



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

May 10, 2021

Camille T. Zozula, Manager
Regulatory Compliance & Corporate Licensing
Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, PA 16066

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION OF
WESTINGHOUSE ELECTRIC COMPANY REPORT NO. 99900404/2021-201

Dear Ms. Zozula,

On March 22-26, 2021, the United States (U.S.) Nuclear Regulatory Commission (NRC) staff conducted a virtual inspection of the Westinghouse Electric Company (WEC) facilities in Cranberry Township, Pennsylvania. 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."

This technically-focused inspection evaluated aspects of WEC's programs for the development of the Core Protection Calculator System (CPCS) for Entergy's Waterford Unit 3 (WF3) digital upgrade project (Agencywide Document Access and Management System (ADAMS) Accession No. ML20205L588). For this project, WEC is responsible for the development of the system requirements, software and hardware requirements, detailed software and hardware design and implementation, all factory acceptance testing, and delivery of the completed CPCS to the WF3 site. The WF3 CPCS digital upgrade license amendment request (LAR) is under NRC staff evaluation using the Alternate Review Process (ARP) described in Digital Instrumentation and Controls (DI&C) Interim Staff Guidance (ISG)-06, "Licensing Process," Revision 2.

This is the first vendor inspection for a DI&C LAR under evaluation using the DI&C-ISG-06 ARP. During this inspection, the NRC inspection team reviewed WEC's activities associated with the requirements phase of the system development lifecycle. Specifically, the NRC inspection team reviewed the CPCS software and hardware requirements phase life cycle documents to verify consistency with the system requirements specifications, licensing basis, and design commitments. The NRC inspection team verified adequate translation of design information into specific hardware and software requirement specifications, verified control of traceability of the requirements through inspection of the implementation of WEC's configuration management and design control processes, verified Independent verification and validation activities conducted by WEC staff, and evaluated WEC's nonconformance and corrective action processes used during product development.

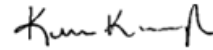
The enclosed report presents the results of this inspection. This NRC inspection report does not constitute NRC endorsement of your overall quality assurance (QA) or 10 CFR Part 21 programs.

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, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's Rules of Practice, a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system, ADAMS, which is accessible from the NRC Web site at <http://www.nrc.gov/readingrm/adams.html>.

Sincerely,

Kerri Kavanagh, Chief
Quality Assurance and Vendor Inspection Branch
Division of Reactor Oversight
Office of Nuclear Reactor Regulation



Signed by Kavanagh, Kerri
on 05/10/21

Docket No.: 99900404
EPID No.: I-2021-001-0132

Enclosure:
Inspection Report No. 99900404/2021-201
and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION OF WESTINGHOUSE
ELECTRIC COMPANY REPORT NO. 99900404/2021-201
Dated: May 10, 2021

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NRR-043

OFC	NRR/DRO/IQVB	NRR/DRO/IQVB	NRR/DRO/IQVB
NAME	GGalletti	DZhang	JOrtega-Luciano
DATE	5/04/2021	5/03/2021	5/05/2021
OFC	NRR/DEX/ELTB	NRR/DRO/IQVB	
NAME	SDarbali	KKavanagh	
DATE	5/05/2021	5/10/2021	

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**U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF REACTOR OVERSIGHT
VENDOR INSPECTION REPORT**

Docket No.: 99900404

Report No.: 99900404/2021-201

Vendor: Westinghouse Electric Company

Vendor Contact: Camille T. Zozula, Manager
Phone: +1 (412) 374-2577
Email: zozulact@westinghouse.com

Inspection Dates: March 22 – 26, 2021

Vendor Location: Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, PA 16066

Inspection Team Leader: Greg Galletti, NRR/DRO/IQVB

Inspectors: Deanna Zhang NRR/DRO/IQVB
Jonathan Ortega-Luciano NRR/DRO/IQVB
Samir Darbali NRR/DEX/ELTB

Approved by: Kerri Kavanagh, Chief
Quality Assurance Vendor Inspection Branch
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

Westinghouse Electric Company
99900404/2021-201

The United States (U.S.) Nuclear Regulatory Commission (NRC) staff conducted a virtual inspection at the Westinghouse Electric Company (WEC) facilities in Cranberry Township, Pennsylvania. 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." The NRC inspection team conducted this inspection virtually from March 22 – 26, 2021.

