heat Removal Heat Exchanger (PRHR HXH) lower support stiffener plates. The specific findings and references to the pertinent requirements are identified in the enclosures to this letter. In response to the enclosed Notice of Nonconformance (NON), WEC should document the results of the extent of condition review for the finding and determine if there are any effects on other safety-related components.

The NRC has identified repeated findings at WEC in the area of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. For example, on January 26-30, 2015, the NRC staff conducted Inspection 99900404/2015-202 at the WEC facility in Cranberry Township, PA. The NRC inspection team identified Nonconformance 99900404/2015-202-01 for WEC's failure to take timely and effective corrective actions to address significant conditions adverse to quality. In addition, this inspection also identified Nonconformance 99900404/2015-202-02 for WEC's failure to establish measures to assure that conditions adverse to quality were promptly corrected, and for significant conditions adverse to quality, corrective actions were taken to preclude repetition with multiple examples (Agencywide Documents Access and Management System (ADAMS) Accession No: ML15070A213).

Additionally, on September 26-30, 2016, the NRC staff conducted Inspection, 99900404/2016-204, at WEC facility in Cranberry Township, PA (ADAMS Accession No: ML16307A159). During this inspection the NRC inspection team identified Nonconformance 99900404/2016-204-01 for WEC's failure to ensure that a condition adverse to quality was promptly identified and corrected. WEC determined that the design of a population of safety-related AP1000 valves were not designed so that access is provided to perform the examinations required by American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for In-service Inspection of Nuclear Power Plant Components." However, despite identifying this inaccessibility issue as early as January 2011, WEC did not enter the issue into its corrective action program until February 2016.

In the inspection report included as an enclosure to this letter, the NRC has again identified a finding regarding WEC's failure to implement timely and effective corrective actions for a significant condition adverse to quality, and to take actions to preclude repetition. Specifically, the NRC inspection team identified that WEC failed to promptly correct a significant condition adverse to quality, determine the cause of the condition, and ensure the corrective action taken will preclude repetition. WEC's CAPAL 100391094 was still open, 90 days over the 180-day time period allowed for closure of a Significance Level 1 CAPAL. Additionally, WEC had not yet completed the RCA to determine the cause of the condition, nor identified the corrective actions required to preclude repetition.

The examples in Inspection Reports 99900404/2015-202, 99900404/2016-204 and 99901416/2016-201, support a potential programmatic weakness in WEC's Quality Assurance Program. WEC should assess this weakness to ensure compliance with regulatory requirements.

Please provide a written explanation or statement within 30 days from the date of this letter in accordance with the instructions specified in the enclosed NON. We will consider extending the response time if you show good cause for us to do so.

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," the NRC will make available electronically for public inspection a copy of this letter, its enclosure, and your response through the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System, which is accessible at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible (and if applicable), your response should not include any personal privacy, proprietary, or Safeguards Information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material

be withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information would create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

Sincerely,

***/RA Paul Prescott Acting for/***

Kerri A. Kavanagh, Chief  
Quality Assurance Vendor Inspection Branch-3  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

Docket No.: 99901416

Enclosures:

1. Notice of Nonconformance
2. Inspection Report No. 99901416/2016-201  
and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT OF MANGIAROTTI S.P.A NO. 99901416/2016-201, AND NOTICE OF NONCOMFORMANCE

Dated: June 8, 2017

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<b>OFFICE</b>	NRO/DCIP	NRO/DCIP	NRO/DCIP
<b>NAME</b>	AArmstrong	AFerguson	TLamb (PPrescott for)*
<b>DATE</b>	06/06/2017	06/07/2017	06/07/2017
<b>OFFICE</b>	NRO/DCIP	NRO/DCIP	NRO/DCIP
<b>NAME</b>	PPrescott*	SSmith (CWeber for)*	KKavanagh (PPrescott for)*
<b>DATE</b>	06/07/2017	06/05/2017	06/07/2017

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## NOTICE OF NONCONFORMANCE

Westinghouse Electric Company  
5801 Bluff Road  
Hopkins, SC 29601

Docket No. 99901416  
Report No. 2016-201

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection of Westinghouse Electric Company and Mangiarotti S.p.A (hereafter referred to as WEC and Mangiarotti, respectively) conducted at the Monfalcone, Italy facility and the WEC facility located in Rockville, MD, from July 19-21, 2016 and April 24-28, 2017, respectively. The NRC inspection team determined that WEC did not conduct certain activities in accordance with NRC requirements:

- A. Criterion XVI, "Corrective Action," 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," states that "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management."

W2-5.1-101, "Westinghouse Corrective Action Program Procedure," Revision 3.0, dated March 1, 2017, states in part, that, "The Issue owner shall ensure that the appropriate level of causal analysis or extent of condition evaluation is completed as a root cause analysis (RCA). For Significance Level 1 issues, the issue closure review requires all actions are complete (but the effectiveness reviews are pending) and the completion is within 180 days from the issue submittal."

Contrary to the above, as of April 27, 2017, WEC failed to promptly correct a significant condition adverse to quality, determine the cause of the condition, and ensure the corrective action taken will preclude repetition. Specifically, WEC opened CAPAL 100391094, "Material Identification and Tractability," dated June 10, 2016, for Mangiarotti's incorrect use of material in the manufacturing of the Lower Support Stiffener Passive Residual Heat Removal Heat Exchanger (PRHR HXH). Testing identified the material used was SA 240 Type 321, instead of the required Type 304/304L stainless steel. CAPAL 100391094 was upgraded from a Significance Level 2 to a Significance Level 1 on July 28, 2016. As of April 27, 2017, WEC's CAPAL 100391094 was still open, which is 90 days over the 180-day time period allowed for closure of a Significance Level 1 CAPAL. Additionally, WEC had not yet completed the RCA to determine the cause of the condition, nor identified the corrective actions required to preclude its repetition.

This issue has been identified as Nonconformance 99901416/2016-201-01.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, Quality Assurance Vendor Inspection Branch-3, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of

Nonconformance” and should include for each noncompliance: (1) the reason for the noncompliance or, if contested, the basis for disputing the noncompliance; (2) the corrective steps that have been and the results achieved; (3) the corrective steps that will be to avoid further noncompliance; and (4) the date when the corrective action will be completed. Where good cause is shown, the NRC will consider extending the response time.

