June 11, 2015

Mr. Justin Hubbard, Quality Manager
Kinectrics, Inc.
800 Kipling Ave., Unit 2
Toronto, ON, M8Z 5G5, Canada

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION OF KINECTRICS, INC. REPORT NO. 99901415/2015-201 AND NOTICE OF NONCONFORMANCE

Dear Mr. Hubbard:

On April 27, 2015, to May 1, 2015, the U.S. Nuclear Regulatory Commission (NRC) conducted a joint inspection under the Multinational Design Evaluation Programme (MDEP) protocol VICWG-01 at the Kinectrics, Inc. (Kinectrics) facility in Toronto, Ontario, Canada. Using the MDEP protocol the NRC inspection team was supplemented with an inspector from the Canadian Nuclear Safety Commission (CNSC). The purpose of this limited-scope inspection was to assess Kinectrics' 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 Kinectrics' implementation of quality activities associated with the testing of safety-related components supplied to U.S. operating reactor plants and to Westinghouse Electric Company (Westinghouse) AP1000 plants under construction. The enclosed report presents the results of this inspection. During this inspection, the NRC staff looked at the environmental qualification (EQ) activities for safety-related components associated with inspections, tests, analyses, and acceptance criteria (ITAAC) from revision 19 of the approved Westinghouse AP1000 design certification document. Specifically, these activities were associated with ITAAC 2.2.01.06a.ii, ITAAC 2.1.03.09a.ii, and ITAAC 3.5.00.01.ii. The NRC inspection team did not identify any findings associated with the ITAAC contained in Section 4 of the attachment to this report. 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 customers. Specifically, Kinectrics failed to establish adequate measures to ensure that testing requirements were satisfied, failed to implement measures to control the issuance and use of technical documents, failed to initiate and implement the nonconformance and corrective action processes, and failed to verify a commercial-grade dedication (CGD) critical characteristic associated with software validation. 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 (NON). We will consider extending the response time if you show good cause for us to do so.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response, (if applicable), 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).

Sincerely,

/RA/

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

Docket No.: 99901415

Enclosures:
1. Notice of Nonconformance
2. Inspection Report 99901415/2015-201
   and Attachment

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 (NON). We will consider extending the response time if you show good cause for us to do so.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response, (if applicable), 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).

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Docket No.: 99901415

Enclosures:
1. Notice of Nonconformance
2. Inspection Report 99901415/2015-201 and Attachment

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DATE	06/02/2015	06/01/2015	05/29/2015	06/11/2015

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NOTICE OF NONCONFORMANCE

Kinectrics, Inc.
800 Kipling Ave., Unit 2
Toronto, ON, M8Z 5G5, Canada

Docket No.: 99901415
Report Number: 2015-201

Based on the results of a Nuclear Regulatory Commission (NRC) inspection conducted at Kinectrics Inc.'s (Kinectrics) facility in Toronto, Ontario, Canada, on April 27, 2015, through May 1, 2015, certain activities were not conducted in accordance with NRC requirements which were contractually imposed on Kinectrics by NRC licensees:

A. Criterion XI, "Test Control," of Appendix B, Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, states, in part, "A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents."

   Criterion VI, "Document Control" of Appendix B, 10 CFR Part 50, states, in part, "Measures shall be established to control the issuance of documents, such as instructions, procedures, and drawings, including changes thereto, which prescribe all activities affecting quality. These measures shall assure that documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and are distributed to and used at the location where the prescribed activity is performed."

   Section 11.3 of Kinectrics 10 CFR Part 50 Appendix B Quality Assurance Manual (QAM), Revision I, dated March 6, 2015, states, in part, "Characteristics to be tested and test methods to be employed shall be specified. Test procedures shall reference or contain acceptance and/or rejection criteria from applicable design or purchasing documents. Testing shall be performed in accordance with written and approved procedures under suitable environmental conditions."

   Section 6.4 of Kinectrics QAM, Revision I, dated March 6, 2015, states, in part, "Internally developed final technical documents shall be reviewed and approved prior to release."

   Section 5.1 of Kinectrics Operating Procedure (OP) 5-6, "Control & Identification of Technical Documents," Revision 8, dated November 30, 2010, states, in part, "ensure that documents received a review and approval prior use and ensure that the documents are clearly marked DRAFT and are signed by author prior circulation."

Contrary to the above, as of May 1, 2015, Kinectrics failed to establish adequate measures to ensure that testing requirements were satisfied in accordance with written test plan procedures, and failed to implement measures to control the issuance and use of technical documents, which prescribe activities affecting quality. Specifically, Kinectrics failed to ensure that the design basis accident (DBA) requirements (i.e. high humidity and containment temperature) for two Duke Nuclear LLC purchase orders (POs) were appropriately translated into test plan K-015963-PSWI-004 R01, qualification report K-015963-RP-004, and associated certificates of conformance (CoC). Furthermore, Kinectrics failed to ensure that all the tests were completed, reviewed, and approved by quality assurance personnel prior to the issuance of the CoCs, which referenced an unapproved qualification report.

This issue has been identified as Nonconformance 99901415/2015-201-01.

B. Criterion XV, "Nonconforming Materials, Parts, or Components," of Appendix B, to 10 CFR Part 50, states, in part, that, "Measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation."

Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50, states, in part, that, "In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition."

Section 16.1.2 of Kinectrics QAM, Revision I, dated March 6, 2015, states, "Nonconformities will be reported via a Nonconformance report (NCR) that prompts a Corrective Action Report (CAR) if a Significant Condition Adverse to Quality (SCAQ) is identified."

Section 1.2, of Kinectrics operating procedure (OP) 13-1, "Control of Nonconformities," Revision 16, dated August 5, 2014, states that the nonconformity procedure "applies to the identification and disposition of any Kinectrics work found not conforming to requirements, including problems and deficiencies both in product and quality programs."

Section 5.1, of Kinectrics OP 13-1, Revision 16, dated August 5, 2014, states that "Upon identifying a nonconformance, the discovering employee shall initiate a NCR in Intelex."

Contrary to the above, as of May 1, 2015, Kinectrics failed to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation, and, in the case of significant conditions adverse to quality, failed to appropriately assure that the cause of the condition was determined and corrective actions were taken to preclude repetition.

