



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

April 1, 2024

Mr. Todd Wigley
Product Assurance Manager
Westinghouse Electric Company
Columbia Fuel Fabrication Facility
5801 Bluff Road
Hopkins, SC 29061

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT OF WESTINGHOUSE ELECTRIC COMPANY'S COLUMBIA FUEL FABRICATION FACILITY NO. 99900005/2024-201

Dear Mr. Wigley:

From February 12 through February 16, 2024, the U.S. Nuclear Regulatory Commission (NRC) staff conducted a routine inspection at the Westinghouse Electric Company's Columbia Fuel Fabrication Facility (hereafter referred to as WEC-CFFF) in Hopkins, SC. The purpose of this limited-scope inspection was to assess WEC-CFFF'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."

This technically focused inspection specifically evaluated WEC-CFFF's implementation of the quality activities associated with the supply of safety-related fuel design and fabrication for U.S. nuclear power plants. In addition, the NRC inspection team evaluated WEC-CFFF's closure of corrective actions for the inspection findings documented in inspection report No. 99900005/2019-201, dated February 26, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20035E477). The enclosed report presents the results of the inspection. This NRC inspection report does not constitute NRC endorsement of WEC-CFFF's overall quality assurance (QA) or 10 CFR Part 21 programs.

Within the scope of this inspection, no violations or nonconformances were identified.

In accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," and the NRC's "Rule of Practice," a copy of this letter, its enclosure(s), and your response will

be made available electronically for public inspection in the NRC's Public Document Room or from the NRC's document system (ADAMS), accessible at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,



Ayegbusi, Odunayo signing on behalf
of Kavanagh, Kerri
on 04/01/24

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

Docket No.: 99900005

EPID No.: I-2024-201-0019

Enclosures:

1. Inspection Report No. 99900005/2024-201 and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT OF WESTINGHOUSE ELECTRIC COMPANY'S COLUMBIA FUEL FABRICATION FACILITY NO. 99900005/2024-201 DATED: APRIL 1, 2024

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

Docket No.: 99900005

Report No.: 99900005/2024-201

Vendor: Westinghouse Electric Company
Columbia Fuel Fabrication Facility
5801 Bluff Road
Hopkins, SC 29061

Vendor Contact: Mr. Todd Wigley
Product Assurance Manager
Email: wigleywt@westinghouse.com
Phone: (803)394-0160

Nuclear Industry Activity: WEC-CFFF's scope of supply includes safety-related engineering design, fabrication and testing of nuclear fuel assemblies for NRC's regulated facilities.

Inspection Dates: February 12 - 16, 2024

Inspectors:

Andrea Keim	NRR/DRO/IQVB	Team Leader
Aaron Armstrong	NRR/DRO/IQVB	Inspector
Anne DeFrancisco	R-I/DRSS/MLAB	Senior Safety Culture Assessor
Micheal Fitzgerald	NRR/DRO/IQVB	Inspector
Thomas Vukovinsky	R-II/DFFI/PB2	Inspector
Chris Van Wert	NRR/DSS/SFNB	Technical Expert

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

Enclosure

EXECUTIVE SUMMARY

WESTINGHOUSE ELECTRIC CORPORATION-C 99900005/2024-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a limited scope routine vendor inspection at the Westinghouse Electric Company's Columbia Fuel Fabrication Facility (hereafter referred to as WEC-CFFF) in Hopkins, SC, 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," and 10 CFR Part 21, "Reporting of Defects and Noncompliance." The NRC inspection team conducted this inspection from February 12, 2024, through February 16, 2024. The last vendor inspection at this facility was conducted in January 2020.

This technically focused inspection specifically evaluated WEC-CFFF's implementation of the quality activities associated with the design, fabrication and testing of safety-related fuel assemblies and nuclear fuel assembly components for U.S. nuclear power plants. Specific activities observed by the NRC inspection team included:

- Commercial Grade Dedication of Braze Paste and Supporting Testing
- Receipt Inspection of Grid Straps
- Walkdown of the calibration laboratory and out of tolerance measurement and test equipment (M&TE) storage area
- Metallurgical Examination of Grid Braze Test Sample
- Attended the Condition Review Group and Corrective Action Review Board
- Observed a Final Assembly Inspection of a fuel assembly

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 February 10, 2023, IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated February 10, 2023, IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated February 10, 2023, and IP 71152, "Problem Identification and Resolution," dated October 31, 2023.

The NRC inspection team concluded that WEC-CFFF'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 WEC-CFFF personnel are implementing these policies and procedures effectively.

The results of this inspection are summarized below.