Because 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, which is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or Safeguards Information (SGI) so that the NRC can make it available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material be withheld, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information would create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards SGI is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, “Protection of Safeguards Information: Performance Requirements.”

Dated this the 8<sup>th</sup> day of June 2017.

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

Docket No.: 99901416

Report No.: 99901416/2016-201

Vendor: Mangiarotti S.p.A  
Via Timavo, 59  
34074 Monfalcone  
Gorizia - Italy  
Tel: (+39) 0481 – 254500

Westinghouse Electric Company  
11333 Woodglen Drive, Suite 202  
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Vendor Contact: Mr. Russell Bastyr, Vice President  
NF&CM Quality and Performance Improvement  
Westinghouse Electric Company  
5801 Bluff Road  
Hopkins, SC 29601  
(803) 647-1843

Nuclear Industry Activity: Mangiarotti manufactures and tests nuclear island equipment, pressurizers, steam generators and heat exchangers for the Vogtle and VC Summer construction sites. Mangiarotti is located in Monfalcone (Gorizia), Italy.

Inspection Dates: July 19-22, 2016 and April 24-27, 2017

Inspection Team Leader Aaron Armstrong NRO/DCIP/QVIB-1 (Westinghouse Lead)  
(Mangiarotti Team)

Inspectors: Paul Prescott NRO/DCIP/QVIB-3 (Mangiarotti Lead)  
Ashley Ferguson NRO/DCIP/QVIB-3 (Westinghouse Team)  
Taylor Lamb NRO/DCIP/QVIB-3 (Westinghouse Team)

Approved by: Kerri A. Kavanagh, Chief  
Quality Assurance Vendor Inspection Branch-3  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

## **EXECUTIVE SUMMARY**

Mangiarotti S.p.A.  
99901416/2016-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a vendor inspection at the Mangiarotti S.p.A. (hereafter referred to as Mangiarotti) facility to verify that it had implemented an adequate quality assurance (QA) program that complies with the requirements 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." In addition, the NRC inspection also verified that Mangiarotti implemented a program under 10 CFR Part 21, "Reporting of Defects and Noncompliance," that met the NRC's regulatory requirements. The NRC inspection team conducted an inspection from July 19 through July 22, 2016. This inspection was held open to allow Westinghouse Electric Company (WEC) time to complete the corrective actions associated with issues related to Mangiarotti's control of purchased material and services identified during an audit by WEC for the acquisition of Mangiarotti. The NRC conducted a closeout inspection at the WEC facility in Rockville, MD from April 24 through April 27, 2017. This was the second inspection of the Monfalcone facility.

This technically-focused inspection specifically evaluated the fabrication activities for safety-related systems, structures, and components at Mangiarotti for the WEC AP1000 reactor design. Additionally this inspection focused on the implementation of corrective actions by WEC to address issues regarding Mangiarotti's controls for purchased of materials and services.

Some of the specific activities observed for the AP1000 Passive Residual Heat Removal Heat Exchanger by the NRC inspection team included:

- Welding per Mangiarotti's W1-DFW-18-00-002, Revision 5, dated March 14, 2014, "AP1000 Passive Residual Heat Removal Heat Exchanger [PRHR HXH]"
- Nondestructive Examination (NDE) Visual Examination testing per Mangiarotti's W1-SPG-00-00-001, Revision 1, dated November 9, 2010, "AP1000 Passive Residual Heat Removal Heat Exchanger PRHR: Visual Examination."
- NDE Liquid Penetrant testing per Mangiarotti's W1-SPG-00-00-003, Revision 1, dated November 12, 2010, "AP1000 Passive Residual Removal Heat Exchanger Liquid Penetrant Examination on Material and Welds."

These regulations served as the bases for the NRC inspection:

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

During the course of this inspection, the NRC inspection team implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated January 27, 2017, IP 43003, "Reactive Inspections of Nuclear Vendors," dated December 14, 2015, IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated January 1, 2017, and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated February 13, 2012.



The NRC inspection team concluded that Mangiarotti's QA policies and procedures comply with the applicable requirements of Appendix B to 10 CFR Part 50 and 10 CFR Part 21, and that Mangiarotti personnel are implementing these policies and procedures effectively, with one exception. The NRC inspection team concluded that WEC had not taken prompt corrective action or identified the cause of a significant condition adverse to quality related to WEC's identification of Mangiarotti's incorrect use of material for the manufacturing of the AP1000 Lower Support Stiffener for the PRHR HXH. The results of this inspection are summarized below.

#### Nonconforming Materials, Parts, or Components and Corrective Action

The NRC inspection team concluded that WEC did not adequately implement its corrective action program in accordance with the regulatory requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The NRC inspection team issued Nonconformance 99901416/2016-201-01 for WEC's failure to promptly correct a significant condition adverse to quality, determine the cause of the condition, and ensure the corrective actions taken would preclude repetition. Specifically, WEC identified Mangiarotti's incorrect use of material for the manufacturing of the AP1000 Lower Support Stiffener for the PRHR HXH in Corrective Action Prevention and Learning (CAPAL) 100391094, which was categorized as a significant condition adverse to quality. CAPAL 100391094 was still in process at the time of the inspection, which was 90 days passed the 180-day time period allowed per WEC's corrective action procedure for closure of Significance Level 1 issues. In addition, at the time of this inspection, WEC had not yet completed the Root Cause Analysis (RCA) to determine the cause of the condition, nor identified the corrective actions required to preclude its repetition.

#### Oversight of Contracted Activities

The NRC inspection team concluded that Mangiarotti is implementing its control of purchased material, equipment, and services in accordance with the regulatory requirements of Criterion VII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and interviews conducted, the NRC inspection team also determined that Mangiarotti is adequately implementing its policies and procedures associated with the control of purchased material, equipment, and services. No findings of significance were identified.

#### Control of Special Processes

The NRC inspection team concluded that Mangiarotti is implementing its special processes program in accordance with the regulatory requirements of Criterion IX of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and interviews conducted, the NRC inspection team also determined that Mangiarotti is adequately implementing its policies and procedures associated with the use of controlling special processes. No findings of significance were identified.