Specifically, the NRC inspection team found multiple examples where Kinectrics personnel did not initiate or inadequately completed a NCR; which initiates both the Kinectrics nonconformity and corrective action processes. In addition, the guidance available in Kinectrics' OP was not sufficiently clear to allow employees to recognize which issues should have been characterized as SCAQ and thus take necessary actions to prelude repetition. Examples of these deficiencies were:

- Kinectrics' personnel failed to initiate a NCR relating to two departures from test requirements that occurred on April 13, 2015, during terminal block qualification testing for United Controls International PO 2360-4REV1, Revision 0, dated March 18, 2015: (1) Test temperature exceeded the 300 degrees Celsius calibrated range of the measuring thermocouples on multiple occasions, and (2) Test voltage dropped below the required 850 volt dc on multiple occasions.

- Kinectrics' personnel failed to initiate a NCR or CAR relating to the 2012 NRC inspection Notice of Nonconformance which identified two deficiencies related to the dedication of commercial molded case circuit breakers: (1) Nonconformance 99901415/2012-201-03 for failure to appropriately verify the adequacy of certain circuit breaker design features, and (2) Nonconformance 99901415/2012-201-04 for failure to take appropriate corrective and preventive measures in establishing the authenticity and traceability of the circuit breakers.

- Kinectrics preventive measures in response to NRC Nonconformance 99901415/2012-201-04, a finding relating to establishing the authenticity and traceability of commercial molded case circuit breakers, addressed the procurement from Tiger Controls. However it failed to show evidence that personnel made a determination of significance (e.g. if the issue was a SCAQ). Kinectrics failed to demonstrate if they should have addressed the generic case of establishing authenticity by verifying component traceability to the original equipment manufacturer (OEM) for other distributor orders when OEM tests were relied upon as a part of commercial-grade dedication.

- Kinectrics extent of condition failed to identify all customer projects affected by Kinectrics 10 CFR Part 21 report dated June 27, 2014, which related to a potential defect in irradiation services provided by Steris Isomedix. Kinectrics letter to Duke Energy Carolinas, dated June 27, 2014, identified three affected POs, but failed to identify PO 148575 for component qualification and PO 149027 for components.

This issue has been identified as Nonconformance 99901415/2015-201-02.

C. 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.”

Attachment 2, “Surveys of Test and Calibration Service Providers,” of Kinectrics Administrative Work Instruction (AWI) 6-4, “Commercial Grade Dedication,” Revision 3, dated September 23, 2013, states, in part, that “a standard set of critical characteristics shall be examined within the suppliers program and facilities. These include the supplier measures to control: software if used for processing results is validated.”

Contrary to the above, as of May 1, 2015, Kinectrics failed to establish adequate measures for the selection and review for suitability of application of materials that are essential to the safety-related functions of the structures, systems, and components. The NRC inspection team found that Cal-Matrix survey report QA-2014-15 dated July 5, 2014, and Navair survey report QA-2014-11 dated July 25, 2014, did not provide objective evidence of verification of all critical characteristics associated with commercial calibration services for a seismic accelerometer. Specifically, the surveys did not validate supplier controls of processing software used in the calibration of accelerometer number 32286, which was used in AP1000 junction box panel number 1 and 3 qualification for Westinghouse Electric Company (Westinghouse) PO 4500631186.

This issue has been identified as Nonconformance 99901415/2015-201-03.

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; and (4) the date when your corrective action will be completed. Where good cause is shown, the NRC will consider extending the response time.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC’s Agencywide Documents Access and Management System, which is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html, to the extent possible, it should not include any personal privacy, proprietary, or Safeguards Information 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 be withheld, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information 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 11th day of June 2015.

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

Vendor Docket No.:	99901415	
Inspection Report No.:	99901415/2015-201	
Vendor:	Kinectrics 800 Kipling Ave., Unit 2 Toronto, ON, M8Z 5G5, Canada	
Vendor Contact:	Mr. Justin Hubbard, Quality Manager justin.hubbard@kinectrics.com (416) 207-6000 Ext. 6137	
Nuclear Industry Activity:	Kinectrics provides safety-related component services for operating power plants and new construction. Kinectrics primarily conducts equipment qualification and component testing for applications both inside and outside containment.	
Inspection Dates:	April 27, 2015 to May 1, 2015	
Inspection Team Leader:	George Lipscomb	NRC/NRO/DCIP/EVIB
Inspectors:	Jose Jimenez	NRC/NRO/DICP/EVIB
	Annie Ramirez	NRC/NRO/DCIP/EVIB
	Alfredo Matos-Marin	NRC/R-II/DCI/CIB1
	Paul Wong	CNSC
Approved by:	Richard A. Rasmussen, Chief Electrical Vendor Inspection Branch Division of Construction Inspection and Operational Programs Office of New Reactors	

Enclosure 2

EXECUTIVE SUMMARY

Kinectrics
99901415/2015-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a joint inspection under the Multinational Design Evaluation Programme (MDEP) protocol VICWG-01 at the Kinectrics, Inc. (Kinectrics) facility in Toronto, Ontario, Canada. Using the MDEP protocol the NRC inspection team was supplemented with an inspector from the Canadian Nuclear Safety Commission (CNSC). The purpose of this limited-scope inspection was to verify that Kinectrics 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." Specifically, the NRC staff evaluated environmental qualification (EQ) of safety-related components associated with inspections, tests, analyses, and acceptance criteria (ITAAC) from revision 19 of the approved Westinghouse Electric Company (Westinghouse) AP1000 design certification document. Specifically, these activities were associated with ITAAC 2.2.01.06a.ii, ITAAC 2.1.03.09a.ii, and ITAAC 3.5.00.01.ii. The NRC inspection team conducted the inspection from April 27 through May 1, 2015. This inspection also evaluated corrective actions associated with findings identified during the May 2012 NRC inspection at the same facility.

This technically-focused inspection evaluated Kinectrics' implementation of quality activities associated with the inspection and testing associated with four safety-related components for both operational plants and new plant construction. In addition to observing these activities, the NRC inspection team evaluated test control and its effect on component EQ, supplier controls, commercial-grade dedication (CGD) and associated commercial surveys, problem resolution and reporting, and control of measuring and test equipment (M&TE).

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

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

During the course of this inspection, the NRC inspection team implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors"; 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.

Test Control and Qualifications

The NRC inspection team determined that Kinectrics has not adequately implemented the requirements of Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The NRC inspection team issued Nonconformance 99901415/2015-201-01 for Kinectrics' failure to ensure that deviations from an approved test plan were documented, evaluated and approved in accordance with procedural requirements prior shipment of safety-related components and

issuance of certificates of conformance (CoCs). Specifically, Kinectrics fulfilled two Duke Nuclear LLC POs and delivered CoCs establishing that the supplied items were qualified per the associated qualification report. However, the report failed to identify that final design basis accident (DBA) profile qualification requirements were not met. Furthermore, Kinectrics failed to ensure that the qualification report was reviewed and approved by quality assurance personnel, as required by Kinectrics control procedures, prior to the issuance of the CoC.

