



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

November 4, 2022

Bill Eldredge, Quality and Engineering Manager  
Schulz Electric Company  
110 Commerce St,  
East Haven, CT 06512

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT  
OF SCHULZ ELECTRIC COMPANY NO. 99901269/2022-201

Dear Mr. Eldredge,

On September 19 – 23, 2022, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Schulz Electric Company (SEC) facility in East Haven, Connecticut. The purpose of this limited-scope inspection was to assess SEC's compliance with the provisions of selected portions of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 21, Reporting of Defects and Noncompliance."

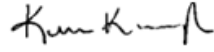
This technically-focused inspection specifically evaluated SEC's implementation of the quality activities associated with design, fabrication, and testing of safety-related components being supplied to the U.S. operating nuclear power plants. The enclosed report presents the results of the inspection. This NRC inspection report does not constitute NRC endorsement of SEC's 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 applicable technical and regulatory 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," the NRC will make available electronically for public inspection a copy of this letter and its enclosure through the NRC's 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>.

If you have any questions concerning this matter, please contact Mr. Odunayo Ayegbusi of my staff at (301) 415-8107.

Sincerely,



Signed by Kavanagh, Kerri  
on 11/04/22

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

Docket No.:99901269

Enclosure:  
Inspection Report No. 99901269/2022-201  
and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION VENDOR  
INSPECTION REPORT OF SCHULZ ELECTRIC COMPANY  
NO. 99901269/2022-201 DATED: November 4, 2022

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

Docket No.: 99901269

Report No.: 99901269/2022-201

Vendor: Schulz Electric Company

Vendor Contact: Bill Eldredge  
Phone: (203) 859-7413  
Email: [eldredge@schulzelectric.com](mailto:eldredge@schulzelectric.com)

Nuclear Industry Activity: Schulz Electric Company provides electric motor repairs, rewinding, and dedication services to the commercial nuclear industry.

Inspection Dates: September 19-23, 2022

Vendor Location: 110 Commerce St  
East Haven, CT 06512

Inspection Team Leader: Odunayo Ayegbusi    NRR/DRO/IQVB

Inspectors: Paul Prescott            NRR/DRO/IQVB  
Deanna Zhang            NRR/DRO/IQVB  
Aaron Armstrong        NRR/DRO/IQVB  
Eva Brown                NRR/DRO/IQVB

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

Enclosure

## **EXECUTIVE SUMMARY**

Schulz Electric Company 99901269/2022-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a routine vendor inspection at the Schulz Electric Company' (hereafter referred to as (SEC)) facility in East Haven, CT, to verify 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 on-site from September 19 – 23, 2022.

This technically-focused inspection specifically evaluated SEC's implementation of the quality activities associated with the repair, rewinding, and testing of safety-related electric motors being supplied to U.S. nuclear power plants.

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

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

During this inspection, the NRC inspection team implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated January 27, 2017, IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated January 27, 2017; and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting of Defects and Noncompliance," dated May 16, 2019.

The NRC inspection team observed the following specific activities:

- Vacuum Pressure Impregnation (VPI) process for a 4 kilovolts (kV) 3-phase 60 cycle Vertical Service Water pump motor frame and stator, Serial Number EKJ522003; Model Number 5K6348XC76A.
- Shop area walkdown and review of measuring and test equipment (M&TE) to validate that M&TE that may be used on safety-related equipment was within the current calibration, as well as a review and treatment of nonconforming M&TE on the shop floor.

The NRC inspection team concluded that SEC'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 SEC personnel are implementing these policies and procedures effectively. The information below summarizes the results of this inspection.

### **10 CFR Part 21 Program**

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its 10 CFR Part 21 program to verify compliance with the requirements of 10 CFR Part 21. The NRC inspection team: 1) reviewed the 10 CFR Part 21 postings; 2) reviewed a sample of safety-related purchase orders (POs) to ensure 10 CFR Part 21 was

specified; 3) verified that SEC's nonconformance and corrective action programs provide a link to the 10 CFR Part 21 program; and 4) reviewed SEC's process for Part 21 evaluations. No findings of significance were identified.

### Design Control

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its design control 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 select sample of the design, qualification, and testing documentation associated POs for design verification and analysis for changes to existing motor designs.

During the review of a design analysis and verification report for a design change to an insulation system, the NRC inspection team observed that the conclusion in the report that the seismic qualification for the original design remained valid for the modified insulation system was not supported by the information in the environmental qualification report for the modified system. The NRC inspection team determined that this issue is minor because the changes to the insulation system had a minimal impact to the original seismic qualification. SEC created Corrective and Preventive Action Report (CPAR) No. 22-09 to modify the environmental qualification report to address this issue.

During the review of a redesigned and re-built motor, the NRC inspection team noted that SEC's checklist for acceptance of the design analysis and verification report for this motor did not include a documented rationale for dispositioning of the recommended changes to the design within the report. The NRC inspection team determined this issue to be minor because SEC had performed testing of the motor to demonstrate it met the technical requirements of the customer. SEC created CPAR No. 22-12, which included this issue as one example of incomplete or incorrectly filled out documentation. No findings of significance were identified.

