April 30, 2015

Mr. Kevin Morrow
Quality Assurance Manager
ATC Nuclear Tennessee
777 Emory Valley Rd.
Oak Ridge, TN 37830

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION OF ATC NUCLEAR TENNESSEE, REPORT NO. 99901458/2015-201 AND NOTICE OF NONCONFORMANCE

Dear Mr. Morrow:

On March 16 to March 20, 2015, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the Argo Turbo Corp. (ATC) facility in Oak Ridge, TN. The purpose of the limited scope inspection was to assess ATC'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 inspection specifically evaluated ATC's qualification and commercial-grade dedication (CGD) of Class 1E components supplied to U.S. operating reactor plants. The enclosed report presents the results of this inspection. This NRC inspection report does not constitute NRC endorsement of your overall quality assurance (QA) or 10 CFR Part 21 programs.

Based on the results of this inspection, the NRC inspection team found that the implementation of your QA program did not meet certain NRC requirements imposed on you by your customer or NRC licensees in the area of design control. Specifically, ATC failed to verify the adequacy of the design of circuit breakers through a suitable testing program. Furthermore, ATC failed to identify appropriate acceptance methods for identified critical characteristics of an Endevco cable assembly and 535 digital controllers. Lastly, ATC failed to ensure that deviations between purchase order requirements and test procedures were adequately identified, evaluated, and documented. The specific findings and references to the pertinent requirements are identified in the enclosures to this letter.

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

In accordance with 10 CFR 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC’s Rules of Practice, a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC’s document system, Agencywide Documents Access and Management System, which is accessible from the NRC Web site at http://www.nrc.gov/readingrm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, “Protection of Safeguards Information: Performance Requirements.”

Sincerely,

/RA/

Richard A. Rasmussen, Chief
Electrical Vendor Inspection Branch
Division of Construction Inspection
and Operational Programs
Office of New Reactors

Docket No.: 99901458

Enclosures:
1. Notice of Nonconformance
2. Inspection Report 99901458/2015-201
   and Attachment

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's Rules of Practice, a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system, Agencywide Documents Access and Management System, which is accessible from the NRC Web site at http://www.nrc.gov/readingrm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

Sincerely,

/RA/

Richard A. Rasmussen, Chief
Electrical Vendor Inspection Branch
Division of Construction Inspection
and Operational Programs
Office of New Reactors

Docket No.: 99901458

Enclosures:
1. Notice of Nonconformance
2. Inspection Report 99901458/2015-201 and Attachment

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OFFICE	NRO/DCIP/EVIB	NRO/DCIP/EVIB	NRO/DCIP/EVIB	
NAME	SSmith	GLipscomb	RRasmussen	
DATE	04/15/15	04/10/15	04/30/15	

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NOTICE OF NONCONFORMANCE

ATC Nuclear Tennessee
777 Emory Valley Rd.
Oak Ridge, TN 37830

Docket No.: 99901458
Report No.: 99901458/2015-201

Based on the results of a Nuclear Regulatory Commission (NRC) inspection conducted at the ATC Nuclear Tennessee (ATC) facility in Oak Ridge, TN, on March 16-20, 2015, certain activities were not conducted in accordance with NRC requirements which were contractually imposed on ATC by NRC licensees:

A. Criterion III, "Design Control," of Appendix B to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 states, in part, that "design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculation methods, or by the performance of a suitable testing program."

   ATC Quality Assurance Manual (QAM), Section 3.0, "Design Control," states, in part, that "The adequacy of design shall be checked or verified by the performance of design review, by the use of alternate or simplified calculation methods, or by the performance of suitable testing program."

   Contrary to the above, as of March 20, 2015, ATC failed to verify the adequacy of the design of circuit breakers for purchase order (PO) 415850 from TVA (Sequoyah Nuclear) through a suitable testing program. Specifically, seismic test plan SP12T1970-01-01, for a General Electric Manually Operated Model Breaker/Switch, Revision 0, dated December 12, 2013, stated that the safety function of the breaker was to close and carry the rated current/voltage when manually closed and to open when manually tripped. The test plan also stated that the breaker was seismically qualified in accordance with the Institute of Electrical and Electronics Engineer (IEEE) 344-1975 "IEEE Recommended Practices for Seismic Qualification for Class 1E Equipment for Nuclear Power Generating Stations." However, ATC failed to provide an appropriate analysis, in accordance with IEEE 344-1975, to address the multiple seismic tests of similar, but not equivalent, configurations. Specifically, during the seismic testing there were changes to internal components, breaker state (open/close), and mounting configuration. ATC did not have a documented analysis to supplement the testing that demonstrated that the breaker, in spite of the changes, could meet its performance requirements when subjected to seismic acceleration. In addition, the qualification testing, similarity analysis, and dedication plan failed to address the requirement that the breaker could be manually closed following a safe shut down earthquake (SSE) to carry the rated current/voltage. Therefore, the final qualification report does not demonstrate the breakers ability to perform its required functions following a seismic event.

   This issue has been identified as Nonconformance 99901458/2015-201-01.

B. Criterion III, “Design Control,” of Appendix B to 10 CFR Part 50 states, in part, that “measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components.”