Inspection Areas

The NRC inspection team determined that WEC-CFFF established its programs for design control, commercial-grade dedication, procurement document control, oversight of suppliers, test control, control of measuring and test equipment, nonconforming material, parts, or components, and corrective action, in accordance with the applicable regulatory requirements of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and activities observed, the NRC inspection team also determined that WEC-CFFF is implementing its policies and procedures associated with these programs. In addition, the NRC inspection team determined that WEC-CFFF is implementing its 10 CFR Part 21 program for evaluating deviations and reporting defects that could create a substantial safety hazard in accordance with the applicable regulatory requirements. Finally, the NRC inspection team performed a limited scope safety conscious work environment (SCWE) assessment. Based on interviews and documents reviewed, the NRC inspection team finds the SCWE at WEC-CFFF is adequate.

No findings of significance were identified in these areas.

REPORT DETAILS

1. 10 CFR Part 21 Program

a. Inspection Scope

The NRC inspection team reviewed the Westinghouse Electric Company's Columbia Fuel Fabrication Facility (hereafter referred to as WEC-CFFF) policies and implementing procedures that govern the implementation of its Title 10 of the *Code of Federal Regulations* (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 WEC-CFFF's purchase orders (PO) 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 WEC-CFFF's nonconformance and corrective action procedures provide a link to the 10 CFR Part 21 program. Furthermore, for a sample of 10 CFR Part 21 evaluations performed by WEC-CFFF, the NRC inspection team verified that WEC-CFFF had effectively implemented the requirements for evaluating deviations and failures to comply. The NRC inspection team verified that the notifications were performed in accordance with the requirements of 10 CFR 21.21, as applicable.

The NRC inspection team also discussed the 10 CFR Part 21 program with WEC-CFFF 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 WEC-CFFF 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 WEC-CFFF is implementing its policies and procedures associated with the 10 CFR Part 21 program. No findings of significance were identified.

2. Design Control

a. Inspection Scope

The NRC inspection team reviewed WEC-CFFF's policies and implementing procedures that govern the implementation of its design control program 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 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities.”

The NRC inspection team reviewed design changed packages for a AP1000 IFM Grid cell size tolerance, low-tin ZIRLO 17X17 OFA mid grid outer strap and 17X17 OFA mid grid assembly, and CE Guardian Grid Insert not meeting drawing requirement to verify that the documents included the correct technical and regulatory requirements per the customer specifications, WEC-CFFF’s procedures, and the applicable requirements. The NRC inspection team reviewed engineering design changes documents associated with these packages to verify that WEC-CFFF incorporated the appropriate design controls and testing verifications for these design changes. The NRC inspection team verified that WEC-CFFF’s design control process effectively translated the design changes requested into the affected WEC-CFFF documentation. The NRC inspection team reviewed the engineering evaluations and applicable test reports to support the acceptability of a AP1000 IFM Grid cell size tolerance, changes to the low-tin ZIRLO 17X17 OFA mid grid outer strap and 17X17 OFA mid grid assemblies, and CE Guardian Grid Insert design change.

The NRC inspection team also discussed the design control program with WEC-CFFF’s management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

In addition to the design control process, the NRC inspection team reviewed three current technical issues to verify that WEC-CFFF incorporates operating experience into to its design control process. Below is a status on these issues and efforts are still in process.

McGuire Rod Cluster Control Assembly

The staff reviewed the documentation of anomalous marks noted at McGuire on rod cluster control assembly (RCCA) rods at the end of Cycle 29. The explanation provided by WEC-CFFF was that the marks were related to guide cards interacting with the RCCA rods as they were maneuvered in a step fashion throughout the cycle. The NRC inspection team reviewed the presentation and materials provided, and concluded that the marks appeared to be surface discoloration and do not represent a significant loss of material or capabilities. This was based on the high-resolution photos and the results of the eddy current and other NDE testing.

South Texas Project Leaker

The NRC inspection team reviewed material provided by WEC-CFFF regarding a fuel leaker found at South Texas Project Unit 2 during fuel cycle 22. The source of the leak was found to be at a location between grids 7 and 8 of a fuel rod. NDE techniques and eddy current evaluations were used and included photos and videos. Due to a hydrogen blister and concerns about fracturing the failed fuel rod, the fuel rod was not pulled for further investigations. No definitive cause was identified based on the NDE performed to date, but probable causes include primary hydriding and debris fretting. The NRC inspection team evaluated the material provided and concluded that the assessment

was adequate. The NRC inspection team notes that additional testing and evaluations would be necessary to reach a final root cause of the fuel rod leak.