Nonconformance/Corrective Action Program

The NRC inspection team issued Nonconformance 99901415/2015-201-02 in association with Kinectrics' failure to implement the regulatory requirements of Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Specifically for failing to initiate NCRs or corrective action reports (CARs) for issues identified during (1) the on-going qualification of a terminal block for United Controls International, or (2) resolution of findings associated with the NRC inspection of Kinectrics in 2012. Failure to initiate an NCR resulted in a lack of objective evidence that the actions associated with the NCRs/CARs were adequately evaluated for significance and that the proposed actions were implemented and closed.

Additionally, the NRC inspection team found two examples where the Kinectrics corrective and preventive action process was insufficient to preclude repetition. First, relating to the corrective actions relating to a past 2012 NRC finding, where Kinectrics corrective actions failed to address the generic case of verifying component traceability to the original equipment manufacturer (OEM) for distributor orders when OEM tests were relied upon as a part of CGD. Second, for Kinectrics' failure in their extent of condition to identify all customer projects affected by Steris Isomedix 10 CFR Part 21 report.

Commercial-Grade-Dedication / Control of Measuring and Test Equipment

The NRC inspection team determined that Kinectrics has established a program that adequately controls CGD in accordance with the regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50, and 10 CFR Part 21. However, the NRC inspection team identified two instances of inadequate implementation of the requirements of Criterion III when applied to verification of all critical characteristics during the survey of commercial calibration service suppliers. The NRC inspection team issued Nonconformance 99901415/2015-201-03 for Kinectrics' failure to ensure 2014 Navair Technologies and Cal-Matrix Metrology surveys validate supplier controls of processing software used in calibration as part of CGD.

AP1000 Equipment Qualification and Inspection, Tests, Analyses, and Acceptance Criteria (ITAAC)

The NRC inspection team determined that, Kinectrics' procedures and implementation of the inspected qualification activities were consistent with requirements specified in customer orders. The inspectors determined that Kinectrics' programmatic controls of procured qualification testing services for the qualification of components to be used in the AP1000 reactor design were adequate in support of ITAAC 2.2.01.06a.ii, ITAAC 2.1.03.09a.ii, and ITAAC 3.5.00.01.ii. No findings of significance were identified.

REPORT DETAILS

1. Test Control and Qualifications

a. Inspection Scope

The NRC inspection team examined the implementation of equipment qualification tests that were performed to verify the equipment designs adequately addressed performance requirements under worst case earthquakes and harsh operating environments. Kinectrics 10CFR50 Appendix B (QAM), Section 11 "Test Control," was reviewed to confirm the procedure addressed the requirements of Appendix B to 10 CFR Part 50. In addition, test procedure K-015963-PSWI-004 R01 for the qualification of Eaton C-H HMCP100R3C circuit breakers was reviewed to confirm the requirements of the QAM were addressed for qualification testing of safety-related circuit breakers. Elements of the test procedure evaluated for this inspection included the adequacy of test requirements and acceptance criteria in flowing down applicable design requirements and technical guidance. Test records were reviewed for adequacy of information recorded, including identification of test personnel, documentation of results, and reviews for acceptability of results.

The inspectors also reviewed records of test procedure K-115239-PSWI-001-R3 for the qualification testing of nuclear cables accessories. The review was performed to determine whether test parameters conformed to specifications provided by the customer, and whether test results were adequately documented and evaluated. The inspectors observed the test set up and preparation for environmental qualification (EQ), and reviewed documented test results. In addition, the inspectors interviewed the project engineer and electrical technician to understand the control of process and procedure for the execution of the test including the control of measurements and equipment.

The attachment to this inspection report lists the individuals interviewed and documents reviewed by the NRC inspection team.

b. Observations and Findings

The inspectors evaluated Kinectrics test plan K-015963-PSWI-0004-R01 and Kinectrics qualification report K-015963-RP-0004-R00 developed for qualification of circuit breakers and panels for Duke Nuclear. The inspectors identified that the approved test profile, which was developed by Kinectrics and approved by Duke Nuclear for the qualification of the breakers, was incomplete. The purchase order (PO) required seismic and environmental qualification for four circuit breakers and a circuit panel, in accordance with Institute of Electrical and Electronics Engineers (IEEE)-344-1975, "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," and with specific licensee design basis specifications for a worst case scenario earthquake. Additionally, the circuit breakers and panel were to be submitted for thermal and irradiation aging, and a more severe final design basis accident (DBA) profile because of the specific site location of the breakers.

The inspectors identified that Kinectrics did not complete qualification report (K-015963-RP-0004-R00) and that the qualification report did not include DBA qualification data or a technical evaluation for the DBA analysis as required by test plan K-015963-PSWI-0004-R01. The inspectors noted that Kinectrics fulfilled two POs (PO149027 and PO149028) and delivered certificates of conformance (CoC) establishing that the items supplied to Duke Nuclear were qualified per qualification report K-015963-RP-0004-R00. However, the report failed to identify that DBA qualification test plan requirements were not met or why the report deviated from customer approved test plan requirements. Furthermore, Kinectrics failed to ensure that the qualification report was reviewed and approved by quality assurance personnel, as required by Kinectrics control procedures prior to the issuance of the CoC. The inspectors determined the CoCs referenced an unapproved qualification report, and therefore do not provide reasonable assurance that the breakers and circuit panels supplied to Duke Nuclear meet PO requirements. This issue is identified as NON 99901415/2015-201-01.

c. Conclusions

The NRC inspection team determined that Kinectrics has not adequately implemented the requirements of Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The NRC inspection team issued Nonconformance 99901415/2015-201-01 for Kinectrics' failure to ensure that deviations from an approved test plan were documented, evaluated and approved in accordance with procedural requirements prior shipment of safety-related components and issuance of CoCs.

2. Nonconformance/Corrective Action Program

a. Inspection Scope

The NRC inspection team reviewed policies, implementing procedures, and records that govern the control of nonconforming materials, parts, and components to verify compliance with Criterion XV, "Nonconforming Materials, Parts, or Components," and that govern corrective actions to verify compliance with Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed the Kinectrics' QAM, which contains the overall quality policies, to ensure it addressed the regulatory requirements for nonconforming items and corrective actions. Additionally, the NRC inspection team reviewed corrective and preventive actions from the 2012 NRC inspection, and a limited number of NCRs and CARs to assess Kinectrics' program implementation.