### Commercial Grade Dedication

The NRC inspection team reviewed SEC'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 and Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50. Specifically, the NRC inspection team reviewed dedication packages for both dedicated items and services to assess the different elements of the CGD program including the technical evaluation process, design drawings, commercial-grade surveys, and test and inspection reports. Based on the limited sample of documents reviewed, the NRC inspection team determined that SEC is implementing its policies and procedures associated with the CGD program. No findings of significance were identified.

### Supplier Oversight

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its supplier oversight program to verify compliance with the regulatory requirements of Criterion IV, "Procurement Document Control," and Criterion VII of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed SEC's program for the development and maintenance of its approved suppliers list (ASL). The NRC inspection team selected a sample of suppliers to review the methodology for conducting and documenting audits and the review of third-party audits to verify adequate evaluation of the suppliers' controls for meeting the applicable requirements of Appendix B to 10 CFR Part 50. During the review of a sample of supplier audits and the ASL, the NRC inspection team noted that SEC had not answered a step in

the audit report evaluation checklist for suppliers on its ASL with audit findings. The NRC inspection team determined this issue to be minor because SEC provided objective evidence that the findings were adequately closed out and had no impact on the quality of products or services supplied. SEC initiated CPAR No. 22-10 and 22-12 to address this issue. No findings of significance were identified.

#### Identification and Control of Materials, Parts, and Components

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its materials identification and control program to verify compliance with the requirements of Criterion VIII, "Identification and Control of Materials, Parts, and Components," of Appendix B to 10 CFR Part 50. The NRC inspection team also observed implementation of the material identification and control program by SEC's employees during in-process fabrication activities including receipt inspection, special testing, storage and inventory control, and machining. No findings of significance were identified.

#### Special Processes

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its manufacturing control program to verify compliance with the regulatory requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed SEC's VPI process. The NRC inspection team reviewed a sample of procedures and test reports associated with magnetic particle testing and visual testing for a bracket actuator and a valve bonnet, as applicable. No findings of significance were identified. The NRC inspection team observed potential crack indications on a motor frame undergoing the VPI processes that had not been documented nor dispositioned. The NRC inspection team determined this issue to be minor because VPI was in process, and SEC initiated CPAR No. 22-15 to evaluate this issue. No findings of significance were identified.

#### Control of Measuring and Test Equipment

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its M&TE program to verify compliance with the requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. The NRC inspection team performed a walkdown of SEC's M&TE area and selected a sample of M&TE for review. The NRC inspection team verified the M&TE were labeled, handled, and stored in a manner that indicated the calibration status of the instrument and ensured its traceability to calibration test data. The NRC inspection team also verified that the M&TE had been calibrated, adjusted, and maintained at prescribed intervals prior to use. No findings of significance were identified.

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

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its 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 SEC's nonconformance and corrective action reports and confirmed the samples chosen were documented, evaluated, and dispositioned in accordance with SEC's program requirements. The NRC inspection team reviewed the area designated for nonconforming materials, parts, or components and found that sufficient measures were in place to prevent their inadvertent use during maintenance activities. In addition, the NRC inspection team reviewed the implementation and closure of the corrective

actions opened to address the Notice of Nonconformance documented in the NRC's inspection report No. 99901269/2018-201-01, dated May 24, 2018. No findings of significance were identified.



## REPORT DETAILS

### 1. 10 CFR Part 21 Program

#### a. Inspection Scope

The U.S. Nuclear Regulatory Commission (NRC) inspection team reviewed Schulz Electric Company (SEC) 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. The NRC inspection team also evaluated the 10 CFR Part 21 postings and a sample of SEC's purchase orders (POs) to verify 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."

In addition, the NRC inspection team reviewed a sample of SEC's nonconformance and corrective action reports to verify that SEC adequately considered issues for evaluation under their 10 CFR Part 21 program. The NRC inspection team also verified that SEC's nonconformance and corrective action procedures provide a link to the 10 CFR Part 21 program.

The NRC inspection team discussed the 10 CFR Part 21 program with SEC'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 SEC was 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 SEC was adequately 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 SEC'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." SEC's scope of supply includes the design, repair, reverse engineering, and commercial grade dedication (CGD) of safety-related motors used in operating US nuclear power plants.

The NRC inspection team reviewed a select sample of the design, qualification, and testing documentation associated POs for design verification and analysis for changes to

existing motor designs and had observations regarding two of the sampled design, qualification, and testing documentation as documented in Section 2.b below.