Comanche Peak Nuclear Power Plant Fuel Rod Oxide Loss

The NRC inspection team reviewed material provided by WEC-CFFF regarding oxide loss indications found at Comanche Peak Nuclear Power Plant Units 1 and 2 fuel rods. These locations were determined to be between grids 7 and 8 which is in a transition zone between the high power and blanket regions. CPNPP uses 17x17OFA assemblies which included Zirlo rods. No fuel leakage was identified during operation with the oxide loss indications. Post-irradiation examinations included high-magnification visual exams and cladding corrosion measurements. WEC-CFFF testing found the oxide reduction to be within the acceptance limits. WEC-CFFF identified possible contributing causes of the fuel rod oxide loss but the root cause has not been determined. The NRC inspection team notes that additional research and testing would be necessary to reach a final root cause of the unexpected degradation mechanism of the Zirlo rods.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that WEC-CFFF is implementing its design control program 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, the NRC inspection team also determined that WEC-CFFF is implementing its policies and procedures associated with the design control program. No findings of significance were identified.

4. Commercial-Grade Dedication

a. Inspection Scope

The NRC inspection team reviewed WEC-CFFF's policies and implementing procedures that govern the implementation of its commercial-grade dedication (CGD) program to verify compliance with the regulatory requirements of Criterion III, "Design Control," and Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50.

The NRC inspection team reviewed WEC-CFFF's program for the dedication of commercial-grade items for use in safety-related applications to verify its compliance with the applicable regulatory requirements. This assessment included a review of the policies and procedures governing the implementation CGD activities, interviews with WEC-CFFF's personnel, and reviews of related documentation. Specifically, the NRC inspection team reviewed dedication packages to assess the different elements of the CGD program, including the technical evaluation process, dedication specification, supplier commercial grade survey reports, and receipt inspection reports. The NRC

inspection team evaluated the criteria for the identification of item functions, selection of critical characteristics and acceptance criteria, and the identification of verification methods to verify effective implementation of WEC-CFFF's CGD process.

The NRC inspection team observed CGD activities pertaining to braze paste and supporting testing services. The NRC inspection team also discussed the CGD programs with WEC-CFFF'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 WEC-CFFF is implementing its commercial-grade dedication program in accordance with the regulatory requirements of Criterion III and Criterion VII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that WEC-CFFF is implementing its policies and procedures associated with the commercial-grade dedication program. No findings of significance were identified.

5. Supplier Oversight

a. Inspection Scope

The NRC inspection team reviewed WEC-CFFF's policies and implementing procedures that govern the implementation of its supplier oversight program to verify compliance with the regulatory requirements of Criterion VII of Appendix B to 10 CFR Part 50.

The NRC inspection team reviewed WEC-CFFF's approved supplier list (ASL), and a sample of supplier audits. The NRC inspection team selected a sample of suppliers from the ASL to review the methodology for conducting and documenting audits to verify adequate evaluation of the suppliers' controls for meeting the applicable requirements of Appendix B to 10 CFR Part 50. For the sample of supplier audits reviewed, the NRC inspection team verified the following: the audit reports included an audit plan; audits were performed according to established frequency; audit reports included adequate documented objective evidence of compliance with the applicable requirements; and audit documentation was reviewed by WEC-CFFF responsible management. The NRC inspection team also verified that audits performed by the Nuclear Industry Assessment Committee were evaluated by WEC-CFFF in accordance with its written procedures for applicability to its scope of activities. The NRC inspection team reviewed the qualification records of the lead auditors who performed the audits and verified that qualification activities met WEC-CFFF's requirements for lead auditors.

The NRC inspection team observed receipt inspection activities for grid straps. The NRC inspection team also discussed the procurement document control and supplier oversight program with WEC-CFFF'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 WEC-CFFF is implementing its supplier oversight program 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, the NRC inspection team determined that WEC-CFFF is adequately implementing its policies and procedures associated with the supplier oversight program. No findings of significance were identified.

5. Test Control

a. Inspection Scope

The NRC inspection team reviewed WEC-CFFF's policies and implementing procedures that govern the implementation of its test control program to verify compliance with the requirements of Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50.

The NRC inspection team reviewed test documentation, facilities, and specific procedures pertaining to metallurgical examination of grid test specimens. This testing activity was performed to support CGD of braze paste for use in grid assemblies. The NRC inspection team also reviewed qualification records for personnel performing metallurgical examination of samples.

The NRC inspection team discussed the test control program with WEC-CFFF'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 WEC-CFFF is implementing its test control program in accordance with the regulatory requirements of Criterion XI of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that WEC-CFFF is implementing its policies and

procedures associated with the test control program. No findings of significance were identified.

6. Control of Measuring and Test Equipment

a. Inspection Scope

The NRC inspection team reviewed WEC-CFFF's policies and implementing procedures that govern the implementation of its control of the M&TE program to verify compliance with the regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50.