## REPORT DETAILS

### 1. 10 CFR Part 21 Program

#### a. Inspection Scope

The NRC inspection team reviewed Mangiarotti S.p.A's (hereafter referred to as Mangiarotti) policies and implementing procedures that govern Mangiarotti's 10 CFR Part 21, "Reporting of Defects and Noncompliance," program to verify compliance with the regulatory requirements. In addition, the NRC inspection team evaluated the 10 CFR Part 21 postings and a sample of Mangiarotti's purchase orders (POs) for compliance with the requirements of 10 CFR 21.21, "Notification of Failure to Comply or Existence of a Defect and its Evaluation," and 10 CFR 21.31, "Procurement Documents." The NRC inspection team also verified that Mangiarotti's nonconformance and corrective action procedures provide a link to the 10 CFR Part 21 program.

The NRC inspection team reviewed the Part 21 evaluation conducted for the release of product as indeterminate quality as a result of Mangiarotti's inadequate performance of supplier oversight. The NRC inspection team's review included the corrective actions associated Corrective Action Prevention and Learning (CAPALs) identified in Sections 2.b.1. through b.7. of this inspection report. The CAPALs detailed Westinghouse Electric Company's (WEC's) actions to address the issues concerning components being fabricated of indeterminate material. The NRC inspection team's subsequent review of the CAPALs found that WEC addressed this potentially significant safety issue by nondestructive examination (NDE) of the materials for the components related to domestic AP1000 projects. The NRC inspection team's review of the associated NDE reports determined that except for one example, the proper material was used for component fabrication. However, there is one component at Vogtle that has yet to be tested. This component is identified for subsequent testing prior to use.

The NRC inspection team also discussed the 10 CFR Part 21 program with Mangiarotti's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

#### b. Observations and Findings

No findings of significance were identified.

#### c. Conclusion

The NRC inspection team concluded that Mangiarotti is implementing its 10 CFR Part 21 program in accordance with the regulatory requirements of 10 CFR Part 21. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Mangiarotti is implementing its policies and procedures associated with the 10 CFR Part 21 program. No findings of significance were identified.

## 2. Nonconforming Materials, Parts, or Components and Corrective Action

### a. Inspection Scope

The NRC inspection team reviewed Mangiarotti's and WEC's policies and implementing procedures that govern the control of nonconformances to verify compliance with the requirements of Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The NRC inspection team also discussed the nonconformance and corrective action programs with Mangiarotti's and WEC's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

### b. Observations and Findings

#### b.1 Corrective Actions Associated with CAPALS 100389541, 100395799, and 100395812

The NRC inspection team reviewed WEC CAPALS 100389541, 100395799, and 100395812 issued to address Mangiarotti's failure to complete the ultrasonic testing (UT) examinations on the supports of the PRHR HXH, on the base plate material beneath the accumulator tank skirt attachment welds upon completion of the welds, and on the Core Makeup Tank (CMT) support legs upon completion of the welds. As a corrective action, WEC directed Mangiarotti to complete the required UT examinations in the field in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Section III requirements.

The NRC inspection team reviewed the UT examination reports to verify that the NDE was performed in accordance with ASME Section III. The NRC inspection team noted that the UT examination for the welds on the CMT support legs was scheduled, but had not yet been completed; however, WEC had segregated and placed Hold tags on the CMTs through the nonconformances and disposition process at VC Summer and Vogtle sites.

Based on the review of the UT examination results, and other associated documents, the NRC inspection team determined that WEC's corrective actions to address Mangiarotti's failure to perform NDE for the PRHR HXH, CMT and the Accumulator met the requirements of Appendix B to 10 CFR Part 50

#### b.2 Corrective Actions Associated with CAPAL 100391094

The NRC inspection team reviewed CAPAL 100391094, dated June 16, 2016, issued by WEC, which identified material used by Mangiarotti for the manufacturing of the PRHR HXH Lower support stiffeners for AP1000 plants were tested and found to be a different type of material than what was required. Testing for the lower support stiffener indicated the material to be SA 240 Type 321, instead of

Type 304/304L stainless steel. On July 7, 2016, WEC's Issue Review Committee determined CAPAL 100391094 should be escalated to a Significance Level 1.

The NRC inspection team reviewed WEC's procedure W2-5.1-101, "Westinghouse Corrective Action Program Procedure," Revision 3.0, dated March 1, 2017, state that issues with a Significance Level 1 require a Root Cause Analysis (RCA) and is conducted in accordance with WEC's procedure W2-5.1-103, "Root Cause Analysis." As a note, W2-5.1-101, Revision 3 was the active procedure at the time of this inspection, and the earlier revisions of this procedure contained the same timing and evaluation requirements. The Significance Level 1 RCA investigation is to be completed 40 days from the issues submittal and approved by the corrective action review board 45 days after the issues submittal. Procedure W2-5.1-101 also states that Significance Level 1 have all actions completed, but an effectiveness review is pending, within 180 days after the issues submittal.

The NRC inspection team noted as of April 27, 2017, WEC's CAPAL 100391094 was still open, which is 90 days over the 180-day time period allowed for closure of a Significance Level 1 CAPAL. Additionally, WEC had not yet completed the RCA that is required to be completed 45 days from the date of CAPAL issue to determine the cause of the condition, nor had WEC identified the corrective actions required to preclude repetition. The NRC inspection team and WEC discussed this issue and the inspection team determined that without completing the RCA, WEC could not determine the cause of the material identification and traceability condition, and ensure the corrective action taken will preclude its repetition. The NRC inspection team reviewed WEC's evaluations, testing and disposition of material with indeterminate quality and determined WEC met some of the requirements of Appendix B to 10 CFR Part 50; however, the NRC inspection team issued Nonconformance 99901416/2016-201-01 for WEC's failure to assure that significant conditions adverse to quality are promptly corrected, determine the cause of the condition, and ensure the corrective action taken will preclude repetition.