The NRC inspection team also discussed the design control program with SEC'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

The NRC inspection team reviewed DAV-N8409EQFWCD – 6.9 kilovolt (kV), "Design Analysis and Verification for Environmental Qualification Report", which documents SEC's analysis of testing and subsequent evaluation performed on upgraded 6.9 kV insulation. The insulation was qualified to the same normal, accident, post-accident environmental profiles and in accordance with the same nuclear standards as that of the original 4.16 kV insulation. During the review of this report, the NRC inspection team observed that the conclusion in the report, that the seismic qualification for the original 4.16 kV insulation system remained valid for the upgraded 6.9 kV insulation system was not supported by the information in SEC's Environmental Qualification Report N44446EQFWCD, Revision 2 for the modified insulation. Specifically, this environmental qualification report did not document any evaluation performed to demonstrate the seismic qualification performed on the original 4.16 kV insulation remained valid for the modified insulation. Following discussions with SEC staff regarding this issue, SEC's staff stated that the environmental qualification report should have included an evaluation of the seismic qualification and created CPAR No. 22-09 to address this issue. The NRC inspection team determined this issue to be minor because the changes to the insulation have a minimal impact to the original seismic qualification and this project was for a non-U.S. customer.

The NRC inspection team reviewed documentation in support of inspections and design verifications for a redesigned and re-built 700 horsepower (HP) squirrel cage induction motor. SEC contracted the design analysis and verification of this motor with a third-party commercial vendor and accepted the third-party's design analysis and verification report in accordance with SEC's CGD processes, as documented in SEC-SD-0186, Accepted Nuclear Service – Design Verification Services for Limerick 700 HP Vertical Squirrel Cage Induction Motor Design Analysis. During the review of this CGD acceptance evaluation, the NRC inspection team observed the checklist for acceptance of the design analysis and verification report did not include a documented rationale for dispositioning of the recommended changes to the design within the report. SEC staff agreed that the documentation for the rationale for accepting the recommended changes was not included in the checklist and included this issue as an example in CPAR No. 22-12. CPAR No. 22-12 was created to document issues identified during this inspection of incomplete or incorrectly filled out documentation. The NRC inspection team determined this issue to be minor because SEC had performed testing of the motor to demonstrate it meets the technical requirements of the customer. In addition, SEC will be performing additional tests of this motor and will obtain its customer's review and approval prior to delivery of this redesigned and re-built motor. No findings of significance were identified.

c. Conclusion

With exception of the minor issues identified above, the NRC inspection team concluded that SEC 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 SEC is

implementing its policies and procedures associated with the design control program. No findings of significance were identified.

### 3. Commercial-Grade Dedication

#### a. Inspection Scope

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its CGD program to verify compliance with the regulatory requirements of Criterion III and Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50. In addition, the NRC inspection team conducted interviews with SEC personnel, observed dedication activities in-process, and reviewed related CGD documentation. Specifically, the NRC inspection team reviewed a sample of dedication packages for both dedicated items and services to assess the different elements of the CGD program, including the technical evaluation process, design drawings, commercial-grade surveys, and test and inspection reports.

The sample of CGD packages for items included the following: rotor shafts, motor frame, bearings, electric motors, gearboxes, winding wire, and motor heater. The CGD packages included: 1) the technical evaluation for the identification and documentation of the basis and justification for the selection of the critical characteristics; 2) acceptance methods and acceptance criteria; 3) receiving inspection records; and 4) Certificates of Conformance. The NRC inspection team evaluated the criteria for the identification of item functions, credible failure mechanisms/modes, selection of critical characteristics and acceptance criteria, and the identification of verification methods to verify the effective implementation of SEC's CGD process.

The sample of CGD packages for services included design analysis and verification of a redesigned and re-built motor, partial discharge testing of a motor stator, coil manufacturing, shaft collar fabrication, gear machining, and gearbox repair/refurbishment. The NRC inspection team reviewed the (1) critical characteristics and acceptance methods for the critical characteristics for the services undergoing dedication and documentation produced to support the acceptance of these services (including test data, design analysis, etc.), and documentation of SEC's acceptance of these services.

The NRC inspection team also discussed SEC's CGD program with 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 SEC is implementing its CGD 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 determined that SEC is implementing its policies and procedures associated with the CGD program. No findings of significance were identified.

#### 4. Supplier Oversight

##### a. Inspection Scope

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

The NRC inspection team reviewed SEC's program for the development and maintenance of its approved suppliers list (ASL). The NRC inspection team selected a sample of suppliers to review the methodology for conducting and documenting audits and the review of third-party audits to verify adequate evaluation of the suppliers' controls for meeting the applicable requirements of Appendix B to 10 CFR Part 50. The NRC inspection team verified that for a sample of POs, SEC adequately invoked the applicable technical, regulatory, and quality requirements. The NRC inspection team also reviewed SEC's process for conducting audits at an established frequency and verified that the audit reports provided adequate objective evidence of compliance with the applicable requirements. Audit findings were documented and resolved in SEC's corrective action programs. In addition, the NRC inspection team verified that the audits were performed by qualified personnel.