ATC QAM, Section 3.0, “Design Control,” states in part that “Materials, parts, equipment, and processes that are essential to the safety related functions of structures, systems and components shall be properly selected and reviewed for the suitability of application.”

Contrary to the above, as of March 20, 2015, ATC’s technical evaluation failed to identify appropriate acceptance methods to review the suitability of parts and materials for identified critical characteristics that are essential to the safety-related functions of 535 digital controllers and an Endevco cable assembly. Specifically,

- ATC failed to identify appropriate acceptance criteria to ensure that the voltage ratings of static random-access memory (SRAM) chips are compatible with the circuit board voltage ratings in 535 digital controllers to prevent a known failure mode. ATC CGD Plan (CGD14T2335-01-01) “Commercial Grade Dedication Plan for controller, digital model 535 single loop process,” Revision 0, dated October 27, 2014, identified the SRAM chip as a critical characteristic. However, ATC used the SRAM chip part number as the only acceptance method to verify that the chip is compatible with the circuit board. Since the SRAM chip is procured from a commercial distributor, the part number verification alone does not verify the SRAM chip’s voltage rating. As documented by ATC in a Part 21 notification (Agencywide Documents Access and Management System (ADAMS) Accession Number ML121910333), an incompatible SRAM chip would pass all functional testing and would degrade the circuit over time and could fail in-service. Therefore, ATC failed to identify appropriate acceptance criteria to ensure that the rating of the SRAM chip installed on a 535 digital controller is compatible with the circuit board rating in order to prevent a known failure mode.

- ATC failed identify appropriate acceptance methods to verify the fiberglass sleeve material of an Endevco cable assembly. ATC Commercial Grade Dedication (CGD) Plan (CGD12T2415-01-01) “CGD for an Endevco Cable Assembly” for PO 500574602 for Palo Verde,” Revision 1 dated May 6, 2013, identified critical characteristics of the cable assembly. These critical characteristics included verifying that that the sleeve material was constructed out of fiberglass to prevent inadvertent grounding, and to withstand high temperatures on the cable. ATC’s acceptance method for verifying the material of the sleeve was specified as visual; however, a visual examination does not provide reasonable assurance that the material is fiberglass and not a different plastic or polymer that would not be able to prevent inadvertent grounding or withstand high temperatures.

These issues have been identified as examples of Nonconformance 99901458/2015-201-02.

C. Criterion III, "Design Control," of Appendix B 10 CFR 50 states, in part, “measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in § 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications,

drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components."

ATC QAM, Section 3.0, "Design Control," states, in part, that "Applicable design inputs, quality requirements and standards shall be appropriately specified and correctly translated into specifications, drawing procedures and instructions. Materials, parts, equipment and processes that are essential to the safety related functions of structures, systems and components shall be properly selected and reviewed for suitability of application."

Contrary to the above, as of March 20, 2015, ATC failed to ensure that measures were established for the review for suitability of application of parts and processes, including deviations between PO requirements and test procedures. Specifically,

- ATC failed to ensure that deviations from qualification plan EMC11T3570-01-01, and the associated PO from TVA, were accounted for and bounded to show that the electromagnetic compatibility (EMC) testing requirements were met for a safety-related Foxboro controller. Specifically, there was no documented engineering evaluation to ensure that the differences between the International Electromechanical Commission (IEC) revisions (i.e. changes in dB levels, test set up distances, equipment parameters, effective source impedances, insulation support, etc.) that were used during the testing and the IEC revisions specified on the qualification plan were accounted for and bounded to show that the test report met the qualification plan requirements.

- ATC failed to ensure a deviation from PO 00031113, for capacitors to be used at Point Beach Nuclear Power Plant, was correctly identified on the certificate of conformance (COC). The licensee PO required a Foxboro capacitor (P/N H0183AC). ATC's COC to the licensee stated the item supplied was a Foxboro capacitor (P/N H0183AC); however, the actual item shipped to Point Beach Power Plant was a Nippon Chemi-Con capacitor (P/N 32D5941). Therefore, ATC failed to appropriately identify the correct part number and original equipment manufacturer of the capacitor. Since the end use of the capacitor was not specified in the PO, the licensee would need to be aware of the specific part number they are receiving to evaluate, if installing the capacitor into a qualified component, would challenge or invalidate the equipment qualification.

These issues have been identified as examples of Nonconformance 99901458/2015-201-03.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, Electrical Vendor Inspection Branch, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each noncompliance: (1) the reason for the

noncompliance, or if contested, the basis for disputing the noncompliance; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid noncompliance's; and (4) the date when your corrective action will be completed. Where good cause is shown, consideration will be given to extending the response time.

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

Dated this the 30th day of April 2015.

