

May 10, 2012

Mr. Gary Felicetti, Quality Assurance Manager  
Clark Dynamics, LLC  
1801 Route 51  
Jefferson Hills, PA 15025

SUBJECT: NRC INSPECTION REPORT NO. 99901412/2012-201, NOTICE OF VIOLATION,  
AND NOTICE OF NONCONFORMANCE

Dear Mr. Felicetti:

On March 19-23, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Clark Dynamics, LLC facility (hereafter referred to as Clark) in Jefferson Hills, PA. The purpose of the technically-focused, limited scope inspection was to assess Clark's compliance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," and selected portions of Appendix B, "Quality Assurance Program Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," related to Clark's activities associated with the vibrational aging and seismic qualification of worm gear actuators and electrical penetrations associated with inspections, tests, analyses, and acceptance criteria (ITAAC) 2.2.01.05.ii, 2.2.02.05a.ii, 2.2.05.05a.ii, 2.3.02.05.ii, 2.3.07.05.ii, and 2.7.01.05.ii from Revision 19 of the Westinghouse AP1000 pressurized-water reactor certified design.

The inspectors reviewed selected procedures and records, observed seismic qualification testing, and interviewed personnel. 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 has determined that one Severity Level IV violation of NRC requirements occurred. The NRC evaluated the violation in accordance with the agency's Enforcement Policy, which is available on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.

The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because Clark failed to provide adequate procedural guidance in accordance with 10 CFR 21.21 for the submittal of an interim report to the NRC when an evaluation cannot be completed within the 60-day evaluation period, and failed to include the timeliness requirements for notifying the responsible Clark officer within 5 days of completing an evaluation.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In addition, during this inspection the NRC inspectors found that the implementation of your quality assurance program did not meet certain NRC requirements imposed on you by your customers or NRC licensees. Specifically, Clark failed to accomplish certain calibration activities in accordance with documented procedures, dedicate commercially calibrated measuring and test equipment used in safety-related applications, ensure that adequate test instrumentation was available and used, and assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality were properly calibrated. Clark failed to provide procedural guidance that prescribes which information is required to be included in the logbook for testing and to record all required information in the logbook. Also, Clark failed to control access to work instructions and procedures, such that uncontrolled instructions and procedures were in use. These nonconformances are cited in the enclosed Notice of Nonconformance (NON), and the circumstances surrounding them are described in detail in the enclosed inspection report.

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

The NRC inspectors determined that overall, the vibrational aging and seismic qualification testing activities performed in support of the AP1000 worm gear actuator and electrical penetration were conducted in accordance with the Commission's rules and regulations and the technical and quality requirements passed down from your customers or NRC licensees. The NRC inspection determined that, with the exception of the cited violation and nonconformances, your programs for implementing the requirements of 10 CFR Part 21 and Appendix B to 10 CFR 50 for personnel training, oversight of contracted activities, test control, and corrective actions generally met the applicable regulations.

The NRC inspectors, however, did identify some concerns with the methods that Clark is using to perform calibration of measuring and testing equipment used to perform safety-related testing. The circumstances surrounding this issue are described in detail in the subject inspection report. This NRC inspection was limited in scope, and it is expected that you will determine the extent of condition, identify other measuring and testing equipment that may be nonconforming and on which tests they were used. These issues warrant your attention and consideration for their impact on safety-related work and reportability in accordance with 10 CFR Part 21.

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 enclosure, and 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 (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/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, 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 would 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/*

Edward H. Roach, Chief  
Mechanical Vendor Branch  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

Docket No. 99901412

Enclosures:

1. Notice of Violation
2. Notice of Nonconformance
3. Inspection Report No. 99901412/2012-201 and attachment

G. Felicetti

- 3 -

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 would 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/

Edward H. Roach, Chief  
Mechanical Vendor Branch  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

Docket No.: 999011412

Enclosures:

1. Notice of Violation
2. Notice of Nonconformance
3. Inspection Report No. 99901412/2012-201 and attachment

DISTRIBUTION:

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ADAMS Accession No.: ML12108A097

\*concurred via email

NRO-002

OFFICE	NRO/DE/EMB	R-II/DRS/EB1	NRO/DCIP/CMVB	NRO/DCIP/CMVB	NRO/DCIP/CAEB	NRO/DCIP/CMVB
NAME	PYChen	JEargle*	RPatel	SCrane	TFrye	ERoach
DATE	04/18/2012	04/18/2012	04/18/2012	04/17/2012	04/18/2012	04/10/2012

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## NOTICE OF VIOLATION

Clark Dynamics, LLC  
Jefferson Hills, PA.

Docket No.: 99901412  
Inspection Report No.: 99901412/2012-201

During an NRC inspection conducted at the Clark Dynamics, LLC (Clark) facility in Jefferson Hills, PA, on March 19–23, 2012, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Paragraph 21.21(a), "Notification of Failure to Comply or Existence of a Defect and its Evaluation," of Part 21, "Reporting of Defects and Noncompliance," of Title 10 of the *Code of Federal Regulations* (10 CFR) 21.21(a) requires, in part, that "each individual, corporation partnership, or other entity subject to the regulations in this part shall adopt appropriate procedures to - (a)(2) ensure for deviations which cannot be evaluated within 60 days from discovery of the deviation or failure to comply, an interim report must be prepared and submitted to the commission and (a)(3) a director or responsible officer subject to the regulations of this part is informed as soon as practicable, and in all cases, within the 5 working days after completion of the evaluation required by paragraph 10 CFR 21.21(a)(1)."

Contrary to the above, as of March 23, 2012, Clark failed to adopt appropriate procedures in accordance with 10 CFR 21.21(a)(2) and 10 CFR 21.21(a)(3). Specifically, Clark's 10 CFR Part 21 implementing procedure, quality assurance procedure (QAP) 08.03.02, "Reporting of Defect and Non-Compliance to the NRC," Revision 0, dated July 26, 2010, failed to include the following provisions:

1. Ensure that if an evaluation cannot be completed within 60 days from discovery of the deviation or failure to comply, an interim report is prepared and submitted to the Commission through a director or responsible officer or designated person within 60 days of discovery of the deviation or failure to comply.
2. Ensure that a director or responsible officer is informed as soon as possible, and in all cases, within 5 working days after completion of the evaluation.

These issues have been identified as Violation 99901412/2012-201-01.

This is a Severity Level IV violation (Section 6.9.d of the NRC Enforcement Policy).

Pursuant to the provisions of 10 CFR 2.201, "Notice of Violation," Clark is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, Attn.: Document Control Desk, Washington, DC 20555-001 with a copy to the Chief, Mechanical Vendor 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 Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation," and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence if the correspondence adequately addresses the required response. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because 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 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.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 10th Day of May 2012

## NOTICE OF NONCONFORMANCE

Clark Dynamics, LLC  
Jefferson Hills, PA.

Docket No.: 99901412  
Inspection Report No.: 99901412/2012-201

Based on the results of an NRC inspection conducted at the Clark Dynamics, LLC (Clark) facility in Jefferson Hills, PA, on March 19-23, 2012, certain activities were not conducted in accordance with NRC requirements that were contractually imposed on Clark by its customers or NRC licensees:

- A. Criterion XI, "Test Control," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities, states, in part, that the "test procedures shall include provisions for assuring that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions."

Clark procedure No. EL:10000, "Seismic Qualification Test Procedure for Westinghouse Electric Company Limitorque Actuators," Revision 0, dated March 8, 2012, required the vibrational aging of the Westinghouse Electric Company Limitorque actuator to be performed with a frequency sweep from 5 Hz to 100 Hz.

Figure 19, "Seismic Specimen Mounting," of Kinectrics test procedure: K-403869-PWSI-0005, "Test Procedure for Qualification Testing of IST LV Power and I&C Electrical Penetrations," Revision 3, dated February 29, 2012, states that, in part: "Seismic fixture flange bolts [shall be torqued to] 400 ft-lbs and wedge bolts [shall be torqued to] 20 ft-lbs." Section 4.1 of the same procedure states, in part, that, "prior to being used in this test program, all measuring and testing equipment shall be calibrated."

Contrary to the above, as of March 23, 2012, Clark failed to ensure that adequate test instrumentation was used in safety-related testing. Specifically:

1. Clark used three accelerometers over a range for which they were not calibrated. During vibrational aging of the actuator, Clark used three accelerometers that were calibrated from a range of 25 Hz to 500 Hz.
2. Clark used uncalibrated torque wrenches to torque seismic fixture bolts and wedge bolts for the LV-1 low voltage penetration seismic testing.

These issues have been identified as Nonconformance 99901412/2012-201-02.

- B. Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50," states that "measures shall be established to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits."

Clark's ISL Work Instruction Number 1816, "Calibration of Torque Calibrators/Torque Wrenches, Universal," Revision 4, dated June 30, 2010, required torque wrenches to be calibrated with a tolerance of +/- 3 percent over a range of 20 ft-lbs – 600 ft-lbs.