The attachment to this inspection report lists the individuals interviewed and documents reviewed by the NRC inspection team.

b. Observations and Findings

b.1 Corrective Action Associated with Nonconformance 99901415/2012-201-01

During an NRC inspection conducted at the Kinectrics, Inc., facility in May 2012, the NRC issued Nonconformance 99901415/2012-201-01 for Kinectrics' failure to implement measures to ensure that testing performed by subcontractors was in conformance with procurement documents. Specifically, documentation associated with two Kinectrics suppliers of testing services did not contain adequate documentation of calibration data for instruments used.

In its response to the NRC, Kinectrics indicated that their corrective steps were captured by NCRs 1222 and 1215 and that all the associated calibration records were subsequently obtained and found acceptable. In addition, training for staff was conducted to avoid recurrence.

The NRC inspection team verified that the associated calibration records were available and adequate. The inspectors reviewed NCRs 1222 and 1215 and other documentation providing evidence of the completion of Kinectrics corrective actions in response to the finding. Based on the review of the objective evidence available, the NRC inspection team determined that the corrective actions documented in Kinectrics' response letter and NCRs 1222 and 1215 were adequate to address the identified finding.

b.2 Corrective Action Associated with Nonconformance 99901415/2012-201-02

The NRC also issued Nonconformance 99901415/2012-201-02 for Kinectrics' failure to explicitly state the proper technical standard and revision to be used for electromagnetic compatibility testing of electrical penetration assemblies. Consequently, the incorrect revision of the MIL-STD-461 was used to perform the testing.

In its response to the NRC, Kinectrics stated that a review comparing the MIL-STD-461E (required) to MIL-STD-461F (version used by subcontractor) was performed by a Kinectrics technical expert who verified that salient portions of the standard applied for the electrical penetration assemblies were either equivalent or conservative. As a result of this effort a revision to tests RE101, RE102, and RE103 was completed to align them with the required standard revision.

The NRC inspection team reviewed NCR 1216 and the documentation that provided objective evidence for the completion of the corrective actions. The NRC inspection team reviewed Kinectrics' revisions to tests RE101, RE102, and RE103, and confirmed they addressed the requirements of MIL-STD-461E. Based on this review, the NRC inspection team determined that Kinectrics' corrective actions documented in NCR1216 were adequate to address the identified finding.

b.3 Corrective Action Associated with Nonconformance 99901415/2012-201-03

The NRC also issued Nonconformance 99901415/2012-201-03 for Kinectrics' failure to perform inspections, tests, or analyses sufficient to verify the interrupting rating, which is a critical characteristic of the subject breakers. Kinectrics also failed to perform any actions that would have verified that the breakers were manufactured in accordance with a commercial program sufficient to verify the interrupting ratings.

In its response to the NRC, Kinectrics stated that it was evaluating the development of a standard template for the dedication for specific product types by identifying critical characteristics as well as providing the rational for the selection of those critical characteristics.

The NRC inspection team discussed the implementation of the templates with the Kinectrics quality engineers. The engineers stated that the development has not been completed because development would occur as they receive future POs and at the time of the inspection none had been received. Since a review of even a limited implementation of the corrective actions was not possible, this issue remains open.

b.4 Corrective Action Associated with Nonconformance 99901415/2012-201-04

The NRC also issued Nonconformance 99901415/2012-201-04 for Kinectrics' failure to ensure that the replacement breakers they received from Tiger Controls and shipped to Duke Energy were in fact authentic and could be traced back to the actual original equipment manufacturer (OEM).

In its response to the NRC, Kinectrics stated that the breakers were not shipped directly from the OEM but rather were shipped to an Eaton distribution center near Tiger Controls. Tiger Controls physically took possession of the breakers at that distribution center and shipped them directly to Kinectrics' laboratories in Toronto. This was due to the fact that Eaton would not ship these breakers internationally. Kinectrics has since confirmed through the OEM and Tiger Controls that the items were new and unused from the OEM.

The NRC inspection team verified the actions taken by Kinectrics personnel to ensure parts received from Tiger Controls had the necessary traceability back to the OEM. Based on the review of the objective evidence, the NRC inspection team determined that Kinectrics' corrective actions were adequate to address the specific conditions identified in the finding.

b.5 Implementation of Kinectrics' Nonconformance and Corrective Action Programs

The NRC inspection team noted during the review of the implementation of the nonconformance and corrective action programs that various issues and deficiencies that were known by Kinectrics personnel did not receive the necessary processing as a NCR or additional screening to determine if their significance warranted the issuance of a CAR. First, while evaluating test results for the qualification of a terminal block for United Controls International, the NRC inspectors observed that the test temperature exceeded the 300 degrees Celsius calibrated range of the thermocouples on multiple occasions during the first day of the test (approximately three weeks prior). Kinectrics personnel failed to address the departure by initiating an NCR as required by Section 5.1 of Kinectrics Operating Procedure (OP) 13-1. Additionally, the NRC inspectors noticed a drop in test voltage from the required 850 volts DC on multiple occasions on the first day of testing, also with no NCR initiation.

Second the NRC conducted an inspection of Kinectrics in 2012 where deficiencies resulted in the issuance of NON 99901415/2012-201-03 and NON 99901415/2012-201-04. Kinectrics OP-13-1 requires that any findings identified as a result of an audit shall be entered into the nonconformance program. In their response to the NRC, Kinectrics did not specifically state if NCRs and CARs were opened to address the findings identified in the 2012 inspection report. Discussion with Kinectrics' quality engineers showed that, while some actions were taken to address the findings, no NCRs were opened as required by the procedure. The NRC inspectors reviewed the documentation provided as evidence that the NONs were addressed adequately, and as stated in Sections 2.b.3 and 2.b.4 of this report, the NRC inspectors did not identify any issues with the documentation provided. However, Kinectrics was required to open a NCR in accordance with their procedures to facilitate trending of conditions adverse to quality and to ensure corrective actions precluded repletion if the issue was characterized as significant condition adverse to quality. Since no NCRs were opened, the Kinectrics QA process established to meet these requirements was never initiated.

The NRC inspection team also found two examples where the Kinectrics corrective and preventive action process was insufficient to preclude repetition. First, relating to the corrective actions relating to past NRC finding NON 99901415/2012-201-04, Kinectrics corrective actions did establish traceability of Tiger Controls (distributor) provided commercial circuit breakers to the original OEM. This addressed the specific example provide in the NRC finding. However, the preventive actions failed to address the generic case of establishing component acceptability as required by the Kinectrics CGD process.