For the sample of M&TE reviewed, the NRC inspection team determined that the M&TE had the appropriate calibration stickers and current calibration dates, including the calibration due date. The calibration records reviewed by the NRC inspection team indicated the accuracy required, calibration results, calibration dates, and the due date for recalibration.

The NRC inspection team confirmed that when M&TE equipment is found to be out of calibration, the M&TE is removed from use and segregated to prevent further usage. WEC-CFFF then initiates an Out-of-Tolerance report and a corrective actions process issue reports (CAP IR) until the out-of-tolerance condition is reviewed and dispositioned. Through the CAP IR, WEC-CFFF performs an evaluation to identify which items have been accepted using this equipment since the last valid calibration date and perform an extent of condition review.

The NRC inspection team performed an inspection of WEC-CFFF's calibration laboratory to observe that M&TE were labeled, handled, and stored in a manner that indicated the calibration status of the instrument. The NRC inspection team observed a Fuel Bundle Final Assembly Inspection and verified that the M&TE used during the inspection were calibrated and maintained at prescribed intervals prior to use.

The NRC inspection team also discussed the control of M&TE program with WEC-CFFF'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 WEC-CFFF is implementing its control of the M&TE program in accordance with the regulatory requirements of Criterion XII 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-CFFF is implementing its policies and procedures associated with the control of M&TE. No findings of significance were identified.

7. Nonconforming Materials, Parts, or Components and Corrective Action

a. Inspection Scope

The NRC's inspection team reviewed WEC-CFFF's policies and implementing procedures that govern the implementation of its control of 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, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

WEC-CFFF's process for controlling nonconforming material was based on the issuance of electronic problem notice (EPN) (i.e., nonconformance report). The NRC inspection team reviewed a sample of EPNs to verify that WEC-CFFF: (1) dispositioned the EPNs in accordance with the applicable procedures, (2) documented an appropriate technical justification for various dispositions, and (3) took adequate corrective action to address the nonconforming items. For EPNs that were dispositioned as use-as-is, the NRC inspection team confirmed that the technical justifications were documented to verify the acceptability of the nonconforming item. The NRC inspection team performed a walk down of the segregation areas to verify that nonconforming materials were properly identified, marked, and segregated, when practical, to ensure that they were not reintroduced into the production processes. Furthermore, the NRC inspection team also verified that the EPN process provided a link to the 10 CFR Part 21, "Reporting of Defects and Noncompliance," program.

The NRC inspection team also reviewed a sample of CAP IRs to ensure that conditions adverse to quality were promptly identified and corrected. The NRC inspection team verified the CAP IRs provided: (1) adequate documentation and description of conditions adverse to quality, (2) an appropriate analysis of the cause of these conditions and the corrective actions taken to prevent recurrence, as applicable, (3) direction for review and approval by the responsible authority, (4) a description of the current status of the corrective actions, and (5) the follow-up actions taken to verify timely and effective implementation of the corrective actions. In addition, the NRC inspection team verified that WEC-CFFF's CAP IRs provided a link to the 10 CFR Part 21 program.

In addition, the NRC inspection team reviewed the implementation and closure of the corrective actions taken in response to the Notice of Nonconformance (NON) documented in the NRC's inspection report No. 99900005/2019-201, dated March 25, 2020 (ADAMS Accession No. ML20035E477).

The NRC inspection team also discussed the nonconforming materials, parts, or components and corrective action programs with WEC-CFFF's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

Corrective Action Associated with Notice of Nonconformance 99900005/2019-201-01

Following the January 2019 of WEC-CFFF, the NRC issued NON 99900005/2019-201-01 for WEC-CFFF's failure to assure that special processes were controlled and accomplished using qualified procedures in accordance with specifications and acceptance criteria. Specifically, while witnessing a tungsten arc welding on the top pins for 15x15 fuel assembly, the NRC inspection team noted that there was no shop procedure established for the control of weld filler material and the weld filler material was not being adequately controlled. The NRC inspection team observed weld filler material in two workstations with either no markings or illegible labels. The NRC inspection team also noted that the weld filler material in the workstations was not marked with the heat or lot number. Proper control of weld filler material is necessary to assure that each heat of material is documented in the associated traveler/routing as well as to avoid contamination.

In its response, dated March 25, 2020 (ADAMS Accession No. ML20085J604), WEC-CFFF stated that it initiated CAP IR-2020-644 to address the NON.

The NRC inspection team reviewed the documentation that provided the objective evidence for the completion of the corrective actions. The NRC inspection team confirmed (1) that manufacturing operating procedures for welding and brazing were revised to include traceability requirements for weld and brazing filler wire, (2) the storage and labelling of weld and brazing filler material at individual workstations was labeled with material, lot and heat number, and (3) that responsible personnel received training on the updated procedures on weld filler material traceability requirements. Based on its review, the NRC inspection team closed NON 99900005/2019-201-01.