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

Docket No.:	99901458	
Report No.:	99901458/2015-201	
Vendor:	ATC Nuclear Tennessee 777 Emory Valley Rd Oak Ridge TN, 37830	
Vendor Contact:	Mr. Kevin Morrow Quality Assurance Manager kmorrow@argoturbo.com	
Nuclear Industry Activity:	The ATC Nuclear facility is located in Oak Ridge, TN. This facility is a third-party supplier of safety-related components, commercial-grade dedication (CGD), and qualification testing services such as seismic and environmental qualification of mechanical and electrical components, and obsolete equipment replacement.	
Inspection Dates:	March 16-20, 2015	
Inspection Team Leader:	Annie Ramirez	NRO/DCIP/EVIB
Inspectors:	Eugene Huang Stacy Smith Nicholas Savwoir George Lipscomb	NRO/DCIP/EVIB NRO/DCIP/EVIB NRO/DCIP/EVIB NRO/DCIP/EVIB
Approved by:	Richard A. Rasmussen, Chief Electrical Vendor Inspection Branch Division of Construction Inspection and Operational Programs Office of New Reactors	

EXECUTIVE SUMMARY

ATC Nuclear TN
99901458/2015-201

The U.S. Nuclear Regulatory Commission (NRC) conducted this vendor inspection to verify that ATC Nuclear Tennessee (hereafter referred to as ATC) 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."

This inspection specifically evaluated ATC's qualification and CGD of Class 1E electrical and instrumentation components supplied to U.S. operating reactor plants. The NRC inspection team reviewed the environmental and seismic qualifications of a sample of components and observed testing and CGD activities performed during the inspection. In addition, the inspection team reviewed ATC's nonconformance, corrective action, and 10 CFR Part 21 programs. The NRC conducted this inspection at ATC's facility in Oak Ridge, TN.

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

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

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

The information below summarizes the results of this inspection.

10 CFR Part 21

The NRC inspection team determined that ATC established a program that appropriately translated the requirements of 10 CFR Part 21 into implementing procedures and, for those activities that the inspectors reviewed, implemented them as required. No findings of significance were identified.

Design Control and Qualification

The NRC inspection team determined that ATC did not adequately implement the requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. The NRC issued Nonconformance 99901458/2015-201-01, for ATC's failure to verify the adequacy of the design of circuit breakers through a suitable testing program. In addition, the NRC inspection team issued Nonconformance 99901458/2015-201-02, for ATC's failure to identify appropriate acceptance methods to verify critical characteristics for an Endevco Cable assembly and 535 digital controllers. Furthermore, the NRC issued Nonconformance 99901458/2015-201-03, for ATC's failure to ensure that measures were established for the review for suitability of application of a capacitor and suitability of processes for electromagnetic compatibility (EMC) testing of a Foxboro controller.

Software Commercial-Grade Dedication

The NRC inspection team determined that ATC established a program that adequately controls software CGD in accordance with the regulatory requirements of Criterion III, “Design Control,” of Appendix B to 10 CFR Part 50. No findings of significance were identified.

Procurement Document Control and Oversight of Contracted Activities

The NRC inspection team determined that ATC established a program that adequately controls procurement document control in accordance with the regulatory requirements of Criterion IV, “Procurement Document Control,” of Appendix B to 10 CFR Part 50. No findings of significance were identified.

Measuring and Test Equipment

The NRC inspection team concluded that ATC established a program that adequately controls calibration and use of measuring and test equipment (M&TE) in accordance with the regulatory requirements of Criterion XII, “Control of Measuring and Test Equipment,” of Appendix B to 10 CFR Part 50. No findings of significance were identified.

Nonconformances and Corrective Actions

The NRC inspection team concluded that ATC established a program that adequately implements the regulatory requirements of Criterion XV, “Nonconforming Materials, Parts, or Components,” and Criterion XVI, “Corrective Action,” of Appendix B to 10 CFR Part 50. No findings of significance were identified.

Audits

The NRC inspection team concluded that ATC established a program that adequately implements the regulatory requirements of Criterion XVIII, “Audits,” of Appendix B to 10 CFR Part 50. No findings of significance were identified.

REPORT DETAILS

1. 10 CFR Part 21 Program

a. Inspection Scope

The inspectors reviewed ATC's policies and implementing procedures that govern its 10 CFR Part 21 program to verify compliance with the requirements of 10 CFR Part 21. Quality Assurance Manual (QAM) section 19.0 discussed the high level program requirements and responsibilities of implementing Part 21. The inspectors also interviewed the vendor's QA staff members responsible for implementation of the program. The inspection team verified that ATC's nonconformance and corrective action processes provide adequate links to the Part 21 procedure. In addition, the inspectors reviewed a sample of evaluations of deviations to ensure that the correct process was followed. The documents reviewed by the inspectors are included in the attachment to this inspection report.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team determined that ATC established a program that appropriately translated the requirements of 10 CFR Part 21 into implementing procedures and, for those activities that the inspectors reviewed, implemented them as required. No findings of significance were identified.