### b.3 Corrective Actions Associated with CAPAL 100398394

The NRC inspection team reviewed CAPAL 100398394 that WEC issued to address that the commercial dedication instruction for machining activities for the AP1000 Auxiliary Building Wall 11 Blowdown Line, used by Mangiarotti, was not in compliance with commercial-grade dedication industry guidance regarding qualification and experience of personnel performing activities. WEC's corrective actions included a revision to commercial dedication instructions, W1-CDI-00-00-001 and W1-CDI-00-00-002 to include skills, experience, and qualification of personnel as a critical characteristic.

Based on the review of W1-CDI-00-00-001 and W1-CDI-00-00-002, the NRC inspection team determined that the revised commercial dedication instructions did not identify objective acceptance criteria; specifically, the degree of training, education, or qualification required to provide reasonable assurance of the acceptability of the services being procured. WEC generated CAPAL 100466573 to address this issue.

**b.4 Corrective Actions Associated with CAPAL 100398618**

The NRC inspection team reviewed CAPAL 100398618 that WEC issued to address Mangiarotti's failure to use the Engineering and Design Coordination Report (E&DCR) process, as required by procedure, to request a material substitution for replacement flanges used on the AP1000 accumulator tank. Mangiarotti requested the material substitution via Deviation Notice W4-DN-00-00-018. WEC identified that although the engineering justification is required to be documented in the E&DCR, Mangiarotti had documented the technical basis and justification for the material substitution in the As-Built Report and Design Report. As a corrective action, WEC conducted training for Mangiarotti's staff regarding the process for material changes.

Based on the review of the training material and logs, the NRC inspection team determined WEC's corrective actions to address the lack of procedure adherence regarding material changes met regulatory the requirements of Appendix B to 10 CFR Part 50.

**b.5 Corrective Actions Associated with CAPAL 100398651**

The NRC inspection team reviewed CAPAL 100398651 that WEC issued to address Mangiarotti's failure to adequately verify and validate sub-suppliers' certificates of conformance (CoCs). As a corrective action, WEC instructed Mangiarotti to revise the procedures governing the review of CoCs and conduct training for the responsible personnel.

Based on the review of procedures governing the review of CoC's and training records, the NRC inspection team determined that WEC's corrective actions for Mangiarotti's review of CoCs met the regulatory requirements of Appendix B to 10 CFR Part 50.

**b.6 Corrective Actions Associated with CAPAL 100395683**

The NRC inspection team reviewed CAPAL 100395683, which identified that core make-up tank diffuser hardware material was purchased by Mangiarotti from a supplier not qualified to the standards of the Mangiarotti's Quality Assurance Program, and was not on Mangiarotti's Qualified Vendors List. As a result, Mangiarotti created a Qualification Control Plan (QCP) for testing material in the Mangiarotti laboratory. Specifically, for verifying the external supplier's core make-up tank inlet diffuser material, the material testing was performed and a Certified Material Test Report (CMTR) was issued verifying the material suitability.

Based on the review of CAPAL 100395683, the QCP for testing material, the changes in the QCP, and the acceptability of the CMTR, the NRC inspection team determined that WEC met the requirements of Appendix B to 10 CFR Part 50.

### b.7 Corrective Actions Associated with CAPAL 100376707

The NRC inspection reviewed CAPAL 100376707 WEC issued to address several potential problems and inconsistencies identified in many of the supplier audits performed by Mangiarotti.

Based on the review of the WEC's Apparent Cause Analysis (ACA), audit plan improvements, results of subsequent re-audits, testing performed on material of indeterminate quality, clarifications for internal audit teams and the revised expectations for auditing, the NRC inspection team determined that WEC's corrective actions for issues identified with supplier audits performed by Mangiarotti met the requirements of Appendix B to 10 CFR Part 50.

### c. Conclusion

The NRC inspection team issued Nonconformance 99901416/2016-201-01 for WEC's failure to implement the requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Nonconformance 99901416/2016-201-01 cites WEC for failure to promptly correct a significant condition adverse to quality, determine the cause of the condition, and ensure the corrective action taken will preclude repetition. Specifically, WEC opened CAPAL 100391094, "Material Identification and Tractability," dated June 10, 2016, for Mangiarotti's incorrect use of material in the manufacturing of the Lower Support Stiffener PRHR HXH. Testing identified the material used was SA 240 Type 321, instead of the required Type 304/304L stainless steel. CAPAL 100391094 was upgraded from a Significance Level 2 to a Significance Level 1 on July 28, 2016. As of April 27, 2017, WEC's CAPAL 100391094 was still open, which is 90 days over the 180-day time period allowed for closure of a Significance Level 1 CAPAL. Additionally, WEC had not yet completed the RCA to determine the cause of the condition, nor identified the corrective actions required to preclude its repetition.

## 3. Oversight of Contracted Activities

### a. Inspection Scope

The NRC inspection team reviewed Mangiarotti's policies and implementing procedures that govern the implementation of its oversight of contracted activities and internal audits program to verify compliance with the requirements of Criterion IV, "Procurement Document Control," Criterion VII, "Control of Purchased Material, Equipment, and Services," and Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50.

During transition and integration of Mangiarotti to WEC's quality assurance program, WEC conducted several audits of Mangiarotti between 2010 and 2013. During these audits, many programmatic issues within Mangiarotti's program were identified. The NRC inspection team reviewed the corrective actions WEC had Mangiarotti implement to address the programmatic issues.

The NRC inspection team also discussed the oversight of contracted activities and internal audits programs with Mangiarotti's and 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

b.1 Internal Audit Process Failure to Identify Supplier Issues

During the audit performed by WEC during the acquisition of Mangiarotti, WEC identified several inconsistencies between POs and the qualified scope for suppliers. These issues were not identified during an internal audit WEC conducted after the acquisition of Mangiarotti. WEC opened CAPAL 100376707 to perform an evaluation on how WEC's internal audit program evaluates its supplier assessment program. The CAPAL was also opened to determine necessary improvements and lessons learned.

To disposition the ineffective assessment of suppliers, WEC performed an ACA that identified human error as the cause for WEC's internal audit team failure to assess the supplier qualification program to a sufficient depth. The ACA also identified human error as the reason follow-up audit planning did not identify the weakness in the original supplier qualification assessment, and was not included in the scope for follow-up audits. WEC conducted training to provide the expectations for auditing in these areas. The training covered use of standards and requirements, checklist requirements, procurement document content, procurement document review, receipt inspection, supplier qualification, and procurement of qualified and unqualified source material.