Contrary to the above, as of March 23, 2012, Clark failed to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality were properly calibrated. Specifically:

1. Clark failed to use appropriate calibration equipment to calibrate its torque wrenches. Clark used a torque calibrator that had a range of 0 ft-lbs to 600 ft-lbs and was marked in increments of 10 ft-lbs to calibrate torque wrench McBee Nos. 4085 and 4091, that could not be read accurately to the tolerance required by the procedure. This torque calibrator was used to calibrate torque wrench McBee Nos. 4085 and 4091.
2. Clark failed to appropriately calibrate torque wrench McBee No. 4091. Torque wrench McBee No. 4091 had a special calibration tag that required 30 ft-lbs be subtracted from the setpoint. Clark ISL Working Instruction No. 1816, did not specify this requirement. Clark did not evaluate if the special calibration requirement was appropriate over the entire range of the torque wrench calibration.

These issues have been identified as Nonconformance 99901412/2012-201-03.

- C. Criterion III, "Design Control," of Appendix B to 10 CFR 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."

Contrary to the above, as of March 23, 2012, Clark failed to review the suitability of the application of commercially calibrated measuring and test equipment (M&TE) for use in activities affecting quality as part of a commercial-grade item dedication. Specifically, Clark issued five purchase orders for commercial calibration services for M&TE and subsequently used the commercially procured M&TE in safety-related applications without dedicating the commercial-grade item.

This issue has been identified as Nonconformance 99901412/2012-201-04.

- D. Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50 states that, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

Section 7, "Documentation Hierarchy," of the Clark QAM states, in part, that activities affecting quality of products and services are prescribed by and performed in accordance with documented processes, instructions, procedures, or drawings that include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed results have been satisfactorily attained. It further states that the activity is described to a level of detail commensurate with the complexity of the activity and the need to assure consistent and acceptable results.

1. Contrary to the above, as of March 23, 2012, Clark failed to develop a documented procedure for an activity affecting quality. Specifically, Clark failed to develop a procedure that prescribes which information is required to be included in the logbook for testing. This includes information relating to the



identification, description, and quantity of test specimens, test setup and interfaces, list of all measuring equipment used and calibration dates, test data and results, and test deviations and anomalies.

Section 4.2 "Test Instrument Lists" of Test Procedure K-403869-PSWI-001, "Test Procedure for Qualification Testing of IST Medium Voltage Power Electrical Penetrations," Revision 7, dated June 29, 2011, and Test Procedure K-403869-PSWI-002, "Test Procedure for Qualification Testing of IST Low Voltage Power Electrical Penetrations," Revision 7, dated June 29, 2011. The procedures state, in part, "Immediately prior to each test, a test equipment list shall be completed listing all instrumentation used in the test to obtain quantitative measurement including any that require field calibration for the specific function they monitor."

Clark ISL Work Instruction Number 2575, "Calibration of Stopwatches and Other Elapsed Time Indicators," Revision 4, dated February 1, 2012. ISL Work Instruction Number 2575 required Clark to determine the amount of time necessary to accurately measure the unit under test.

Section 5.5.2 of QAP 07.06.01, "Calibration Procedure," Revision 2, dated July 21, 2010, stated, in part, that, "calibration shall be documented on form QAF.07.06.01." Form QAF.07.06.01 includes a provision for recording pre- and post-calibration reading for all M&TE.

Clark ISL Calibration Procedure 0766, "Calibration of Piezoelectric Accelerometers, Universal," Revision 4, dated June 30, 2010, states, in part, that, "a minimum of seven (7) [calibration] points are required."

2. Contrary to the above, as of March 23, 2012, Clark failed to accomplish activities affecting quality in accordance with documented procedures. Specifically:
  - a. Clark did not appropriately document the M&TE used during the seismic qualification testing of the MV-1 medium voltage and the LV-1 low voltage electrical penetration in accordance with Section 4.2 "Test Instrument Lists" of Test Procedure K-403869-PSWI-001, and Test Procedure K-403869-PSWI-002 respectively.
  - b. Clark used various time periods for the calibration of its timing devices, which had not been calculated in accordance with ISL Work Instruction Number 2575, Clark needed to determine the accuracy of the timing device based on the manufacturer's documentation, which Clark could not locate in its files.
  - c. Clark failed to document the post-calibration information for a waveform synthesizer, a weight hanger, and several accelerometers, working weights, and torque wrenches on form QAF 07.06.01 as required by QAP 07.06.01 procedure.
  - d. Clark failed to calibrate its accelerometers to a minimum of seven points and complete the appropriate M&TE records.

These issues have been identified as Nonconformance 99901412/2012-201-05.

- E. Criterion VI, "Document Control," of Appendix B to 10 CFR Part 50, states that "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."

QAP 04.02.03, "Document Control Procedure," Revision 4, dated January 3, 2010, states, in part, that, "Hard copies of internal documents may be printed and used for the following: 1) [a]udits, 2) [r]eview for potential revision, [and] 3) [t]raining. Hard copies printed for any other reason other than 1 through 3 above is prohibited. All printed copies are to be considered uncontrolled."

Contrary to the above, as of March 23, 2012, Clark failed to control the issuance of documents that prescribe activities affecting quality and failed to assure that those documents are distributed to and used at the location where the prescribed activity is performed. Specifically, the inspectors identified the following:

1. Several uncontrolled prior revision calibration procedures were found in the calibration laboratory.
2. A test engineer performed the test setup for the seismic qualification of the LV-1 electrical penetration with an uncontrolled work instruction that was not reviewed for adequacy and approved for release by authorized personnel.

These issues have been identified as Nonconformance 99901412/2012-201-06.

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, Mechanical Vendor 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 10th of May 2012.

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

Docket No.: 99901412

Report No.: 99901412/2012-201

Vendor: Clark Dynamics, LLC  
1801 Route 51  
Jefferson Hills, PA 15025

Vendor Contact: Mr. Gary Felicetti  
Quality Assurance Manager  
Telephone: 412-387-1017  
E-mail: gfelicetti@clarktesting.com

Nuclear Industry Activity: Clark Dynamics, LLC (Clark), located in Jefferson Hills, PA, provides equipment qualification testing in the following areas: seismic testing, electromagnetic compatibility and electromagnetic interference testing, shock and vibration testing, accelerated aging testing, thermal shock testing, metallurgical qualification and validation testing, and structural testing. Clark primarily performs these services for other suppliers of nuclear safety-related components and design services for the operating reactor fleet and new reactors under construction.

Inspection Dates: March 19–23, 2012

Inspectors: Samantha Crane CMVB/DCIP/NRO, Team Leader  
Jason Eargle EB1/DRS/R-II  
Raju Patel CMVB/DCIP/NRO  
Pei-Ying Chen EMB/DE/NRO, Technical Specialist

Approved by: Edward H. Roach, Chief  
Mechanical Vendor Branch  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

## **EXECUTIVE SUMMARY**

Clark Dynamics, LLC  
99901412/2012-201

On March 19-23, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Clark Dynamics, LLC facility (hereafter referred to as Clark) in Jefferson Hills, PA. The inspection focused on seismic qualification testing in support of the Westinghouse AP1000 pressurized-water reactor. Specifically, the inspectors observed the vibrational aging and seismic qualification testing performed on one Limatorque HBC worm gear actuator and one LV-1 low voltage electrical penetration during the period of the inspection. The NRC staff verified that the completed seismic qualification testing performed for one MV-1 medium voltage and one LV-1 low voltage electrical penetration was performed in accordance with the applicable quality and technical requirements imposed in the associated purchase orders. The inspectors observed the setup and performance of vibrational aging, one resonance search, two operating-basis earthquake (OBE) seismic qualification tests, and portions of one safe-shutdown earthquake (SSE) qualification test for the Limatorque HBC worm gear actuator that were associated with inspections, tests, analyses, and acceptance criteria (ITAAC) 2.2.01.05.ii, 2.2.02.05a.ii, 2.2.05.05a.ii, 2.3.02.05.ii, 2.3.07.05.ii, and 2.7.01.05.ii from Revision 19 of the Westinghouse AP1000 certified design.

The NRC inspectors also observed the resonance search and portions of the OBE testing for the LV-1 low voltage electrical penetration and data acquisition for seismic testing associated with ITAAC 2.2.01.05.ii from Revision 19 of the AP1000 certified design. In addition to these activities, the NRC inspectors observed calibration activities and verified that measuring and test equipment (M&TE) was appropriately calibrated and used within its calibrated range.

The purpose of this inspection was to verify that Clark performed the seismic qualification testing in accordance with a quality assurance (QA) program that complied with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." The inspection also verified that Clark implemented a program under 10 CFR Part 21, "Reporting of Defects and Noncompliance," that met the regulatory requirements of the NRC.

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

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

During the conduct of this inspection, the NRC inspectors implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance."

The NRC had not previously performed any inspections at the Clark facility in Jefferson Hills, PA.

With the exception of the violation and nonconformances described below, the NRC inspection team concluded that Clark is effectively implementing its QA and 10 CFR Part 21 programs in the performance of seismic qualification testing. The results of this inspection are summarized below.

## 10 CFR Part 21

The inspectors concluded that Clark's 10 CFR Part 21 procedure did not meet the requirements of 10 CFR Part 21. The inspectors identified Violation 99901412/2012-201-01 for Clark's failure to include requisite guidance in its 10 CFR Part 21 procedure for: (1) an interim report per paragraph 21.21(a)(2) and, (2) the notification to the director or responsible officer as soon as practical, within 5 working days after the completion of the evaluation as required per paragraph 21.21(a)(3). This finding is more than minor because of the complexity of the services that Clark provides and the likelihood that an evaluation would exceed 60 days and require an interim report. However, based on the limited sample of nonconformances, corrective actions, and test deviations reviewed, the inspectors determined that the implementation of the Clark program for reporting of defects and noncompliance was consistent with the regulatory requirements of 10 CFR Part 21.