2. Design Control and Qualification

a. Inspection Scope

The inspectors reviewed ATC's policies and implementing procedures for qualification of Class1E components to verify compliance with Criterion III, "Design Control," and Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The inspectors evaluated a sample of qualification packages to ensure that they were properly performed in accordance with Institute of Electrical and Electronics Engineer (IEEE) standards as required by customer purchase orders (POs). Additionally, the inspectors reviewed how ATC procured safety-related EMC tests for the purpose of environmental qualification. The documents reviewed by the inspectors are included in the attachment to this inspection report.

b. Observations and Findings

Circuit Breaker Qualification

The NRC inspection team reviewed PO 415850-3 from TVA (Sequoyah Nuclear), dated December 30, 2014, for a two pole 250 volt direct current (VDC) breaker. ATC procured

a commercial-grade three pole breaker for this order and modified the breaker to remove automatic trip functions, essentially making the breaker a switch. After seismically qualifying the breaker, ATC removed one of the poles to meet the customer specifications, and then dedicated the breaker. Since ATC chose to seismically qualify the breaker in the three pole configuration, and then modify the breaker to two poles, ATC provided a similarity analysis for seismic qualification. The customer PO required that this safety-related order be supplied in accordance with IEEE 323-1974 "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations," IEEE 344-1975 "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment Nuclear Power Generating Stations," and TVA specifications. Test Plan STP12T1970-01-01, documented that the breaker has the following safety functions: (1) the breaker (switch) must close and carry the rated current/voltage when manually closed, and (2) the breaker (switch) must open when manually tripped. The test plan also stated that the breaker was seismically qualified in accordance with the IEEE 344-1975 "IEEE Recommended Practices for Seismic Qualification for Class 1E Equipment for Nuclear Power Generating Stations."

After the NRC reviewed the qualification package and discussed the testing with ATC personnel, it was clear that the seismic qualification included multiple iterations of seismic tests. The seismic tests were of similar, but not equivalent, configurations. Specifically, there were no consecutive seismic tests where an equivalent breaker and configuration were tested due to an internal component change, breaker state (open/close), and mounting configuration changes. ATC did not have an appropriate analysis, in accordance with IEEE 344-1975, to address the multiple seismic tests of similar, but not equivalent, configurations to demonstrate that the breaker could meet its performance requirements when subjected to seismic acceleration. In addition the qualification testing, similarity analysis, and dedication plan failed to address that if the breaker was in the open position, it could be manually closed following a safe shut down earthquake (SSE) to and carry the rated current/voltage.

The failure to verify the adequacy of the design of circuit breakers through a suitable testing program is identified as Nonconformance 99901458/2015-201-01. ATC took prompt corrective action and opened corrective action report (CAR) 15T-14 to evaluate this issue.

CGD of Class 1E Components

The NRC inspection team reviewed the dedication plan and corrective actions associated with Moore 535 digital controllers. Specifically, the NRC reviewed CAR 11T-42 that addressed a Part 21 notification made by ATC in July 2012 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML121910333). The Part 21 notified licensees of a defect in Moore 535 digital controllers due to an incompatible SRAM chip being installed on the main processing unit of the controller. ATC identified that an incompatible SRAM chip rated for 3.5 VDC was installed on a circuit board rated for a 5 VDC. The incompatible chip would pass the burn-in and functional tests, but could cause the controller to fail in-service. As part of the corrective action, ATC identified the part number of the SRAM chip that failed as a critical characteristic on the 535 controller's dedication plan. However, the NRC

inspectors identified that part number verification does not provide a quantitative measure that the SRAM chip is properly rated. In addition, the NRC noted that ATC procures the 535 controller from commercial supplier Moore Industries, and Moore Industries procures the SRAM chip from commercial distributor AVNET. Neither ATC nor Moore has a process in place to quantitatively verify the SRAM chips received from a commercial sub supplier is compatible with the circuit board. Therefore, ATC failed to identify appropriate acceptance criteria to ensure the rating of the SRAM chip installed on a 535 digital controller is compatible with the circuit board rating to prevent a known failure mode.

The failure to identify appropriate acceptance methods to verify critical characteristics of 535 digital controllers is identified as an example of Nonconformance 99901458/2015-201-02.

The NRC inspection team also reviewed Palo Verde Nuclear Generating Station PO 500574602 for an Endevco cable assembly. "CGD for an Endevco Cable Assembly PO 500574602," Revision 1, dated May 6, 2013, identified critical characteristics of the cable assembly. These critical characteristics included verifying that that the sleeve material be constructed out of fiberglass to prevent inadvertent grounding and withstand high temperatures on the cable. An Endevco cable is a high temperature cable assembly used to supply adequate current to a system. ATC's acceptance method for verifying the material of the sleeve was specified as visual; however, a visual examination does not provide reasonable assurance that the material is fiberglass and not a different plastic or polymer that would not be able to prevent inadvertent grounding or withstand high temperatures.

The failure to identify appropriate acceptance methods to verify critical characteristics of an Endevco cable assembly is an additional example of Nonconformance 99901458/2015-201-02. ATC took prompt corrective action and opened CAR 15T-09 to evaluate this issue.