The NRC inspection team reviewed CAPAL 100376707, WEC's ACA evaluation, and training provided to WEC's lead auditors for ineffective supplier assessment. The NRC inspection team determined that the CAPAL, ACA, and training records provided objective evidence that WEC's corrective actions for supplier assessment activities met the requirements of Appendix B to 10 CFR Part 50.

b.2 Supplier Quality Assessment Process Failure to Identify Supplier Issues

WEC opened CAPAL 100377436 to perform an investigation as to how WEC's supplier quality assurance had not previously discovered the anomalies identified during the audit of Mangiarotti. The extent of condition focused on critical equipment or service suppliers on WEC's qualified suppliers list.

To disposition the extent of condition of Mangiarotti supplier qualification issues, WEC performed an ACA that identified WEC's and Mangiarotti's management oversight of the auditing process has not been consistent or adequate in focus. WEC's ACA also identified the number of auditors required for the scope of an audit and the proficiency of audit team members had been less than adequate. WEC identified critical equipment/service suppliers that have been audited by supplier quality assessment (SQA) to Appendix B to 10 CFR Part 50 and ASME-NQA requirements. WEC performed evaluations of these sub suppliers to determine the adequacy of the audits performed by SQA. Additionally, WEC developed and implemented guidance which provides detailed instructions for the required composition of audit teams based on the scope of the audit. In addition, WEC developed guidance for implementing the SQA supplier assessment checklist. This

document provides guidance for audit team leaders and members on the expectations for answering each question on the audit checklist.

The NRC inspection team reviewed CAPAL 100377436, WEC's ACA evaluation, and training provided to WEC's auditors for the evaluations of critical equipment/service suppliers, guidance for supplier assessments, and WEC's revised guidance on implementing their supplier assessment checklist. The NRC inspection team determined that the CAPAL, ACA, and training and guidance developed and implemented provided objective evidence that WEC's corrective actions for the supplier quality assessment process met the requirements of Appendix B to 10 CFR Part 50.

### b.3 QA Program Audit Reports Render Some Released Product as Indeterminate Quality

The results of a WEC limited scope audit of Mangiarotti's safety-related QA Program concluded that Mangiarotti had failed to either properly assess or qualify eleven suppliers prior to issuing them safety-related purchase orders for ASME Code material/services; or failed to dedicate or upgrade the materials or services that were procured, thus resulting in products being released that were of indeterminate quality.

To disposition the safety-related services/materials that were of indeterminate quality, WEC performed supplier quality assessments of Mangiarotti's sub-suppliers utilized in the fabrication of the AP1000 Accumulator Tank, CMT, and Pressurizers. The supplier quality assessments involved performing requalification assessments, traceability assessments, and clarifying the sub-suppliers qualification basis. In addition, WEC performed engineering evaluations of the safety-related services/materials procured from Mangiarotti sub-suppliers which involved clarifying the component safety classification, and issuing and dispositioning deviation notices for nonconforming components.

The NRC inspection team reviewed a sample of the supplier quality assessments to verify that audit reports contained objective evidence of the review of the relevant criteria of Appendix B to 10 CFR Part 50 and of the quality controls that were in place at the time the materials and services used in the fabrication of the AP1000 Accumulator Tank, CMT, and Pressurizers were procured.

The NRC inspection team reviewed the engineering evaluation performed by WEC of Mangiarotti's sub-suppliers utilized for procurement of material. The NRC inspection team observed that WEC verified that suppliers (IBF S.P.A, Forgiatura Morandini S.r.l, and Voestalpine Böhler Welding Austria GmbH) used by Mangiarotti for the procurement of materials for the Pressurizer, CMT, Accumulator, and PRHR HXH were certified to provide material under ASME Code Section III, NCA-3800. For suppliers which provided ASME Code materials, that were not qualified under ASME Code, Section III, NCA-38000, WEC verified that Mangiarotti implemented NCA-3885.5, "Utilization of Unqualified Source Material." For the items identified as having insufficient qualifications in accordance with NCA-3855.5 (locking plates,



lower stiffener plates, and retention plates), the NRC inspection team observed that WEC performed additional chemical and physical testing to qualify the material.

The NRC inspection team also reviewed the evaluation performed by WEC of Mangiarotti sub-suppliers (Tecno-Test SRL, Q Techna, GP Services) utilized to perform NDE services such as UT. The NRC inspection team observed that WEC verified that personnel performing NDE were qualified and certified under Mangiarotti's QAP which met the requirements of Appendix B to 10 CFR Part 50 and ASME Code specifications.

For the suppliers utilized by Mangiarotti (Vostalpine, RTM Breda, Forgiatura Vienna, Outokumpu) to provide chemical analysis testing services in support of CMTRs, the NRC inspection team observed that WEC verified that the supplier was a Qualified Material Organization (QMO) under ASME Code, Section III, NCA-38000. For suppliers that were not a QMO, WEC performed a commercial grade survey of the supplier to verify adequate programmatic controls for the critical characteristics related to material testing that were in place at the time services were procured.

The NRC inspection team determined that for the sample of engineering evaluations and supplier assessments reviewed, WEC had provided reasonable assurance that the materials and services procured from Mangiarotti's sub-suppliers conformed to the requirements of Appendix B to 10 CFR Part 50 and ASME Code specifications.

c. Conclusion

The NRC inspection team concluded that WEC is implementing its oversight of contracted activities in accordance with the regulatory requirements of Criterion IV, "Procurement Document Control," Criterion VII, "Control of Purchased Material, Equipment, and Services," and Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50. Criterion IX of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and interviews conducted, the NRC inspection team also determined that WEC is adequately implementing its policies and procedures associated with oversight of contracted activities. No findings of significance were identified.

4. Control of Special Processes

a. Inspection Scope

The NRC inspection team reviewed Mangiarotti's policies and implementing procedures that govern manufacturing controls to verify compliance with the regulatory requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50.