## Test Control

The inspectors interviewed personnel, and observed one vibrational aging and one seismic qualification test for the Limatorque HBC series worm gear actuators for the Westinghouse AP1000 and reviewed documentation related to the test. The inspectors also observed the seismic qualification testing of the IST LV Power and I&C Electrical Penetration for the Westinghouse AP1000. The inspectors also reviewed completed test documentation for two similar qualification tests to verify testing was performed in accordance with project specifications and the Clark quality assurance manual (QAM).

The inspectors concluded that the implementation of the Clark program for test control was not consistent with the regulatory requirements of Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The inspectors initiated a Notice of Nonconformance (NON) 99901412/2012-201-02 for failure to ensure that adequate test instrumentation was used during the vibrational aging of the Limatorque HBC series worm gear actuator and the seismic testing of the LV-1 low voltage electrical penetration, NON 99901412/2012-201-06 for failure to control the use of procedures and work instructions during calibration and seismic testing and NON 99901412/2012-201-05 for failure to follow procedures, record equipment data, and develop a procedure for specifying minimum requirements regarding the contents of logbooks for testing.

## Control of Measuring and Test Equipment

The inspectors walked down the test lab and M&TE storage locations to verify that M&TE was properly labeled with the M&TE number and calibration period. The inspectors interviewed personnel responsible for the storage, control, and calibration of M&TE and reviewed the calibration history and certificates for a sample of M&TE.

The inspectors concluded that the implementation of the Clark program for control of M&TE was not consistent with the regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. The inspectors issued NON 99901412/2012-201-03 for failure to appropriately calibrate torque wrenches, as well as NONs described under test control. The evaluation of the calibration status of M&TE, warrants attention and consideration for its effect on safety-related testing and reportability in accordance with 10 CFR Part 21.

### Oversight of Contracted Activities

The inspectors reviewed the Clark policies and procedures for procurement document control and control of purchased material, equipment, and services, reviewed the approved suppliers list, a sample of eight purchase orders and the associated external audit reports, and supplier evaluations to verify proper implementation of the Clark procurement program.

The inspectors identified NON 99901412/2012-201-04 for failure to dedicate commercial calibration services. The inspectors concluded that, with the exception of NON 99901412/2012-201-04 for failure to dedicate commercial calibration services, the implementation of the Clark oversight of contracted activities was consistent with the regulatory requirements of Criteria IV and VII of Appendix B to 10 CFR Part 50 and the provisions of the Clark QAM and associated implementing procedures.

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

The inspectors determined that the implementation of Clark's programs for control of nonconforming material, parts, or components and corrective action were consistent with the regulatory requirements in Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and observation of ongoing test activities at the Clark facility, the inspection team determined that Clark is effectively implementing its QAM and the associated nonconformance and corrective action procedures. No findings of significance were identified.

### Personnel Qualification

The inspectors reviewed the personnel training and qualification process, reviewed the training and qualification records of five test personnel and discussed the personnel training and qualification process with Clark management and technical staff. The inspectors determined that the training and qualification of Clark personnel conforms to the regulatory requirements in Criterion II, "Quality Assurance Program," of Appendix B to 10 CFR Part 50. In addition, the inspectors determined that, for the limited sample reviewed, the Clark staff has been effectively implementing the Clark QAM and implementing procedures for the training and qualification of its personnel. No findings of significance were identified.

## **REPORT DETAILS**

The U.S. Nuclear Regulatory Commission (NRC) inspectors observed various activities associated with the seismic testing of a Limitorque HBC worm gear actuator with a 12-inch hand wheel, and IST LV Power and I&C Electrical Penetration, conducted interviews with responsible Clark Dynamics, LLC (Clark) personnel, and verified that the completed seismic qualification testing performed for one MV-1 medium voltage and one LV-1 low voltage electrical penetration was performed in accordance with the applicable quality and technical requirements imposed in the associated purchase orders (POs). Specifically, the inspectors observed the setup and performance of vibrational aging, one resonance search, two operating-basis earthquake (OBE) seismic qualification tests, and portions of one safe-shutdown earthquake (SSE) qualification test for the Limitorque HBC worm gear actuator that were associated with inspections, testes, analyses, and acceptance criteria (ITAAC) 2.2.01.05.ii, 2.2.02.05a.ii, 2.2.05.05a.ii, 2.3.02.05.ii, 2.3.07.05.ii, and 2.7.01.05.ii from Revision 19 of the Westinghouse AP1000 pressurized-water reactor certified design. The NRC inspectors also observed the resonance search and portions of the OBE testing for the LV-1 low voltage electrical penetration, and data acquisition for seismic testing associated with ITAAC 2.2.01.05.ii from Revision 19 of the AP1000 certified design. In addition to observing these activities, the NRC inspectors observed calibration activities to verify that measuring and test equipment (M&TE) was appropriately calibrated and used within its calibrated range.

### **1. 10 CFR Part 21 Program**

#### **a. Inspection Scope**

The inspectors reviewed the policies and implementing procedures that govern the Clark program under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," to verify its compliance with the NRC's regulatory requirements. The inspectors reviewed the Clark procedures that govern corrective action and the control and correction of nonconforming items to verify an adequate link to the 10 CFR Part 21 process, and they reviewed the corrective action request (CAR) forms initiated over the past 2 years to verify if any deviations to technical requirements occurred that should have been evaluated for 10 CFR Part 21 applicability. In addition, the inspectors reviewed a sample of eight POs to verify that compliance with 10 CFR Part 21 was included in safety-related POs. The attachment to this inspection report lists the documents reviewed by the inspectors.

#### **b. Observations and Findings**

##### **b.1 10 CFR Part 21 Procedure**

Quality Assurance Procedure (QAP)-08.03.02, "Reporting of Defects and Noncompliance to the NRC," Revision 0, dated July 26, 2010, establishes the requirements for compliance with the regulatory requirements of 10 CFR Part 21. The procedure defines the process for reporting defects; the posting requirements; the responsibilities, timelines, actions for identifying and evaluating deviations and failures to comply; and the records retention requirements.

The inspectors verified that Clark's nonconforming items and corrective action programs, as described in Section 8.7, "Process of Defects in Basic Components," of Clark's Quality Assurance Manual (QAM), QAP-08.03.01, "Non-Conformance Control,"



Revision 2, dated March 24, 2010; and QAP-08.05.02, "Corrective Action," Revision 2, dated March 24, 2010, provide a connection to the 10 CFR Part 21 program.

The inspectors reviewed the QAP-08.03.02 and met with Clark's quality assurance (QA) manager to discuss the procedure. Based on discussion with the QA manager, the inspectors determined that Clark's QAP-08.03.02 does not address all of the requirements of 10 CFR Part 21.

Paragraph 21.21(a) of 10 CFR Part 21 requires, in part, that each individual, corporation partnership, or other entity subject to the regulations in this part shall adopt appropriate procedures to ensure: (a)(2) for deviations which cannot be evaluated within 60 day from discovery of the deviation or failure to comply, an interim report must be prepared and submitted to the commission, and (a)(3) that a director or responsible officer subject to the regulations of this part is informed as soon as practicable, and in all cases, within the 5 working days after completion of the evaluation required by paragraph 21.21(a)(1).

Contrary to the above, as of March 23, 2012, Clark's 10 CFR Part 21 procedure, Clark's QAP-08.03.02, did not include requisite guidance for: (1) an interim report per paragraph 21.21(a)(2), and (2) the notification to the director or responsible officer as soon as practical, within 5 working days after the completion of the evaluation, as required per paragraph 21.21(a)(3).

Clark's QAP-08.03.02 states in part that test engineer is responsible for evaluation of test anomalies, however, section 2, "Responsibility," of the QAP does not contain the provision for informing the Clark's director or responsible officer as soon as practical, and, in all cases, within 5 working days after completion of the evaluation that the service associated with the basic component fails to comply or contains a defect, as required by paragraph 10 CFR 21.21(a)(3).

Clark's QAP-08.03.02 includes the process of evaluation of a deviation or failure to comply associated with substantial safety hazard and notification to the NRC and to Clark's customers. However, section 5.3 "Evaluation," of the QAP, does not include a provision to ensure that if an evaluation of an identified deviation or failure to comply potentially associated with a substantial safety hazard cannot be completed within 60 days from discovery of the deviation or failure to comply, an interim report is to be prepared and submitted to the Commission through a director or responsible officer, as required by 10 CFR 21.21(a)(2).

This finding is more than minor because of the complexity of the qualification testing services that Clark provides and the likelihood that an evaluation would exceed 60 days and require an interim report. Clark management acknowledged the issue and took immediate action by issuing CAR 000950. The inspectors identified this issue as Violation 99901412/2012-201-01.

## **b.2 Implementation**

The inspectors reviewed the implementation of Clark's 10 CFR Part 21 program. The inspectors noted that Clark had not performed any 10 CFR Part 21 evaluations. The inspectors reviewed the CAR forms initiated over the past 2 years and the test deviations and anomalies in a sample of test reports and did not identify any specific

issues that would have warranted further evaluation under the Clark QAP-08.03.02 procedure.