The NRC inspection team also discussed the supplier oversight program with SEC'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

During the review of a sample of supplier audits and the ASL, the NRC inspection team noted that SEC had not answered a step in the audit report evaluation checklist for suppliers on its ASL with audit findings. The step inquires if the basis for the findings/observation's closeout is adequate. Neither yes nor no was checked off on the form; however, the form was signed and dated to indicate that the form was officially completed. The NRC inspection team determined this issue to be minor because SEC provided objective evidence that the findings were adequately closed out and had no impact on the quality of products or services supplied. SEC initiated CPAR No. 22-10 and 22-12 to address this issue. No findings of significance were identified.

##### c. Conclusion

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

## 5. Identification and Control of Materials, Parts, and Components

### a. Inspection Scope

The NRC inspection team reviewed SEC's policies and implementing procedures that govern the implementation of its material identification and control program to verify compliance with the regulatory requirements of Criterion VIII, "Identification and Control of Materials, Parts, and Components," of Appendix B to 10 CFR Part 50. The NRC inspection team also observed implementation of the material identification and control program by SEC's employees during in-process fabrication activities including receipt inspection, special testing, storage and inventory control, and machining. The NRC inspection team verified that all materials inspected were adequately marked with appropriate lot, batch and/or heat numbers using the markings and labeling conventions in accordance with written procedures and instructions.

The NRC inspection team discussed the material identification and control program with SEC'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 SEC is implementing its material identification and control program in accordance with the regulatory requirements of Criterion VIII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and direct observation of material control practices in the manufacturing facility, the NRC inspection team also determined that SEC is adequately implementing its policies and procedures associated with the material identification and control program. No findings of significance were identified.

## 6. Control of Special Processes

### a. Inspection Scope

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

### b. Observations and Findings

During the week of the inspection, the NRC inspection team observed a portion of Shop Instruction 602, "Vacuum Pressure Impregnation of Windings" for Work Package N-9522. The motor frame undergoing the Vacuum Pressure Impregnation (VPI) processes was for a 4 kV 3-phase 60 cycle vertical service water pump (Serial Number EKJ522003; Model Number 5K6348XC76A). The motor was seismically, but not environmentally, qualified. While transporting the frame and stator from the oven to the VPI tank, the NRC inspection team identified abnormalities in the frame material which could be potential indications requiring evaluation. The NRC inspection team questioned SEC regarding the significance of these indications to the qualification of the pump and whether the indications had been

disposed. SEC was unable to determine if the identified indications were cracks and stopped the VPI process. SEC contacted the licensee on the disposition of these indications. SEC informed the NRC inspection team that the indications had not been previously disposed, and the licensee was sending out a representative the following week to evaluate these indications. The NRC inspection team determined no visual inspection occurs after the receipt inspection process or after surface preparation of the base material has been completed. The NRC inspection team and SEC discussed that additional visual inspection requirements subsequent to parts processing, such as ice blasting for paint removal, should have identified these indications for disposition.

The NRC inspection team determined this issue to be minor because the motor frame was in process, and SEC initiated CPAR No. 22-15 to address this issue. No findings of significance were identified.

### Conclusion

With the exception of the minor issue identified above, the NRC inspection team concluded that SEC is implementing its control of special processes 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 activities observed, the NRC inspection team determined that SEC is implementing its policies and procedures associated with the control of special processes. No findings of significance were identified.

## 7. Control of Measuring and Test Equipment

### a. Inspection Scope

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

For a sample of M&TE, the NRC inspection team reviewed M&TE on the shop floor as well as the records for selected M&TE to ensure appropriate calibration stickers and current calibration dates, including the calibration due date. The NRC inspection team also verified that all M&TE reviewed during observed maintenance activities were properly calibrated, adjusted, and maintained at prescribed intervals prior to use. Calibration records reviewed by the NRC inspection team indicated the as-found or as-left conditions, accuracy required, calibration results, calibration dates, and the due date for recalibration. Furthermore, the NRC inspection team also verified that the selected M&TE were calibrated using procedures traceable to known industry standards.

The NRC inspection team confirmed that when M&TE equipment was found to be out of calibration, SEC generated an M&TE out-of-tolerance condition to identify items that were accepted using this equipment since the last valid calibration date and to perform an extent of condition review. The NRC inspection team also reviewed in-process fabrication activities in accordance with shop work orders and reviewed both material staging areas and nonconforming material segregation areas to verify material identification control methods including stamping, tagging, and pen markings. The NRC inspection team reviewed a sample of in-process and completed discrete job router documentation and confirmed material identification for each process step was adequately documented in accordance with procedures governing those activities.

The NRC inspection team performed a walk-down of SEC's laboratory to observe that M&TE were labeled, handled, and stored in a manner that indicated the calibration status and ensured its traceability to calibration test data. The NRC inspection team observed the calibration of an internal caliper and micrometer and confirmed that the calibration was performed in accordance with SEC's procedures. The NRC inspection team discussed material identification methods with quality control inspectors, quality assurance personnel, and fabrication/craft personnel and confirmed understanding of identification and control of materials.

The NRC inspection team also discussed the M&TE program with SEC'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 SEC is implementing its 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, the NRC inspection team also determined that SEC is implementing its policies and procedures associated with the M&TE program. No findings of significance were identified.