For welding activities, the NRC inspection team reviewed shop travelers, weld procedure specifications (WPS), supporting procedure qualification records (PQRs), welder qualifications, ASME Code data reports, and the calibration certificates of the welding equipment. The NRC inspection team verified that the applicable welding data; such as weld material and heat/lot number, WPS, inspection procedures used, the final inspection results were recorded in accordance with the applicable Mangiarotti procedures and instructions; and the welding data was recorded on the associated weld record for each weld.

In addition, the NRC inspection team observed weld material storage and verified that weld material was adequately controlled, including that flux covered weld electrodes were either in hermetically sealed containers or kept in baking/portable ovens to control the moisture content within the requirements of the applicable filler metal specification and ASME Code Section III. The NRC inspection team verified that calibrated thermocouples/ovens were used and had valid calibration documentation in accordance with applicable Mangiarotti procedures. The NRC inspection team also verified that weld material was controlled at all times until its consumption.

The NRC inspection team reviewed the associated welder qualification records and confirmed that the welders had completed the required training and had maintained their qualifications in accordance with Mangiarotti procedures. The NRC inspection team also verified that the applicable procedure for welder qualification met the requirements of ASME Code (Sections III and IX).

The NRC inspection team discussed the manufacturing and special process programs with Mangiarotti'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. Conclusion

The NRC inspection team concluded that Mangiarotti is implementing its special processes program in accordance with the regulatory requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and interviews conducted, the NRC inspection team also determined that Mangiarotti is adequately implementing its policies and procedures associated with the control of special processes. No findings of significance were identified.

5. Entrance and Exit Meetings

On July 19-21 2016 and April 24-27 2017, the NRC inspection team discussed the scope of the inspection with Russell Bastyr and other members of WEC and Mangiarotti's management and technical staff. On April 27, 2017, the NRC inspection team presented the inspection results and observations during an exit meeting with Russell Bastyr, and other members of WEC and Mangiarotti's management and technical staff. The attachment to this report lists the attendees of the entrance and exit meetings, as well as those individuals whom the NRC inspection team interviewed.

## ATTACHMENT

### 1. ENTRANCE/EXIT MEETING ATTENDEES

Name	Title	Affiliation	Entrance	Exit	Interviewed
Aaron Armstrong	Inspection Team Leader	NRC	M&W	X	
Ashley Ferguson	Inspector	NRC	W	X	
Paul Prescott <sup>1</sup>	Inspector	NRC	M		
Kerri Kavanagh	QVIB-3 Branch Chief	NRC		X	
Taylor Lamb	Inspector	NRC	W		
Russell Bastyr	VP WFCM Quality	WEC	M&W	X	X
Michael Stenfanchik	SVP Nuclear Fuel & Component Manufacturing	WEC	M&W	X	X
Ronnie Gardner	VP Quality Programs& Assessments	WEC	W*	X*	
Michele DeWitt	SVP Nuclear Fuel & Component Manufacturing	WEC	W*	X*	
Steve Hamilton	QEHS&PI SVP	WEC	W*	X*	
Tara Werner	Director Quality Programs& Assessments	WEC	W*	X*	
Paul Belz	Mangiarotti QA Manager	WEC		X*	
Randy Ivey	Director Supply Quality Oversight	WEC	W*		
Nancy Closki	Component Technical Issue Manager	WEC	W*		
Mario Signorini	CEO Mangiarotti	WEC	W*		
Arthur Copsey	Director Engineering Quality and PI QEHS	WEC	W*	X*	
Matteo Rolaro	Welding Mangiarotti	WEC			X
Gianluca DiPalma	Mangiarotti				X
Sampaoli Bruno	Foreman Mangiarotti				X
Greco Guiseppe	Welding Mangiarotti				X

W= at Westinghouse, Rockville MD  
M= at Mangiarotti, Malfancone IT  
\*= Attended by conference call

<sup>1</sup> Participated Remotely from NRC Headquarters Office

2. INSPECTION PROCEDURES USED

Inspection Procedure (IP) 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated February 13, 2012.

IP 43002, "Routine Inspections of Nuclear Vendors," dated April 25, 2011.

IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated April 25, 2011.

3. LIST OF ITEMS OPENED

Item Number	Status	Type	Description
99901476/2016-201-01	Open	NON	Criterion XVI

4. DOCUMENTS REVIEWED

Policies and Procedures

- GNSC-P-8000, "FOAK Production Qualification and Development," Revision 0, dated August 22, 2016
- MG-QP, "Mangiarotti Quality Plan," Revision 5, dated February 14, 2017
- MGQ, "Quality Management System manual," Revision 4, dated September 16, 2016
- PGE.01, "Document Control and Archiving," Revision 1, dated March 21, 2017
- PGE.03, "Supplier Selection and Assessment," Revision 1, dated May 23, 2016
- PGE.08, "Internal and External Audits," Revision 0, dated September 9, 2015
- PGE.046, "Mangiarotti Nuclear Safety Culture Policy," Revision 1, dated February 15, 2017
- QA-7.21, "Supplier Quality Executive Council," Revision 0, dated March 31, 2017
- W2-9.5-101, "Supplier QA Program Qualification and Assessment," Revision, dated March 21, 2017
- PGE.22, "Qualification of Audit Personnel," Revision 0, dated October 14, 2013
- PGE.22, "Qualification of Audit Personnel," Revision 1, dated September 20, 2015
- PGE.23, "Inspection and Test Personnel Qualification," Revision 6, dated September 16, 2016
- PGE.43, "Certificate of Compliance (CofC)," Revision 1, dated January 10, 2017
- W2-4.2-101, "Internal Quality Assurance Audits," Revision 2.0, dated December 13, 2016
- WEC-16-23, "Internal Audit Plan," dated May 6, 2016
- QA-7.17, "Supplier Assessment Procedure," Revision 4, dated October 18, 2016
- W1-DFW-18-00-002, "AP100 passive residual hear removal heat exchanger," Revision 5, dated March 14, 2014
- W1-SPG-00-00-003, "AP1000 Passive Residual removal Heat Exchanger Liquid Penetrant Examination on Material and Welds," Revision 1, dated November 12, 2010
- W2-5.1-101, "Westinghouse Corrective Action Program Procedure," Revision 3 dated January 18, 2017