No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that WEC-CFFF is implementing its nonconforming materials, parts, or components and corrective action programs 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-CFFF is effectively implementing its policies and procedures associated with the control of nonconforming materials, parts, or components and corrective action program activities. No findings of significance were identified.

9. Safety Conscious Work Environment

a. Inspection Scope

The NRC inspection team interviewed a total of 66 facility personnel, including:

- 54 of 1st, 2nd and 3rd shift employees randomly selected across a broad range of areas at the facility
- 6 Staff Managers
- 6 Employees including team managers, training staff, employee concerns staff, and staff supporting operating experience efforts

The NRC inspection team toured manufacturing areas on the mechanical and chemical portions of the facility and observed a huddle (i.e. shift status) meeting in the conversion area control room. The NRC inspection team reviewed Nuclear Safety Culture Monitoring Panel (NSCMP) meeting minutes; training module content associated with employee behaviors; procedural guidance associated with human performance and observation, and recently conducted nuclear safety culture surveys. The inspectors also reviewed corrective actions associated with implementation of layered process audits (LPA) and trend data. LPA is defined as, “an electronic observation tool administered through [an external contractor], that has pre-established conditions, standards, and behaviors to be observed.”

The inspection team noted that WEC-CFFF self-identified that corrective actions were to be taken in response to a trend in human performance (HuP) failures. In May 2023, the facility implemented a targeted HuP LPA checklist to be implemented by team managers that includes focus on verification behaviors as a corrective action in response to the identified trend (IR 2023-239). The inspectors noted that the facility completed more than 11,000 overall LPA checklists (HuP specific and other types) during 2023. Out of the overall LPA checklists, HuP plant performance failure codes trended at second-most frequent in 2023 after equipment failures. Expectations for quantity of checklists completed in 2023 were not consistently met across various work groups in accordance with WEC-CFFF Procedure CA-218, Human Performance and Observation Program. The inspectors noted that perceptions of the worker observation and management presence in the field were varied across the facility. WEC-CFFF employees did not necessarily reflect awareness of, or satisfaction with, the content or performance of the checklists, in terms of the quality of, or amount of feedback received for performance.

The NRC inspection team observed that addressing challenges in staffing levels and training capacity were noted as focus areas for the facility. The NRC inspection team noted instances of perceived emphasis on production and quality aspects as well as a perception that a lack of resources and the pace of training may introduce risks to safety if not kept at sufficient levels. Employees reported the ability, and a willingness, to stop work, if in an unsafe or potentially unsafe situation. Employees emphasized that timeliness and thoroughness of communications on occurrences related to safety, as well as communications related to overall safety culture performance at the facility could be improved.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

Based on the samples selected for review, the NRC inspection team generally concluded: (1) corrective actions were in progress to address human performance plant performance trends; (2) WEC-CFFF employees express personal responsibility for nuclear safety at the facility; and (3) WEC-CFFF employees identified their willingness to raise and report nuclear safety issues through one or more available avenue(s). The NRC inspection team determined that the SCWE at WEC-CFFF was adequate.

10. Entrance and Exit Meetings

On Monday, February 12, 2024, the NRC inspection team discussed the scope of the inspection with Todd Wigley, Product Assurance Manager, and other members of WEC-CFFF's management and technical staff. On February 16, 2023, the NRC inspection team presented the inspection results and observations during an exit meeting with Annette Pope, Senior Director, and other members of WEC-CFFF'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
Todd Wigley	Project Assurance Manager	Columbia Fuel Fabrication Facility (WEC-CFFF)	X	X	X
Tina Robertson	Principal Quality Engineer	WEC-CFFF	X*	X*	
Annette Pope	Senior Director	WEC-CFFF	X	X	X
Roy Stutts	Chemical and Mechanical Operations Manager	WEC-CFFF	X	X	X
Meghan Cudd Hefner	ECP Specialist	WEC-CFFF	X		X
Judi Hughes	Principal Trainer	WEC-CFFF			X
Andrew Atwood	Materials Manager / Consulting Engineer	WEC-CFFF		X*	X
Chris Hudson	Technical Services Manager	WEC-CFFF		X	
Alex Shuler	Production Planning Manager	WEC-CFFF		X	
Chad Hasychak	Quality Engineering Manager	WEC-CFFF	X	X	
Stephen Subosits	Lead Licensing Engineer	WEC-CFFF	X	X	
Robert Maurer	Supplier Performance Engineer	WEC-CFFF	X*	X*	
Camille Zozula	Global Nuclear Regulatory Affairs Manager	WEC-CFFF	X*	X*	
Carl Schwartz	Supply Chain Project Management Manager	WEC-CFFF	X*		
Jeremy King	Senior Director Fuel Engineering	WEC-CFFF	X*		
Phillip Hazlett	Fellow Engineer	WEC-CFFF	X*	X*	
Jeffery Ferguson	Regulatory Compliance	WEC-CFFF		X*	