In a second example, Kinectrics failed to identify in their extent of condition all customer projects affected by the Steris Isomedix 10 CFR Part 21 report. Kinectrics letter to Duke Energy Carolinas, dated June 27, 2014, identified three affected POs, but failed to identify affected PO 148575 for component qualification and PO 149027 for components.

This issue has been identified as Nonconformance 99901415/2015-201-02.

c. Conclusions

The NRC inspection team issued Nonconformance 99901415/2015-201-02 for Kinectrics' failure to implement the regulatory requirements of Criterion XV and XVI of Appendix B to 10 CFR Part 50. Nonconformance 99901415/2015-201-02 cites Kinectrics for failing to adequately implement their nonconformance and corrective action programs. Specifically for failing to issue NCRs or CARs for issues identified during testing or audits, and for failing to ensure proposed actions prevent repetition.

3. Commercial Grade Dedication / Control of Measuring and Test Equipment

a. Inspection Scope

The NRC inspection team reviewed CGD policies and procedures to determine if Kinectrics' controls met the materials, parts, equipment, and processes suitability requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50, and CGD requirements in 10 CFR Part 21. Specifically, the inspectors reviewed CGD procedures for acceptance of commercial calibration services for measuring and test equipment (M&TE) used for Westinghouse AP1000 junction box panel number 1 and 3 qualifications.

During the assessment, the inspectors discussed the CGD process with Kinectrics personnel and verified implementation for a sample of calibrated accelerometers. The review of completed documentation included an evaluation of Kinectrics' safety-function assessment, determination of critical characteristics, designation of methods of acceptance, and control of the commercial calibration supplier.

The attachment to this inspection report lists the individuals interviewed and documents reviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team noted that calibration of M&TE is contracted to various external vendors. Accelerometer (Equipment # 32286, KIN-02879), which was used for the seismic testing of AP1000 junction box panel numbers 1 and 3, was calibrated by two different commercial vendors, Cal-Matrix Metrology and Navair Technologies. Kinectrics procedure AWI-6-4 defines a standard set of critical characteristics to be examined within the supplier's program during the dedication process. The inspectors noted during review of Kinectrics Audit Report # QA-2014-11 (for Navair Technologies) and the Kinectrics Audit Report # QA-2014-15 (for Cal-Matrix Metrology), that all critical characteristics as required by AWI-6-4 were not verified during the surveys. Specifically, a critical characteristic required that supplier software, if used for processing results, be validated. The inspectors learned that Kinectrics verifies this element by survey, but

failed to verify the element in both the Navair Technologies and Cal-Matrix Metrology surveys. The Kinectrics auditor stated that it was unknown if processing software was actually used by Navair and Cal-Matrix, because the survey element was not evaluated during the surveys. This issue has been identified as Nonconformance 99901415/2015-201-03.

c. Conclusions

The NRC inspection team determined that Kinectrics has established a program that adequately controls CGD in accordance with the regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50, and 10 CFR Part 21. However, the NRC inspection team identified two instances of inadequate implementation of the requirements of Criterion III when applied to verification of all critical characteristics during the survey of commercial calibration service suppliers. The NRC inspection team issued Nonconformance 99901415/2015-201-03 for Kinectrics' failure to ensure surveys validate supplier controls of processing software used in calibration.

4. AP1000 Equipment Qualification and Inspection, Tests, Analyses, and Acceptance Criteria (ITAAC)

a. Inspection Scope

The NRC inspection team reviewed Kinectrics' test plans, test procedures, test reports, POs, customer design specifications, supplier reports, audits, and supporting documentation to verify that qualification processes and results met purchaser requirements and Westinghouse design requirements. The activities inspected included work in support of completion of ITAAC requirements for ITAAC 2.2.01.06a.ii, ITAAC 2.1.03.09a.ii, and ITAAC 3.5.00.01.ii. Specifically, the inspectors reviewed the qualification of Nuclear Instrumentation System (NIS) Excore Detector Junction Box Connection Assemblies for use in the Westinghouse AP1000 nuclear power plant applications. These assemblies support the Power Range (PR), Source Range (SR) and Intermediate Range (IR) neutron detector systems and the field cable and connector assemblies for harsh environmental application.

The inspectors also reviewed the qualification of radiation monitoring system components for use in Westinghouse AP1000 nuclear power plant applications, to include the Class 1E and non-Class1E components enveloped by ITAAC 3.5.00.01.ii. Specifically, the inspectors reviewed completed work for the qualification of a Heat Traced Fixed Filter Particulate, Iodine and Gas Monitor (PIG), and work in progress for the qualification of a Heat Traced Particulate and Gas Monitor (PG). These components will support the main control room radiation monitoring package, and the containment atmosphere primary sampling system, respectively. During testing under General Atomics PO 4200002657, Kinectrics is responsible for the test environments, while the customer (General Atomics) is responsible for the actual operation and functional testing of the test subjects. For the observed testing in progress, the inspectors evaluated activities under Kinectrics' responsibility to include keeping test parameters such as temperature and humidity within limits. The inspectors also verified that measures were in place to identify, correct and document deviations from test procedures. During

walkdowns, the inspectors independently verified that required test conditions were monitored and maintained within limits, procedures were followed and that instruments being used were qualified. The inspectors also reviewed supporting documentation to include, validation of data-capturing software, M&TE calibration, and certification of laboratories where M&TE was calibrated. In addition, the NRC inspection team interviewed responsible individuals in charge of the methods and implementation of the qualification type testing.

Included in the inspection documents reviewed were seismic and loss of coolant accident (LOCA) qualification test reports to determine whether parameters and test scope defined for harsh environment testing of specimens incorporated the requirements specified in the applicable portions of the test plan and test results were adequately documented and evaluated. The inspection scope included review of purchaser approval of test results and acceptance of minor deviations from the established requirements.

The sampled components tested included:

- AP1000 Junction Box Panel 1,2,&3 (cables and connectors) February 2015 (K-115256) – PO 4500631186
- PG and PIG Monitors Abnormal/Extreme Environmental Testing (K-015973) – PO 4200002657

The inspectors reviewed the test results and verified compliance with the qualification requirements stated in Westinghouse equipment qualification methodology APP-GW-G1-002, Revision 3, IEEE Standard 323-1974, IEEE Standard 344-1987, and IEEE Standard 572-1985. The test plan was developed in accordance with this methodology and included various phases of thermal aging, thermal cycling, abnormal extreme testing (temperature and pressure), seismic testing, LOCA testing, and the final functional tests.