This technically-focused inspection evaluated aspects of WEC's programs for the development of the Core Protection Calculator System (CPCS) for Entergy's Waterford Electric Station Unit 3 (WF3) digital upgrade project (Agencywide Document Access and Management System (ADAMS) Accession No. ML20205L588). For this project, WEC is responsible for the development of the system requirements, software and hardware requirements, detailed software and hardware design and implementation, all factory acceptance testing, and delivery of the completed CPCS to the WF3 site. The WF3 CPCS digital upgrade license amendment request (LAR) is under NRC staff evaluation using the Alternate Review Process (ARP) described in Digital Instrumentation and Controls (DI&C) Interim Staff Guidance (ISG)-06, "Licensing Process," Revision 2. Under the ARP, the acceptability of the digital I&C system is based on system-level and architectural design information, the framework for the DI&C system development processes, and the licensee's oversight and evaluation of the vendor's DI&C system development process activities. Detailed design, implementation, and factory acceptance testing information is not evaluated during the LAR review. Therefore, verification that the design, implementation, and factory acceptance testing were performed in accordance with the development processes described in the LAR may be confirmed using a combination of vendor inspections and inspection of the licensee's vendor oversight activities as described in the LAR. This is the first vendor inspection for a DI&C LAR under evaluation using the DI&C-ISG-06 ARP and the content of this inspection report may support future inspections of the licensee's vendor oversight activities.

During this inspection, the NRC inspection team reviewed the CPCS software and hardware requirements phase life cycle documents to verify consistency with the system requirements specifications, licensing basis, and design commitments. The NRC inspection team verified adequate translation of design information into specific hardware and software requirement specifications, verified control of traceability of the requirements through inspection of the implementation of WEC's configuration management and design control processes, verified independent verification and validation activities conducted by WEC staff, and evaluated WEC's nonconformance and corrective action processes used during product development.

The following regulations served as the bases for this NRC inspection:

- Appendix B to 10 CFR Part 50
- 10 CFR Part 21, "Reporting of Defects and Noncompliance."

During the course of this virtual inspection, the NRC inspection team used Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated January 27, 2017, and IP 35710,

“Quality Assurance Inspection of Software Used in Nuclear Applications,” dated January 30, 2018.

The information below summarizes the results of this inspection.

CPCS Requirements Phase Review

The NRC inspection team reviewed WEC’s policies and implementing procedures that govern the requirements phase activities and design output documents for the WF3 CPCS upgrade project, to verify compliance with the requirements of Criterion III, “Design Control,” of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of system requirements and request for engineering changes (RECs) to verify traceability of these items. The NRC inspection team also reviewed the design process and development plans that govern the WF3 CPCS upgrade project. No findings of significance were identified.

Design Control – Independent Verification and Validation

The NRC inspection team reviewed WEC’s policies and implementing procedures that govern the design control and independent verification and validation activities (IV&V), to verify compliance with the requirements of Criterion III, “Design Control,” of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of WEC’s IV&V task reports, implementation processes, including databases associated with the CPCS design information. No findings of significance were identified.

Nonconforming Materials, Parts, or Components and Corrective Action

The NRC inspection team reviewed WEC’s policies and implementing procedures that govern the Nonconforming Materials, Parts, or Components and Corrective Action programs 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 reviewed a sample of WEC’s nonconformance and corrective action reports. No findings of significance were identified.

Internal Audits

The NRC inspection team reviewed WEC’s policies and implementing procedures that govern the implementation of its internal audit program to verify compliance with the regulatory requirements of Criterion XVIII, “Audits,” of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed the frequency of the internal audits, the audit reports’ objective evidence, and verified findings were captured in the corrective action program. No findings of significance were identified.

REPORT DETAILS

1. CPCS Requirements Phase Review

a. Inspection Scope

The U.S. Nuclear Regulatory Commission (NRC) inspection team reviewed Westinghouse Electric Company, LLC's (hereafter referred to as WEC) policies and implementing procedures that govern the requirements phase activities of the development lifecycle for the Waterford Steam Electric Station Unit 3 (WF3) Core Protection Calculator System (CPCS) to verify 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 Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities."

The NRC inspection team reviewed a select sample of WF3 CPCS upgrade project design documents and Request for Engineering Changes (RECs) to verify that these documents were generated in accordance with WEC's processes and procedures. Specifically, the NRC inspection team reviewed these documents to verify requirements traceability, including those requirements generated from RECs, to verify compliance to Criterion III of Appendix B to 10 CFR Part 50. The NRC inspection team also reviewed the software development plan and system test plan for the WF3 CPCS digital upgrade project to verify these plans adhered to WEC's design processes for safety-related systems.