The inspectors interviewed the Clark dynamics test manager and the QA manager who are responsible for performing such evaluations and that they were appropriately trained and capable of properly evaluating and reporting an issue in accordance with QAP-08.03.02 and 10 CFR Part 21. The inspectors verified the posting outside its calibration laboratory and in test facility included a copy of Section 206 of the Energy Reorganization Act of 1974, as amended, the latest copy of 10 CFR Part 21, and a copy of QAP-08.03.02 per requirements of 10 CFR 21.6, "Posting Requirements." In addition, the inspectors verified for a sample of Clark POs, that Clark had implemented a program consistent with the requirements in 10 CFR 21.31, "Procurement Documents," by specifying the applicability of 10 CFR Part 21 in its POs for its basic components or services associated with the basic components.

c. Conclusions

The inspectors concluded that, with the exception of Violation 99901412/2012-201-01 for failure to include the requisite guidance for interim reports and the provision for notification of a director or responsible officer in its 10 CFR Part 21 procedure, Clark appropriately translated the requirements of 10 CFR Part 21 into implementing procedures and, for those activities reviewed by the team, implemented them as required.

2. Training and Qualification of Personnel

a. Inspection Scope

The inspectors reviewed Clark's policies and procedures to verify that Clark was implementing training activities in a manner consistent with regulatory requirements and industry standards. The inspectors reviewed the personnel training and qualification process and the training and qualification records of five test personnel to verify conformance with the requirements in Criterion II, "Quality Assurance Program," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." In addition, the inspectors discussed the personnel training and qualification process with Clark management and technical staff. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

The inspectors verified that training programs had been established and implemented for the indoctrination and training of personnel performing activities affecting quality, including testing personnel, engineers, and quality assurance personnel to assure that proficiency was achieved and maintained. QAP-06.02.01, "Qualification and Training Procedure," Revision 9, dated March 1, 2012, describes how Clark trains its employees so that they have sufficient training and skills for consistent job and task performance.

Test personnel are certified based on the Clark dynamics test manager's evaluation of the test personnel's education and experience, on-the-job training, proficiency and capability to perform instrument calibration. The final certification of test personnel is

reviewed and approved by the Clark dynamics test manager and the QA manager and documented in the qualification and training record file, and in the Dynamics Personnel Qualification Matrix. For a sample of five test personnel, the inspectors verified that qualification records documented on-the-job training, education, experience and any certifications required by industry and contract requirements. The training of test facility personnel was conducted and documented to familiarize personnel with facility hardware and software, equipment operation, test plans and procedures, and test specifications. The sample of qualification records reviewed were periodically evaluated, reviewed, and approved by Clark management in accordance with QA program requirements.

c. Conclusions

The inspectors concluded that Clark's program requirements for training and qualification of personnel are consistent with the requirements of Criterion II of Appendix B to 10 CFR Part 50. The inspectors also concluded that Clark's quality assurance manual and associated training and qualification procedures were adequate and effectively implemented. No findings of significance were identified.

3. Oversight of Contracted Activities

a. Inspection Scope

The inspectors reviewed the Clark policies and implementing procedures that govern procurement document control and control of purchased material, equipment, and services to verify compliance with Criterion IV, "Procurement Document Control," and Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50, respectively. The inspectors reviewed the approved suppliers list (ASL), a sample of eight POs for safety-related services, the associated external audit reports, and the supplier evaluations to verify proper implementation of the Clark procurement program. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

b.1 Procurement Document Control

QAP 07.04.01, "Purchasing Procedure," Revision 2, dated October 13, 2010, establishes provisions for the control of documents for the procurement of nuclear safety-related items, materials, and services and the requirements to ensure that purchased material, equipment, and services conform to procurement documentation. For a sample of eight Pos, the inspectors verified that the POs specified quality requirements, including technical, administrative, regulatory, and reporting requirements, and that the supplier uses a documented QA program that is implemented and meets the applicable regulatory requirements. For the three safety-related POs issued to Tobalski/Watkins, Assurance Technical Services, and Steris Isomedix, the inspectors found that Clark appropriately implemented its program in accordance with its QA program and applicable regulations.

The inspectors noted that Section 5.2, "Supplier Selection," of QAP 07.04.01 does not require suppliers of domestic calibration services to be evaluated before acceptance of material, equipment, or services. In addition, Section 5.6, "Domestic Calibration

Suppliers,” of QAP 07.04.01 states that the procurement documents for domestic calibration laboratories are not required to impose a quality assurance program consistent with the quality assurance program requirements for nuclear facilities, and that accreditation by nationally accepted accreditation bodies recognized by the National Voluntary Laboratory Accreditation Program (NVLAP) by a mutual recognition agreement may be used instead of source inspection, commercial grade survey, and/or audit.

The NRC staff has determined that NVLAP, the American Association for Laboratory Accreditation (A2LA), or any other accreditation provided by a domestic accrediting body may only be used as the basis for qualifying a commercial calibration laboratory as part of the commercial-grade dedication process when all of the requirements described in the Arizona Public Service Company (APS) safety evaluation report (Agencywide Documents Access and Management System (ADAMS) Accession No. ML052710224) are met. NVLAP and A2LA accreditation may not be used as the sole basis for qualifying safety-related calibration services.

Criterion III 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.”

Contrary to the Criterion III, as of March 23, 2012, Clark failed to review the suitability of the application of commercially calibrated measuring and test equipment for use in safety-related applications as part of a commercial-grade item dedication. Specifically, Clark issued two POs to Bruel and Kjaer, one PO to Cal-Tec, and two POs to Pre-Cal Services for commercial calibration services for M&TE that were subsequently used in safety-related applications, but failed to include the requirements to conform with 10 CFR Part 21 and Appendix B to 10 CFR Part 50 in the POs or to dedicate the calibration services.

Clark used M&TE calibrated by commercial calibration laboratories for both safety-related applications as well as to calibrate other M&TE that was used in safety-related applications without reviewing the suitability of its use as part of a formal commercial-grade dedication process. Even though the inspectors verified that Clark had met the conditions described in the APS safety evaluation report for using NVLAP or A2LA accreditation in lieu of commercial-grade surveys as part of a commercial-grade dedication process, Clark failed to perform technical evaluation to: identify all of the critical characteristics for the M&TE, identify the acceptance criteria, and define the verification methods, or document that the acceptance criteria had been met. Clark took immediate corrective action and opened CAR 000949 to address this issue. This issue is being tracked as Nonconformance 99901412/2012-201-04.

## **b.2 Control of Purchased Material, Equipment, and Services**

QAP-07.04.02, “Supplier Qualification Procedure,” Revision 7, dated March 12, 2012, describes the process of selecting and approving suppliers of material and subcontract services. The inspectors verified Clark’s ASL documented (1) the vendor name(2) the scope of qualification, (3) limitations and restrictions, if necessary, (4) the date that reapproval is due, and (5) the vendor’s quality program and any Clark established

controls, if applicable. In addition, the inspectors verified the listings from the ASL and cross-referenced the information with applicable audit reports.

The inspectors verified for a sample of five external audits of Assurance Technical Services, Cal-Tec, Kinetrics, Steris Isomedix, and Tobalski/Watkins that adequate controls had been established and implemented for the oversight of contracted activities. The inspectors confirmed that the audit reports contained a review of the relevant QA criteria in Appendix B to 10 CFR Part 50 for the activities performed by the individual suppliers, as well as documentation of pertinent supplier guidance associated with each criterion. The inspectors confirmed that the suppliers performing work for Clark were appropriately listed on the ASL, and that the scope of supply was documented and consistent for the activities contracted.

c. Conclusions

The inspectors concluded that, with the exception of Nonconformance 99901412/2012-201-04 for failure to dedicate commercial calibration services, the implementation of Clark's oversight of contracted activities was consistent with the regulatory requirements of Criteria IV and VII of Appendix B to 10 CFR Part 50 and the provisions of the Clark QAM and associated implementing procedures.

4. Test Control

a. Inspection Scope

The inspectors interviewed personnel and reviewed the policies and procedures that govern the implementation of the Clark process to verify compliance with Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The inspectors observed vibrational aging and seismic qualification test for the Limitorque HBC series worm gear actuators associated with ITAAC 2.2.01.05.ii, 2.2.02.05a.ii, 2.2.05.05a.ii, 2.3.02.05.ii, 2.3.07.05.ii, and 2.7.01.05.ii from Revision 19 of the AP1000 certified design, and reviewed documentation related to the test. The inspectors also observed the seismic qualification testing of IST LV Power and I&C Electrical Penetrations associated with ITAAC 2.2.01.05.ii from Revision 19 of the AP1000 certified design. The low voltage electrical penetration was manufactured by Kinetrics, Inc., for the Westinghouse AP1000 and reviewed completed test documentation for two similar qualification tests. The purpose of observing these test activities was to determine if the tests were conducted in accordance with written procedures, that the test procedures and test plans were consistent with the requirements in the customer specifications and the Clark QAM. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

b.1 Test Program

Westinghouse Electric Company developed the qualification testing program for the actuators and electrical penetrations. Westinghouse developed the test plans and test specifications and contracted directly with Clark for the testing of the actuators and with Kinetrics for the testing of the electrical penetrations. Kinetrics then subcontracted with Clark for the testing of the electrical penetrations. Clark is responsible for the seismic testing; however, all functional testing is performed by the customer. This

inspection focused on Clark's implementation of Westinghouse's test program, test plan, and test specifications for the seismic qualification of the actuator and electrical penetrations.