Suitability of Part and Processes

The NRC inspection team reviewed EMC qualification plan EMC11T3570-01-01, Revision 1 and 2, and qualification test report QTR11T3570-01-02, Revision 0, for a Foxboro controller. The NRC inspection team noted that TVA approved the use of qualification plan EMC11T3570-01-01, that required EMC qualification testing to be performed in accordance with Electric Power Research Institute (EPRI) TR-102323, Revision 3. ATC used commercial test lab TUV to perform the EMC testing and specified in PO 00289518 to TUV, that testing be performed in accordance to EPRI TR-102323, Revision 3. However, TUV used International Electromechanical Commission (IEC) revisions that were not reviewed in the EPRI standard. The NRC noted that there was no documented engineering evaluation in ATC's qualification test report to ensure that the differences between the IEC revisions (i.e. changes in dB levels, test set up distances, equipment parameters, effective source impedances, insulation support, etc.) that were used during the test and the IEC revisions that were required per the qualification plan were accounted for and bounded to show that the test report met to the qualification plan requirements.

The failure to ensure that measures were established for the review for suitability of EMC testing of a safety-related controller is an example of Nonconformance 99901458/2015-201-03.

In addition, the NRC inspection team reviewed the CGD plan CGD12T2205-01-1 Rev. 1, for a capacitor for Point Beach Nuclear Plant. The PO required a Foxboro capacitor (P/N H0183AC). ATC's COC to the licensee stated the item supplied was a Foxboro capacitor (P/N H0183AC); however, the actual item shipped to Point Beach Power Plant was a Nippon Chemi-Con capacitor (P/N 32D5941). The NRC did note that ATC was aware that they were shipping a different capacitor than what was required by the licensee and had determined that the capacitors had similar electrical properties; however, failed to accurately reflect that information on the COC. Since the end use of the capacitor was not specified in the PO, the licensee would need to be aware of the specific part number they are receiving in order to evaluate the application. For example, installing the capacitor into a qualified component, could challenge or invalidate the equipment qualification.

The failure to ensure that measures were established for the review for suitability of a capacitor is an additional example of Nonconformance 99901458/2015-201-03. ATC took prompt corrective action and opened CAR 15T-12 to evaluate this issue.

c. Conclusions

The NRC inspection team determined that ATC did not adequately implement the requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. The NRC issued Nonconformance 99901458/2015-201-01, for ATC's failure to verify the adequacy of the design of circuit breakers through a suitable testing program. In addition, the NRC inspection team issued Nonconformance 99901458/2015-201-02, for ATC's failure to identify appropriate acceptance methods to verify critical characteristics for an Endevco Cable assembly and a 535 digital controller. Furthermore, the NRC issued Nonconformance 99901458/2015-201-03, for ATC's failure to ensure that measures were established for the review for suitability of application of a capacitor and suitability of processes for EMC testing of a Foxboro controller.

3. Software Commercial Grade Dedication

a. Inspection Scope

The NRC inspection team reviewed ATC's software CGD policies and procedures to verify compliance with Criterion III, "Design Control," of Appendix B to 10 CFR Part 50, which is supported by the CGD definitions in 10 CFR Part 21. In addition, the inspectors reviewed ATC procedure QAP-3-002, "Computer Software Quality Assurance and Control," and discussed the software CGD process with ATC personnel. The inspectors reviewed completed CGD documentation for the Moore Industries 535 and the Siemens 353 digital controllers to verify implementation. The sample of completed documentation

included inspection of safety function assessment, failure modes and effects analysis, determination of critical characteristics, and designation of methods of acceptance for the computer program resident in each controller. The documents reviewed by the inspectors are included in the attachment to this inspection report.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team determined that ATC established a program that adequately controls software CGD in accordance with the regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

4. Procurement Document Control

a. Inspection Scope

The NRC inspectors reviewed procurement procedures, a sample of purchasing records, and interviewed ATC personnel responsible for implementing the procurement program to verify compliance with Criterion IV, "Procurement Document Control," of Appendix B to 10 CFR Part 50. In addition, the inspectors reviewed section 4.0, "Procurement Document Control," of the ATC Quality Program Manual and ATC implementing procedure QAP-4-001, "Procurement Document Control." The inspectors discussed the PO issuance process with ATC personnel and sampled issued PO documentation to verify implementation. The sample of PO documentation included services, software, and component samples procured as basic components or commercially as part of CGD. The documents reviewed by the inspectors are included in the attachment to this inspection report.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team determined that ATC established a program that adequately controls procurement document control in accordance with the regulatory requirements of Criterion IV, "Procurement Document Control," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

5. Measuring and Test Equipment

a. Inspection Scope

The NRC inspectors reviewed M&TE policies and implementing procedures to verify compliance with Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. The inspectors verified the implementation of M&TE control through direct observation of inspection activities of ATC personnel and review of certificates of calibration for a sample of M&TE. In addition, the NRC inspectors evaluated a sample of M&TE associated with the functional testing for pressure boundary integrity and seismic testing for pressure gauges. Furthermore, the inspectors observed Portable X-Ray Spectrum Analyzer (XRF) and Fourier Transform Infrared spectroscopy (FTIR) analyses of pistons for valve regulators. The inspectors sampled instruments used during testing to ensure they were calibrated and appropriate for the range of operation for each described activity. The documents reviewed by the inspectors are included in the attachment to this inspection report.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team concluded that ATC established a program that adequately controls calibration and use of M&TE in accordance with the regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