The NRC inspection team discussed the WF3 CPCS design process and development plans with WEC's management and technical personnel. The references and attendance lists in the attachment to this inspection report identify the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

Requirements Traceability

The NRC inspection team reviewed the following documents to verify traceability of six sampled CPCS System Requirements within WNA-DS-04517-CWTR3, "System Requirements Specification for the Core Protection Calculator System," Revision 5 (hereafter referred to as CPCS SysRS):

- WNA-DS-04618-CWTR3, "Software Requirements Specification for the Core Protection Calculator System," Revision 2 (hereafter referred to as CPCS SRS);
- WNA-DS-04650-CWTR3, "Hardware Design Description for the Core Protection Calculator System," Revision 2 (hereafter referred to as CPCS HDD);
- WNA-SD-00689-CWTR3, "Software Design Description for the Common Q Core Protection Calculator System Database and Utility Functions," Revision 0 (hereafter referred to as the CPCS SDD);

- WNA-RTM-00076-CWTR3-RTMs, which contains the “Entergy Waterford Steam Electric Station Unit 3 Requirements Traceability Matrix for the Core Protection Calculator System Upgrade Project,” Revision D (hereafter referred to as the SysRS RTM), the “CPC SRS RTM,” and the “Waterford CPCS RECs RTM,” (hereafter referred to as the REC RTM).

The six sampled system requirements identified in Sections 2.3.1.7, 2.4.1, 2.5.4, 3.1.2, 3.1.4, and 4.4.2 of the CPCS SysRS covered topics related to performance, physical, and environmental characteristics. The NRC inspection team verified that within the SysRS RTM, the six sampled system requirements from the CPCS SysRS were traceable to source documents such as purchase specifications and to lower level documents such as the CPCS SRS, CPCS HDD, and CPCS SDD.

The WF3 CPCS is based on the reference CPCS design at the Palo Verde Generating Station. For the WF3 CPCS project, some of the baseline system requirements from the reference CPCS design have been modified in order to meet the functional requirements and licensing basis of WF3. In addition, since the completion of the CPCS project at the Palo Verde Generating Station, the baseline requirements have evolved to address changes in the design and to resolve errors in the system, software, or hardware. The new baseline requirements are documented in 00000-ICE-30158, “System Requirements Specification for the Common Q Core Protection Calculator System,” Revision 14 (hereafter referred to as the Baseline SysRS). Therefore, the WF3 CPCS SysRS references the Baseline SysRS directly for those system requirements that have been adopted for the WF3 CPCS without modification.

The NRC inspection team sampled requirements from the Baseline SysRS related to deterministic performance of the CPCS. The CPCS SysRS stated that these Baseline SysRS requirements apply with no modifications, clarifications, or deletions for these selected five requirements. The Baseline SysRS traced these requirements to design restrictions identified by the equipment manufacturer. These legacy requirements are not included in the SysRS RTM. To perform forward traceability of these legacy requirements, the NRC inspection team reviewed 14273-ICE-37781, “Requirements Traceability Matrix for the Arizona Public Service CPCS Project,” Revision 00, (hereafter referred to as the Palo Verde SysRS RTM). The Palo Verde SysRS RTM traced the Palo Verde CPCS documents for design, implementation/integration and test/validation. The NRC inspection team verified within the Palo Verde SysRS RTM the sampled requirements from the Baseline SysRS were traceable to the equipment manufacturer documents. The NRC inspection team verified that the Palo Verde SysRS RTM provided traceability for some of the selected requirements to the lower level 00000-ICE-3233, “Software Requirements Specification for the Common Q Core Protection Calculator System,” Revision 9 (hereafter referred to as the Baseline SRS). For the other selected requirements which are based on the manufacturer design restrictions, the Palo Verde SysRS RTM specified that the Baseline SRS does not include the restricted design aspects. Thus, the NRC inspection team verified that the Common Q™

platform manufacturer's restrictions for deterministic performance of the CPCS have been addressed downstream from the Baseline SysRS.

The NRC inspection team sampled three requirements generated in REC documents, WT3-CPCS-00015, WT3-CPCS-00029, and WT3-CPCS-00057, and performed forward and backward traceability using the REC RTM. REC WT3-CPCS-00015 was generated based on lessons learned from a previous application of the Common Q CPCS and the NRC inspection team was able to trace the requirement to the CPCS SRS and the CPCS SDD. REC WT3-CPCS-00029 was generated at the request of Entergy to support elimination of surveillance requirements for WF3 Technical Specifications, and the NRC inspection team was able to trace the requirement to the CPCS SysRS and CPCS SRS. REC WT3-CPCS-00057 was generated by a WEC calculation letter and the NRC inspection team was able to trace the requirement to the CPCS SysRS. Since full implementation of REC WT3-CPCS-00057 has not been completed, this REC remains open at the time of this inspection.