## b.2 Test Plan and Procedures

The inspectors discussed EL 10000, "Seismic Qualification Test Procedure for Westinghouse Electric Company Limitorque Actuators," Revision 0, dated March 8, 2012, with the Clark dynamic testing manager, QA manager, QA assistant, and test procedure preparer. The inspectors verified that the test procedure included the technical and quality requirements identified in the Westinghouse PO. The inspectors verified that the test procedure provided an adequate description of pre-testing, testing, and post-testing activities. The procedure included descriptions of the test objectives, quality assurance requirements, facility description and control, data acquisition and analysis, initial conditions, prerequisites, instructions, acceptance criteria, and post-test activities.

The seismic qualification testing for the low-voltage electrical penetration was performed to the Kinectrics' procedure K-403869-PSWI-0005, "Test Procedure for Qualification Testing of IST LV Power and I&C Electrical Penetrations," Revision 1, dated February 29, 2012. Clark did not develop or use any of its own procedures for this testing.

## b.3 Test Implementation

### Vibrational Aging of a Limitorque HBC Series Worm Gear Actuator with a 12-Inch Hand Wheel

The inspectors observed the test setup and vibrational aging of a Limitorque HBC series worm gear actuator with a 12-inch hand wheel. During the observation, 90 minutes of vibration was applied along each orthogonal axis of the test specimen, and the results were recorded in the test logbook. The inspectors confirmed that the following testing elements were satisfied, verified, and recorded, as appropriate: a) test parameters and initial conditions, b) test acceptance criteria, c) test prerequisites, d) environmental conditions, e) test anomalies and their disposition, f) test instrument range, accuracy, and uncertainty appropriate for the test, g) current calibration, and h) proper procedure sequence followed and deviations evaluated and documented. While Clark generally satisfied the above test elements, the inspectors identified an issue with respect to the test instrument range, accuracy, and uncertainty being appropriate for the test.

Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50 states, in part, that the "test procedures shall include provisions for assuring that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions."

Subsection 2.3.5, "Instrumentation," of EL:10000 test procedure states, in part, that accelerometers shall have a response of 1 Hz to 500 Hz as a minimum, and subsection 3.2, "Vibrational Aging," of the procedure states, in part, that "the test specimen shall be vibration aged... with a frequency sweeping from 5 Hz to 100 Hz to 5 Hz...."

Contrary to the above, as of March 23, 2012, Clark used accelerometers for the vibrational aging of the Limitorque HBC series worm gear actuator that were not calibrated over the entire range for which they were used. The inspectors noted that three accelerometers—McBee No's 3966, 3761, and 4064—were listed in the test logbook for the Limitorque HBC series worm gear actuator that underwent vibrational aging tested under Clark test number ANT: 5445 on March 20 and 21, 2012. These three accelerometers were calibrated over the 25 to 500 Hz frequency range and used during the vibrational aging test for frequencies ranging from 5 Hz to 100 Hz.

According to Institute of Electrical and Electronics Engineers (IEEE) Standard 344, the purpose of the vibrational aging is to show that the lower levels of normal and transient vibration, associated with plant operation and the OBE will neither adversely affect an equipment's performance of its safety function nor cause any condition to exist that, if undetected, would cause failure of such performance during a subsequent SSE. By using the accelerometers outside of their calibrated range, Clark cannot assure that the vibrational aging produced the equivalent fatigue effects of specified in plant vibration resulting from normal and transient plant operating conditions.

This issue was discussed with the Clark dynamics test manager and the QA manager, who took immediate corrective action and initiated a CAR 000956 to address the issue. The inspectors issued Nonconformance 99901412/2012-201-04 for Clark's failure to ensure that adequate test instrumentation was used during the vibrational aging of the Limitorque HBC series worm gear actuator.

#### Seismic Qualification Testing of a Limitorque HBC Series Worm Gear Actuator with a 12-Inch Hand Wheel

The inspectors also witnessed portions of the seismic qualification of a Limitorque HBC series worm gear actuator with a 12-inch hand wheel that was associated with ITAAC 2.2.01.05.ii, 2.2.02.05a.ii, 2.2.05.05a.ii, 2.3.02.05.ii, 2.3.07.05.ii, and 2.7.01.05.ii from Revision 19 of the AP1000 certified design. The inspectors observed a resonance search performed on each orthogonal axis and OBE testing. The OBE vibratory motion was simulated by exposing the test specimen to three sinusoidal sweeps of required input motion at the levels described in EL 10000 in each of three orthogonal axes. Of the two OBE sweeps performed, one was performed with the actuator in the closed position and one with the actuator in the open position.

The inspectors also observed portions of the SSE sine beat testing for line mounted applications. This was demonstrated by exposing the actuator to a series of single frequency sine beat tests at each test frequency and any resonance frequency of the test specimen that is less than 100 Hz. The testing was performed in accordance with the minimum peak acceleration values provided in EL 10000 test procedure.

The inspectors verified that the test data and results were recorded and that the testing followed EL 10000 and met the requirements of IEEE Standard 328 for qualification of safety-related actuators for nuclear power generating stations.

Criterion VI, "Document Control," of Appendix B to 10 CFR Part 50 states that "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.”

QAP 04.02.03, “Document Control Procedure,” Revision 4, dated January 3, 2010, states, in part, that, “Hard copies of internal documents may be printed and used for the following: 1. [a]udits, 2. [r]eview for potential revision, [and] 3. [t]raining. Hard copies printed for any reason other than 1 through 3 above is prohibited. All printed copies are to be considered uncontrolled.”

Contrary to the above, as of March 23, 2012, Clark failed to control the issuance of documents that prescribe activities affecting quality and failed to ensure that those documents are distributed to and used at the location where the prescribed activity is performed. While performing the seismic qualification portion of EL 10000 test procedure, the inspectors determined that Clark personnel were using an uncontrolled work instruction. Clark had a controlled version, but it was not located in the room from which the test was controlled. Clark personnel had recorded the required frequencies and accelerations from the test procedure on a separate uncontrolled document. Clark testing personnel were then using this uncontrolled version of the procedure to run a portion of the seismic qualification test for the actuator. When the inspectors questioned the use of this procedure, Clark personnel retrieved the controlled version of the procedure. The inspectors determined that the uncontrolled version of the procedure did contain the same frequencies and accelerations as the controlled version and would not have adversely affected the testing. Clark took immediate corrective action and issued CAR 000955 to address the use of uncontrolled procedures and work instructions. The inspectors identified this issue as an example of Nonconformance 99901412/2012-201-06.

#### Seismic Qualification Testing of an IST LV Power and I&C Electrical Penetration

The inspectors observed the test setup for the seismic qualification testing of an IST LV power and I&C electrical penetration and witnessed the resonance search in three orthogonal directions, the five OBE tests, and the SSE test. These seismic qualification tests are associated with ITAAC 2.2.01.05.ii from Revision 19 of the AP1000 certified design. The inspectors discussed the testing with the Kinectrics senior scientist and confirmed that the tests were completed in accordance with the Kinectrics test procedure, K-403869-PSWI-0005, and generally met the requirements of IEEE Standard 344 for seismic qualification of equipment for nuclear power generating stations. However, while observing the test setup, the inspectors identified that Clark was using uncalibrated torque wrenches during the specimen mounting.

Criterion XI, “Test Control,” states, in part, that the “test procedures shall include provisions for assuring that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions.”

Contrary to the above as of March 23, 2012, Clark failed to ensure that adequate test instrumentation was used in safety-related testing. As described in example of Nonconformance 99901412/2012-201-03 and subsection 5.b of this report, Clark used a torque calibrator to calibrate torque wrenches that was not able to calibrate the torque wrenches within the required tolerances. Therefore, the calibration status of all of Clark’s torque wrenches was in question. The inspectors observed that these torque



wrenches were used to mount specimens for safety-related testing, including the seismic testing of the LV-1 low voltage electrical penetration and the vibrational aging of the manual Limitorque actuator. Under-torquing the bolts on the specimen mounting could increase specimen vibration, which could change the specimen's resonance frequency. Over-torquing the bolts on the specimen mounting could create deformation.

Clark took immediate corrective action and opened CAR 000956 to address the use of M&TE outside of its calibrated range. Clark also sent all of its torque wrenches to an Appendix B calibration laboratory to determine the as-found calibration status of the torque wrenches and will determine where the wrenches were used and the effect on those tests. Clark continued the seismic testing of the Limitorque actuator test by retorquing all of the bolts with the customer's torque wrenches that were controlled in the customer's M&TE program. The inspectors identified this as an example of Nonconformance 99901412/2012-201-02.