- W2-5.1-101, "Westinghouse Corrective Action Program Procedure," Revision 3, dated March 1, 2017
- W2-5.1-102, "Issue Review Committee," Revision 3, dated March 1, 2017
- W2-5.1-103, "Root Cause Analysis," Revision 1, January 18, 2017
- W2-5.1-104, "Apparent Cause Analysis," Revision 1.1, dated January 18, 2017
- W2-5.1-201, "Identification and Reporting of Conditions Adverse to Nuclear Safety," Revision 0.1, September 19, 2016
- Mangiarotti "Inspection Report at Suppliers Checklist," Revision 0, dated December 2015

#### Purchase Orders and Audit Reports

- Purchase Order No. QA-201601621, Revision 1, dated September 14, 2016
- Supplier Quality Program Audit WES-2016-120-R, dated August 8, 2016
- Supplier Quality Program Audit WES-2016-121-R, dated August 22, 2016
- Supplier Quality Program Audit WES-2016-129-R, dated August 5, 2016
- Mangiarotti "Audit Plan and Report," AR2013-074, for V. Bohler GmbH, Revision 1 dated December 2013
- Mangiarotti "Audit Plan and Report" AR2014-038, for V. Bohler GmbH, Revision 1 dated January 2015

#### Nonconformance Reports

- Non Conformity Report (NCR)-3623-R0, "PRHR HX Southern Vogtle Unit 4: UT not performed on some joints," dated December 5, 2016
- NCR-3624-R0, "PRHR HX Scana Summer Unit 3: UT not performed on some joints," dated December 3, 2016
- NCR-1114-R0, "Pitting Marks on Cladded Crowns and Petals Supplied by Deform," (Vogtle Unit 3), dated May 2011
- NCR-1163-R0, "Manway Nozzle Item 2-05/1: Thickness Measurement of CL-007/8 and BT-011," (Vogtle Unit 3), dated September 2011
- NCR-1203-R0, "Machining Executed by a Sub-supplier without Proper Documentation," (Vogtle Units 3 and 4), dated December 2011
- NCR-1417-R0, "On Weld CW-002/2 between Lower Crown Item 2/2-05/2 and Lower Petals Item 3/2-05/2.1-4, RT Exam Detected a Rejectable Indication as per Attached Report N021-RT-W3-PCF-10-10-002-36," (Vogtle Unit 3) dated May 2012
- NCR-1770-R0, "WEC Requests Mangiarotti to Verify Position of Holes on the Accumulator Base Rings to Determine the Position of Each Hole (x-y and radius angle)," (Vogtle Unit 3), dated February 2013
- NCR-1920-R0, "Deviation in the Material for AP1000 Accumulator Tank Material for Level Instrument Nozzle," (VC Summer Units 2 and 3 and Vogtle Units 2 and 3), dated May 2013

#### Corrective Action Documents

- CAPAL 100377388, "QA Program audit renders some release product as indeterminate quality," dated April 22, 2016

- CAPAL 100398618, “Change of Material in Deviation Notice VS3-MT02-GNR-001,” dated July 21, 2016
- CAPAL 100398394, “Commercial Dedication Instruction for machining activities,” dated July 20, 2016
- CAPAL 100465636, “Re-opening of CAPAL issue due to deficiencies in closure,” dated April 21, 2017
- Root Cause Analysis, “QA Program Audit Results Render Some Released Product as Indeterminate Quality,” dated September 25, 2016
- CAPAL 100376707, “Ineffective Assessment of Supplier Assessment Activity,” dated April 20, 2016
- CAPAL 100377436, “Extent of Condition Of Mangiarotti Supplier Qualification Issue,” dated April 22, 2016
- CAPAL 100391094, “Material identification and traceability,” dated April 22, 2016

#### Corrective Action Documents Opened During the NRC Inspection

- CAPAL 100466573, “CDI Acceptance Criteria for Machining Services- Personnel Qualification,” dated April 25, 2017
- CAPAL 100467448, “CGS Objective Evidence for RTM Breda,” dated April 27, 2017
- CAPAL 100466473, “Incorrect Qualification Record for RC-TL-in ATLAS,” dated April 25, 2017
- CAPAL 100465017, “Failure to meet procedural requirements for RCA on CAPAL 100391094,” dated April 18, 2017

#### Training Records

- “AP1000 Core Makeup Tank Lessons Learned – CAPAL 100395812, Activity 8000002239515,” dated December 2016
- Indoctrination and Training Report, related to qualified QCI inspectors on management procedures, dated June 15, 2016
- Westinghouse University Training Roster, Lessons Learned-Change of Material in Deviation Notice, dated October 18, 2016
- Westinghouse Training Attendance Rosters, “Lessons Learned – CAPAL 100395812, Activity 8000002239515,” dated December 8, 2016 and January 30, 2017
- Westinghouse Training Attendance Rosters, “Auditing of Supplier Qualification-Procurement– CAPAL 100376707, Activity 8000002064293,” dated November 5, 2016

#### Miscellaneous

- Certified Material Test Report (CMTR) No. N022-CMTR-PCQ-MLAM018387.01.C, Revision 1, dated January 3, 2017
- CMTR No. N022-CMTR-PCQ-NFOR011702, Revision 1, dated January 3, 2017
- Deviation Notice (DN) No. SV0-MT01-GNR-011, “Deviation Notice for AP1000 Core Makeup Tank Diffuser Hardware Material Qualification,” Revision 0, dated October 6, 2016
- DN No. VSG-MT01-GNR-014, “Deviation Notice for AP1000 Core Makeup Tank Diffuser Hardware Material Qualification,” Revision 0, dated October 6, 2016