Design Process and Development Plans

The NRC inspection team reviewed the following design process and development plans that govern the development of Common Q safety-related systems to verify that the (1) WF3 CPCS Project development activities adhered to the design process and application restrictions, and (2) the software development plan and test plan were developed in accordance with the purchase specifications:

- NABU-DP-00014-GEN, "Design Process for Common Q™ Safety Systems," (hereafter referred to as the Design Process Document), Revision 11 and Revision 12 (hereafter referred to as the Design Process Document);
- WNA-DS-01070-GEN, "Application Restrictions for Generic Common Q Qualification," Revision 15 (hereafter referred to as the Application Restrictions);
- WNA-PD-00594-CWTR3, "Software Development Plan for the Core Protection Calculator System Upgrade Project," Revision 2 (hereafter referred to as the CPCS SDP);
- WNA-PT-00303-CWTR3, "Test Plan for the Common Q Core Protection Calculator System," Revision 2 (hereafter referred to as the CPCS test plan).

The NRC inspection team verified that the WF3 CPCS project followed Revision 11 of the Design Process Document; however some of the modifications made in Revision 12 have also been applied to the WF3 CPCS project. For example, the documentation requirements for addressing compliance with the applications restrictions that have been added to Revision 12 of the Design Process Document have been applied to the WF3 CPCS project. Thus, an application restrictions compliance table has been included in Appendix A of both the CPCS SRS and HDD. The NRC inspection team reviewed the application restriction compliance table in the CPCS SRS and HDD and verified that each application restriction has been evaluated to confirm that either the restriction was

met thru the CPCS design documents or the restriction did not apply to the WF3 CPCS project.

The NRC inspection team reviewed the CPCS SDP and CPCS test plan for the CPCS project. The NRC inspection team verified that the CPCS SDP defined the requirements for WEC to complete the replacement of the WF3 CPCS software in accordance with the purchase order and defined the categorization of WF3 CPCS software in accordance with WCAP-16096-P-A, "Software Program Manual for Common Q™ Systems," Revision 5. The NRC inspection team also verified that the CPCS SDP specified that the Design Process Document, Revision 11, applies to the WF3 CPCS software project process.

The NRC inspection team observed that although the test plan has sections for identifying topics that will be included in the scope of the CPCS system test, and those topics that will be excluded from the CPCS system test, these sections did not clearly identify whether the Baseline SysRS requirements system tests will be re-performed as part of the WF3 CPCS test. In response to the NRC inspection team's observations, WEC staff stated that the intention was to repeat the system tests of the reference plant for the WF3 CPCS project, and created RITS 75801, "Recommended clarifications to WNA-PT-00303-CWTR3, Revision 1, "Test Plan for the Common Q Core Protection Calculator System" to improve the clarity of the test plan. The NRC inspection team reviewed this RITS and verified that the RITS captured the need to improve clarity related to the scope of the system test. In addition, WEC staff informed the NRC inspection team that the test procedure has not been written yet, but that the test to verify the identified deterministic performance requirements will be part of the CPCS integration test.

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 the requirements phase activities satisfied the regulatory requirements set forth in Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. Based on the limited set of design documents and RECs reviewed, the NRC inspection team determined that WEC was implementing its policies and procedures associated with design and development activities for the WF3 CPCS digital upgrade project. No findings of significance were identified.

2. Design Control – Independent Verification and Validation (IV&V)

a. Inspection Scope

The NRC inspection team evaluated WEC's policies and procedures that govern the implementation of independent verification and validation (IV&V) process for WF3 CPCS to verify compliance with the regulatory requirements of Criterion III to Appendix B of 10 CFR Part 50. The NRC inspection team concentrated their review on plans and procedures established for IV&V for the WF3 CPCS digital upgrade project.

The NRC inspection team reviewed a sample of IV&V task reports completed for the concept and requirements phases of the WF3 CPCS system development lifecycle to

verify that the activities and results documented in these reports adhered to WEC processes and procedures related to IV&V. The NRC inspection team also reviewed a sample of RITS identified in the IV&V task reports and confirmed that the deficiencies identified were adequately captured in the RITs database, and that proposed corrective actions were identified and implemented or continued to be adequately tracked for implementation. The NRC inspection team reviewed RITS documenting IV&V review activities for these analyses and confirmed the issues identified were adequately documented and dispositioned.

The NRC inspection team discussed the IV&V processes and procedures with WEC's management and technical personnel. The references and attendance lists in the attachment to this inspection report identify the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team confirmed the IV&V task reports sampled are consistent with the WNA-PQ-00496-CWTR3, "Project Quality Plan for the Core Protection Calculator System Upgrade Project," Revision 1 and Software Development Plan, as described in WNA-PV-00110-CWTR3, "Software Verification and Validation Plan (SVVP)," Revision 0 (hereafter referred to as the SVVP). The SVVP was specific to the CPCS Upgrade Project for WF3 and defined the techniques, procedures, activities, and methodologies used to provide IV&V. The SVVP described IV&V efforts performed by the IV&V team as they relate to the CPCS software. This included IV&V through the stages of development applicable to the WF3 CPCS digital upgrade project. In addition, the NRC inspection team reviewed a sample of continuous activities described in the SVVP, that are maintained and updated throughout the software lifecycle phases and are evaluated by the IV&V organization. These included the criticality, hazard, risk, and security analyses. For each activity, the NRC inspection team reviewed completed checklists, task reports, and sampled various data systems controlled by the CPCS project which captured on-going analyses results.