Name	Title	Affiliation	Entrance	Exit	Interviewed
	Environmental Health and Safety Manager				
Paul Brown	Special Projects Manager	WEC-CFFF		X*	X
Ryan Russel	Principal Operating Experience Leader	WEC-CFFF			X
Jason H. Smith	Product Performance Engineering Manager	WEC-CFFF			X
Ryan Lowes	Senior Manager	WEC-CFFF		X*	
Allen Pearce	Fellow Engineer Product Engineering Manager	WEC-CFFF		X*	
Andrea Keim	Inspection Team Leader	Nuclear Regulatory Commission (NRC)	X	X	
Aaron Armstrong	Inspector	NRC	X	X	
Anne DeFrancisco	SCWE Assessor	NRC		X*	
Thomas Vukovinsky	Inspector	NRC	X	X	
Micheal Fitzgerald	Inspector	NRC	X	X	
Chris Van Wert	Technical Expert	NRC	X*	X*	
Phil McKenna	Deputy Division Director	NRC		X	
Kerri Kavanagh	Branch Chief	NRC	X*	X	

*Participated remotely.

2. INSPECTION PROCEDURES USED

- Inspection Procedure (IP) 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated February 10, 2023
- IP 43002, "Routine Inspections of Nuclear Vendors," dated February 10, 2023
- IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated February 10, 2023
- IP 71152, "Problem Identification and Resolution," dated October 31, 2023.

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Type	Description
99900005/2019-201-01	CLOSED	NON	Criterion XVI

4. DOCUMENTS REVIEWED

Policies and Procedures

- Quality Management System-A (QMS-A), Revision 8.0, dated May 22, 2020
- Commercial Dedication Instruction (CDI) CDI-MFRD-20-56, Revision 0, dated June 15, 2020
- CDI-MFRD-15-103, Revision 2, dated February 11, 2020
- Quality Assurance Procedure (QA) QA-613 "Handling, Storage, Packaging, Preservation & Delivery", Revision 9, dated June 29, 2006
- Westinghouse Level 2 Procedure (W2) W2-5.1-101, "Westinghouse Corrective Action Program Procedure," Revision 10, dated September 27, 2023
- W2-5.1-201.W02, "10 CFR 21 and 10CFR 50.55(e) Posting," Revision 0.0, dated October 6, 2021
- W2-5.1-201, "Identification and Reporting of Conditions Adverse to Nuclear Safety," Revision 2.2, dated November 9, 2022
- W2-9.4-101 "Control of Purchased Items and Services", Revision 8.1, dated August 24, 2022
- W2-9.4-101.J02 "Procurement Classification Job Aid", Revision 0.2, dated December 20, 2023
- W2-9.5-101 "Supplier QA Program Qualification and Assessment", Revision 3.0, dated November 11, 2020
- W2-9.5-102 "Commercial Dedication Process", Revision 2.0, dated June 22, 2022
- W2-9.5-102.W01 "Alternate Method for Dedication of Calibration and Testing Services", Revision 0.3, dated April 13, 2023
- W2-9.5-104 "Supplier Oversight", Revision 2.0, dated June 5, 2018
- W2-9.5-105 "Control of Suppliers on the ASL and QSL", Revision 3.0, dated October 10, 2018
- W2-9.7-101 "Control of Production and Service Provision", Revision 10, dated June 12, 2018
- W2-9.7-103 "Inspection", Revision 4.0, June 21, 2023
- W2-9.8-100 "Control of Inspection, Measurement, & Test Equipment", Revision 2, dated December 6, 2023
- W2-9.14-200 "Counterfeit, Fraudulent, and Suspect Items", Revision 0.2, July 5, 2022
- Quality Assurance Procedure (QA) QA-014 "Product Assurance Terms and Definitions", Revision 14, dated July 13, 2023
- QA-611 "Test Control", Revision 6, dated January 29, 2009