6. Nonconformance and Corrective Action

a. Inspection Scope

The inspectors reviewed ATC's policies and procedures governing the implementation of nonconforming components and corrective actions to verify compliance with Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The inspectors reviewed ATC documented conditions adverse to quality such as corrective action reports to verify actions to resolve the identified conditions were implemented in a timely matter. In addition, the inspectors reviewed nonconformance report justifications to verify appropriate disposition items. The inspectors also conducted several interviews of ATC's management and technical staff about the evaluation of nonconforming components and corrective actions. The inspectors verified that ATC's nonconformance and corrective action processes provides guidance to evaluate issues for reportability under ATC's 10 CFR Part 21 program. The documents reviewed by the inspectors are included in the attachment to this inspection report.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team concluded that the ATC established a program that adequately controls nonconforming material, parts, or components and corrective action in accordance with the regulatory requirements of Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

7. Audits

a. Inspection Scope

The inspectors reviewed ATC's policies and procedures governing the implementation of audits to verify compliance with Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50. The inspectors reviewed a sample of ATC internal audits and completion of follow-up actions if applicable. The documents reviewed by the inspectors are included in the attachment to this inspection report.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team concluded that ATC established a program that adequately implements the regulatory requirements of Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

8. Entrance and Exit Meetings

On March 16, 2015, the NRC inspection team presented the inspection scope during an entrance meeting with ATC personnel including Clyde Keaton, Chief Executive Order (CEO) of ATC. On March 20, 2015, the inspectors presented the inspection results during an exit meeting with ATC personnel.

ATTACHMENT

1. PERSONS CONTACTED AND NRC STAFF INVOLVED:

Name	Title	Affiliation	Entrance	Exit	Interviewed
Kevin Morrow	Quality Assurance Manager	ATC	X	X	X
Ray Chalifoux	VP of Quality Assurance	ATC	X	X	x
Milton Concepcion	Operations Director	ATC	X	X	x
Kevin O'kane	Material Manager	ATC	X	X	X
Brad Snyder	Lab Supervisor	ATC	X	X	X
Clyde Keaton	CEO	ATC	X	X	
Doug Vantassell	President	ATC	X	X	
Robert Lane	VP Sales	ATC	X	X	
Millicent Bialock	Materials	ATC		X	
Kevin Kell	IT	ATC		X	
Joshua Rellz	QA Inspector	ATC		X	
Rosemarie O'Kane	Buyer	ATC		X	
Gail Husveth	Sourcing Manager	ATC		X	
Wes Morgan	AE	ATC		X	
Erny Chenbak	Technician	ATC		X	
Chris Koboldt	Engineer	ATC		X	
Amanda Walters	Admin Specialist	ATC		X	
Heather Born	HR Manager	ATC		X	
Rebecca Vannier	Senior Marketing Coordinator	ATC		X	
Dawn Ward	Admin Assistant	ATC		X	
Andrew Nack	Senior I &C Engineer	ATC		X	X
Dexter Kendall	Engineer	ATC		X	

Name	Title	Affiliation	Entrance	Exit	Interviewed
David Wilson	Level II Test Technician	ATC		X	X
Jared Holbrook	Engineer	ATC		X	
Jason Colby	Technician	ATC		X	
Nicholas Smith	Technician	ATC		X	
Kent Hobbs	APP Engineer	ATC		X	
Kendall Whitehorse	RI	ATC		X	
Jason Lane	Warehouse	ATC		X	
Paul Deadmond III	Technician	ATC		X	X
Donald Sinclair	Technician	ATC		X	
Howard Butle	Sales	ATC		X	
Chris Prats	Prediction Manager	ATC		X	
Annie Ramirez	Inspection Team Leader	NRC	X	X	
Eugene Huang	Inspection Team Member	NRC	X	X	
Stacy Smith	Inspection Team Member	NRC	X	X	
George Lipscomb	Inspection Team Member	NRC	X	X	
Nicholas Savwoir	Inspection Team Member	NRC	X	X	

2. INSPECTION PROCEDURES USED:

IP 43002, “Routine Inspections of Nuclear Vendors”

IP 43004, “Inspection of Commercial-Grade Dedication Programs”

IP 36100, “Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance”

3. ITEMS OPENED, CLOSED, AND DISCUSSED:

Item Number	Status	Type	Description
99901458/2015-201-01	OPEN	NON	Criterion III
99901458/2015-201-02	OPEN	NON	Criterion III
99901458/2015-201-03	OPEN	NON	Criterion III

4. DOCUMENTS REVIEWED:

Procedures

- QAP-11 -001 Test Control Rev. 7 dated 8/6/2010.
- QAP-12-001 Control of Measuring and test equipment Rev. 8 dated 10/23/2014.
- QAP-12-001-1 Calibration Recall List
- QAP-12-001-2 Repair/ Calibration History Record
- QAP-12-001-3 Gage/Instrument out of Specification Notice
- G-805, Material Analysis Test Procedure XRF- Rev 1, dated 3/13/2015
- Generic Tri Axial Seismic Test Procedure GTP-06 Rev.2 dated 6/14/2013
- QAP-16-001-1 “Corrective Action,” Revision 5, 7/8/2010.
- Document No. 1-00-02, “Quality Program Manual,” Revision 0, dated 7/9/2010.
- QAP-3-002, “Computer Software Quality Assurance and Control,” Revision 6, dated 12/5/2014.
- QAP-4-001, “Procurement Document Control,” Revision 6, dated 8/14/2014.
- QAP-4-001, “Procurement Document Control,” Revision 3, dated 7/25/2011.
- QAP-4-001, “Procurement Document Control,” Revision 2, dated 6/11/2010.
- QAP-7-006, “Counterfeit and Fraudulent Material Program, Revision 1.