The NRC inspection team discussed each of the major activities described in the SVVP with the WEC staff and confirmed implementation of the IV&V activities associated with concept documentation evaluation, requirements allocation analysis, software requirements evaluation, traceability analysis, and configuration management assessment. For each activity, the NRC inspection team reviewed completed checklists, task reports, and sampled various data systems controlled by the CPCS project, which captured on-going system requirements and design information. Specifically, the NRC inspection team selected a sample of IV&V task reports, including completed concept phase and requirements phase checklists, associated with the WF3 CPCS project, and verified that those documents were developed in accordance with the SVVP, and contained objective evidence to support the conclusions described in those reports.

No findings of significance were identified.

c. Conclusions

The NRC inspection team concluded that WEC was implementing its IV&V programs activities in accordance with the regulatory requirements of Criterion III of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and activities observed, the NRC inspection team determined that WEC was implementing its policies and procedures associated with IV&V program activities. No findings of significance were identified.

3. Nonconformance and Corrective Action Program (CAP) Review

a. Inspection Scope

The NRC inspection team reviewed WEC's policies and implementing procedures that govern the control of nonconformances and corrective action 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, respectively.

In addition, the NRC inspection team verified that WEC's nonconformance (known as RITS and Quality Notifications (QNs)) and corrective action (known as Issue Report (IR)) processes were implemented in accordance with their respective procedures. RITS is the standard tracking tool for I&C products for reporting and tracking software, documentation, test, and configuration management related discrepancies. QN is the standard tracking tool that controls a nonconforming item and/or activity identified during assembly, inspection or product testing activity. The NRC inspection team selected a sample of RITS, QNs and IRs associated to the WF3 CPCS Project. For the sample selected, the NRC inspection team verified that WEC: (1) ensured that conditions adverse to quality and significant conditions adverse to quality were promptly identified and corrected; (2) adequately documented and described conditions adverse to quality and significant conditions adverse to quality; (3) conducted an appropriate analysis of the cause of these conditions and took corrective actions to prevent recurrence, as applicable; (4) provided direction for review and approval by the responsible authority; (5) described the current status of the corrective actions; and (6) took follow-up actions to verify timely and effective implementation of the corrective actions. In addition, the NRC inspection team reviewed RITS 72774 and 73224, which identified the requirements traceability linkage issues observed by the staff. The NRC inspection team reviewed: (1) how the problems were identified; (2) whether these problems were adequately dispositioned in accordance with WEC's approved procedures; (3) whether appropriate technical justifications were presented for each disposition; and (4) whether adequate corrective actions were taken by WEC staff.

The NRC inspection team discussed the nonconformance and the corrective action programs with WEC's management and technical personnel. The references and attendance lists in the attachment to this inspection report identify 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 WEC was implementing its nonconforming materials, parts, or components and corrective action programs activities in accordance with the regulatory requirements of Criterion XV and Criterion XVI of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and activities observed, the NRC inspection team determined that WEC was implementing its policies and procedures associated with nonconforming materials, parts, or components and corrective action program activities. No findings of significance were identified.

4. Internal Audits

a. Inspection Scope

The NRC inspection team reviewed WEC's policies and implementing procedures that govern the implementation of its internal audit program 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 associated with the WF3 CPCS project. The NRC inspection team verified that WEC had prepared and approved audit plans that identify the scope and criteria to be audited. The NRC inspection team confirmed that the audit reports contained objective evidence of the areas reviewed and that audit findings were entered into WEC's corrective action program.

The NRC inspection team discussed the internal audit program with WEC's management and technical staff. The attachment to this inspection report lists the documents reviewed and the staff interviewed by the NRC inspection team with WEC's management and technical personnel.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that WEC was implementing its internal audits program 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, the NRC inspection team determined that WEC was implementing its policies and procedures associated with the internal audit program. No findings of significance were identified.