- QA-629 “Procurement of Calibration Standards”, Revision 4, dated June 24, 2022
- Quality Control Instruction (QCI) QCI-000210 “Receiving Inspection”, Revision 25, dated August 17, 2023
- QCI-000198 “Supplemental QCI Instructions and General Instructions”, Revision 91, dated June 20, 2019
- QCI-108829 “Metallographic Sample Preparation and Evaluation”, Revision 13, dated November 8, 2018
- QCI-108863 “Grid Braze Disposition Practices”, Revision 12, dated April 7, 2016
- QCI-310405 “Receipt of Bulk Helium, Argon, and Nitrogen”, Revision 39, November 14, 2019
- QCI-312102 “Microbraz 50-S (Paste and Powder) – Receiving Inspection”, Revision 33, dated June 1, 2023
- QCI-312615 “Receipt of Grid Straps”, Revision 4, dated July 16, 2021
- QCI-938501 “Final Assembly Inspection (Clean Check)”, Revision 176, dated July 27, 2023
- QCI-938502 “Final Inspection and Loading of Released Core Components”, Revision 38, dated February 14, 2019
- QCI-960107 “Standard ‘Off-the-Shelf’ Gages”, Revision 43, dated November 17, 2022
- QCI-960108 “Vendor Calibrated Gages”, Revision 28, dated August 9, 2018
- QCI-960110 “Scale Calibration Procedure”, Revision 49, dated March 16, 2023
- QCI-960122 “Alignment of JIG Transit”, Revision 3, dated March 19, 2012
- QCI-960135 “Fuel Assembly Envelope Fixture”, Revision 5, dated April 9, 2012
- Regulatory Affairs Procedure (RA) RA-130 “Regulatory Agency Communications and Postings”, Revision 12, July 27, 2023
- Mechanical Operating Procedure (MOP) MOP-715504 “Evaluate Braze Disposition Practices”, Revision 12, dated 7, 2016
- MOP-735502 “Handling Fixture Procedure”, Revision 42, dated November 10, 2022
- MOP-730708 “Moving Fuel Assemblies In & Out of Storage Racks”, Revision 49, dated November 30, 2023
- MOP-730712 “Wrap Fuel Assembly or Skeleton for Storage or Shipment”, Revision 61, dated November 30, 2023
- MOP-730726 “Fuel Assembly Drag/Clearance Check – General”, Revision 53, dated December 7, 2023
- Procurement Instruction Form (PIF) PIF-0674 “Bulk Gas Receiving”, Revision 8, dated January 23, 2024
- Supply Chain Management Procedure (SCM) SCM-203 “Control of Purchased Items or Services”, Revision 10, dated May 23, 2019
- SCM-305 “Purchase Requisitions for Quality Related Materials & Services”, Revision 7, dated September 14, 2017
- SCM-500 “Supplier Quality Administrative Procedure”, Revision 10, dated August 11, 2016
- SCM-507 “Supplier Administrative Requirements”, Revision 5, dated September 19, 2019

- SCM-511 “Supplier Quality Oversight – NF”, Revision 16, dated May 3, 2018
- SCM-512 “Supplier Quality Assurance Requirements for Procured Items”, Revision 6, dated March 2, 2017
- SCM-521 “Surveillance Inspection Guidelines”, Revision 4, dated November 23, 2017
- SCM-523 “Supplier Quality Oversight Review of Purchase Requisitions”, Revision 2, August 9, 2018
- SCM-525 “Technical Review and Approval of Purchase Requisitions”, Revision 0, dated August 10, 2017
- QA-022 “Global Supply Quality Assurance”, Revision 1, dated May 5, 2022
- RA-130, “Regulatory Agency Communications and Postings,” Revision 12, dated July 27, 2023
- CA-316, “Stop Order,” Revision 3, dated April 29, 2021

Design control

- IR-2022-8097, “CE 16 NGF Guardian Grid Inserts (10028E61) used to build customer delivered fuel assemblies identified as not meeting the drawing requirement,” dated September 13, 2022
- CN-NFPE-22-044, “Evaluation of GUARDIAN Grid Sleeve Corner Radius Deviation,” Revision 1
- Westinghouse Deviation Disposition Report: DDR-0621 Rev: 1, dated February 23, 2023
- IR-2022-7258, “CE Guardian Grid Legacy Issues,” dated August 16, 2022
- ECN-0004078, Grid Insert Product Drawing 10028E61, Revision 0
- ECN-0004079, Guide Thimble Tube Assembly Product Drawing 10028E39, Revision: 0
- ECN-0004118, Guide Thimble Tube Assembly Product Drawing 10028E18 and 10042E03, Revision 0
- ECN-0004080, CE16NGF Guardian Grid Drawing Changes, Revision 0
- CN-NFPE-22-041, “CE16NGF Guardian Grid Sleeve to Guide Tube End Plug Dimensional Interface,” Revision: 0
- GCCD-20-12, “Justification for AP1000 IFM Grid Cell Size Tolerance Increase,” Revision 1, May 11, 2020
- ECN-0003848, “AP1000 EIFM Grid Assembly Product Drawing 10039E05,” Revision 0
- CN-NFPE-20-51, “17X17 OFA Low Tin ZIRLOTM Mid and IFM Grid Design Criteria Evaluation,” Revision: 0
- ECN-0003449, 17X17 OFA MID Grid Assembly (LOW-TIN ZIRLO™) document, Revision 0
- GCCD-20-38, “17 OFA Low Tin ZIRLOTM Mid Grid and IFM Dynamic Crush Final Verification Test Report,” dated July 15, 2020
- GCCD-20-34, “Low Tin ZIRLOTM 17X17 OFA Mid Grid Load-Deflection Final Verification Test Report,” dated June 30, 2020
- PE-PPE-23-084, “Field Anomaly Report – RCCA”, Revision 29, dated October 16, 2023
- PE-TECH-23-57, “Report for Licensee -Leaking Fuel,” Revision 0, dated April 18, 2023
- PE-TECH-24-019, “Causal Analysis Report,” No Revision, dated January 24, 2024