The inspectors discussed the development of the test procedures and test plans for the selected components. Kinectrics personnel explained the test sequence selected for the qualification, the margins for error, and the acceptance criteria for visual inspections and functional testing. The discussion also covered the seismic and LOCA testing preparation, which included radiation, thermal, and post-thermal radiation aging in some cases. The inspectors verified that the design basis event testing (DBE) and post-DBE testing were enveloped by the AP-1000 design parameters. Kinectrics personnel demonstrated they were knowledgeable in the test requirements for qualification of the selected components and provided evidence that the test equipment was calibrated, functional, and listed in the qualification report. The inspectors reviewed personnel records for individuals involved with the qualification tests to ensure qualified personnel were used to conduct the tests. The testing and analysis documentation by Kinectrics supported the conclusion that the qualification requirements specified in the POs were met.

The attachment to this inspection report lists the individuals interviewed and documents reviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team determined that, Kinectrics' procedures and implementation of the inspected qualification activities were consistent with requirements specified in customer orders. The inspectors determined that Kinectrics' programmatic controls of procured qualification testing services for the qualification of components to be used in the AP1000 reactor design were adequate in support of ITAAC 2.2.01.06a.ii, ITAAC 2.1.03.09a.ii, and ITAAC 3.5.00.01.ii. No findings of significance were identified.

5. Entrance and Exit Meetings

On April 27, 2015, the NRC inspection team discussed the scope of the inspection during an entrance meeting with Mr. David Harris, CEO, and other members of Kinectrics' management and technical staff. On May 1, 2015, the NRC inspection team presented the inspection results and observations during an exit meeting with Mr. David Harris, CEO, and other members of Kinectrics' management and technical staff. The attachment to this report lists the attendees at the entrance and exit meetings, as well as those individuals whom the NRC inspection team interviewed.

ATTACHMENT

1. ENTRANCE/EXIT MEETING ATTENDEES

Name	Title	Affiliation	Entrance	Exit	Interviewed
David Harris	CEO	Kinectrics	X	X	
Garry Chapman	Director – US Nuclear Programs	Kinectrics		X	X
David Marttilla	Service Line Lead – EQ	Kinectrics	X	X	X
Jeremy Owen	Project Manager – EQ	Kinectrics	X	X	X
Frank Bartoszek	QA Supervisor	Kinectrics	X	X	X
John D'Angelo	General Manager	Kinectrics	X	X	
Bert Grespan	NPQ Manager	Kinectrics	X	X	X
Steve Burany	Senior Project Manager	Kinectrics	X	X	X
Steven Munro	Technician	Kinectrics	X		X
David Vellekoop	Quality Consultant	Kinectrics	X	X	X
Philip Dale	Technician	Kinectrics			X
Suresh Channarasappa	Fellow Engineer	Westinghouse	X	X	
George Lipscomb	Lead Inspector	NRC	X	X	
Jose Jimenez	Inspector	NRC	X	X	
Alfredo Matos-Marin	Inspector	NRC	X	X	
Annie Ramirez	Inspector	NRC	X	X	
Paul Wong	Inspector	CNSC	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. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Type	ITAAC	Description
99901415/2012-201-01	Closed	NON	N/A	App. B, Criterion VII
99901415/2012-201-02	Closed	NON	N/A	App. B, Criterion IV
99901415/2012-201-03	Open	NON	N/A	App. B, Criterion III
99901415/2012-201-04	Closed	NON	N/A	App. B, Criterion XVI
99901415/2015-201-01	Opened	NON	N/A	App. B, Criterion XI
99901415/2015-201-02	Opened	NON	N/A	App. B, Criterion XV
99901415/2015-201-03	Opened	NON	N/A	App. B, Criterion III

4. Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)

The NRC inspectors identified the following ITAAC related to components being tested by Kinectrics. At the time of the inspection, Kinectrics was involved with the testing of safety-related components for the AP1000 reactor design. For the ITAAC listed below, the NRC inspection team reviewed Kinectrics' QA controls in the areas of procurement, training, inspection, testing, and M&TE. The ITAAC's design commitment referenced below are for future use by the NRC staff during the ITAAC closure process; the listing of these ITAAC design commitments does not constitute that they have been met and closed. The NRC inspection team did not identify any findings associated with the ITAAC identified below.

Containment System - The Class 1E equipment identified in Table 2.2.1-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a DBA without loss of safety-function for the time required to perform the safety-function.	102	2.2.01.06a.ii
The Class 1E equipment identified in Table 2.1.3-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of safety-function for the time required to perform the safety-function.	82	2.1.03.09a.ii
The seismic Category I equipment identified in Table 3.5-1 can withstand seismic design basis loads without loss of safety-function.	824	3.5.00.01.ii

5. LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ADAMS	Agencywide Documents Access and Management System
AWI	administrative work instruction
CAR	corrective action report
CEO	Chief Executive Officer
CNSC	Canadian Nuclear Safety Commission
CoC	certificate of conformance
CGD	commercial-grade-dedication
DBA	design basis accident
DBE	design basis event
EQ	equipment qualification
HELB	high energy line break
IP	inspection procedure
IR	intermediate range
ITP	inspection and test plan
LOCA	loss of coolant accident
MDEP	Multinational Design Evaluation Programme
M&TE	measuring and test equipment
NCR	nonconformance report
NIS	Nuclear Instrumentation System
NOA	notice of anomaly
NON	Notice of Nonconformance
NPQ	Nuclear Parts & Qualification
NRC	Nuclear Regulatory Commission
OEM	original equipment manufacturer
OP	operating procedure
PG	Type C - Particulate, and Gas Monitor
PIG	Type F - Particulate, Iodine and Gas Monitor
PO	purchase order
PR	power range
QA	quality assurance
QAM	quality assurance manual
QAOP	quality assurance operating procedure
QF	quality form
RFQ	request for quotation
S/N	serial number
SR	source range

6. DOCUMENTS REVIEWED

Procedures

"Kinectrics 10CFR50 Appendix B Quality Assurance Manual," Revision I, dated November 18, 2014

QAOP 8.1, "Identification and Control of Test Materials," Revision E, dated December 2012.