5. Entrance and Exit Meetings

On March 22, 2021, the NRC inspection team presented the inspection scope during an entrance meeting with, Ms. Camille Zozula, Manager, Regulatory Compliance & Corporate Licensing, and other WEC personnel. On March 26, 2021, the NRC inspection team presented the inspection results and observations during an exit meeting with Mr. Stephan Packard, Manager, Quality Assurance, and other WEC personnel. 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. PERSONS CONTACTED AND NRC STAFF INVOLVED:

Name	Affiliation	03/22/2021 Entrance	03/26/2021 Exit	Interviewed
Matthew Shakun	WEC	X	X	X
Maria Assard	WEC	X	X	
Steven Bilman	WEC	X	X	
Kasey Corbin	WEC	X	X	X
Roger Costantino	WEC	X	X	X
Christopher Crefeld	WEC	X	X	
Allen Denyer	WEC	X	X	X
David Jarosh	WEC	X		
Matt Johnson	WEC	X		X
Nicole Kurant	WEC	X	X	X
Alex Lee	WEC	X	X	X
Stefan Levine	WEC	X	X	
Kenneth Lunz	WEC	X	X	
Lisa Manning	WEC			X
Tyler Morissette	WEC	X		
Warren Odess- Gillett	WEC	X	X	X
Erin Orga	WEC	X	X	X
Stephan Packard	WEC	X	X	X
Lori Richards	WEC	X	X	X
Christopher Srock	WEC	X	X	
Jerry Stanley	WEC	X	X	X
Maryna Tyrpak	WEC	X	X	X
Serdar Uyar	WEC	X	X	X
Murat Uzman	WEC	X	X	X
Earl Wagoner	WEC	X	X	X
Matthew Wereb	WEC	X	X	X
John Wiesemann	WEC	X	X	X
Benjamin Romeo	WEC		X	X
Louis Jesso	WEC			X
Jennifer Moon	WEC			X
Matthew Thomson	WEC			X
Jonathan Golnoski	WEC		X	
Camille Zozula	WEC	X		
Loren Miller	Entergy	X		
Chris Talzac	Entergy	X		
Roger Rucker	Entergy	X		
Greg Galletti	NRC	X	X	

Name	Affiliation	03/22/2021 Entrance	03/26/2021 Exit	Interviewed
Deanna Zhang	NRC	X	X	
Jonathan Ortega-Luciano	NRC	X	X	
Samir Darbali	NRC	X	X	
Paul Prescott	NRC		X	
Kerri Kavanagh	NRC	X		

2. INSPECTION PROCEDURES USED:

IP 43002, "Routine Inspections of Nuclear Vendors," dated July 15, 2013
IP 35710, "Quality Assurance Inspection of Software Used in Nuclear Applications," dated January 30, 2018

3. REFERENCES FOR DOCUMENTS REVIEWED

Procedures

1. WNA-PQ-00496-CWTR3, "Entergy Operations Inc. Waterford Steam Electric Station Unit 3 Project Quality Plan for the Core Protection Calculator System Upgrade Project," Revision 1, dated July 30, 2019
2. WNA-WI-00403-GEN, "Reporting and Resolution of IV&V RITS Issues Work Instructions," Revision 2, dated October 8, 2018
3. W2-5.1-101, "Westinghouse Corrective Action Program Procedure," Revision 7.1, dated February 28, 2020
4. W2-5.1-201, "Identification and Reporting of Conditions Adverse to Safety," Revision 2.0, dated March 18, 2020
5. W2-5.1-201.W01, "Nuclear Safety Review Staff Work instruction," Revision 2.1, dated April 22, 2020
6. W2-8.5-105, "Customer Notification Made via Nuclear Safety Advisory Letters, Technical Bulletins, and InfoGrams," Revision 0.2, dated May 16, 2017
7. NA 15.1, "Control of Nonconformances," Revision 20.0, dated January 16, 2021
8. NA 4.19.9, "Issue Reporting and Resolution," Revision 3.1, dated February 20, 2019
9. NABU-DP-00014-GEN, "Design Process for Common Q™ Safety Systems," Revision 11, dated October 2015
10. NABU-DP-00014-GEN, "Design Process for Common Q™ Safety Systems," Revision 12, dated September 2020
11. W2-9.14-100, "Control of Nonconforming Process Outputs, Products and Services," Revision 2.0, dated February 27, 2018
12. W2-8.6-104, "Software Problem Reporting," Revision 1.0, dated September 4, 2018
13. W2-10.2-101, "Global Project Excellence Procedure (GPEP)," Westinghouse Electric Company LLC, Revision 2, dated January 8, 2019
14. WNA-IG-00321-GEN, "Execution of Quality Notifications," Revision 9, dated July 2020
15. WNA-DS-02884-GEN, "Isolated Development Infrastructure Requirements," Revision 3, dated April 2018
16. WNA-DS-01070-GEN, "Application Restrictions for Generic Common Q Qualification," Revision 15, dated October 2017
17. WNA-WI-00333-GEN, "Common Q Application Software Hazard Analysis Work Instructions," Revision 5.