- Drawing No. APP-MT02-V2-002, "AP1000 Accumulator Tank Tap & Connections Assembly," Revision 5, dated September 19, 2011
- Inspections, Tests, Analysis, and Acceptance Criteria (ITAAC) Impact Screening No. 100389547, dated June 26, 2016
- Long Term Commitment (LTC) Approval Checklist, "Missed Examinations on PRHR HX per ASME B&PV III NF-4441," dated October 7, 2016
- LTC Approval Checklists, "Missed Examinations on ACC Tanks per ASME B&PV III NF-4441," dated October 28, 2016, January 30, 2017
- LTC Approval Checklist, "Missed Examinations on CMT Tanks per ASME B&PV III NF-4441," dated January 30, 2017
- LTR- NCE-16-109, "Mangiarotti AP1000 Projects - Pressurizer, Core Make-up Tank, Accumulator, and Passive RHR Heat Exchanger Sub-supplier Engineering Evaluations for IBF, Forgiatura Morandini and Voestalpine Böhler Welding," Revision 0, dated April 25, 2016
- LTR-NCE-16-110, "Mangiarotti AP1000 Projects - Pressurizer, Core Make-up Tank, Accumulator, and Passive RHR Heat Exchanger Sub-supplier Engineering Evaluations for Lechler GmbH," Revision 0, dated April 27, 2016
- LTR-NCE-16-113, "Mangiarotti AP1000 Projects - Pressurizer, Core Make-up Tank, Accumulator, and Passive RHR Heat Exchanger, Sub-supplier Engineering Evaluations Tecno-Test SRL, Q Techna, and GP Services," Revision 0, dated April 27, 2016
- LTR-NCE-16-116, "Mangiarotti AP1000 Projects - Pressurizer, Core Make-up Tank, Passive Residual Heat Removal Heat Exchanger, and Accumulator Sub-supplier Engineering Evaluations for VOESTALPINE GROBBLECH GmbH," Revision 1, dated May 4, 2016
- LTR-NCE-16-126, "Mangiarotti AP1000 Projects - Passive Residual Heat Removal Heat Exchanger (PRHR HX) Sub-supplier Engineering Evaluations," Revision 0, dated May 6, 2016
- LTR-NCE-134, "ASME Code Requirements for AP1000 PRHR HX Shims," Revision 0, dated May 18, 2016
- LTR-NCE-16-135, "ASME Code Basis for Accepting Nonconformances of AP1000 PRHR HX Locking Plates and Lock Washers and Continued Applicability of Design Specification APP-ME02-Z0-101 R.10," Revision 0, dated May 18, 2016
- LTR-NCE-16-136, "Testing of Materials for the Mangiarotti Supplier Qualification," Revision 0, dated May 24, 2016
- LTR-NCE-16-137, "Mangiarotti AP1000 Projects – V.C. Summer Accumulator Tanks Sub-supplier Engineering Evaluation," Revision 0 dated June 3, 2016
- LTR-NCE-16-140, "Mangiarotti AP1000 Projects – V.C. Summer Unit 3 and Vogtle Units 3 and 4 Accumulator Tanks Sub-supplier Engineering Evaluation," Revision 0 dated June 3, 2016
- LTR-NCE-16-144, "Mangiarotti AP1000 Projects – V.C. Summer Unit 2 Core Makeup Tanks Sub-supplier Engineering Evaluation, Revision 0, dated June 3, 2016
- LTR-NCE-16-145, "Mangiarotti AP1000 Projects – V.C. Summer Unit 3 and Vogtle Units 3 and 4 Core Makeup Tanks Sub-supplier Engineering Evaluation," Revision 0 dated June 3, 2016
- LTR-NCE-16-152, "Mangiarotti AP1000 Projects – Chemical Analysis Suppliers for Accumulator Tanks, Core Makeup Tanks, Pressurizer, and Passive Residual Heat Removal Heat Exchangers," Revision 0, dated June 9, 2016
- LTR-NCE-16-166, Evaluation of PI-16-21, "Mangiarotti Delivered Components found to have indeterminate Quality," Revision 0, dated June 21, 2016

- LTR-NCE-16-183, "SMI PRHR HX NF-4441(a) Missed UT Examination Extent of Condition Summary," Revision 1, dated November 15, 2016
- GQ-16-044, "Mangiarotti AP1000 Projects Supplier Reviews (Techno-Test SRL, Q Techno, GP Services) Associated with RCA CAPAL # 100377388," Revision 1, dated June 3, 2016
- GQ-16-124, "AP1000 Accumulator Tanks (ACC) Mangiarotti Sub-supplier Issue Hold Tag Release for Vogtle & VC Summer," Revision 0 dated October 13, 2016
- GQ-16-125, "AP1000 Pressurizers (PRZ) Mangiarotti Sub-supplier Issue Hold Tag Release for Vogtle & VC Summer," Revision 0, dated October 13, 2016
- GQ-16-127, "AP1000 Core Makeup Tanks (CMT) Mangiarotti Sub-supplier Issue Hold Tag Release for Vogtle & VC Summer," Revision 0, dated October 13, 2016
- PI-61-21, Closeout Request for PI-16-21, "Mangiarotti Delivered Components found to have indeterminate Quality," dated June 22, 2016
- Presentation on Lessons Learned – Change of Material in Deviation Notice, dated October 18, 2016
- Stop Work Order SWO-100377388.03, dated October 20, 2016
- Ultrasonic Examination Report No. 4500707395-UT-PRHR HX-01, "Summary of the Sanmen Unit 1 PRHR HX Zero and Angle Beam Ultrasonic Examinations as Required by Westinghouse FDR SM1-ME02-GNR-4121, R2," dated December 8, 2016
- W1-CDI-00-00-001, "PRHR HX Gasket Seat Surface Re-machining-Commercial Dedication instruction," Revision 1, dated October 10, 2016
- W1-CDI-00-00-002, "PRHR HX Tensioner Pin item 401 Re-machining- Commercial Dedication Instruction," Revision 1, dated November 11, 2016
- RCA 100377388 CAPR4 – Procedure GAP Analysis
- RCA 100377388 CAPR 1 – MG QMS Gap Analysis
- ACA 100376707, "Ineffective Assessment of Supplier Assessment Activity," Revision 1, dated April 2016
- ACA 100377436, "Extent of Condition of Mangiarotti Supplier Qualification Issue," dated April 2016
- Evaluation, "Extent of Condition of Mangiarotti Supplier Qualification Issue" October 19, 2016
- Supplier Quality Assessment training and guidance document, " Guidance for implementing supplier assessment checklist," dated October 19, 2016
- ACA 100391094, "Material identification and traceability," dated July 28, 2016
- CMTR #121 "Welding filler material qualifications certifications," Revision 1, January 15, 2013