8. Nonconforming Materials, Parts, or Components and Corrective Action Program

a. Inspection Scope

The NRC inspection team reviewed SEC'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 verified that SEC's processes and procedures provide for the identification, documentation, segregation, evaluation, and disposition of nonconforming items. These processes also apply the principles of rework/repair, scrap, return to vendor, or "use as-is."

The NRC inspection team observed SEC's assembly floor operations and verified that nonconforming materials, parts, or components were properly identified, marked, and segregated, when practical, to ensure that they were not reintroduced into the production processes. The NRC inspection team reviewed a sample of nonconforming reports (NCRs) associated with the production of safety-related parts and confirmed that SEC dispositioned the nonconforming materials in accordance with the applicable procedures and took adequate corrective action regarding the nonconforming items, as appropriate.

Additionally, the NRC inspection team discussed the nonconformance program with SEC's personnel to verify they were cognizant of program requirements, designated areas to segregate and control nonconforming materials, parts, or components, and that they actively used the NCR process to identify and document any nonconforming conditions.

The NRC inspection team reviewed a sample of CPARs from the past 3 years, and the CPARs that were issued as a result of the last NRC inspection in 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18043A260). The NRC inspection team confirmed there was a description of the issue in the CPARs to ensure that there was sufficient information to understand the problem, that there was an appropriate analysis of the cause of the problem, and that the actions taken were sufficient to prevent the problem from recurring.

The NRC inspection team also discussed the nonconforming materials, parts, or components and corrective action programs with SEC'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

Corrective Action Associated with Nonconformance No. 99901269/2018-201-01

Following the April 2018 inspection of SEC, the NRC issued Nonconformance (NON) 99901269/2018-201-01 for SEC's failure to ensure the suitability of certain parts used in the manufacture of safety-related motors. Specifically, SEC failed to establish and implement an acceptable method to verify by direct inspection, commercial-grade survey, source surveillance, or other acceptable methods, the material composition of shafts used in AC motors provided by a commercial supplier.

In its response dated June 13, 2018 (ML18166A168), SEC issued CPAR 18-08 stating SCE will generate a position paper that evaluates historical data and risk associated with those jobs for which the material was not verified and make recommendations concerning programmatic changes to implement. In addition, SEC would provide training on those programmatic changes to be implemented. SEC also recommended that all shaft material be verified by testing. The NRC inspection team reviewed the documentation that provided the objective evidence for the completion of these corrective actions. SEC has revised its process for testing all shaft material, trained personal, and generated a position paper. Based on its review the NRC inspection team closed NON 99901269/2018-201-01. No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that SEC 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, the NRC inspection team also determined that SEC is implementing its policies and procedures associated with the control of nonconforming materials, parts, or components and corrective action. No findings of significance were identified.

9. Entrance and Exit Meetings

On September 19, 2022, the NRC inspection team presented the inspection scope during an entrance meeting with Mr. Bill Eldredge, SEC Quality and Engineering Manager, and other members of SEC management and technical staff. On September 23, 2022, the NRC inspection team presented the inspection results to Mr. Eldredge and other members of SEC'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

<b>Name</b>	<b>Position</b>	<b>Affiliation</b>	<b>Entrance</b>	<b>Exit</b>	<b>Interviewed</b>
Bill Eldredge	Quality and Engineering Manager	SEC	X	X	X
Jim Corrick	Project Manager	SEC	X	X	X
James Dean	Nuclear Projects	SEC	X	X	X
John Willowski	QA Engineer	SEC	X		
John Ganley	General Manger	SEC	X	X (virtual)	
Matt Radulski	Customer Service	SEC		X	
Chris Russo	Plant Manager	SEC		X	
Odunayo Ayegbusi	Inspector	NRC	X	X	
Paul Prescott	Inspector	NRC	X	X	
Deanna Zhang	Inspector	NRC	X	X	
Aaron Armstrong	Inspector	NRC	X	X	
Greg Galletti	Acting Branch Chief	NRC	X	X	
Eva Brown	Inspector	NRC	X	X	

2. INSPECTION PROCEDURES USED

Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated January 27, 2017

IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated January 27, 2017

IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting of Defects and Noncompliance," dated May 16, 2019

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Type	Description
99901269/2018-201-01	CLOSED	Nonconformance	Criterion VII

4. DOCUMENTS REVIEWED

Quality Assurance Procedures (QAP) and Shop Instructions (SI):