QAOP 11.1, "Test Control," Revision F, dated November 30, 2010

QAOP-19-1, "10 CFR Part 21 Evaluations," Revision A, dated November 30, 2010

OP-9-1, "Preparation and Control of Technical Work Instructions," Revision 11, dated July 31, 2011

OP-10-3, "Qualification of Inspectors," Revision 5, dated January 16, 2014

OP-13-1, "Control of Nonconformities," Revision 16, dated August 5, 2014

OP-14-1, "Corrective Action," Revision 12, dated August 30, 2013

OP-14-2, "Preventive Action Plan," Revision 6, dated August 8, 2012

OP-18-1, "Validation of Qualification," Revision 5, dated August 15, 2011

OP-18-2, "Provision of Training," Revision 3, dated August 3, 2000

OP-18-3, "Control of Capability Data," Revision 4, dated August 2000

OP-18-4, "Review of Qualifications," Revision 3, dated August 3, 2000

OP-18-5, "Qualification for New employees," Revision 4, dated August 15, 2001

OP-18-6, "Maintenance of Capability Data," Revision 4, dated August 3, 2000

AWI-3-1, "Complying with Nuclear Quality Program Requirements Imposed by Costumers," Revision 5, dated January 19, 2015

AWI-6-1, "Analytical and Environmental Services Laboratory Purchased Materials & Services," Revision 2, dated April 14, 2015

AWI 6-4, "Commercial Grade Dedication," Revision 3, dated September 23, 2013

AWI-8-2, "Configuration Control of Software," Revision 0, dated March 3, 2014

Test Documentation

Test Procedure No.: K-403505-PSWI-0001, “Test Procedure for HELB Steam Test Qualification of Tyco Terminal Blocks for Use at Oconee Nuclear Station,” Revision 2, dated April 9, 2015

ITP K-403505-ITP-0001, “Inspection and Test Plan HELB Steam Test of Tyco Terminal Blocks for United Controls International for Use at Duke Energy - Oconee Nuclear Station,” Revision 0, dated April 8, 2015

Software Validation: HELB Test, “United Controls HELB Test K-403505,” Revision 0, dated April 10, 2015

Baseline Functional Test, “K-403505-DATA-0001: Functional Testing Datasheet,” dated April 9, 2015

Test Report K-015963-RP-0004, “Test Report for qualification of C-H HMCP100R3C Circuit Breakers and LWPQ20136 Panels for Duke Oconee,” Revision 0, dated October 18, 2013

Test Procedure No.: K-015963-PSWI-004, “Test procedure for qualification of Eaton C-H HMCP100R3C Circuit Breakers for Duke Oconee,” Revision 1, dated July 26, 2011

ITP K115012-ITP-0001, “CGD of Eaton Circuit Breakers Part # HMCP100R3C, CAT ID # 0000878617,” Revision 1, dated August 3, 2011

Test Procedure No.: K-115239-PSWI-001, “Test Procedure for the Qualification testing of Nuclear Cables Accessories,” Revision 3, dated January 30, 2015

Test Procedure No.: K-115256-PSWI-0002, “AP1000 Nuclear Instrumentation System (NIS) Excore Detector Junction Box Connection Assemblies,” Revisions 0-4, dated March 5, 2014, to November 25, 2014

ITP K-115256-ITP-0002, “AP1000 Nuclear Instrumentation System (NIS) Excore Detector Junction Box Connection Assemblies 30/60 year Program,” Revision 0-2, dated March 7, 2014, to July 29, 2014

ITP K-115256-ITP-0001, “AP1000 Nuclear Instrumentation System (NIS) Excore Detector Junction Box Connection Assembles 5 year Accelerated Program,” Revision 2, dated May 16, 2014

Test Procedure No.: K-115266-PSWI-0001, “Test Procedure for qualification Testing of AP1000 NIS Excore Detector Junction Box Connection Assemblies,” Revision 5, dated November 25, 2014

Test Procedure No.: K-115256-RA-0001, “Test Report for Qualification Testing of AP1000 NIS Excore Detector Junction Box Connection Assembly Panel 1, 5-year Qualified Life Program,” Revision 1, dated February 13, 2015

Test Log Book and Data Package, “Kinectrics Low-Voltage 2 Penetration Assembly Seismic Qualification,” approved July 25, 2012

Test Procedure No.: K-015937-PSWI-0001, “Test Procedure for Qualification Testing of a radiation monitoring system for General Atomics Electromagnetic System (GA-EMS),” Revision 2, dated September 22, 2014

Corrective Action Requests (CAR) / Nonconformance Report (NCR) / Notice of Anomaly (NOA)

CAR 969-1, Re-occurring quality issues on same IMS project, dated February 7, 2014

NCR 1215, Anomalies relating to K-403869, closed September 10, 2012

NCR 1222, Anomalies relating to K-403869, closed November 5, 2012

NCR 2279, Steris Isomedix gamma radiation dose margins, dated March 9, 2015

NCR 2434, Project K-115256, dated July 14, 2014

NCR 2600, Project K-115256, dated November 12, 2014

NCR 2601, Project K-115256, dated November 26, 2014

NCR 2603, Project K-115256, dated November 26, 2014

NCR 2640, Project K-115256, dated December 9, 2014

NCR 2693, Anomalies relating to K-403571, closed April 8, 2015

NCR 2713, Project K-115256, dated December 01, 2015

NOA K115239-NOA-0002 R00, Anomalies relating to PO N22891 and N22487, dated March 26, 2015

NOA K-115256.001-NOA-0001 R01, Anomalies relating to K-115256, dated May 8, 2014

NOA K-115256.002-NOA-0001 R01, Anomalies relating to K-115256, dated May 19, 2014

NOA K-115256.003-NOA-0001 R01, Anomalies relating to K-115256, dated September 9, 2014

NOA K-115256.004-NOA-0001 R00, Anomalies relating to K-115256, dated January 13, 2015

Procurement and Receiving Documents

UCI PO 2360-4REV1 to Kinectrics for testing services, Revision 0, dated March 18, 2015

UCI PO 001125 to Kinectrics for change request K-403505-CCR-00001-R00, Revision 0, dated November 7, 2014

Inspection Record No. K-403505-II-0001 R00, "Record of Inspection of Incoming Items," dated April 10, 2015

PO 280034498 to Cal-Matrix Metrology for calibration services, Revision 0, dated March 28, 2014

Duke Energy Carolinas PO 00149027 to Kinectrics for dedication of circuit breaker panels, Revision 0, dated July 31, 2011

Duke Energy Carolinas PO 00149028 to Kinectrics for Oconee circuit breakers, Revision 0, dated July 31, 2011

Procurement Plan for Radiation Aging of J-Box Panel 3, "E-Beam," dated August 11, 2014

Procurement Plan for Radiation Aging of J-Box Panel 3, "Steris Isomedix," dated July 24, 2014