#### Completed Qualification Testing of an IST LV and an IST MV Power and I&C Electrical Penetration

The inspectors reviewed completed test logbooks for the seismic testing of the MV-1 medium voltage and previously performed LV-1 low voltage electrical penetrations for Kinetrics PO that did not require Clark to generate a test report. Instead, Clark was required to submit its logbook so that Kinetrics could develop the test report. The inspectors verified that the following testing elements were satisfied, verified, and recorded, as appropriate: a) test parameters and initial conditions, b) test acceptance criteria, c) test prerequisites, d) environmental conditions, e) test anomalies and their disposition, f) test instrument range, accuracy, and uncertainty appropriate for the test, g) current calibration, and h) proper procedure sequence followed and deviations evaluated and documented. The inspectors determined that, with two exceptions, Clark was generally satisfying, verifying, and recording the above testing elements.

Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50 states, in part, that, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

Section 7, "Documentation Hierarchy," of the Clark QAM states, in part, that activities affecting quality of products and services are prescribed by and performed in accordance with documented processes, instructions, procedures, or drawings that include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed results have been satisfactorily attained. It further states that the activity is described to a level of detail commensurate with the complexity of the activity and the need to assure consistent and acceptable results.

Section 4.2 "Test Instrument Lists" of Test Procedure K-403869-PSWI-001, "Test Procedure for Qualification Testing of IST Medium Voltage Power Electrical Penetrations," Revision 7, dated June 29, 2011, and Test Procedure K-403869-PSWI-002, "Test Procedure for Qualification Testing of IST Low Voltage Power Electrical Penetrations," Revision 7, dated June 29, 2011, states, in part, "Immediately prior to each test, a test equipment list shall be completed listing all instrumentation used in the test to obtain quantitative measurement including any that require field calibration for the specific function they monitor."

Contrary to the above, as of March 23, 2012, Clark failed to appropriately document M&TE used during the seismic qualification testing of the MV-1 medium voltage and LV-1 low voltage electrical penetration. Clark took immediate corrective action and initiated CAR 000952 to address this issue. The inspectors identified this issue as an example of Nonconformance 99901412/2012-201-05.

#### b.4 Test Results and Data Reduction

The inspectors verified that Clark was implementing suitable QA requirements in the data collection process and had established process and functional responsibilities for effective evaluation of test results. The inspectors reviewed Clark's controls applicable to log taking and data acquisition software to assess the completeness of the requirements with regard to traceable, verifiable data and with regard to documenting the accuracy of instruments used to collect data.

Clark uses data acquisition software developed by Vibration Research Corporation to generate the vibration signals, control the seismic qualification testing, and collect response data. The inspectors verified that the software reduces test data to a format that facilitates qualification of the components under test. The inspectors discussed the design, modification, and programming of the data acquisition software with the Clark dynamics test manager. The test manager explained that the software was developed by Vibration Research Corporation, which performed the validation and verification (V&V) of the software. Clark reviewed and approved the V&V report and performs annual calibration and verification of the software and hardware combination using simulated inputs. An electronics technician explained how the seismic qualification testing is accomplished within a given required response spectra using computer software and using the seismic qualification testing of the LV-1 low voltage electrical penetration as an example to demonstrate various seismic qualification steps and presentations of the test data and results.

Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50 states, in part, that, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

Section 7, "Documentation Hierarchy," of the Clark QAM states, in part, that activities affecting quality of products and services are prescribed by and performed in accordance with documented processes, instructions, procedures, or drawings that include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed results have been satisfactorily attained. It further states that the activity is described to a level of detail commensurate with the complexity of the activity and the need to assure consistent and acceptable results.

Contrary to the above, as of March 23, 2012, Clark failed to develop a procedure that prescribes which information is required to be included in the logbook for testing. The inspectors identified that Clark uses a test logbook for each test to record the identification, description, and quantity of test specimens, test setup and interfaces, list of all measuring equipment used and calibration dates, test data and results, and test deviations and anomalies. The logbook is also used to identify test deficiencies and to record the corrective actions and their review and completion, and to document

evaluations and their review and approval by responsible test engineers and management. However, the inspectors identified that Clark does not have a documented procedure that describes this process. As described in Nonconformance 99901412/2012-201-05 for Clark's failure to document M&TE used during seismic qualification testing activities and in subsection 4.b.3, "Completed Qualification Testing of an IST LV and an IST MV Power and I&C Electrical Penetration," of this report, the inspectors identified instances in which the required information was not recorded in the logbooks. Clark took immediate corrective action and initiated CAR 000952 to address the lack of a documented procedure specifying minimum requirements regarding the contents of logbooks. The inspectors identified this issue as an example of Nonconformance 99901412/2012-201-05.

#### **b.5 Test Reports**

For a sample of six completed test reports, the inspectors verified that the test reports met the requirements of IEEE Standard 344 and clearly identified the equipment and components tested, stated the test objective, defined the test procedure, provided a clear statement of test results, listed acceptance criteria, provided relevant test data, identified test anomalies and their disposition, and, where appropriate, stated conclusions drawn from the test. In addition, the inspectors verified that the test reports included a description of the test facilities and provided appropriate documentation of all test instrumentation.

#### **c. Conclusions**

The inspectors concluded that the implementation of the Clark program for test control was not consistent with the regulatory requirements of Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The inspectors identified Nonconformance 99901412/2012-201-02 for failure to ensure that adequate test instrumentation was used during the vibrational aging of the Limitorque HBC series worm gear actuator and the seismic testing of the LV-1 low voltage electrical penetration, Nonconformance 99901412/2012-201-06 for the failure to control the use of uncontrolled procedures and work instructions during calibration and seismic testing, and Nonconformance 99901412/2012-201-05 for failure to follow procedures and record equipment data, and the failure to develop a procedure for specifying minimum requirements regarding the contents of logbooks.

### **5. Control of Measuring and Test Equipment**

#### **a. Inspection Scope**

The inspectors reviewed the policies and procedures governing the implementation of the Clark process for control of M&TE to verify compliance with Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. The inspectors performed a walk down of the test facility and M&TE storage locations, selected a sample of M&TE from the test facility observed during the test activities and interviewed the calibration technician to verify that M&TE was properly identified, properly stored in a controlled environment, and periodically calibrated using traceable national standards. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

Section 9.2, "Measuring Equipment Calibration," of the Clark QAM establishes requirements and assigns responsibilities for the control of M&TE. The program ensures that tools, gauges, instruments, M&TE, as well as devices used in activities affecting quality, are of the proper range, type, and accuracy to verify conformance to established requirements. To ensure accuracy, the M&TE shall be controlled, calibrated, adjusted, and maintained at prescribed intervals, or before use, against certified equipment having known relationships to nationally recognized standards. If no national standards exist, the basis for calibration shall be documented. Out-of-tolerance equipment provisions include documentation and evaluation of the validity of previous inspection or test results and of the acceptability of items previously inspected or tested.

The inspectors verified that QAP 07.06.01, "Clark Testing Group Calibration Procedure," Revision 2, dated July 21, 2010, contains adequate requirements for the control, calibration, storage, and handling of M&TE. The inspectors also determined that all calibration certificates reviewed document the National Institute of Standards and Technology calibration standards used to support the calibration as required by QAP 07.06.01. The inspectors verified that most M&TE used during the observed vibration aging and seismic testing were adequately labeled with clear identification numbers, calibration dates, and calibration due dates. The lone exception was a noncalibrated pressure gauge installed on the LV-1 electrical penetration. The inspectors questioned the use of this gauge, and Clark removed it and replaced it with a calibrated pressure gauge before testing.

The inspectors reviewed Clark's process of controlling out-of-calibration M&TE by selecting a sample of three M&TE that were segregated and identified as rejects and verifying Clark's M&TE database on how these M&TE were controlled. Based on review of Clark's M&TE and an interview with the calibration technician, the inspectors determined that Clark's implementation of its out-of-calibration M&TE was effective.

Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50 states that "measures shall be established to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits."

ISL Work Instruction Number 1816, "Calibration of Torque Calibrators/Torque Wrenches, Universal," Revision 4, dated June 30, 2010, required torque wrench McBee Nos. 4085 and 4091 to be calibrated with a tolerance of +/- 3 percent over a range of 20-100 ft-lbs and 100-600 ft-lbs, respectively.

Contrary to the above, as of March 23, 2012, Clark failed to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality were properly calibrated. Clark used a torque calibrator to calibrate torque wrenches (McBee Nos. 4085 and 4091) with a range from 0 ft-lbs to 600 ft-lbs and was marked in increments of 10 ft-lbs. The inspectors determined that the torque calibrator used for calibrating torque wrenches could not be read accurately to the tolerance required by the procedures. In addition, the inspectors observed that torque wrench McBee No. 4091 had a special calibration tag on it that required that 30 ft-lbs be subtracted from the setpoint. Clark ISL Work Instruction No. 1816, used for calibrating the torque wrench did

not specify this special calibration requirement, and that the calibration technician stated that they did follow this instruction. In addition, the Clark calibration technician did not know if the special calibration requirement was appropriate over the entire range of the torque wrench calibration. Clark took immediate corrective action and opened CAR 000954. The inspectors identified these two issues as Nonconformance 99901412/2012-201-03.

Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50 states that, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

Clark ISL Work Instruction Number 2575, "Calibration of Stopwatches and Other Elapsed Time Indicators," Revision 4, dated February 1, 2012, directed Clark to determine the amount of time necessary to accurately measure the unit under test by using the manufacturer's stated accuracy of the timer and a formula given in the procedure, which Clark could not locate the manufacturer's documentation. The inspectors reviewed several completed calibration records for timers and identified that Clark was using various time periods for the calibration of its timing devices, none of which had been calculated in accordance with the calibration procedure and that Clark was using these timers for safety-related vibrational aging of the Limitorque actuator. The length of time for which the vibrational aging is performed dictates the amount of equivalent vibration fatigue to which the actuator is exposed.