- Quality Assurance Manual, Revision 13, dated May 1, 2021
- QAP 3, "Evaluation of CGI for Safety Related Application," Revision 17, dated May 5, 2022
- QAP 3A, "Design Control," Revision 8, dated June 8, 2022
- QAP 4, "Procurement Document Control," Revision 19, dated June 8, 2022
- QAP 6A, "Contract Review," Dated May 5, 2022
- QAP 7, "Control of Purchased Materials, Equipment, and Services," Revision 22, dated May 5, 2022
- QAP 8, "Identification and Control of Materials, Parts, and Components," Revision 18, dated January 27, 2021
- QAP 10, "Inspection," Revision 22, dated January 27, 2021
- QAP 12, Control of Measuring and Test Equipment, Revision 15, January 27, 2021
- QAP 14, "Inspection and Test Status," Revision 14, dated April 20, 2022
- QAP 15, "Control of Non-Conforming Items," Revision 17, Dated April 20, 2022
- QAP 18, "Audit & Commercial Grade Surveys," Revision 20, March 22, 2021
- SI 102, "Identifying and Reporting Under 10CFR21," dated December 2, 2021
- SI-602, "Vacuum Pressure Impregnation of Electrical Windings," Revision 11
- SI N-8617-LT, "Motor Load Testing and Characteristic Curve Development for Paragon / Limerick," Revision 0, dated April 15, 2020

Part 21 Evaluation Checklist:

- Part 21 Evaluation checklist, dated April 13, 2020
- Part 21 evaluation checklist, dated April 24, 2020
- Part 21 evaluation checklist, dated October 8, 2020
- Part 21 evaluation checklist, dated December 8, 2020
- Part 21 evaluation checklist, dated September 7, 2021
- Part 21 evaluation checklist, dated August 19, 2021

- Part 21 evaluation checklist, dated November 30, 2021
- Part 21 evaluation checklist, dated April 24, 2022

Design Documents:

- DAV-N-9330, Design Analysis and Verification of Wire Size Change, Revision 0, dated August 20, 2021
- DAV-N8409EQFWCD-6.9kV Design Analysis and Verification for Environmental Qualification Report Revisions, dated August 7, 2019
- Environmental Qualification Report N8409FWCD-6.9kV for Schulz Electric Form Wound Continuous Duty 6.9 kV Insulation System, Revision 0, dated October 23, 2018
- Project 119049, Document RPT01, Limerick 700 HP Vertical Squirrel Cage Induction Motor Design Analysis, Revision 0, dated September 20, 2019

Commercial Grade Dedication Packages:

- SEC-SD-0186, Accepted Nuclear Service – Design Verification Services for Limerick 700 HP Vertical Squirrel Cage Induction Motor Design Analysis, dated December 19, 2019
- SEC-SD-0210, Accepted Nuclear Service – Partial Discharge Testing, dated September 28, 2021
- Commercial Grade Item Technical Evaluation 725, Three Phase Fractional Integral Horsepower Squirrel-Cage Induction motors NEMA Frame Size 680 or IEC Frame Size 400 and Smaller Continuous & Intermittent Duties (Excluding MOV's), Revision 11, dated June 10, 2019
- SEC-SR-5750, Manufactured Rotor Shaft Part No. N-9148-SR, dated October 2020
- Commercial Grade Item Technical Evaluation 818, Manufactured Motor and/or Generator Mechanical Components, Revision 0, dated March 25, 2019
- SEC-SR-5777, Toshiba 1 HP 145TZ Frame Motor Part No. XD10033513, dated December 2020
- SEC-SR-5773, Sheerer XLR1-S-N Bearing Part No. Sheerer XLR1-8-N, dated December 2020
- Commercial Grade Item Technical Evaluation 730, Anti-Friction Bearings, Revision 7, dated March 24, 2004
- SEC-EQ-5798, Toshiba 900 HP AC Motor Part No. ET68105, dated January 2021
- Commercial Grade Item Technical Evaluation 766, Three Phase Fractional and Integral Horsepower Squirrel-Cage, Continuous Duty Induction Motors having Non-NEMA Frame Sizes (Excluding MOVs), Revision 2, dated June 10, 2019
- SEC-SR—5349, Rotor Coating Part No. Dolph's Synthite EB-41, dated March 2021
- Commercial Grade Item Technical Evaluation N8842-RC, Dolph's Synthite EB-41 as a Rotor Coating, Revision 0, dated January 3, 2020
- SEC-SR-5867, Motor, 3 HP 182JP, Baldor Part No. EJPM3610T, dated April 2021
- SEC-SR-5910, Motor, GE, 15 HP, 254TCZ Part No. 5K5254SAA2179, dated August 2021
- Commercial Grade Item Technical Evaluation 831, Three Phase Continuous Duty Fractional and Integral Horsepower Totally Enclosed Air Over (TEAO) Squirrel Cage Induction Motors NEMA Frame Size 680 or IEC Frame Size 400 and Smaller, Revision 0, dated January 20, 2021
- SEC-SR-6028, Gearbox, Philadelphia Gear Size/Type 2539 Part No. 2593-901-003, Revision D, dated March 31, 2022