Nonconformance Reports (NCRs) and Corrective Action Reports (CARs)

- CAR 15T-12,dated 3/19/2015 (in process)
- CAR 14T-13,dated 3/18/20115 (in process)
- CAR 15T-08,dated 3/15/2015 (in-process)
- CAR 15T-13,dated 3/19/2015 (in-process)
- CAR 12T-01, dated 1/3/2012.
- CAR 12T-03, dated 1/19/2012.
- CAR 12T-05, dated 1/24/ 2012.
- CAR 12T-11, dated 2/9/2012.
- CAR 12T-12, dated 2/9/2012.
- CAR 12T-15, dated 2/29/2012.
- CAR 12T-22, dated 4/27/2012.
- CAT 12T-35, dated 8/14/2012.
- CAR 13T-06, dated 1/28/2013.
- CAR 13T-07, dated 1/20/2013.
- CAR 13T-16, dated 3/14/2013.
- CAR 13T-15, dated 3/14/2013.
- CAR 13T-16-R1, dated 3/14/2013.
- CAR 14T-20, dated 9/17/2014.
- CAR 11T-42, dated 10/14/2011.
- NCR 10T2190-01, dated 8/28/2012.
- NCR 10T4840-13, dated 3/12/2012.
- NCR 11T8740-02, dated 11/13/ 2012.
- NCR 11T11660-01, dated 5/21/2012.
- NCR 12T0285-01, dated 3/13/2012.
- NCR 12T2585-01, dated 9/4/2012.
- NCR 12T2585-02, dated 9/4/2012.
- NCR PA4302-01, dated 5/20/2010.
- *NCR 14T3325-02, dated 1/21/2015.
- *CAR 15T-11, dated 3/18/2015.

Commercial Grade Dedication Packages

- CGD12T4125-0101, Revision 1, dated 5/6/2013.
- CGD13T0815-01-01, Revision 0, dated 4/25/2013.
- CGD11T1470-01-01, Revision 2, dated 3/12/2012.
- CGD 11T8740-01-01, Revision 1
- PA4302-CGD-01, Revision 1
- CGD14T2335-01-01, dated 10/27/2014.
- CGD12T-04, dated 11/12/2012.
- CGD12T1970-01-01, Revision 1, dated 8/28/2013

Audits

- Survey Report 12T-04 for Moore Industries International dated 11/2/2012.
- Survey Report ATCN-12-01 for Siemens Industry, Inc. dated 2/15/2012.
- Internal audit ATCN-13-01, dated 7/18/2013.
- Internal audit IA-2014-001, dated 7/17/2014
- Audit report 13T-01, Analysis and Measurement Services Corporation (AMS), dated 10/11/2013.

Procurement Documents

- PO 500574602," Palo Verde," dated 4/19/2013.
- PO 00044614 "Xcel Energy," dated 11/29/2012.
- PO 0229373 "Simco Electronics," 10/2/2012.
- PO 00366332, "Certificate Measurements Inc.," dated 1/6/2015.
- PO 00361814 "Certified Measurements Inc.," dated 12/1/2014.
- PO 522317-2 "TVA-Watts Bar," dated 3/11/13.
- PO 0018445 "Calhoun Station" dated 1/24/2013.
- PO 00493103 "Exelon Manufacture: Moore Industries," dated 9/5/2012.
- PO 00031128 "Exelon," dated 3/14/ 2013.
- PO 800493 "TVA," dated 2/23/2015.
- PO 00184395 "OPPD," dated 1/24/2013.
- PO 500101-7625816 "Intermech," dated 9/16/2013.
- PO 00264099 "Moore Industries – Int'l, Inc.," dated 3/20/2013.
- PO 00299554 "Applied Technical Services, Inc.," dated 10/29/2013.
- PO 00262090 "Applied Technical Services, Inc.," dated 3/7/2013.
- PO 070913 "ANSYS, Inc.," dated 7/9/2013.
- PO 0020311 "ANSYS, Inc.," dated 2/3/2011.
- PO 00372348"Tyco Electronics," dated 2/23/2015.
- PO 00265523 "TE Connectivity," dated 6/6/2013.
- PO 00248816 "Honeywell, Inc.," dated 2/26/2013.
- PO STS-03364 "Honeywell Corp.," dated 4/5/2005.
- PO 00272923, ATC to Analysis & Measurement Services for EMC on Eagle Signal Controls Time Delay, dated 5/16/2013.
- PO 00293527, ATC to TUV America, dated 9/23/2013.
- PO 00290338, ATC to TUV America, dated 9/6/2013.
- PO 00070933, TVA to ATC, dated 5/4/2011.
- PO 00289518, dated 8/30/2013.
- PO 415850-3-GE-2-50, circuit breaker for Sequoyah, dated 12/30/2014
- PO 00478771, Switch, dated 4/23/2013
- PO 0003113, Capacitor, dated 4/9/2012