Clark ISL Calibration Procedure 0766, "Calibration of Piezoelectric Accelerometers, Universal," Revision 4, dated June 30, 2010, provides step-by-step instructions on how to perform calibration of universal piezoelectric accelerometers. The procedure requires the calibration technician to repeat the procedure until the manufacturer's upper 5 percent limit of the accelerometer is reached and that a minimum of seven points are required to be recorded.

The inspectors selected a sample of three accelerometers with Clark's unique McBee No.'s 3966, 3761, and 4064 to verify that the accelerometers were properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits and were calibrated using standards traceable to nationally recognized standards. The inspectors observed that Clark did not follow its calibration procedure. Specifically, Clark calibrated and recorded only six data points instead of a minimum of seven points as required by Clark's ISL Calibration Procedure 0766, failed to document as-left calibration data, and used these accelerometers for the vibration aging of the Limitorque actuator. This issue is addressed in subsection 4.b.3, paragraph titled, "Seismic Qualification Testing of an IST LV Power and I&C Electrical Penetration," of this report and in Nonconformance 99901412/2012-201-02.

Section 5.5.2 of QAP 07.06.01, "Calibration Procedure," Revision 2, dated July 21, 2010, stated, in part, that, "Calibration shall be documented on form QAF.07.06.01." QAF.07.06.01 includes a provision for recording a pre- and post-calibration reading for all M&TE. The inspectors determined that the post-calibration information had not been recorded for the calibration of a wave form synthesizer, a weight handler, and several accelerometers, working weights, and torque wrenches. However, the inspectors did not identify any instances in which the pre-calibration reading was out of calibration. Clark took immediate corrective action and initiated CARs 000951 and 000953 to address the

failure to follow calibration procedures. The inspectors identified these issues as examples of Nonconformance 99901412/2012-201-05.

In addition to the issue of Clark not following its calibration procedures, as described in subsection 4.b.3, paragraph titled, "Seismic Qualification Testing of an IST LV Power and I&C Electrical Penetration," of this report and in Nonconformance 99901412/2012-201-06, the inspectors identified another example of Clark's failure to control its instruction, procedures and drawings.

During the inspection of Clark's calibration laboratory, the inspectors requested the calibration technician to provide a copy of the calibration procedure for torque wrenches. The inspectors were provided with a photocopy of Clark's ISL Work Instruction Number 1816," Revision 4, dated June 30, 2010. The inspectors reviewed the calibration procedure and compared the guidance and revision control against the Clark ISL Work Instruction Number 1816, Revision 4, dated February 1, 2012, controlled in Clark's document database. The inspectors observed that both calibration procedures had identical guidance but their revision dates were different. When the inspectors questioned the appropriateness of the uncontrolled procedure used in the calibration laboratory, Clark immediately removed the uncontrolled procedure from the calibration laboratory. Upon further review, the inspectors identified additional examples of uncontrolled procedures in the calibration laboratory. Clark took immediate corrective action and initiated CAR 000955 to address the failure to prevent the use of uncontrolled procedures. The inspectors identified this issue as an example of Nonconformance 99901412/2012-201-06.

c. Conclusions

The inspectors concluded that the implementation of the Clark program for control of M&TE was not consistent with the regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. The inspectors issued Nonconformance 99901412/2012-201-03 for Clark's failure to appropriately calibrate torque wrenches, Nonconformance 99901412/2012-201-05 for failure to follow calibration procedures, and Nonconformance 99901412/2012-201-06 for failure to prevent the distribution and use of uncontrolled procedures, respectively.

6. Nonconforming Materials, Parts, or Components and Corrective Actions

a. Inspection Scope

The inspectors reviewed the Clark policies and procedures that govern the control of nonconforming materials, parts, or 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, respectively. The inspectors reviewed a sample of CARs, and test deviations associated with the qualification testing to verify that Clark's implementation and control over nonconforming quality materials, parts, or components and corrective action were adequate. The attachment to this inspection report lists the documents reviewed by the inspectors.

b Observations and Findings

Sections 8.6, "Non-Conformances," and 8.13, "Corrective Actions," of the Clark QAM defines the processes for the identification and documentation of nonconformances and corrective actions. Clark's QAP-08.03.01, "Non-conformance Control," Revision 2 dated March 24, 2010, describes the requirements for identification, documentation, control, disposition, review, and approval of nonconforming materials and services. Section 5.2 of the procedure states that a Notice of Anomaly should be considered whenever there is: (1) any deviation of test specimen performance from the established requirements, (2) any deviation of test method from those designated by the customer, (3) any equipment or instrumentation malfunction, or (4) any condition that may influence the integrity of test data. In addition, the procedure describes the process of notifying customers and the NRC when a deviation or failure to comply associated with substantial safety hazard is discovered.

QAP-08.03.02, "Corrective Action Procedure," Revision 2, dated March 24, 2010, describes the roles and responsibilities for identifying and reviewing corrective actions, documentation, and disposition of deviations or failures to comply. The procedure describes the process for identifying, evaluating, reporting, and correcting nonconformances.

The inspectors discussed the nonconformance and corrective action programs with Clark's QA manager, and selected a sample of five CARs generated by Clark in 2011 and 2012. Upon review of selected CARs, the inspectors noted that even though the CARs were initiated only to correct actions resulting from internal and external audits and customer complaints, Clark's nonconformance and corrective action programs effectively captured the deficiencies. Each CAR reviewed included a detailed description of the nonconformance, justification for disposition of the condition that led to the nonconformance, corrective action to prevent further recurrence and documenting Clark's verification of implementation of corrective actions taken to assure its effectiveness prior to closing the CAR.

In addition, the inspectors reviewed Clark's process of documenting test deviation in its test program. Specifically, the inspectors reviewed the test logbooks and test report conformance statements for the five contracts listed below:

1. Contract No. 4500381288, test report No. ANT: 5249, "Seismic Test for the Westinghouse Electric Company Standard Single Safety Cabinet Configuration #1A Model #21812," dated November 10, 2011.
2. Contract No. 4500408913, test report No. ANT: 5442, "Seismic Test for the Westinghouse Electric Company Standard AP1000 RCP Switchgear," dated December 13, 2011.
3. Contract No. 4500418131, test report No. ANT: 5465, "Seismic Qualification Test for the Westinghouse Electric Company AP1000 In-Core Instrumentation System (IIS) Cable and Connector Assemblies," dated February 7, 2012.

4. Contract No. 10020223A, test report No. ANT: 5412, "Seismic Test for the FTI Redundant Power Supply and Input Isolation Relay Modifications to the Engineered Safeguards Loading Sequencer," dated December 2, 2011.
5. Contract No. 13193, test report No. ANT: 5480, "Seismic Qualification Test for Flanders/CSC Six (6) Fire Dampers and Sleeves," Revision 1, dated November 22, 2011.

The inspectors noted that each test logbook and test report conformance statement documented a list of customer-requested deviation from test procedures and customer approval. The inspectors did not identify any test anomalies that should have been entered into the nonconformance and corrective action programs.

c. Conclusions

The inspectors concluded that the implementation of the Clark programs for control of nonconforming material, parts, and components and corrective action are consistent with the regulatory requirements of Criteria XV and XVI of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and observation of ongoing testing activities at the Clark facility, the inspectors also determined that Clark is effectively implementing its QAM and the associated nonconformance and corrective action procedures. No findings of significance were identified.

7. Entrance and Exit Meetings

On March 19, 2012, the inspectors discussed the scope of the inspection with Mr. Timothy Barefoot, Clark's President, and with the Clark management and staff. On March 23, 2012, the inspectors presented the inspection results and observations during an exit meeting with Mr. Gary Felicetti, Clark's QA Manager, and other Clark staff. The attachment to this report lists the entrance and exit meeting attendees, as well as those interviewed by the inspectors.