- Commercial Grade Item Technical Evaluation 804 for Philadelphia Gear Brand Boxes, Revision 2, dated May 20, 2020
- SEC-SR-6079, Magnet Wire, 0.086 x 0.265" SDG over H GP/MR-200 Part No. Essex c2523d0862524bexp, dated July 2022
- Commercial Grade Item Technical Evaluation 710, Magnet Wire, Revision 6, dated January 3, 2018
- SEC-SR-6073, Rotor Shaft Part No. N-1694-SR, dated July 2022
- Commercial Grade Item Technical Evaluation 818, Manufactured Motor and/or Generator Mechanical Components, Revision 0, dated March 25, 2019
- SEC-SR-6070, Rotor Shaft Part No. 9292-SR, dated July 2022
- SEC-SR-6071, Heater 240V 350W ¾" Diameter 4¾" Long Part No. Chromalox 275805, dated July 2022
- Commercial Grade Item Technical Evaluation 736, Electric Strip/Cartridge Heaters, Revision 2, dated January 21, 2002
- SEC-SD-0185, Coil Manufacturing Services, dated December 2019
- Commercial Grade Item Technical Evaluation 796, Acceptance of Commercial Grade Coil Manufacturing Services, Revision 1, dated January 17, 2018
- SEC-SD-0183, Shaft Collar Manufacturing Services, dated October 2019
- Commercial Grade Item Technical Evaluation 812, Acceptance of Commercial Grade Machining Services Performed by Philadelphia Gear, Revision 1, dated October 18, 2018
- SEC-SD-0198, Gear Machining Services, dated December 2020
- Commercial Grade Item Technical Evaluation 812 Acceptance of Commercial Grade Machining Services Performed by Philadelphia Gear, Revision 1, dated October 18, 2018
- Attachment 1, Quality and Technical Requirements to: Philadelphia Gear – New Castle, Revision 0, dated November 11, 2020
- SEC-SD-0210, Partial Discharge Testing, dated September 2021
- Commercial Grade Item Technical Evaluation 808, Acceptance of Commercial Grade Motor and Generator Testing Services, Revision 0, dated February 7, 2017
- Attachment 1, Quality and Technical Requirements to: Advanced Testing Systems, Revision 0, dated September 7, 2021
- SEC-SD-0221, Gearbox Repair/Refurbishment, dated August 2022
- Commercial Grade Item Technical Evaluation 801, Philadelphia Gear Gearbox Repair/Refurbishment Services, Revision 2, dated May 20, 2020
- Attachment 1, Quality and Technical Requirements to: Philadelphia Gear – New Castle, Revision 0, dated February 9, 2022
- Commercial Grade Item Technical Evaluation 811, Acceptance of Commercial Grade Design and Design Verification Services, Revision 0, dated January 10, 2018
- SEC-SD-018, Design Verification Services, dated December 2019
- SEC-SD-0191, Bearing Repair Services, dated February 2020
- • Commercial Grade Item Technical Evaluation 813, Acceptance of Commercial Grade Babbitt Bearing Repair/Refurbishment Services Revision 0 dated January 2020
- Attachment 1, Quality and Technical Requirements to: Smith Services, Revision 0, dated January 10, 2020

#### Commercial Grade Dedication Shop Instructions

- Shop Instruction N-9070-LT, Motor Lead Testing for PO# 3501216832, dated December 13, 2019
- Shop Instruction N-9049-LT, Motor Load Testing for N-9048 for PO# SY19VA16221MA, dated November 7, 2019
- Shop Instruction N-9366-LT, Motor Load Testing for PO# 45656082, dated January 18, 2021
- Shop Instruction N-9129-LT, Motor Lead Testing and Characteristic Curve Development for PO# 10604135, dated November 13, 2020
- Shop Instruction N-9491-LT, Gearbox Load Testing for PO#02433320, dated October 22, 2021

#### Audit/Survey:

- Approved Suppliers List, dated May 16, 2022
- 2020 Internal Audit Report, dated November 27, 2020
- 2021 Internal Audit Report, dated November 22, 2021
- Global Quality Assurance, Inc Audit Report, dated January 21, 2020
- Smith Services Commercial Grade Survey Report, dated June 16, 2021
- Philadelphia Gear Commercial Grade Survey Report, dated January 3, 2022
- Audit Assessment Evaluation – Laser Technologies Inc, dated June 22, 2020
- Audit/survey Meeting Attendance Record, June 9, 2020
- NIAC Commercial Grade Survey 25047 Report – Laser Technologies Survey, dated June 22, 2020
- NIAC Commercial Grade Item/Survey Checklist, SDI Audit No. 25047, June 18, 2020
- Letter S. Finley to J. Lelas, Laser Technologies, “Survey Plans,” May 18, 2020
- Letter C. Eldredge, “Acceptance of Auditor Qualifications,” June 22, 2020
- Quality Assurance Department Survey Findings and Recommendations Form – June 9, 2020, Finding – “Pressure Gauge found OOC”
- Quality Assurance Department Survey Findings and Recommendations Form – June 9, 2020 – Finding – “Failure to put Franklin test on production routing and paperwork”
- Quality Assurance Department Survey Findings and Recommendations Form – June 9, 2020- Observation – “Recommendation of their procedures or interaction for material with shelf life”
- Quality Assurance Department Survey Findings and Recommendations Form – June 9, 2020- Observation – “Procedure does not describe how to test, which equipment, or how to use equipment”
- Operating Procedure, OP-Q-2000, Revision C, “Monitoring and Measure Equipment” – Laser Technologies
- Quality Manager System Lead Auditor Qualification Form, May 7, 2014
- Quality Manager System Lead Auditor Examination Form, May 7, 2014
- WSS-2, Audit – Williams Specialty Services, February 19, 2021