WF3 CPCS Upgrade Project Documents

18. WNA-PD-00594-CWTR3, "Software Development Plan for the Core Protection Calculator System Upgrade Project," Revision 2, dated September 2020
19. WNA-PT-00303-CWTR3, "Test Plan for the Common Q Core Protection Calculator System," Revision 1, dated October 2020

20. WNA-DS-04517-CWTR3, "System Requirements Specification for the Core Protection Calculator System," Revision 5, dated December 2020
21. WNA-DS-04618-CWTR3, "Software Requirements Specification for the Common Q Core Protection Calculator System," Revision 2, dated November 2020
22. WNA-DS-04650-CWTR3, "Hardware Design Description for the Core Protection Calculator System," Revision 2, dated November 2020
23. WNA-RTM-00076-CWTR3, "Requirements Traceability Matrix for the Core Protection Calculator System Upgrade Project," Revision D, dated February 2021
24. WNA-SD-00689-CWTR3, "Software Design Description for the Common Q Core Protection Calculator System Database and Utility Functions," Revision 0, dated November 2020
25. 00000-ICE-30158, "System Requirements Specification for the Common Q Core Protection Calculator System," Revision 14, dated 2015
26. 14273-ICE-37781, "Requirements Traceability Matrix for the Arizona Public Service CPCS Project," Revision 00, dated July 2003
27. WCAP-16096-P-A, "Software Program Manual for Common Q™ Systems," Revision 5, dated November 2018
28. SPEC-18-00005-W, "Core Protection Calculator System Procurement Specification," Revision 0, dated July 24, 2019
29. 00000-ICE-3233, "Software Requirements Specification for the Common Q Core Protection Calculator System," Revision 9, dated January 2015
30. WNA-PV-00110-CWTR3, "Software Verification & Validation Plan for the Core Protection Calculator System Upgrade Project," Revision 0, dated January 2020
31. WNA-AR-00861-CWTR3, "Software Hazard Analysis for the Common Q Core Protection Calculator System," Revision 2, dated November 2020
32. LTR-IVV-21-001, "Subject: Interim Software Verification and Validation Concept Phase and Requirements Phase Checklists for Waterford Unit 3 CPCS Upgrade Project," Revision 1, dated March 15, 2021
33. WNA-VT-00840-CWTR3, "IV&V Task Report for Concept Documentation Evaluation and Requirements Allocation Analysis," Revision 0, dated February 2021
34. WNA-VT-00829-CWTR3, "IV&V Task Report for Software Requirements Specification Evaluation and RTA," Revision 1, dated January 2021
35. WNA-VT-00836-CWTR3, "IV&V Task Report for CPCS Software Hazard Analysis Evaluation," Revision 0, dated December 2020
36. WNA-PC-00069-CWTR3, "Configuration Management Plan for the Core Protection Calculator System Upgrade Project," Revision 1, dated July 2019

Purchase Orders

37. Purchase Order 10587546, Revision 2, dated August 15, 2019
38. Purchase Order 10587546, Revision 3, dated October 23, 2019

Request for Engineering Change

39. REC WT3-CPCS-00015, "CPCS System: AC160 Code modify 500 ms CONTRM cycle time to 512 ms to eliminate need for PSDIA Custom PC Element," dated September 9, 2019

40. REC WT3-CPCS-00029, "Addition of Platform Diagnostic to Support Manual Surveillance Requirements Elimination," dated March, 19, 2020
41. REC WT3-CPCS-00057, "CPCS Response Time Requirement Update," dated October 29, 2020

I&C Issue Tracking System (RITS)