PO 280035967 to Steris Isomedix Services for radiation services, Revision 0, dated August 13, 2014

PO 280037894 to Steris Isomedix Services for radiation services, Revision 0, dated February 4, 2015

PO 4500631186, dated February 18, 2014

Westinghouse acceptance records (Form F-7.7-1 Rev. 3) for K-115256-PSWI-0002, Revision 00, 01 and 04

General Atomics PO 4200002657 to Kinectrics for testing services, dated May 1, 2013

PO 280034484 to Alpha Controls & Instrumentation (requisition # 10034280), delivery date April 1, 2014

PO 280034498 to Cal-Metrix Metrology Inc. (requisition #10034294), delivery date April 1, 2015

Drawings

General Atomics Drawing No. 04648900, “AP1000 Important to Safety Radiation Monitoring System Qualification Plan,” released November 30, 2011

General Atomics Drawing No. 04648907, “RM-200 Process Monitors abnormal environmental test procedure,” released September 23, 2013

Audit and Survey Documents

E-Beam Survey Report dated June 19, 2012

Audit qualification file for Steris Isomedix (undated)

QA Audit Report QA-2014-11 for Navair Technologies dated July 25, 2014

QA Audit Report QA-2014-15 for Cal-Matrix Metrology dated July 5, 2014

Clark Laboratories Quality Program Kinectrics Audit Report 17123

Audit Report WES-2009-017 for Synergy, LLC, audit dated January 20-23, 2009

Contract and Requirements Documents

Westinghouse NIS MOD 3 J-Box Test Plan RFQ dated January 29, 2014

Customer Contract or PO Review Checklist and Project Approval for UCI PO 001125, Revision 0, and 2360-4, Revision 1, dated November 11, 2014

Kinectrics US Inc. Quotation: K-115256-PROP-002, “Equipment and Environmental Qualification of Mated Connections (30/60 Year Qualified Life), Revision 1

Document: LTR-EQ-14-50, “Revised Qualification Requirements for the AP1000 NIS Junction Box Connection Assemblies,” dated March 16, 2014

Document: LTR-EQ-14-65, “Radiation Dose Requirements for the AP1000 Nuclear Instrumentation System (NIS) Junction Box Connection Assemblies and the NIS and Radiation Monitoring System (RMS) EPA Feedthrough Connection Assemblies,” dated April 4, 2014

Document: LTR-EQ-14-100, “Seismic Qualification Requirements for the AP1000 NIS J-Box Connection Assemblies,” dated June 10, 2014

Document: LTR-EQ-14-120, “Design Basis Accident Requirements for AP1000 Nuclear Instrumentation System Junction Box Panel Connection Assemblies,” dated July 9, 2014

Document: NA-NIS-14-003, “AP1000 Nuclear Instrumentation System (NIS) Excore Cables Acceptance Criteria and Test Monitoring,” Revision 1, dated July 3, 2014

Calibration Documents

Industrial Systech Ltd. Certificate of Calibration 43164, “Kinectrics Type-T Thermocouple KIN-03804,” dated January 21, 2015

Certificate No. 38528, “Type-K Thermocouple,” dated October 23, 2013

Certificate No. 2000215687, “Meggar (AVO),” dated September 12, 2013

Cert/SO No. 9-800NN-41-1, “Hi-pot tester AC/DC,” dated March 28, 2014

Certificates of calibration, “16-Channel Thermocouple Input Module (KIN-02498)”

Certificates of calibration, “Pressure sensor/transducer (KIN-02614)”

Certificates of calibration, “Temp/Press/humidity transmitter (KIN-00968)”

Certificates of calibration, “Digital multi-meter (KIN-02477)”

Certificates of calibration, “Accelerometer (Equip. #32286)”

Criterion Instruments (Global EMC), Certificate of Compliance 101119-1, order 39181, S/N 14, dated November 19, 2010

Alpha Controls & Instrumentation, Report of Calibration AC15021124-L0430873, S/N L0430873, date February 6, 2015

Cal-Matrix, Certificate of Calibration, S/N T1H6023, dated December 03, 2014

Cal-Matrix, Certificate of Calibration, S/N 26870030, dated July 30, 2015

Cal-Matrix, Certificate of Calibration, S/N MY49006261, dated November 6, 2014

Sintrax Instruments, Calibration Certificate, S/N G4240023, dated June 16, 2014

Industrial Systech Ltd., Certificate of Calibration # 41017, dated June 4, 2014

Cal-Matrix, Supplemental Report for 9-805PF-101-1, Calibration Lab Data, dated July 31, 2014

Miscellaneous Documents

Kinectrics letter to US NRC, “Potential Part 21 Issue on Irradiations Performed by Steris Isomedix Services (Steris) in Whippany, New Jersey,” dated June 27, 2014

Steris Isomedix Services letter to affected customers, “Isomedix Service in Whippany NJ NRC Inspection Findings,” dated June 18, 2014

Steris Isomedix Services letter to affected customers, “Clarification Memo – Nuclear Regulatory Commission (NRC),” dated June 23, 2014

KIMO Instruments technical data sheet for mineral insulated thermocouple (website) (undated)

Meeting minutes, “Kinectrics Quality Management System Review Meeting,” dated April 24, 2014

Qualification record for Darryl Markell, Technologist, “Capability and Training Inventory – Personal Report,” dated September 27, 2013

Westinghouse Correspondence, “AP1000 NIS Excore Cables Acceptance Criteria and Test Monitoring,” dated July 3, 2014

“Commercial Grade Dedication Plan K-SEISMIC-CGD-0001,” Revision 0, dated October 17, 2013

“Software Verification and Validation Report for Vibration Research Corporation Vibration Controller Model Number VR8500-12 (Kinectrics Equipment ID 8.0.3),” dated June 29, 2009

K-115256.002 Thermal Aging Parts A, B, D, E and Additional Aging per NCR 2410 computer plots and test data logs (in-process)

K-115256.002 Panel 3 Thermal Cycling Groups 1 & 2 computer plots and test data logs (in-process)

Kinectrics Memo, “Record of Training in response to and review of NRC inspection Report 99901415/2012-201,” dated August 10, 2012

Quality Form (QF) 16-6, “Software Control Record,” Revision 8-11

Form QF-17-5, “Global EMC NIAC Assessment Evaluation,” Revision 13-12

Form QF-14-1, Revision 13-8

Alpha Controls & Instrumentation Inc., A2LA Accreditation Certificate, dated January 22, 2015

Cal-Matrix Metrology, Certificate of Accreditation, NRC CLAS Certificate 2000-03, dated October 13, 2014