#### Purchase Orders:

- 469462, Purchase Order for Imperial Metrology On-site Calibration, dated June 2,

2022

- 470233, Purchase Order to Provide laminations dated July 19, 2022
- Schulz Electric Reports:
- N-9441, "Westinghouse AC Motor"
- N-9479, "Endbell Coating Evaluation for NRC Event Number 54664"
- N-9522, "Vertical SW Pump Motor Refurbishment"
- Q-9144, "Condensate Pump Motor Rewind"
- N\_PO-000005358 (SEC Job No. 8617), 700 HP RHR SW Pump Motor Inspection and Repair, Revision 6, dated September 25, 2019
- 447917, Purchase Order for Rotor Redesign Services for 700 HP Motor, dated July 22, 2019
- EE20VA55392PA (SEC Job No. N-9330), Motor Type "Baldor Reliance" EMM16154-APN M3AA 160 MLB 4 B3 15 KW (20 HP), Revision 0, dated February 17, 2021
- PO-447917, Attachment 1, Quality and Technical Requirements to: EME, dated July 23, 2019

Measuring and Test Equipment Documents:

- Schulz Electric Master M&TE List, September 12, 2022
- Accredited Calibration Report SEC-3067A, Omega Chart Recorder
- Accredited Calibration Report SEC-3156, Baker ST112E surge tester
- Accredited Calibration Report SEC-3739, Fluke 971 Humidity
- Accredited Calibration Report SEC-3783, AEMC Digital Low Resistance Ohmmeter
- Accredited Calibration Report SEC-3807, Fluke Megohmmeter
- Accredited Calibration Report SEC-3902, Amprobe Thermometer

NCRs

- SEC-QA-20-02, Rotor Shaft Total Indicated Runout, dated January 21, 2020
- SEC-QA-20-03, Bearing Hub Fit ID, dated January 21, 2020
- SEC-QA-21-05, Load Testing RPM, dated July 22, 2021
- SEC-QA-21-01, "Connection box cover bolthole [SIC] broken during handling"
- SEC-QA-21-07, "M&TE found OOT during calibration"
- SEC-QA-21-08, "M&TE found OOT during calibration"
- SEC-QA-21-12, "New motor 'C' and 'H' dimensions OOTs for N-9340"
- SEC-QA-21-13, "New motor 'C' and 'H' dimensions OOTs for N-9330"
- SEC-QA-21-14, "Vendor QA thinks PO requirements not met"
- SEC-QA-21-15, "M&TE found OOT during calibration"
- SEC-QA-21-17, "M&TE found OOT during calibration"
- SEC-QA-21-19, "M&TE found OOT during calibration"
- SEC-QA-22-03, "Gearbox 9PG) dedicated and provided to Seabrook without Oil Filtration System – OPEN"
- SEC-QA-22-04, "Gearbox provided to Schulz Electric by PG without Oil Filtration System – OPEN"
- SEC-QA-22-06, "New rotor shaft had two OOT dimensions"
- SEC-QA-22-10, "M&TE found OOT during calibration"
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- SEC-QA-22-11, "M&TE found OOT during calibration"
- SEC-QA-22-12, "Shaft Extension Keyway 'R; Dimension UNSAT"

#### Corrective Action Reports (CARs) Reviewed During the NRC Inspection

- CPAR 15-16, "Endbell Coating"
- CPAR, 16-01, "Endbell Coating"
- CPAR 21-03, "TE-809 has incorrect CC"
- CPAR 21-05, "Inadequate Part 21 Eval of OOT M&TE for SEC-QA-21-08"
- CPAR 21-07, "Cals done outside 17025 Scope and not certified to PO Reqts"
- CPAR 22-05, "PO Q&TR for CG Services do not meet requirements of EPRI Doc"

#### Corrective Action Reports Drafted as a Result of the NRC Inspection

- CPAR 22-07, "Commercial Grade Item Dedications"
- CPAR 22-08, "Quality Assurance Manual"
- CPAR 22-09, "EQ Insulation System Upgrade"
- CPAR 22-10, "Control of Purchased Materials, Equipment or Services"
- CPAR 22-11, "Evaluation of Potential 10CFR21 Reportable Conditions"
- CPAR 22-12, "Completion of Documentation"
- CPAR 22-13, "Evaluating Nonconformances"
- CPAR 22-14, "Addressing Audit Observations/Recommendations"
- CPAR 22-15, "In-Process Inspections"

#### Training Records

- Quality and Engineering Manager
- Quality Engineer