Part 21 Reports

- 2023-2024 Potential Reportable Conditions list

Purchase Order (PO)

- PO 4500663358, Change 30 dated August 18, 2023
- PO 4500841831, Change 2, dated April 12, 2023
- PO 4500180938, Change 93, dated October 18, 2023
- PO 4500353838, Change 129, dated December 19, 2023
- PO 5500004915, Change 3, dated February 9, 2024
- PO 4500433492, Change 54, dated February 2, 2024
- PO 5500005012, Change 1, dated November 16, 2022
- PO 5500005106, Change 8, dated August 10, 2023
- PO 4500841831, Change 2, dated April 12, 2023
- PO 5500005205, Change 4, dated January 25, 2024
- PO 5500005529, Change 4, dated May 2, 2023
- PO 4500897117, Change 0, dated December 21, 2023
- PO 4500896922, Change 0, dated December 19, 2023
- PO 4500441517, Change 71, dated January 2, 2024
- PO 5500005454, Change 6, dated November 17, 2023
- PO 5500005446, Change 2, dated February 22, 2023

Commercial-Grade Dedication Records

- CDI-MFRD-11-71 “Commercial Dedication Instruction for Helium”, Revision 3, June 19, 2015
- Commercial Grade Survey SAES ID 77365 dated January 23, 2024
- Commercial Grade Survey SAES ID 70006 dated May 30, 2023
- Commercial Grade Survey SAES ID 70413 dated August 5, 2023
- Commercial Grade Survey SAES ID 70577 dated September 11, 2023
- Commercial Grade Survey SAES ID 70806 dated October 17, 2023
- Commercial Grade Survey SAES ID 77365 dated January 23, 2024
- Commercial Grade Survey SAES ID 77537 dated February 13, 2024

Measuring and Test Equipment Records

- QC29372 - Scale
- QC12406 – Envelope Fixture 1
- QC07515 - Envelope Fixture 2
- QC-08215 – Caliper
- QC-16330 – Master set

Corrective Action Process Issue Reports

- List of CAP IRs issued January 2021 through January 2024
- CAP IR-2024-1440 dated February 12, 2024
- CAP IR-2024-644 dated June 3, 2020
- CAP IR-2020-642 dated January 15, 2020
- CAP IR-2023-2532 dated March 10, 2023
- CAP IR-2023-4690 dated May 11, 2023

- CAP IR-2022-3822 dated April 26, 2022
- CAP IR-2023-2012 dated February 23, 2023

Electronic Problem Notifications (EPNs)

- EPN-0145466A dated January 30, 2024
- EPN-0145528A dated February 12, 2024
- EPN-0145548A dated February 14, 2024
- EPN-0145511A dated February 8, 2024
- EPN-0145529A dated February 12, 2024

Audit Reports

- SAES ID 69862 dated May 1, 2023
- SAES ID 69945 dated May 12, 2023
- SAES ID 70364 dated July 26, 2023
- SAES ID 70774 dated October 10, 2023
- SAES ID 77394 dated January 25, 2024

Safety Culture and Safety Conscious Work Environment

- CFFF NSCMP 4Q23 Meeting Minutes
- Procedure CA-218, "Human Performance and Observation Program," Rev.10, dated May 23, 2023
- Columbia Fuel Fabrication Facility NSC Survey Report, December 2023
- IR 2023-239
- IR 2020-757
- 2023 Layered Process Audits (LPA) Overview
- 2023 – 2024 LPA trend overviews
- TRN-030, "My Signature is My Word and Impacts of Falsifications"
- Columbia Fuel Fabrication Facility (CFFF) NSC Pulse Survey Report, December 2021
- Columbia Fuel Fabrication Facility (CFFF) NSC Pulse Survey, June 2022
- Employee NSC & Falsification Training module

Training Records

- Britney Hingleton
- Lionel Martin
- Bobby Joyner
- Randal Lincoln
- Russ Jackson
- Selvetria Sumpter
- David Brown