## ATTACHMENT

### 1. ENTRANCE/EXIT MEETING ATTENDEES

<b>Name</b>	<b>Title</b>	<b>Affiliation</b>	<b>Entrance</b>	<b>Exit</b>	<b>Interviewed</b>
Samantha Crane	Inspection Team Lead	NRC/NRO	X	X	
Raju Patel	Inspector	NRC/NRO	X	X	
Jason Eargle	Inspector	NRC/R-II	X	X	
Pei-Ying Chen	Technical Specialist	NRC/NRO	X	X	
Tim Barefoot	President	Clark	X		
Gary Felicetti	QA Manager	Clark	X	X	X
Stephen Terney	Test Engineer	Clark	X	X	X
Kenneth Gaydos	QA Assistant	Clark	X	X	X
John R. Antenucci	Lab Manager	Clark	X	X	X
Brian Preisendorfer	IT Manager	Clark		X	
Maureen Fritz	Administrative Assistant	Clark	X	X	
Chantel Goldstrohm	VP Business Development/ Marketing	Clark	X		
Greg Deitt	Test Engineer	Clark	X		
Gene Shumar	EMC Engineer	Clark	X		
Toader Balan	S&M Engineer	Clark	X		
David Cuervo	EMC Engineer	Clark	X		
Stephen Garden	Test Engineer	Clark	X		
Timothy Moon	Lead Mechanical Technician	Clark			X
Nathan Peters	Technician	Clark			X
Dan Kelly	Technician	Clark			X
Mark Jacovino	Electrical Technician	Clark			X
Damon Nicodemus	Calibration Technician	Clark			X
Craig Kiefer	Mechanical Technician	Clark			X
Allen Gillot	Principal Engineer	Westinghouse			X
Aaron Hatok	Program Manager	Westinghouse			X
James Bloom	Equipment Qualification Engineer	Westinghouse			X
Ron Wessel	AP1000 Licensing	Westinghouse	X	X	X
Suresh Channarasppa	AP1000 Equipment Qualification	Westinghouse		X	
Phil Dale	Lead Engineer	Kinectrics			X

### 2. INSPECTION PROCEDURES USED

Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors"

IP 36100, "Inspection of 10 CFR Parts 21 and Programs for Reporting Defects and Noncompliance"

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

The following items were found during this inspection:

<u>Item Number</u>	<u>Status</u>	<u>Type</u>	<u>Description</u>
99901412/2012-201-01	Open	NOV	10 CFR 21.21
99901412/2012-201-02	Open	NON	Criterion XI
99901412/2012-201-03	Open	NON	Criterion XII
99901412/2012-201-04	Open	NON	Criterion III
99901412/2012-201-05	Open	NON	Criterion V
99901412/2012-201-06	Open	NON	Criterion VI

4. DOCUMENTS REVIEWED

- APP-GW-G8-036, Appendix 1.1 AP1000 Level 1 General Terms And Conditions, Revision 1, dated February 15, 2010
- APP-PV11-VPH-001, AP1000 Test Plan 60-Year Qualification Of Limitorque HBC Worm Gear Operators, Revision 0, dated May 2011
- Approved Suppliers List, dated March 19, 2012
- Audit of Assurance Technical Services, Inc., dated July 6, 2011
- Audit of Cal-Tec, dated March 9, 2012
- Audit of Kinetrics, dated August 20, 2010
- Audit of Steris Isomedix on September 21, 2010
- Audit of Tobalski/Watkins, dated October 5, 2010
- Audit of Vibration Research, dated February 28, 2012
- Bruel & Kjaer Certificate of Calibration No. 1-247504379-301, for Clark's master accelerometer McBee 0581, serial No. 858643, dated March 16, 2011
- Bulletin 210, Skidmore-Wilhelm Torque Wrench Calibrator Vendor Information
- Corrective Action Request No. 000940, Audit Observation–External, dated March 02, 2012
- Calibration Certificate No. 1-2475044379-301 for Instrument No. 0581, dated March 2, 2011
- Calibration Certificate No. NA2585-726-031612 for Instrument No. 3082, dated March 15, 2012
- CAR No. 000883, Nonconformance – Internal, dated April 19, 2011
- Clark "Equipment List," for Test Report No. ANT: 5445, dated March 19, 2012
- Clark Internal Audit Report, dated January 24-25, 2012
- Clark "Master List of Records," updated March 6, 2012
- Clark Testing Group Internal Audit, dated January 24-25, 2012
- Contract No. 10020223A, test report No. ANT:5412, "Seismic Test for the FTI Redundant Power Supply and Input Isolation Relay Modifications to the Engineered Safeguards Loading Sequencer," dated December 2, 2011
- Contract No. 13193, test report No. ANT: 5480, "Seismic Qualification Test for Flanders/CSC Six (6) Fire Dampers and Sleeves," Revision 1, dated November 22, 2011
- Contract No. 4500381288, test report No. ANT:5249, "Seismic Test for the Westinghouse Electric Company Standard Single Safety Cabinet Configuration #1A Model #21812," dated November 10, 2011

- Contract No. 4500408913, test report No. ANT:5442, "Seismic Test for the Westinghouse Electric Company Standard AP1000 RCP Switchgear," dated December 13, 2011
- Contract No. 4500418131, test report No. ANT:5465, "Seismic Qualification Test for the Westinghouse Electric Company AP1000 In-Core Instrumentation System (IIS) Cable and Connector Assemblies," dated February 7, 2012
- Dynamics Personnel Qualification Matrix, dated March 14, 2012
- EL 9777, ANT 5153 Logbook For LV1, dated March 11, 2011
- EL 9778, T5153 Logbook For MV1, dated April 11, 2011
- EL:10000, "Seismic Qualification Test Procedure for Westinghouse Electric Company Limitorque Actuators," Revision 0, dated March 8, 2012
- EL 10000, Seismic Qualification Test Procedure for Westinghouse Electric Company Limitorque Actuators, Revision 1, dated March 12, 2012
- ISL Work Instruction Number 0766, "Calibration of Piezoelectric Accelerometers, Universal," Revision 4, dated June 30, 2010
- ISL Work Instruction Number 1816, "Calibration of Torque Calibrators/Torque Wrenches, Universal," Revision 4, dated February 1, 2012
- ISL Work Instruction Number 1816, "Calibration of Torque Calibrators/Torque Wrenches, Universal," Revision 4, dated June 30, 2010
- ISL Procedure 1816, Calibration Procedure For Torque Wrench 4085, Revision 4, completed March 3, 2012
- ISL Procedure 1816, Calibration Procedure For Torque Wrench 4091, Revision 4, completed March 20, 2012
- ISL Work Instruction Number 2575, Calibration of Stopwatches and Other Elapsed Time Indicators, Revision 4, dated February 1, 2012
- ISL Procedure 2575, Calibration Procedure For Timer 0682, Revision 0, completed May 5, 2011
- ISL Procedure 2575, Calibration Procedure For Timer 0686, Revision 0, completed May 5, 2011
- ISL Procedure 2864, Calibration Procedure For Weight Hanger 1117, Revision 2, completed January 7, 2010
- ISL Procedure 2864, Calibration Procedure For Working Weight 2887, Revision 0, completed May 5, 2011
- ISL Procedure 2864, Calibration Procedure For Working Weight 2882, Revision 0, completed May 6, 2011
- ISL Procedure 2864, Calibration Procedure For Working Weight 2884, Revision 0, completed February 15, 2012
- ISL Procedure 2864, Calibration Procedure For Working Weight 2858, Revision 0, completed May 5, 2011
- ISL Procedure 2864, Calibration Procedure For Working Weight 2478, Revision 0, completed May 5, 2012
- ISL Working Instruction No. 3534, "Calibration of Piezoelectric Accelerometers ENDEVCO 2262-X and KULITE GAD 813-X, Revision 4, dated February 1, 2012
- ISL Work Instruction Number 4270, Calibration Of National Instruments (9234 Module), Revision 0, dated February 1, 2012
- K-403869-PSWI-0005, "Test Procedure for Qualification Testing of IST LV Power and I&C Electrical Penetrations," Revision 1, dated February 29, 2012
- K-403869-PSWI-001, "Test Procedure for Qualification Testing of IST Medium Voltage Power Electrical Penetrations," Revision 7, dated June 29, 2011

- K-403869-PSWI-002, "Test Procedure for Qualification Testing of IST Low Voltage Power Electrical Penetrations," Revision 7, dated June 29, 2011
- PO 10070DYN to Tobolski /Watkins for engineering services, dated October 8, 2010
- PO 100917DYN to Pre-Cal Services for Calibration Services, dated December 16, 20
- PO 110173YA to Pre-Cal Services for Calibration Services, dated February 11, 2011
- PO 110194DYN to Bruel and Kjaer for Calibration Services, dated February 19, 2011
- PO 110622CTS to Bruel and Kjaer for Calibration Services, dated July 11, 2011
- PO 110857DYN Revision 1 to Assurance Technical Services, Inc., dated December 6, 2011
- PO 120206DYN to Cal-Tec for Calibration Services, dated March 15, 2012
- PO to Steris Isomedix for Irradiation Services, dated August 11, 2010
- QAM-1, "Dynamics Quality Manual," QAM-1, Revision 4, dated January 28, 2011
- QAM-1, Section 8.5, "Purchasing," Revision 4, dated January 28, 2011
- QAP-04.02.04- Records Management Procedure, Revision 6, dated March 6, 2012
- QAP 07.04.01, "Purchasing Procedure," Revision 2, dated October 13, 2010
- QAP 07.04.02, "Supplier Qualification Procedure," Revision 7, dated March 1, 2012
- QAP 07.06.01, Clark Testing Group Calibration Procedure, Revision 2, dated July 21, 2010
- QAP 06.02.01, "Qualification and Training Procedure," Revision 9, dated March 1, 2012
- QAP-08.03.01- Non-Conformance Control, Revision 2, dated March 24, 2010
- QAP-08.03.02- Reporting of Defects and Non-compliance to the NRC, Revision 0, dated July 26, 2010
- QAP-08.05.02- Corrective Action Procedure, Revision 2, dated March 24, 2010
- QAP-08.05.03- Preventive Action Procedure, Revision 1, dated July 1, 2009
- Supplier Evaluation for Process Instruments, dated November 22, 2011
- Test Report for the Seismic Test for the Westinghouse Electric Company Standard Single Safety Cabinet Configuration #1A Model # 21812