42. RITS 73224, "Requirements Phase Engineering Peer Review Action Items," dated March 10, 2021
43. RITS 69795, "WNA-PD-00594-CWTR3, SDP, Change APC MUX Software Classification from General Purpose to Important-To-Availability," dated September 5, 2019
44. RITS 71302, "Resolution of June Entergy Audit Comments for APC Mux SyRS (WNA-DS-04831-CWTR3)," dated June 22, 2020
45. RITS 73006, "Missing links to CEAPDS SRS (WNA-DS-04617-CWTR3)," dated February 5, 2021
46. RITS 73000, "Missing/Incorrect links for Procurement Spec in Revision D of RTM (WNA-RTM-00076-CWTR3)," dated February 5, 2021
47. RITS 73129, "Incorrect Figure referenced in WNA-DS-04683-CWTR3 Revision 1 (Long-Term, Non-Functional)," dated February 24, 2021
48. RITS 73180, "Customer Comments on CEAPDS RTM (WNA-RTM-00076-CWTR3 Revision D)," dated March 4, 2021
49. RITS 73198, "Inconsistent conventions used for numbering bits in error codes," dated March 8, 2021
50. RITS 73216, "Prioritize SRS Requirements," dated March 9, 2021
51. RITS 73215, "Document Design Review Plan," dated March 9, 2021
52. RITS 73204, "Issues with SVVP (WNA-PV-00110-CWTR3)," dated March 9, 2021
53. RITS 71299, "Resolution of June Entergy Audit Comments for CPCS SyRS (WNA-DS-04517-CWTR3)," dated June 22, 2020
54. RITS 73239, "Suggestion for Improvement (WNA-DS-04517-CWTR3) from Requirements Phase EPR," dated March 17, 2021
55. RITS 72774, "Discrepancies identified during Waterford 3 CPCS software requirements traceability analysis of WNA-DS-04618-CWTR3, Revision 2," dated January 5, 2021
56. RITS 73013, "Discrepancies identified during the traceability analysis of concept documentations and requirements allocation evaluation for the releases by LTR-GIC-20-019, Revision 2," dated March 12, 2021
57. RITS 71069, "Review WF3 SHA WNA-AR-00861-CWTR3," Revision 0, dated May 13, 2020
58. RITS 71293, "Discrepancies identified during the traceability analysis of concept documentations and requirements allocation evaluation," dated June 19, 2020
59. RITS 71294, "Resolution of June Entergy Audit for CPCS RTM (WNA-RTM-00076-CWTR3)," dated June 22, 2020
60. RITS 72591, "Discrepancies identified during evaluation of WF3 CPCS Software Hazard Analysis (SHA), WNA-AR-00861-CWTR3," Revision 2, dated December 11, 2020

Quality Notification

61. QN 60097487, "Waterford Staging Rack Assembly G03," dated December 29, 2020

- 62. QN 60097755, "MOXA FOM Procurement G01," dated January 7, 2021
- 63. QN 60097486, "Waterford Staging Rack Assembly," dated December 29, 2020
- 64. QN 60096307, "Waterford Staging Rack Assembly G02," dated December 8, 2020
- 65. QN 60097488, "Waterford Staging Rack Assembly G04," dated November 3, 2020
- 66. QN 60094633, "PM646A Processor MDL," dated November 19, 2019

Corrective Action Program Issue Report

- 67. IR-2019-17919, "Acceptance Criteria for Phoenix Relay Release Time Exceeds the Time Used in the Response Time Analysis," dated December 9, 2019
- 68. IR-2020-11971, "Missed Time Response Requirements in the WF3 CPCS System Requirements Specification," dated October 26, 2020
- 69. IR-2020-12937, "Waterford 3 CPC AI688 Equipment Qualification Deficiency," dated November 17, 2020
- 70. IR-2020-13521, "Relay Disconnect Failures During Commercial Dedication Testing for the WF3 CPC Project," dated December 4, 2020
- 71. IR-2020-8817, "The WF3 CPCS Upgrade Test Plan (WNA-PT-00303-CWT3, Revision 0) does not Address Two Requirements Elements," dated August 3, 2020
- 72. IR-2020-1360, "Components Failing to Meet Performance Critical Characteristics were Incorrectly Deemed Commercially Dedicated," dated February 3, 2021
- 73. IR-2021-2677, "EMC Qualification of the AI687 and AO650 not Meeting the Original EMC Test Requirements," dated March 3, 2021

Corrective Action Program Issue Report (IR) and I&C Issue Tracking System (RITS) Generated as a Result of NRC Inspection

- 74. IR-2021-3614, "Waterford 3 CPCS RITS Severity Level," Revision 1, dated March 25, 2021
- 75. RITS 75801, "Recommended clarifications to WNA-PT-00303-CWTR3, Revision 1" dated March 25, 2021

Internal Audits

- 76. Audit #: WEC-20-193, Waterford 3 Core Protection Calculator System (CPCS) Upgrade Project: In-process Software Audit - Requirements Phase, dated August 27, 2020
- 77. Audit #: WEC-20-153, "GOS Global Instrumentation & Control," dated February 27, 2020

ACRONYMS:

ADAMS	Agencywide Documents Access and Management System
CA	Corrective Action
CFR	<i>Code of Federal Regulations</i>
CPCS	Core Protection Calculator System
HDD	Hardware Design Description
IP	Inspection Procedure
IR	Issue Reports
IV&V	Independent Verification and Validation
LAR	License Amendment Request
NON	Notice of Nonconformance
NRC	(U.S.) Nuclear Regulatory Commission
QA	Quality Assurance
QN	Quality Notification
REC	Request for Engineering Change
RTM	Requirements Traceability Matrix
SDP	Software Development Plan
SHA	Software Hazard Analysis
SRS	Software Requirements Specification
SVVP	Software Verification and Validation Plan
SysRS	System Requirements Specification
WEC	Westinghouse Electric Company
WF3	Waterford Steam Electric Station Unit 3