Qualification Reports and Test Procedures/Reports

- Report No. S2000-RP-03, "Dedication and Software Verification and Validation Test Report for the Southern Testing Services, Inc. / Powers Process Controls Single-Loop Process Controller," Revision 0, dated February 7, 2000.
- Report No. S2000-RP-03, Addendum 1, "Dedication and Software Verification and Validation Report Addendum for Moore Industries 535 Process Controllers," Revision 1, dated May 3, 2010.
- Report No. S2000-RP-03, Addendum 2, "Dedication and Software Verification and Validation Report Addendum for Moore Industries 535 Process Controllers," Revision 1, dated November 21, 2014.
- Report S2000-RP-02, Addendum 1, "Seismic Test Report Addendum for Southern Testing Services, Inc. / Powers (Moore Industries) Process Controls Single-Loop Process Controller," Revision 0, dated April 12, 2010.
- Report QTR11N1470, "Qualification Test Report – Siemens Energy & Automation Process Automation Controller (PAC) 353 Design Level B, ATC Job Numbers: 11N1470, Detroit Edison – Fermi Purchase Order 4700404946 and 10N4690, NEXTERA – Seabrook Purchase Order 02259187," Revision 3, September 12, 2012.
- QTR11T3570-01-02, "EMC qualification test report for a Foxboro pneumatic indicating controller part number 43AP-PA52C/ESA21AN," dated October 31, 2013.
- EMC11T3570-01-01, "Electromagnetic compatibility qualifications plan for Foxboro pneumatic indicating controller part number 43AP-PA52C/ESA21AN," dated August 23, 2013.
- Test report NC1308923, "EMC test report," dated September 26, 2013.
- S1081-RP-01, "Nuclear Environmental and Seismic Qualification for General Electric Company Circuit Breaker Cat# AKR-20-30", dated January 9, 1996
- QTR12T1970-01-01, Revision 0, dated November 17, 2014

Measuring and Test Equipment Documents

- Certificate of calibration #1327597 for Jodice power system timer, dated January 24, 2014.
- Certificate of Conformance/Calibration for ATC order 000264099 dated March 28, 2013.

Miscellaneous Documents

- Moore Industries 535 controller 2013 BOM for Job 13T0815: Documents 535-803-00REVB, 535-607 C1 POWERS, 535574AREVF) (undated).
- Moore Industries 535 controller 2010 BOM for S2000-RP-02 Addendum 1 (Documents: 535-803-00REVA, 535-607REVC, 535574AREVE1) (undated).
- Moore Industries 535 controller 2008 BOM for PA2000-RP-01 (Documents: 535-803-00REVA, 535-607REVB1, 535574AREVD) (undated).
- Qualification record for Technical Expert Richard Marchetti dated August 2, 2010.
- Moore Industries ECO 15864 dated July 28, 2010.
- Moore Industries ECO 15517 dated July 28, 2010.
- Moore Industries ECO 15985 dated February 25, 2011.
- Moore Industries ECN 16516 dated July 10, 2012.

- Moore Industries ECN 16532 dated July 10, 2012.
- Moore Industries ECN 16667 dated July 10, 2012.
- Moore Industries ECN 16645 dated July 10, 2012.
- Moore Industries ECN 16227 dated February 29, 2012.
- Moore Industries ECN 16063 dated August 29, 2011.
- 12T3875, "Memo for qualification by similarity analysis in accordance with GP-960," dated September 23, 2013.
- S1015-RP-01, "Nuclear environmental and seismic qualification for an eagle signal controls DA200 series miniflex digital set repeat cycle timer, latch and latch release kit, and relay socket," Revision 0.
- Supplier CGI Survey Report 12T-04, "Moore Industries International, dated November 2, 2012.
- TVA SS E18.14.01, dated June 29, 1995, Revision 0.
- COC #11T3570-01-01, dated November 12, 2013.
- Seismic Plan SP12T1970-01-01, for GE Manually Operated (MO) Model AK-2-50 2 Pole 1600A 480V/25VDC Breaker/Switch, Revision 0

5. ACRONYMS USED:

ADAMS	Agencywide Documents Access and Management System
BOM	bill of materials
CAR	corrective action report
CGD	commercial-grade dedication
CFR	*Code of Federal Regulations*
COC	Certificate of Conformance
DCIP	Division of Construction Inspection and Operational Programs
ECN	engineering change notice
ECO	engineering change order
EMC	electromagnetic compatibility
EPRI	Electric Power Research Institute
EVIB	Electrical Vendor Inspection Branch
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IP	inspection procedure
M&TE	measuring and test equipment
NCR	nonconformance report
NON	Notice of Nonconformance
NRC	(U.S.) Nuclear Regulatory Commission
NRO	Office of New Reactors
PO	purchase order
QA	quality assurance
QAM	quality assurance manual
QAP	quality assurance procedure
U.S.	United States (of America)
VDC	volts direct current